KNOWLEDGE SHARING AND KNOWLEDGE INTERACTION PROCESSES WITHIN BULGARIAN FIRMS

by

Boyka Simeonova

School of Management

Royal Holloway, University of London

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DECLARATION OF AUTHORSHIP

I Boyka Simeonova hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Boyka Simeonova

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ABSTRACT

This study challenges existing theories of knowledge sharing that view knowledge as a commodity or possession that can be passed around from one person or place to another and assumes that knowledge sharing is a one-way process. This study develops the concept of 'knowledge interactions' to reflect the dynamic nature of knowledge with an emphasis on collective action. Knowledge interactions are defined as collective interactions based on spontaneity, intuition and showing each other how things are done in practice.

The aim of this research is to explore and explain how people interact and share knowledge in Bulgarian firms in an attempt to help them become more competitive and innovative. A critical realism paradigm and a mixed methods approach are adopted to guide this study. To start with, a thorough literature review is conducted, followed by semi-structured interviews with key executives and employees in Bulgarian firms. This enables the factors influencing knowledge sharing and knowledge interactions to be identified. These are: organisational culture/climate, transactive memory systems, informal networks, power relations, trust in peers and trust in management. Subsequently, a new theoretical model is developed, the Organisational Knowledge Sharing and Interactions Model, informed by activity theory and critical realism to help explain how the identified factors are related and how they affect knowledge sharing and knowledge interactions. The model is then tested using Partial Least Squares analysis. The key finding of this study is the distinction that can be made between knowledge sharing and knowledge interaction processes based on the different effects the previously identified factors have on these two processes. While transactive memory systems are found to be a key driver for both knowledge sharing and knowledge interactions, knowledge sharing is strongly affected by power relations, but knowledge interactions are significantly influenced by informal networks.

The main contribution of this study is theoretical through the development of a new concept and a new theoretical model. This model has been tested empirically with Bulgarian firms. The theoretical implications based on this study and the findings highlight the importance of knowledge interaction processes, and shed light on the significant positive effect of informal networks on knowledge interactions and emphasise the value of developing transactive memory systems. The practical implications of this research draw managers' attention to the heterogeneity of knowledge processes within organisations and the need to harness these processes. It further invites them to acknowledge the unfavourable effects of power relations in order to mitigate them and to recognise the benefits of informal networks and transactive memory systems in order to nurture them.

ACKNOWLEDGEMENTS

LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CoPs	Communities of Practice
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
EU	European Union
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IS	Information Systems
IT	Information Technology
KI	Knowledge Interactions
KM	Knowledge Management
KMS	Knowledge Management Systems
KS	Knowledge Sharing
MANOVA	Multivariate Analysis of Variance
PLS	Partial Least Squares
R&D	Research and Development
SEM	Structural Equation Modelling
SIC	Standard Industrial Classification
TMS	Transactive Memory Systems
UK	United Kingdom
US	United States
VIF	Variance Inflation Factor
ZPD	Zone of Proximal Development

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1 INTRODUCTION

1.1 Background to Study

Knowledge is recognised as a key dimension in organisations (Alvesson, 2004). It is widely acknowledged that many economies are moving from being market-oriented to being knowledge-intensive as "the foundation of industrial economies has shifted from natural resources to intellectual assets" (Hansen et al., 1999, p. 106). Industry has shifted its focus from being capital-intensive to being information-intensive and is presently moving towards being innovation and knowledge-intensive. Examples of such industries include fields such as management consultancy and software development (Alvesson, 2004; Newell et al., 2009). In such knowledge-based economies organisations strive to achieve organisational growth, competitive advantage and innovation. Innovation within organisations is a result of learning processes when people within the organisation engage in active knowledge sharing (Easterby-Smith et al., 2008; Van Wijk et al., 2008). This places knowledge sharing as an important process within organisations and as a very important aspect of the knowledge economy, as knowledge is recognised to be the driving force of competitive advantage (Grant, 1996).

Bulgaria has experienced a turbulent change to its economy during the transition from being a central planned economy to a market economy. Bulgaria is currently aiming to become a knowledge economy, as stated in the Lisbon Treaty (European Parliament, 2000). A knowledge economy is described as an "economy driven by knowledge intangibles rather than physical capital, natural resources or low-skilled labour" (Jashapara, 2011, p. 9). However, while knowledge sharing processes have been the focus of investigation in developed economies, such processes are less clear in a transitional economy such as Bulgaria. This provides an opportunity to investigate how Bulgarian organisations can benefit from the experiences of other economies where such processes have been well-documented. It is important to explore how Bulgarian organisations can learn from existing practices in other

countries and to what extent these are relevant and applicable to the developing Bulgarian context. This next section is devoted to introducing the new context.

Through recognising the importance of organisational knowledge and the need for Bulgarian organisations to become more knowledge-intensive, this study aims to investigate knowledge processes within Bulgarian private organisations. This investigation aims to shed light on how people interact and share knowledge and what factors affect knowledge sharing and interaction processes within Bulgarian organisations.

1.2   The Bulgarian Context

Bulgaria is a small country (111 910 km²) situated in the eastern Balkans bordering Romania to the north, Turkey and Greece to the south, Macedonia and Serbia to the west and the Black Sea to the east. The population of Bulgaria is 7.305 million (World Bank, 2013a). Bulgaria is a post-communist transition economy and one of the newest European Union (EU) member states. It joined the EU on 1st January 2007. According to the World Bank "Bulgaria has come a long way from its turbulent political and economic transition in the 1990s to becoming a member of the European Union in January 2007" (World Bank, 2013b). However this transition has been "slow and painful" and it still has a long way to go (BBC, 2014).

The period after the fall of the Communist regime in Bulgaria was marked by three transition phases: pre-1997, post-1997, and the accession to the EU in 2007. The pre-1997 phase of the Bulgarian economy was characterised by stagnation, great loss of external market, high inflation, great financial problems, political instability and high levels of unemployment (from 0% to 21.4% in 1993) (World Bank, 2012a; NSI, 2014c). The economic problems escalated further when in 1997 Bulgaria underwent a deep financial crisis and hyperinflation of over 300% (Velinska, 2010).

The post-1997 phase was marked by a gradual improvement in economic and political stability and by mass privatisation. The private sector started emerging and developing in that period. Business experienced a turbulent change as a result of the redistribution of the workforce from being predominantly employed in agriculture (80%) to being predominantly employed in the service sector (60%) (CIA, 2013). This major shift in the economy and the

types of employment presented challenges such as lack of entrepreneurial skills, high levels of bureaucracy, lack of business culture and obsolete infrastructure (Bourdeau-Lepage and Kolarova, 2008).

The last period in Bulgaria's transition was marked by joining the EU which provided "free movement of people, goods, services and capital" (European Commission, 2014a, p. 1). This posed a set of challenges to the Bulgarian economy in the form of what the Lisbon Treaty has set as an objective for the European Union "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth, with more and better jobs and greater social cohesion, and respect for the environment" (European Parliament, 2000, p. 2). The achievement of the goals set by the EU became even more difficult as a result of the deep global financial crisis and economic recession in 2008. In relation to overcoming the crisis the new "EU 2020" Strategy is even more assertive that

> The exit from the crisis should be the point of entry into a new sustainable social market economy, a smarter, greener economy, where our prosperity will come from innovation and from using resources better, and where the key input will be knowledge (European Commission, 2009, p. 2).

The key priorities as set by the European Commission are "(1) Creating value by basing growth on knowledge; (2) Empowering people in inclusive societies; and (3) Creating a competitive, connected and greener economy" (European Commission, 2009, p.4). The term 'knowledge economy' emphasises that knowledge should be viewed as the primary factor for economic growth. More specifically a knowledge economy is defined as "an economy, which creates, disseminates, and uses knowledge to enhance its growth and to increase its overall welfare" (Bourdeau-Lepage and Kolarova, 2008, p. 55). In that respect, knowledge and knowledge processes are of immense importance to economic competitiveness and growth. Currently, Bulgaria holds one of the bottom places in Europe in terms of knowledge economy and innovation (Bourdeau-Lepage and Kolarova, 2008; World Bank, 2012c). The World Bank (2007) stated that countries competing to become knowledge economies "have to rethink and act simultaneously on their education base, their innovation systems, and their ICT infrastructure, while also building a high quality economic and institutional regime" (p. 25).

Economic regime in Bulgaria

Bulgaria has one of the lowest budget deficits in Europe suggesting relatively healthy macroeconomic stability (FT, 2012). However, the same report emphasises a much less stable underlying microeconomic situation characterised by political instability, high levels of crime and corruption, low wages and low standards of living (FT, 2012). Additionally, Savov (2004) explains that "there is growth, but it arouses no optimism" (p. 3) as the current economic growth of the country has not led to increased standards of living. In order to be competitive in the newly opened EU market it is emphasised that the newest members "have to transform their productive structure towards a high value added production of goods and services, a high-skilled labor force and to increase the standard of living" (Bourdeau-Lepage and Kolarova, 2008, p. 54). Bulgaria is the poorest European country with GDP per capita of $6,978 and a minimum monthly salary of 174 EUR (Eurostat, 2014; World Bank, 2014). As Bulgaria is the poorest member of the EU it needs to be even more diligent in order to achieve the goals set by the European Commission. Even though the low-wage economy is problematic for the Bulgarians, this economy has attracted substantial foreign investments. For example Hewlett-Packard, the large US technology corporation, has selected Bulgaria as one of its main hubs for technical support providing employment to nearly 4,000 people (FT, 2012). Bulgaria has also attracted Chinese investment such as Great Wall Motors, China's largest car manufacturer which opened a plant in Bahovitsa. Despite these good examples of foreign investment the main improvements in the economy are observed at macroeconomic level only and no significant improvements are evident in the knowledge economy indexes as described by the World Bank as education, innovation and ICT (World Bank, 2012c). Bourdeau-Lepage and Kolarova (2008) describe the main challenges faced in Bulgaria in relation to these knowledge indexes.

> Together with the industrial sector, the sectors of education and R&D are facing major difficulties. During the transition, more firms closed their research laboratories. Academia, universities, research institutes and schools experienced serious problems because of strict budget restrictions. The education system, the innovation system and R&D activity have been strongly affected during the transition (p. 68).

> The political instability, corruption, organizational conditions and the lack of adequate property rights as well as legal rules and procedures do not favour entrepreneurship and above all, the development of social capital or the establishment of common goals within the population (p. 66).

The other obstacles relate to the quality of human capital and to the level of investment in innovation and education. Thus, Bulgaria lacks well-educated and skilled workers. The country does not really encourage lifelong learning, human development or innovation. Therefore innovation activity is low and sufficient R&D is lacking. In addition, the development of ICTs infrastructure is lagging (p. 66).

Innovation in Bulgaria

Innovation is defined as the "implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (NSI, 2013c, p. 269). The main indicators for innovation are the Research and Development (R&D) investments and the innovation activity of the enterprises in terms of new or significantly improved products (European Commission, 2013; NSI, 2013c). The following table presents the innovation in Bulgaria in comparison with the EU average and the United States (US) innovation indexes.

Innovation	Investment and input	Performance/economic output
Research	R&D intensity 2011: 0.57 % (EU: 2.03 %; US: 2.75 %)	Excellence in scientific production and technological development 2010: 24.65 (EU: 47.86; US: 56.68)
Innovation activity	Index of economic impact of innovation 2010-2011: 0.23 (EU: 0.61)	Knowledge– intensity of the economy 2010: 29.45 (EU: 48.75; US: 56.25)

Table 1.1: Research and innovation in Bulgaria

It is evident from Table 1.1 that Bulgaria is lagging behind in terms of research, innovation activity and knowledge-intensity of the economy. Bulgaria currently occupies one of the bottom places in the EU in terms of innovation and a number of patents and journal articles published (Eurostat, 2012; European Commission, 2013).

In terms of investment in Research and Development, by 2020 Bulgaria needs to meet the R&D/GDP of 1.5% (World Bank, 2012b; European Commission, 2013). The current R&D spending in Bulgaria is 0.57% which is 3.6 times lower that the EU-27 (European Commission, 2013). The private sector is one of the pillars of innovation with the biggest R&D investment spending in comparison to the government, higher education institutions and non-profit organisations. Even though the private sector has the biggest share, with more than

50% of the total R&D investment spending, it only accounts for 300,305 levs for 2012 (NSI, 2014b). Furthermore in terms of innovation activity only 27.1% of all organisations with more than 9 employees are considered to be innovative (NSI, 2012b). Of these four service industries are leaders in innovation activities: computer programming, consultancy and related activities with 38.9%; financial and insurance activities with 35.7%; information service activities with 33.8% followed by telecommunications with 29.7% (NSI, 2012b).

It is recognised that innovation has greatly suffered during the transition period. As Stattev et al. (2006) describe:

> Under *central planning* the national research and innovation system included research institutes, universities, R&D units located at large production conglomerates and the state sponsored scientific and technical intelligence agency...The "bottom-up" initiatives were very limited.

> During *economic transition* to a market oriented economy Bulgarian R&D and innovation system has been left to its own development. No systematic efforts have been made to reform it with a clear vision about its future mission and its role in the national development. Many activities were disrupted and certain divisions closed or depleted from human resources. A large part of Bulgarian scientists and R&D specialists have emigrated in the first 2-3 years after the beginning of changes. Gradually the key knowledge producers have lost contact with market reality and business and have closed themselves in the rein of basic research. Most of the research institutions and R&D have lived on edge of surviving and have covered only operational costs (p. 586).

It is recognised that the underperformance in terms of innovation in Bulgaria is affected by high administrative burden on the business, high levels of corruption, underdeveloped information structure, worsening level of education and increasing depopulation which includes brain drain and ageing population (Chobanova, 2012; Bourdeau-Lepage and Kolarova, 2008; Boeva, 2002).

Education

Lifelong learning and education are main pillars to acquiring and disseminating knowledge (Chobanova, 2012; Bourdeau-Lepage and Kolarova, 2008). In relation to

education, the objective set by the "Europe 2020" Strategy is "to improve educational attainment levels of the population, especially to reduce the school dropout rate and to increase the number of young people with university degree or equivalent degree" (European Commission, 2009, p. 15). Regarding higher education in Bulgaria, there are 51 universities of which 37 are public and 14 are private. The total number of students enrolled in tertiary education is 284,000 which constitutes 41% of the population aged between 19 and 23. However only 25% of the graduates commence a job requiring a higher education degree or related to their qualification. This results in high dissatisfaction with the educational system, where 85% of the graduates consider the university curricula irrelevant and outdated (World Bank, 2013c; NSI, 2014a). The higher education situation in Bulgaria reveals that it is currently not suitable to support innovation. The poor education situation is worsened by the existing brain drain problem. This would lead to a great amounts of knowledge loss supplemented with a shortage of skilled and experienced workforce and knowledge which would force businesses to constantly 'reinvent the wheel'.

Information and Communication Technology (ICT)

A country's ICT infrastructure is assessed in terms of telephone, computer and internet penetration. In terms of the information society, 53.7% of the households in Bulgaria have internet access at home and more than half of the population aged 16 to 74 is considered able to find information using the internet (NSI, 2013b). The number of enterprises using Internet is a lot more promising where 89.1% have internet access, 52.3% of the enterprises have their own website, 43.2% are using intranet/extranet. However, only 35.1% of all enterprises are using social media, only 19.7% of the enterprises have ERP systems, and only 15.1% use CRM systems (NSI, 2013a). Overall investment in ICT by business is very poor with 195,709 levs for 2011(NSI, 2012a). As evident, the investment in ICT and use of technologies within organisations is lagging behind and needs to be further developed in order to support knowledge processes and innovation within organisations.

This brief review shows the challenges that Bulgaria is going through in the process of becoming a knowledge economy. This investigation goes deeper into exploring knowledge processes aiming to understand how people share knowledge, and what enables or obstructs such processes in Bulgarian organisations.

1.3   Problem Definition

After outlining the necessity of this research in the Bulgarian context, the problem definition around the concept of knowledge sharing is outlined in the light of the existing literature and research in the field. The problem definition is organised around the context, knowledge sharing initiatives in Bulgaria, and the nature of knowledge.

Context

Knowledge sharing processes and the factors that influence these processes have been widely explored in the literature in different contexts, countries and within various organisations. However, developing countries have not been at the centre of Knowledge Management (KM) and Information Systems (IS) research (Avgerou, 2008). A similar trend is observed in the field of intra-organisational knowledge sharing (KS). Table 1.2 presents an overview of where the majority of intra-organisation knowledge sharing research has been concentrated and where the developing countries and Bulgaria stand within this field. The countries in Table 1.2 are also compared based on their GDP per capita (World Bank, 2014).

Ranking	% in the recent KS literature[1]	Country	GDP per capita in US $
1	25.3%	United States (US)	$51,749
2	18.7%	Western Europe (including countries such as including Spain, Germany, Belgium, the Netherlands, Sweden and Denmark)	Average GDP per capita $45,197
3	15.4%	United Kingdom (UK)	$39,093
4	12%	A number of studies have been conducted in China	$6,091
5	1.1%	One study in Russia	$14,037
6	0%	No studies investigating intra-organisational knowledge sharing in Bulgaria	$6,978

Table 1.2: Intra-organisational KS research: countries ranking

The majority of the existing studies in the field of intra-organisational knowledge sharing are conducted in developed countries with GDP per capita above $30,000. The main representatives are the US, the UK, and Western Europe accounting for nearly 60% of the recent empirical studies. A fairly limited amount of research has been conducted in this area in relation to emerging markets such as China. Even less academic work on this topic has been

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[1] The percentage is derived from nearly one hundred of the most recent empirical studies in intra-organisational knowledge sharing.

carried out in the context of Eastern Europe. In the case of Eastern Europe the literature provides three examples of attempts to transfer knowledge from Western countries to Russia, Bulgaria and Poland (Michailova and Hollinshead, 2009; Hollinshead and Michailova, 2001; May et al., 2005; Hurt and Hurt, 2005) and only one case of investigating intra-organisational knowledge sharing in Russian organisations (Michailova and Husted, 2003). Studies exploring intra-organisational knowledge sharing in the Bulgarian context are lacking. This study aims to fill this gap by investigating Bulgarian organisations.

Knowledge sharing initiatives in Bulgaria

The knowledge sharing initiatives in Bulgaria were in the form of a classroom training program organised and delivered by Western trainers/managers (Hollinshead and Michailova, 2001). This training targeted Bulgarian managers and its purpose was to help with the transition from planned to service economy and to teach Bulgarian managers how to run a business. As the private sector was newly emerging in the Bulgarian post-communist society managers were lacking skills and experience in entrepreneurship and management. Thus, these programs aimed to transfer best practices from developed capitalist economies.

In Bulgaria the Western training programs lasted for four years from 1992 to 1996 aiming to disseminate information and change the mind-set of the Bulgarians in how to run a business (Hollinshead and Michailova, 2001). The programs were organised as classroom courses. The courses were delivered in English with simultaneous translation in Bulgarian. The participants in the programs were state-owned managers, and private managers of small and medium companies. The Western trainers adopted an ethnocentric approach aimed at "filling up empty vessels" with a lot of information assuming that their way is the only way of doing things (Michailova and Hollinshead, 2009, p. 129). The intention of the Western trainers was to share these Western practices with the expectation that Bulgarians would learn them and replicate them as best practices. However, on the recipient end the Bulgarian participants did not share the same view. In the words of one of the participants in these training programs cited in Hollinshead and Michailova (2001):

There were only a few links with Bulgarian reality, but I do not think that this could be expected from the western teachers. First of all, they know nothing about the Bulgarian practice and, secondly Bulgaria is a peculiar country that is stuck in transition between socialism and capitalism. Our economy does not provide typical examples to illustrate western theories. It would be much better if the teachers knew just a little about Bulgaria. The lack of this type of knowledge made the training difficult, especially for people who were not able to speak English or who were not economists (p. 431).

Eventually, the western trainers realised that they needed to adapt their training programs, get a better understanding of the Bulgarian culture, and be more interactive and informal. In retrospect Michailova and Hollinshead (2009) suggest that the training approach should move from ethnocentricity to polycentricity. Instead of imposing well-established western practices the trainers should take into account the deep values, history and experience of the local people and encourage active learning among participants by recognising that knowledge cannot be divorced from the context. This example shows that while the purpose of the initiatives has been great, the way knowledge was shared and disseminated was not appropriate for the Bulgarian context. Two challenges are evident in this example of unsuccessful knowledge sharing. One is the lack of understanding of the new context, i.e. Bulgaria the second is the assumption that knowledge is a transferable asset which can be readily replicated in a new context.

The nature of knowledge

The predominant view of knowledge within the literature follows the epistemology of possession perspective (Cook and Brown, 1999; Hislop, 2009). From that perspective knowledge is considered as explicit, i.e. codified and objectified knowledge which can be stored and transmitted via information technology, and tacit, i.e. knowledge possessed in people's minds. The majority of studies have adopted a static taxonomic view of knowledge where in the process of knowledge sharing existing knowledge is exchanged between people, units and organisations (Hicks et al., 2009). The process of knowledge sharing is seen as a static, formal process, where replicating existing knowledge is the ultimate outcome. As seen from the example above such a model is unlikely to succeed in a transition context (Hollinshead and Michailova, 2001; Michailova and Hollinshead, 2009). As such this study follows the bridging epistemologies including epistemology of practice perspective (Cook and

Brown, 1999; Newell et al., 2009) where knowledge is seen as dynamic, context-specific and mutually constituted with practice (Orlikowski, 2002). Following this perspective the concept of Knowledge Interactions (KI) is introduced in this research. When referring to knowledge processes it is implied knowledge sharing and knowledge interactions. By moving away from the conventional taxonomic perspective existing issues, concepts and theories are challenged and new concepts and theories emerge to add to the on-going debate.

This study moves away from the purely taxonomic view of knowledge and stresses the importance of knowledge in practice which is dynamic, situational and context-specific by nature. This distinction is formally outlined as this study proposes a new concept – Knowledge Interactions – to reflect the dynamic, practice nature of knowledge where spontaneity of actions, intuition, informality, dialogue and active interactions are at the heart of constructing and transforming knowledge (Orlikowski, 2002; Newell et al., 2009; Marabelli and Newell, 2012).

Additionally the theories used to explore, describe and explain knowledge processes have been developed and applied in the Western developed countries. Before replicating such existing theories and assumptions in the Bulgarian context, it needs to be considered whether these theories and methods are applicable and appropriate to this context. This makes it necessary to explore the context first. In light of the fact that prior studies are lacking in the Bulgarian context the factors affecting knowledge sharing processes need to be extracted from the current existing literature.

1.4   Research Aims and Objectives

The aim of this research is to explore and explain how people interact and share knowledge in Bulgarian organisations. There are four main objectives in this study:

1) Explore knowledge sharing and interaction processes in Bulgarian organisations and identify what key factors affect these processes.

2) Explain the relationships between the identified factors and knowledge sharing and knowledge interaction processes in Bulgarian organisations.

3) Design a theoretical research model to test the relationships between the identified factors and knowledge sharing and knowledge interactions.

4) Test the model and explain the identified relationships.

Key Research Questions

The key questions investigated in this research are: What factors affect the way people interact and share knowledge in Bulgarian firms? How can the relationships between these factors be explained?

1.5   Motivation for Study

The motivation for this investigation stems from the researcher's interest in finding ways to improve knowledge sharing processes within Bulgarian organisations in the endeavour of the country to achieve the goals set by the EU. Bulgaria is coming out of a turbulent transition and aiming to become a knowledge-intensive economy. Bulgarian organisations are currently facing not only intense competition on the Bulgarian market, but also a fierce competition on the EU and the global market. There is a need to recognise the importance of knowledge as a prerequisite for organisational growth, innovation and competitive advantage. However, at present little is known about how knowledge sharing occurs within Bulgarian organisations.

This study aims at investigating knowledge sharing within Bulgarian organisations and find ways of enhancing and improving the existing practices and emphasising the importance of knowledge as a key driver of competitive advantage.

1.6 Importance of Study

This study is important theoretically by investigating underexplored areas and factors subject to debates in the existing literature. It is also important for practice by exploring the Bulgarian context for which little is known. Bulgaria is currently being integrated into what is set to become the "most competitive and dynamic knowledge-based society in the world" (European Parliament, 2000). Thus it is important to understand how people share knowledge in Bulgarian organisations and help Bulgarian companies to recognise the value of knowledge, leverage their potential, and be more competitive and innovative.

Theoretically this study challenges the predominant taxonomic view of knowledge where knowledge sharing is seen as a process of exchange of knowledge as a good which needs to be replicated by the recipient party. As shown earlier, the conventional knowledge sharing process has been deemed unsuccessful in the Bulgarian context. This opens up the need for new theories explaining knowledge interactions where knowledge is seen as context-specific and dynamically constructed in practice. New theoretical models may be necessary to explain the knowledge processes in the Bulgarian context. Additionally the exploration of factors affecting knowledge sharing processes allows this study to offer important contributions to the understanding of the effect these factors have on knowledge sharing in a new underexplored context.

Another important aspect of the study is projected in the use of activity theory as a theoretical framework explaining knowledge processes in Bulgarian organisations. The use of activity theory as a main theoretical apparatus brings important aspects of knowledge processes which have not been explored through such frameworks before. Thus a new theoretical research model is developed and a number of new relationships and hypotheses are proposed. The results enhance the current understanding of knowledge processes by confirming some existing relationships, challenging others and opening avenues for further research in the area.

A brief synopsis of the contributions this study provides to theory and practice are:

1) Investigating knowledge processes in the transitional Bulgarian context, a context in need of becoming a knowledge economy.

2) Introducing a new concept, Knowledge Interactions, and differentiating it from Knowledge Sharing.

3) Designing a new theoretical research model, the Organisational Knowledge Sharing and Interactions Model, based on activity theory and critical realism and incorporating the underexplored factors of power relations and transactive memory systems.

4) Applying a mixed methods methodology to provide rigour to the research as well as to enhance both activity theory and critical realism methodologically.

5) Providing in-depth insights of the two knowledge processes, Knowledge Sharing and Knowledge Interactions, based on the empirical findings after testing the new model.

1.7   Research Design and Description of Research Tasks

First, the thesis commences with conducting a systematic literature review. The aim of the literature review is to examine prior studies investigating knowledge sharing in other contexts and go deeper into revealing the debates around the effect important antecedent factors have on such processes. The most prominent factors evident from the literature are: organisational culture, rewards, motivation, technology, trust, networks, power relations and transactive memory systems, where the latter two emerged as key factors in Bulgarian organisations through the qualitative interviews. Additionally, the literature review provides a snapshot of the methods used to study knowledge sharing processes in other context, which informs the need to adopt a mixed methods approach in the current study. This study is exploratory in nature and the first step is to contextualise the research. This has been achieved through qualitative semi-structured interviews. Semi-structured interviews have been conducted in order to understand how people in Bulgarian organisations share knowledge and

which of the identified factors are considered key in relation to knowledge sharing in the Bulgarian context.

Second, the findings of the semi-structured interviews have brought more clarity into the new concept of knowledge interactions. Additionally, the key factors affecting knowledge processes in the Bulgarian context have appeared to be power relations, transactive memory systems and informal networks. Relatively little is known in the literature about the effect of power relations and transactive memory systems on knowledge sharing processes, while the effect of informal networks is subject to ongoing debates.

Third, existing theories are reviewed and their suitability to help explain the new construct of Knowledge Interactions assessed. Additionally, the theories are scrutinised in their potential to accommodate the key factors of power relations and transactive memory systems which are currently underexplored and under-theorised in the literature. Such theories include *communication theory, social capital theory, communities of practice theory, boundary objects theory* and *activity theory*. Activity theory has been adopted as the most suitable theoretical framework explaining knowledge interactions and accommodating the key factors affecting the knowledge processes within Bulgarian organisations. Through thematic analysis, the identified factors have been grouped in overarching themes informed by activity theory. This has resulted in the development of an activity system framework explaining knowledge processes in Bulgarian organisations.

Fourth, the activity system framework obtained has supported the development of the theoretical research model of this study identifying the relationships between the factors. Based on the proposed research model, the Organisational Knowledge Sharing and Interactions Model, a set of sixteen non-mediation and sixteen mediation hypotheses have been formulated. New relationships have been suggested exploring the effect power relation has on knowledge sharing and knowledge interactions as well as on the organisational culture and on the development of transactive memory systems. Additionally, the effect of informal networks on the two knowledge processes has been tested as well as the relationships between informal networks and organisational culture and informal networks and transactive memory systems development. Trust has been tested as an antecedent factor for organisational culture and transactive memory systems development. Furthermore the effect organisational culture and transactive memory systems have on knowledge sharing and knowledge interactions has

been tested. The research model developed and the hypotheses suggested have been tested in a quantitative study.

Fifth, the thesis has developed four new constructs (informal networks, power relations and knowledge interactions, use of Web 2.0 technologies) and has used four existing constructs (knowledge sharing, trust, organisational culture and transactive memory systems) adapted from existing empirical studies. Initially a construct of the use of Web 2.0 technology was included but as it did not exhibit any significant relationship with the rest of the constructs it was omitted from the model. The newly developed instrument has then been piloted among 37 Bulgarian organisations to ensure clarity of the questions as well as construct reliability and validity.

Sixth, in order to test, validate and extend the research findings a large scale quantitative study has been conducted where 229 participants took part. Reliability and validity have been addressed anew based on the full sample. The non-mediation hypotheses have been tested using Partial Least Squares (PLS) analysis suitable for complex exploratory models (Ringle et al., 2012, Gefen et al., 2011, Hair Jr et al., 2014). For the mediation hypotheses Baron and Kenny's (1986) model has been followed and, in order to test for differences in industry, size and position people hold, a MANOVA analysis has been conducted.

Finally, the findings are discussed in relation to the existing literature. The new concept/construct of Knowledge Interactions is discussed and possibilities for further research outlined. Detailed research design for this study is presented on Figure 1.1.
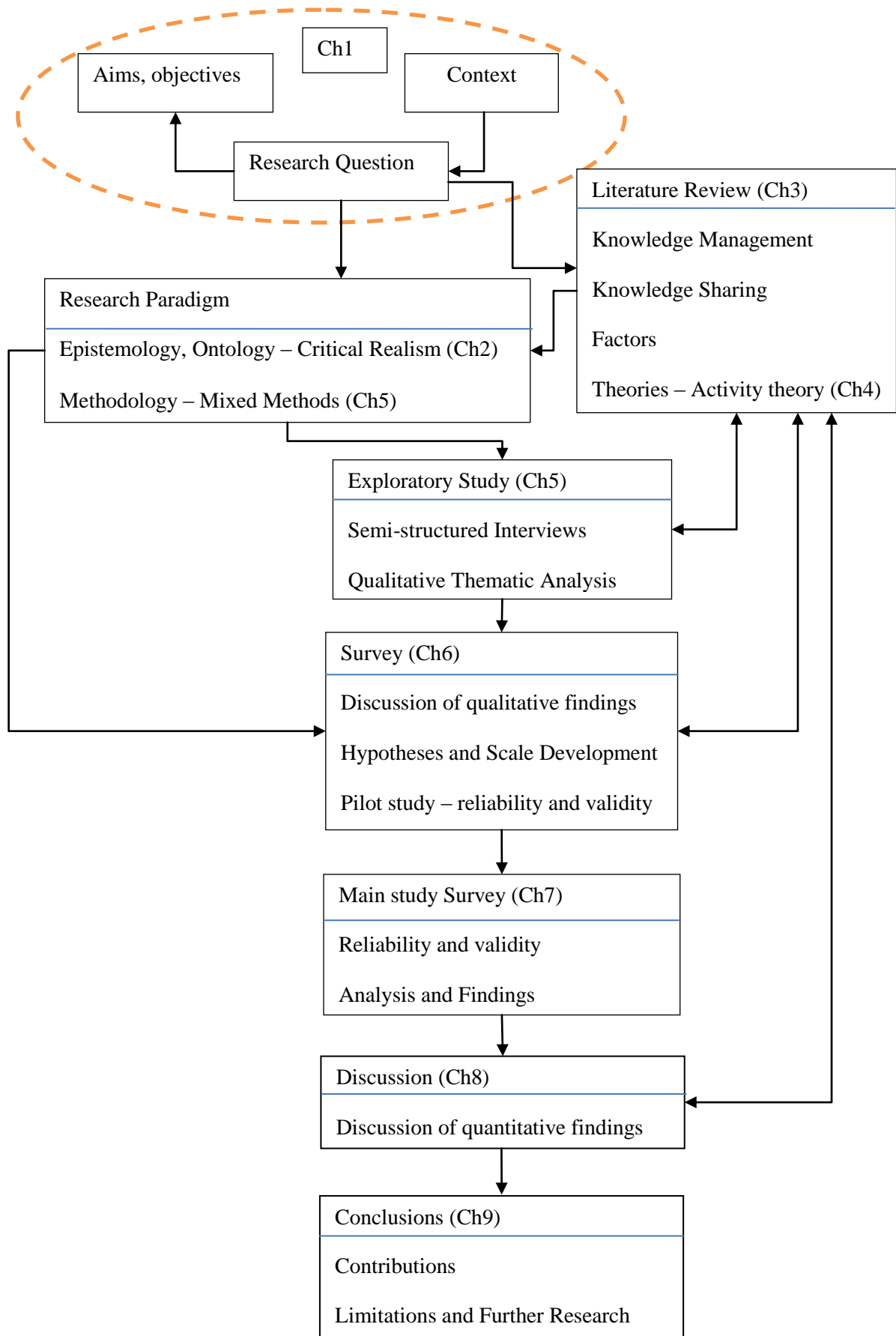
Figure 1.1: Research design and structure of thesis

1.8 Structure of Thesis

This thesis comprises of nine chapters. The current **Chapter 1** presented the background to the study, the Bulgarian context, the problem definition, the research aim and objectives as well as the study design and research tasks. The remainder of the thesis is organised as follows:

Chapter 2 goes deeper into the debate of the nature of knowledge along with outlining ontological and epistemological underpinnings. The position taken on knowledge is outlined. Also the philosophical underpinning informed by critical realism is presented.

Chapter 3 is the thorough systematic literature review. The literature review starts with outlining knowledge management as a concept followed by deeper exploration and presentation of the debates around knowledge sharing along with identification of the factors influencing knowledge sharing and interaction processes.

Chapter 4 presents a number of theories explaining knowledge processes within organisations. These theories are thoroughly reviewed and their advantages, limitations and inconsistencies are discussed. The theory adopted in this research, activity theory, is also reviewed and assessed for its appropriateness for the purposes of this study.

Chapter 5 describes the research methodology. The chapter presents the suitability of mixed methods for the purpose of the study and continues to reveal methodological and data collection challenges in transition contexts such as Bulgaria. The chapter then focuses on the design and the execution of the exploratory qualitative study. Subsequently qualitative thematic analysis is performed and the results of the semi-structured interviews are presented. The chapter concludes with the development of activity theory framework diagram explaining knowledge processes within Bulgarian organisations.

Chapter 6 presents the process of hypotheses and scale development for the quantitative study. Firstly, a new research model is designed based on the activity system framework developed. Based on this research model a number of hypotheses are suggested. Subsequently, in order to test the model and the hypotheses, the questionnaire construct items

are developed. A number of constructs are adapted from the literature, but some are newly developed for the purpose of this study. In order to validate the instrument a pilot study was conducted and reliability and validity of the data are confirmed before proceeding with the main study.

Chapter 7 presents the main quantitative study results and analysis. First the measurement model is evaluated in terms of reliability and validity of the data. After confirming adequate reliability and validity of the measurement model, the hypotheses are tested using PLS analysis for the non-mediation hypotheses and Baron and Kenny's (1986) approach for the mediation hypotheses. MANOVA is then performed to investigate the effect of industry, size and position people hold in the organisation on knowledge sharing and knowledge interaction processes.

Chapter 8 is the discussion of the major findings. The research findings are discussed in relation to existing literature and how these findings challenge the state-of-the-art and contribute to the further understanding and expanding of this area.

Chapter 9 is the conclusion. The main contributions of the study are outlined. These are divided into theoretical and the practical contributions. In retrospect the limitations of the study are presented as well as the opportunities for further research that arose during the process.

1.9   Summary

This chapter outlined the existing gaps in the literature and the research problem regarding knowledge sharing processes and the need for exploring these processes in a transition economy, i.e. Bulgaria. The Bulgarian context was presented, the motivation and the importance of the study outlined. The research questions, aim and objectives of this study were clearly defined. Before delving deeper into the practicalities of knowledge sharing it is important to first explore the nature of knowledge and position the thesis in the current epistemological debates.

2   EPISTEMOLOGICAL PERSPECTIVE

2.1   Introduction

Before going deeper into investigating knowledge sharing processes it is important to explore the nature of knowledge in order to clarify how the concept of knowledge has been used in relation to knowledge sharing processes within organisations. The view of knowledge predetermines researchers' philosophical and theoretical stances. All theoretical frameworks have implicit assumptions about reality and knowledge which guide researchers' actions and views on the nature of reality and the nature of knowledge (Wynn and Williams, 2012; Myers, 2009). The different paradigms/philosophies adopt radically different stances on ontology, epistemology and methodology resulting in different views of what constitutes knowledge (Mingers, 2008). The choice of paradigm/philosophy is based on researchers' views of the world, what knowledge is and how it is developed. In order to reinforce or challenge existing frameworks on knowledge sharing, it is first necessary to understand their deeper ontological and epistemological assumptions (Jashapara, 2007).

The debates on the nature of knowledge have been located within two main epistemological perspectives – epistemology of possession and epistemology of practice (Cook and Brown, 1999). This chapter presents in detail the two epistemological stances along with the on-going debates in the area as well as the position taken in this study. The chapter also presents Critical Realism (CR) which is adopted as a guiding paradigm to investigate knowledge processes within organisations in Bulgaria. Critical realism involves investigating the observable events at the surface level as well as delving deeper into the structures and mechanisms that give rise to these observable events. The chapter presents in detail the ontological and epistemological assumptions of critical realism as a philosophical approach guiding this study.

2.2 Epistemology

Epistemology accounts for the way people make sense of the world and more specifically it addresses "how we know what we know" (Crotty, 1998, p. 8). Epistemology concerns assumptions about what the nature of knowledge is (Jashapara, 2011). There are two dominant epistemological perspectives about the nature of knowledge in the current literature – epistemology of possession and epistemology of practice (Cook and Brown, 1999).

2.2.1. Epistemology of possession

From the perspective of epistemology of possession knowledge is described as (Cook and Brown, 1999; Newell et al., 2009; Nonaka, 1994; Nonaka and Takeuchi, 1995; Hislop, 2002, 2009):

- Explicit vs. tacit knowledge;
- In its explicit form knowledge is viewed as an object existing independently of the individual in the form of documents;
- In its tacit form knowledge is possessed by individuals as a 'know-how' and is difficult to be articulated and disembodied;
- Individual vs. group knowledge.

Explicit – Tacit Knowledge

The roots of explicit-tacit knowledge as described in current Knowledge Management (KM) literature can be found in the ideas of the contemporary philosophers Gilbert Ryle and Michael Polanyi. Ryle (1949) distinguishes between 'knowing how' and 'knowing that', where 'knowing how' represents someone's intelligence of how to do things, while 'knowing that' is the knowledge possessed in terms of facts. Polanyi (1967) explains that knowledge exists in a spectrum between tacit and explicit knowledge. He builds upon Ryle's distinction between 'knowing that' and 'knowing how' and explains that "neither is ever present without the other" (Polanyi, 1967, p. 7).

The tacit-explicit taxonomic perspective is the most commonly held view of knowledge within KM literature (Argote and Ingram, 2000; Grant, 1996; Kogut and Zander, 1992;

Osterloh and Frey, 2000; Spender and Grant, 1996; Nonaka, 1991; von Krogh et al., 2001; Nonaka et al., 2000). Explicit knowledge can be codified, easily expressed, articulated and transmitted to other people and locations. In contrast, tacit knowledge is highly personal knowledge embedded in people's minds, and as such it is regarded as a possession of the individual. Tacit knowledge is difficult to articulate as people know more than they can tell (Polanyi, 1967). Tacit knowledge cannot be broken down into rules and procedures and, because it is possessed by the individual, it can be used only when the individual has time to share it and may be lost if the person leaves the company. Thus, the main quality of tacit knowledge is that it is personal and as such it is difficult to disembody (Roberts, 2000; Hislop, 2002). For example people 'know' how to swim and ride a bicycle, but it is very difficult to explain to a novice what they need to do in order to stay upright on the bicycle or how to float in the water. No amount of explicit knowledge can enable people to swim, ride a bicycle, play sports or musical instruments. Tacit knowledge is needed in order to ride a bicycle and know how to stay upright and not to fall (Cook and Brown, 1999). As such tacit knowledge is considered a source of competitive advantage because it is difficult for competitors to imitate (Leonard and Sensiper, 1998; Osterloh and Frey, 2000; Jashapara, 2007). However, learning from first-hand experience within organisations is often difficult and time-consuming. As such it is argued that in order for tacit knowledge to be understood it needs to be made explicit (Hislop, 2002).

Within the management, information systems and organisation studies literature the view of explicit knowledge dominates (Cook and Brown, 1999; Hislop, 2009; Currie and Kerrin, 2004). Currie and Kerrin (2004) argue that when knowledge is seen as an object that can be codified and clearly articulated, i.e. explicit knowledge, an information processing epistemology is followed. From this perspective knowledge and information become synonyms. It is stressed that when knowledge is expressed in any form outside the mind, it becomes information (Singh, 2007; Alavi and Leidner, 2001). Therefore it is regarded that knowledge can reside in computers and can be successfully transmitted via ICT, just like sending a letter via the post (Hislop, 2002). Explicit knowledge is seen as objective disembodied knowledge existing independently from the individual. Following the analogy of sending a letter – it is assumed that what is sent by the sender is what is received by the receiver and it is self-explanatory. As such the underlying premise of this perspective is that knowledge in its explicit form is self-sufficient and complete and no interaction is required between the sender and the receiver (Hislop, 2002, 2009).

Building on the duality between tacit and explicit knowledge, Nonaka (1994) suggests a knowledge creation framework within organisations. The author describes tacit and explicit knowledge as two distinct types of knowledge which can be converted from one type to another. Four knowledge conversion processes are identified: socialisation (tacit to tacit), externalisation (tacit to explicit), combination (explicit to explicit) and internalisation (explicit to tacit) as shown in Figure 2.1.
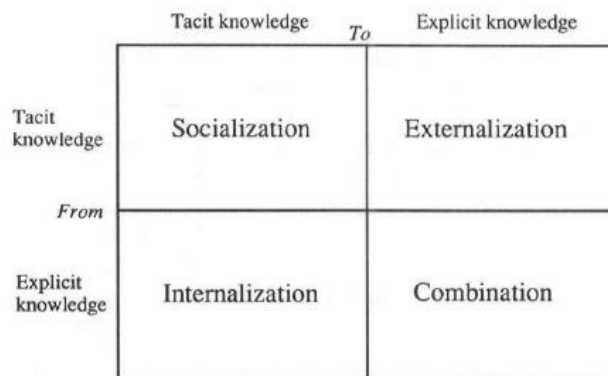
Figure 2.1: Knowledge conversion framework (Nonaka, 1994, p. 19)

This perspective treats knowledge as an individual possession which can be made both tacit and explicit. However, the framework considers the conversion from one type of knowledge to another to be unproblematic and there is an overemphasis on individual knowledge as opposed to group and collective knowledge (Newell et al., 2009).

Individual – Group knowledge

Apart from the dominance of explicit knowledge over tacit knowledge in the existing literature, there is also a dominance of individual knowledge over group and collective knowledge (Cook and Brown, 1999; Newell et al., 2009). In an attempt to move beyond the individually held knowledge, Spender (1996) proposes a framework where it is differentiated between implicit-explicit knowledge as well as individual-social dimension of where this knowledge resides, as shown in Figure 2.2.

	Individual	Social
Explicit	Conscious	Objectified
Implicit	Automatic	Collective

Figure 2.2: Framework of organisational knowledge (Spender, 1996, p. 70)

Spender (1996) argues that the most valuable knowledge for organisations is the collective knowledge which is the crossover between social and implicit knowledge. As such even if an individual leaves the company the knowledge is collectively held and will not be lost. There is a shift from all learning happening within individual heads to all learning being a social phenomenon (Michailova and Sidorova, 2011).

The roots of the notion of knowledge being socially constructed can be found in the social constructionism perspective (Berger and Luckmann, 1966). From that perspective reality is seen as subjective and based on humans' perceptions and as such knowledge is socially constructed and subject to individual interpretations and mental models (Weick, 1995). Through sensemaking individuals identify the cognitive gap of their current understanding/mental models and then create their new environments by interpreting the newly observed phenomenon (Weick, 1995; Lehr and Rice, 2002; Cornelissen, 2012; Stigliani and Ravasi, 2012). However, the main criticism of the social constructionism and sensemaking perspectives is that learning and knowing happens in the mind and the possibility of action is excluded from that perspective (Jashapara, 2007; Jashapara, 2011).

Further to this, Blackler (1995) summarises five types of knowledge: embrained, embedded, encoded, embodied and encultured. The author describes organisations and their knowledge by differentiating between individual and collective knowledge and between the nature of the problem – familiar or novel. The framework is presented in Figure 2.3.

Collective knowledge	Knowledge-Routinized Organisations: Knowledge embedded in technologies, rules and procedures. Capital and labour intensive, low skill requirements. Hierarchical division of labour and control.	Communication-Intensive Organisations: Encultured knowledge and collective understanding. Communication and collaboration. Empowerment through integration.
Individual Knowledge	Expert-Dependent Organisations: Embodied competencies of key members. Performance of specialist experts is crucial. Status and power from reputation and qualifications.	Symbolic-Analyst-Dependent Organisations: Embrained skills of key members. Entrepreneurial problem solving. Status and power from creative achievements.
	Familiar Problem	Novel Problem

Figure 2.3: Organisations and knowledge framework (Blackler, 1995, p. 1030)

As shown in Figure 2.3 different organisations depend on different type of knowledge – embrained, embedded, embodied and encultured (Blackler, 1995). It is further argued that each of these four types of knowledge can be explicit to some extent, which leads to the fifth encoded type of knowledge. Encoded is knowledge stored in electronic repositories and available through information and communication technologies (Blackler, 1995). Despite hinting on some dynamic qualities of knowledge in the form of embodied and encultutred knowledge, this framework is still situated within the epistemology of possession.

Despite the advancements each framework brought to this perspective, the taxonomic view follows the epistemology of possession where knowledge is either externally found in objects or internally held in people's minds (Cook and Brown, 1999). The view of social life from this perspective is that "individuals navigate in an objective external world through cognitive processes" (Newell et al., 2009, p. 18). As such there are a number of critiques of this perspective. Firstly, knowledge is regarded as objectified or as a possession which is somehow static and the subjective, contextual and dynamic nature of knowledge is not accounted for (Newell et al., 2009, Michailova and Sidorova, 2011).

Another discrepancy in this view is found in the dilemma over whether explicit and tacit knowledge are distinct entities or whether they are inseparable and mutually constituted (Tsoukas, 1996; Cook and Brown, 1999; Newell et al., 2009; Gourlay, 2006; Nonaka, 1994; Hislop, 2002, 2009). Through the initial conceptualisation of the term, Polanyi asserted that tacit and explicit knowledge "are not sharply divided. While tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is either tacit or rooted in tacit knowledge. A wholly explicit knowledge is unthinkable" (Polanyi, 1966, p. 7). As such the distinct separation between the two types of knowledge found in the literature is questionable. Therefore, the conversion from one type to another is even more questionable as by gaining tacit knowledge the explicit knowledge does not get lost and vice versa. Gourlay (2006) also explains that both types of knowledge exist in a continuum but by focusing on one of them the other becomes pushed into the background. This way, if organisations overemphasise explicit and codified knowledge the tacit dimension may be hindered. It is argued that a balance between the two types is required in order to achieve a task as explicit knowledge will always be partial and incomplete and needs to be combined with tacit knowledge (Gourlay, 2006).

This leads to another criticism that the taxonomic view following the epistemology of possession is somehow divorced from the actual use and application of knowledge (Hislop, 2002; Newell et al., 2009). There is an implicit assumption that the knowledge is complete and the more knowledge is accumulated the better. However, the mere accumulation of more knowledge as a 'good' will not lead to better organisational performance and competitive advantage. The potential of knowledge is only leveraged in its application (Hislop, 2002; Gourlay, 2006). This points to another drawback of the epistemology of possession perspective as aspects of power and conflict are not taken into account (Newell et al., 2009).

The biggest limitation of the epistemology of possession perspective is that it ignores the elements of doing and action which are central in organisations. For example, a pianist may have an explicit knowledge of the notes, may have a tacit knowledge of the melody but, without practising the piano, cannot learn to play the instrument. Doing and practice are central tenets to the second epistemology – epistemology of practice which considers knowledge and doing as mutually constituted (Cook and Brown, 1999; Orlikowski, 2002).

2.2.2. Epistemology of practice

Conversely to the epistemology of possession, epistemology of practice considers knowledge and doing as mutually constituted (Cook and Brown, 1999; Orlikowski, 2002). This perspective has its philosophical roots stemming from the realist John Macmurray. Macmurray (1961) stresses that action is more fundamental than thought with the assertion that "thought begins only where action fails" (Macmurray, 1933 cited in Jashapara, 2011, p. 52). This perspective is followed in the contemporary management literature as a practice-based perspective. Knowledge from the perspective of epistemology of practice is viewed as (Cook and Brown, 1999; Orlikowski, 2002; Hislop, 2009; Newell et al., 2009):

- Embodied in practice;
- Dynamic and socially constructed through action;
- Context-dependent;
- Contestable;
- Tacit and explicit knowledge are seen as inseparable.

The practice perspective as opposed to the possession perspective deems that knowledge is not an object that can be passed around but that it is inseparable from human actions and activities. The emphasis is put on doing rather than possessing. This is presented by Blackler (1995) who explains that "rather than regarding knowledge as something that people have, it is suggested that knowing is better regarded as something they do" (p. 1023). This way the practice perspective overcomes the strict cognitive, embrained aspect of knowledge and deems that knowledge is embodied in practice by fulfilling specific tasks. As such knowledge is assumed not able to be disembodied but something that develops through practice.

Through the practice perspective knowledge/knowing is viewed as inseparable from practice where knowledge and action are mutually constituted (Blackler, 1995; Tsoukas, 1996; Orlikowski, 2002; Gherardi, 2010). As further elaborated by Orlikowski (2002) "the perspective suggests that knowing is not a static embedded capability, or stable disposition of actors, but rather an on-going social accomplishment, constituted and reconstituted as actor engage with the world in practice" (p. 249). Cook and Brown (1999) argue that knowledge is incomplete if it is not constituted in practice. However, this practice does not happen in isolation and it is affected by social and cultural aspects of the environment and "contextual elements are thus seen to shape how individuals learn and how they acquire knowledge and competence" (Sole and Edmondson, 2002, p. 18). Individuals are not seen as the sources of knowledge but rather the flux of social actors and material artefacts gives rise to constantly changing practices (Marabelli and Newell, 2012; Nicolini, 2011; Orlikowski, 2007; Orlikowski and Scott, 2008; Orlikowski, 2010). From a practice perspective in the course of their activities people make use of different tools and objects which help to construct knowledge in practice as opposed to transmitting it between people, groups and organisations. As such this knowledge is highly context specific.

Knowledge from a practice perspective is seen as interrelated with power and as such it is regarded as contestable (Blackler, 1995; Hislop, 2009). It is stressed that conflicts are to be expected and that "issues of domination and subordination are fundamental to the development of a general theory of knowing as praxis" (Blackler, 1995, p. 1042). As such the concept of power, politics and conflict are more prominent from the epistemology of practice perspective (Blackler, 1995; Hislop, 2009; Newell et al., 2009).

Furthermore, the practice "connotes doing and involves awareness and application of both explicit (language, tools, concepts, roles, procedures) and tacit (rules of thumb, embodied capabilities, shared worldviews) elements" (Sole and Edmondson, 2002, p. 18). From that perspective tacit and explicit knowledge are seen as inseparable. However, even the flux of tacit and explicit knowledge falls short of doing since possessing the tacit knowledge of swimming, riding a bicycle, playing sports or a musical instrument is not the same as the act of doing it (people possess this knowledge even if they are not riding a bicycle at the present moment). Based on that premise Polanyi's famous analogy of riding a bicycle has been extended in a way that "tacit knowledge alone does not enable us to ride; there is more epistemic work that needs to be done. Being able to ride requires interaction between the (tacit) knowledge we possess and the present activity of being in motion on a bike" (Cook and Brown, 1999, p. 388). Thus knowing is described as "an ongoing social accomplishment, constituted and reconstituted in everyday practice" (Orlikowski, 2002, p. 252).

2.2.3.   Bridging epistemologies

Cook and Brown (1999) introduce the bridging epistemology between epistemology of possession and epistemology of practice, presented in Figure 2.4.
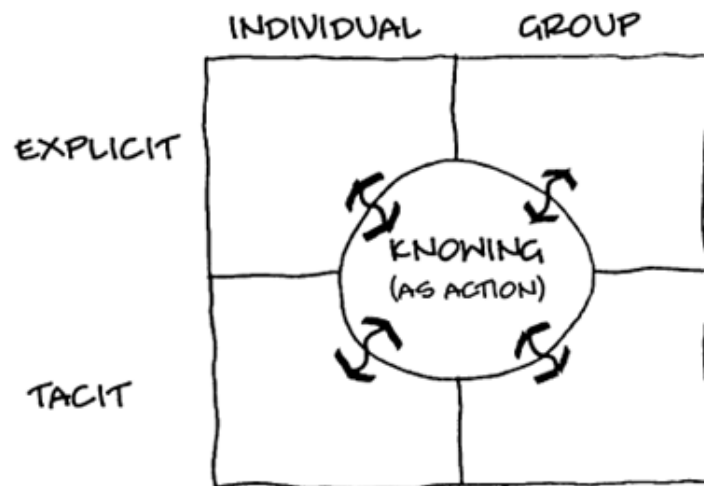
Figure 2.4: Bridging epistemologies (Cook and Brown, 1999, p. 383)

Firstly, Cook and Brown (1999) argue that each of the four categories of knowledge, i.e. explicit, tacit, individual and group are of equal standing and are not subordinate to one another as "each form of knowledge does work that the others cannot" (Cook and Brown,

1999, p. 382). These four forms of knowledge are situated within the epistemology of possession. The fifth form added by Cook and Brown (1999) is that of 'knowing' relating the concept with the act of doing something in practice. This fifth form is situated within the epistemology of practice perspective. The 'generative dance' between the two perspectives is explained by the authors as "individuals and groups clearly make use of knowledge, both explicit and tacit, in what they do; but not everything they know how to do is explicable solely in terms of the knowledge they possess" (p. 382). As such 'knowledge' reflects possession, while 'knowing' reflects the action itself.

Secondly, it is argued that these five dimensions are not competing but they are seen as complementary. It is emphasised that "organizations are better understood if explicit, tacit, individual and group knowledge are treated as four distinct and coequal forms of knowledge (each doing work the others cannot), and if knowledge and knowing are seen as mutually enabling (not competing) (Cook and Brown, 1999, p. 381). As such knowledge is seen as multifaceted and complex "being both situated and abstract, implicit and explicit, distributed and individual, physical and mental, developing and static, verbal and encoded" (Blackler, 1995, p. 1032).

This current study follows the bridging epistemologies framework as it provides the most complete view and understanding of knowledge where all forms of knowledge are given equal weighting and their importance for organisational growth and innovation is strongly recognised (Cook and Brown, 1999). Adopting this view of knowledge provides a flexibility to explore the complexities of knowledge and knowing and to discover the nuances of organisational knowledge in a new context. The next section describes how critical realism complements this view and helps to further explore the inquiry.

2.3   Critical Realism

The following section presents critical realism with its underlying ontological and epistemological assumptions.

Ontology

Ontology concerns assumptions about the nature of reality. Crotty (1998) explains that ontology deals with the problem of 'what is' the nature of existence and reality and defines ontology as "*the study of being*" (p. 10). Further to this it is explained that ontology focuses on the question "what the world must be like for science to be possible" (Bhaskar, 1998, p. 18). Generally within management and organisation studies the topic on ontology is not considered in-depth and the debates around the 'nature of being' seem to be quite controversial (Burrell and Morgan, 1979). Moreover, Crotty (1998) emphasises that "writers in the research literature have trouble keeping ontology and epistemology apart conceptually" (p. 10) and there is a tendency to merge them.

In general, the views on reality exist in the divide between objective and subjective (Burrell and Morgan, 1979; Bryman, 2012; Easterby-Smith et al., 2012). Objective reality exists independently from humans, while subjective reality is assumed to exist solely through human perceptions (Orlikowski and Baroudi, 1991). The critical realism perspective acknowledges that there is an independent reality 'out there' that comprises the world and humans are not able to fully understand and observe this reality (Bhaskar, 1975, 2008; Sayer, 1992, 2000; Johnson and Onwuegbuzie, 2004; Easterby-Smith et al., 2008).

2.3.1. Critical realism ontological assumptions

Ontologically, critical realists view reality as independent and stratified comprising of structures, mechanisms and events (Bhaskar, 1975, 2008; Sayer, 2000).

Independent Reality

Critical realism sees the world "as an open system with emergent properties rather than the predictable machine of the positivist approach and the 'nothing but a sea of meaning' of the extreme social constructionist approach" (Burgoyne, 2009, p. 149). Critical realism claims that objects/entities exist independently of humans' knowledge and identification of their existence (Fleetwood, 2005). People perceive only part of the bigger picture and experience only part of what is 'out there' as the reality is independent and stratified and it is not easily reducible to humans' perceptions and experiences of it. Thus not all reality is dependent on human activities but they are the ones to recognise it and try to understand it (Bhaskar, 1998).

Stratified ontology

The critical realism perspective assumes that science is not only about directly observable events, but that it is also about those structures, objects and entities which exist and may be unobservable but give rise to the observable events. As such the aim of research is to understand what the world must be like for this event to occur and more specifically what the components of this reality are and how they interact to give rise to a set of events (Bhaskar, 1975, 1998).

The stratified view of reality provides three useful distinctions in relation to positivism and interpretivism (O'Mahoney, 2012). Firstly, it moves away from the interpretivist view that "a concept simply becomes true because of its origin within a discourse" (Cruickshank, 2003, p. 118). Secondly in disagreement with the positivist view, critical realism argues that simply because something is not immediately visible and observable it does not mean that it does not exist. Thirdly, there is an apperception that reality is multilevel and consists of three domains: the real, the actual and the empirical. The domain of real includes all structures, mechanisms and events, i.e. the "whole of reality" (Mingers, 2004, p. 299). The domain of actual is described as a subset of the real which includes the events that occur when the powers of the structures and mechanisms are activated regardless of whether their effect could be observed by a human or not. The domain of the empirical represents the actually observable events and behaviours that can be perceived, experienced and measured (Mingers, 2004; Mingers, 2008; Wynn and Williams, 2012). There is a constant interaction between these three domains regardless of whether the events are observable by humans or not. The occurrence of the events depends on structures, mechanisms and contingent conditions which illustrate that there is more to the world than simply a pattern of events. Events arise from the mechanisms which stem from the underlying structures in a specific context. This is presented by Sayer (2000) in Figure 2.5.
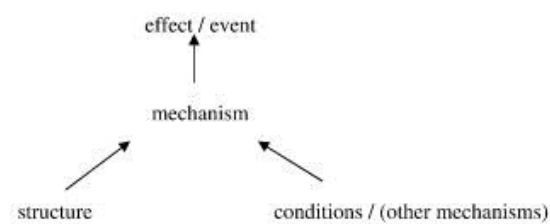
Figure 2.5: Critical realism view of causation (Sayer, 2000, p. 15)

Structures

The structures are "sets of internally related objects or practices" which are part of the domain of the real (Sayer, 1992, p. 92). A real entity/object from a critical realism perspective is defined as an entity that has causal efficacy, i.e. that has an effect or makes a difference to behaviour (Fleetwood, 2005; Fleetwood, 2004). Therefore, from a critical realism perspective structures are considered to be both material and social. There are a number of differences between material and social structures. While material entities are the ocean, the mountains, gravity and so on which exist independently from individual, social structures are considered to be dependent on human activities. However, "this does not imply that human agents have perfect knowledge of their actions or their consequences; only that agents must have some interpretation of the social structure in order to understand the meaning behind their own actions and those of other" (Wynn and Williams, 2012, p. 791). The fact that social structures are considered dependent on human actions does not mean that they do not exist independently of people's identification of these structures (Fleetwood, 2005). For example, if someone has just started a new job in a company this person is unaware of the rules, culture and the community characteristics while the other employees are familiar with them. Furthermore, the degree of identification of these structures may differ depending on the position people occupy within the company. The examples show that the structures exist without people's identification of their existence, and different people identify and understand these structures differently. Thus the existing social structures enable or constrain people's activities which in turn transform these structures (Wynn and Williams, 2012; Syed et al., 2010).

Mechanisms

Mechanisms are defined as "inherent to physical and social structures, enabling or limiting what can happen within a given context" (Wynn and Williams, 2012, p. 791). The mechanisms are described as causal powers and tendencies (Fleetwood, 2004, Smith, 2006). Causal powers are defined as "dispositions, capacities and potentials to do certain things but not others" (Fleetwood, 2004, p. 46). These powers could be enacted or not within a specific context. Tsang and Kwan (1999) explain that "to ascribe power to an object is to say something about what it will or can do, in the appropriate conditions" (p. 762). For example copper possesses the power to conduct electricity regardless of whether it is connected to the electrical circuit or not. As opposed to powers which are characterised as possibilities,

tendencies are qualities of specific things or groups. An example explaining the difference between powers and tendencies is provided by Bhaskar (1975) as "all men…possess the power to steal; kleptomans possess the tendency to do so" (p. 230). However, context is of great importance and whether the powers and tendencies will develop greatly depends on the contextual conditions (Leca and Naccache, 2006). The enactment of these powers and tendencies affects the events within the organisational system.

Events

The events can be defined as the "specific happening or action resulting from the enactment of one or more mechanisms" (Wynn and Williams, 2012, p. 791). The occurrence of events is based on complex causality generated by the activated underlying mechanisms, structures and actions (Hesketh and Fleetwood, 2006). For example the causation effect of a lamp's illumination is a complex flux of necessary conditions and activities such as the glass, the bulb, the wire, the switch, the plug, the electricity, and the human action of pressing the switch. The action of the actor triggers the observable effect of switching on the light. However, the whole process is comprised of complex underlying systems and mechanisms that need to meet the right conditions in order to result in the illumination of a lamp. The enactment of the structures and mechanisms, and in particular of the social structures, depends on humans' actions and activities which in combination cause a particular event. From that perspective it is explained that "when activated, particular mechanisms produce effects in 'conjunctures', which may be unique. According to conditions, the same mechanisms may sometimes produce different events, and conversely the same type of event may have different causes" (Sayer, 1992, p. 116). Further to this Sayer (2000) explains that the events are not predetermined by the structures and mechanisms in a linear causality manner. The causality is assumed to be contingent meaning that the outcome produced by the same mechanism differs in different contexts, thus it is contextual and dependant on contingent conditions (see Figure 2.5). Such contingent conditions, when present, require new mechanisms and adaptation to these conditions.

2.3.2. Critical realism epistemological assumptions

The practice-based perspective of knowledge is naturally embraced by critical realism as John Macmurray was a realist himself. As such critical realism assumes that actions precede

thought and emphasis is placed on participation and interaction (Sayer, 2000; Jashapara, 2011). The epistemological positioning of critical realism posits that knowledge is gained through observation, but also through participation and interactions; that knowledge cannot be reduced to language, it is also experiencing sound, smell, sight; that knowledge is continuously reproduced, and that theories are constantly refined to explain phenomena (Sayer 1992). This epistemological notion of critical realism is related to the transitive and intransitive dimensions of knowledge. The intransitive dimension of knowledge seeks explanation and understanding of the reality existing independently of humans. The transitive dimension is related to the observations and theories produced by humans in an attempt to understand this independent reality (Collier, 1994). While the intransitive dimension may not change considerably over time the knowledge and theories produced by people change and this knowledge and these theories are constantly refined and transformed over time. This gives the perspective of knowledge as a dynamic process always seeking to better understand and explain the world. From a critical realism perspective it is argued that the production of knowledge in its transitive dimension is mediated by the deeper structures and mechanism as our understanding and interpretations are formed through these structures and mechanisms (Wynn and Williams, 2012).

Additionally, critical realism holds the assumption of multiple realities, where multiple sets of mechanisms exist along with multiple possibilities to explain the occurring events. This multiple perspective is explained by the fact that the same structures and mechanisms may lead to different events and that the same events may be caused by different mechanisms and structures (Sayer, 2000; Wynn and Williams, 2012). Wikgren (2005) explains that "knowledge is communicatively constructed, that our concepts and beliefs are historically generated and conditioned, and that the explanatory knowledge produced through realist analysis will always be open to challenge and subject to change on theoretical and empirical grounds" (p. 14). Thus research aims to increase the understanding of particular events recognising that knowledge is not objective, but it is a product of cultural, historical and social aspects.

The goal of critical realism is to explain and understand the deeper structures and mechanisms rather than to predict future events and hence it "seeks to identify the causes of a particular phenomenon that has occurred" (Wynn and Williams, 2012, p. 793). The efforts to create knowledge about the domains of real and actual are focused not on directly observing

the deep structures and mechanisms but rather on "coming to know their manifest effects" (Wynn and Williams, 2012, p. 794). When the structures and mechanisms are not directly observable the knowledge is produced based on inferences from the observable events. As such knowledge is contextual, provisional and transient (Bhaskar, 1975). This means that knowledge is not permanent and does not take one particular state but rather it changes accordingly to the structures, processes and actors within organisations. From a critical realism perspective it is argued that no knowledge is 100% certain and that knowledge is changed and transformed by the social, cultural, historical and organisational circumstances (Smith, 2006). This view is in line with the view adopted in this study recognising that knowledge exists in different forms which are dynamic in nature and complementing one another (Cook and Brown, 1999).

The premise of critical realism is that observable events depend on the deeper structures and processes by which our knowledge is limited (Wynn and Williams, 2012). As it is put by Bhaskar (1975) critical realism research aims to explore the components of this stratified reality as well as the underlying interactions that lead to the observable events. The question critical realism seeks to answer is "What must reality be like in order for this event to have occurred?" (Wynn and Williams, 2012, p. 794). The central question critical realism poses is: what caused something to happen? Critical realism emphasises the importance of understanding what provokes things to happen and why they are as they are (Easton, 2010). Following the critical realism perspective and rationale, the aim of the current research is to identify what causes knowledge sharing to happen within Bulgarian organisations.

The process of knowledge sharing as an observable event within organisations is well documented in the literature. However, little is known about how this process happens in the Bulgarian context. Critical realism recognises that knowledge is context-specific and that the same factors may lead to different events and that the same events may be caused by different factors (mechanisms and structures) (Wynn and Williams, 2012). Using critical realism as a guiding paradigm allows the investigation of the deeper structures and mechanisms affecting knowledge sharing within Bulgarian organisations. This current investigation starts from the event and by means of explication of structure and context the structures, the mechanisms and their interactions that may enable or obstruct the event are investigated (Wynn and Williams, 2012).

Apart from the explanation of the deeper structures and mechanism affecting the occurrence of the event, critical realism adopts a critical and emancipatory stance (Bhaskar, 1975; Sayer, 2000; Jashapara, 2007). This critical and emancipatory role "involves criticizing an organization or society's self understanding rather than adopting a disinterested stance common in more positivist or scientific approaches" (Jashapara, 2007, p. 754). The critical and emancipatory role is considered to be achieved through four steps (Sayer, 2000, p. 159):

(1) identifying problems;

(2) identifying the source or the cause of those problems;

(3) passing to a negative judgement of those sources;

(4) favouring (*ceteris paribus*) actions which remove those sources.

This way critical realism provides the opportunity to be critical of the organisations and their practices in an attempt to identify any problems and their sources in relation to knowledge processes and to try to resolve the problems identified by targeting their sources.

2.4   Summary

This chapter outlined the dominating epistemological perspectives – epistemology of possession and epistemology of practice (Cook and Brown, 1999; Newell et al., 2009; Hislop, 2009). Going beyond understanding knowledge as either explicit or tacit, individual or group, or constituted in action, the 'bridging epistemologies' view appears the most comprehensive view of knowledge by recognising that there are different forms of knowledge and by treating them as complementary (Cook and Brown, 1999). This latter view is adopted in this study.

In light of the adopted epistemological perspective, critical realism was presented as a suitable paradigm guiding this study. Critical realism views reality as independent from the human mind but knowledge about this reality as context-specific and subject to continuous refinement and transformation based on participation and interactions (Sayer, 1992; Wynn and Williams, 2012). Guided by critical realism, this study aims to understand what factors cause knowledge sharing to happen in Bulgarian organisations. Prior to delving into the Bulgarian context, the literature is reviewed in order to extract the key factors affecting knowledge sharing. The systematic literature review is presented in Chapter 3.

3 LITERATURE REVIEW

3.1 Introduction

This chapter presents a literature review in order to identify the factors affecting Knowledge Sharing (KS) within organisations. The aim of the systematic review is to explore and critically analyse the existing body of work regarding knowledge sharing within organisations. This way the 'state of the art' literature is assessed and any gaps and limitations in the current state of the field are identified.

In order to do that, first the concept of Knowledge Management (KM) is presented and discussed. Then the chapter delves deeper into exploring how knowledge sharing is defined within the literature, identifying any discrepancies in the meaning and the use of the concept. Subsequently the main factors affecting knowledge sharing processes within organisations are presented and discussed. These factors appear to be: organisational culture, rewards, motivation, trust, networks, technology, power relation and transactive memory systems, where the latter two factors emerged from the exploratory qualitative study conducted as part of this research[2]. These factors are critically reviewed to display the convergence and the divergence within the literature in relation to their influence on knowledge sharing.

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[2] This research has two stages – exploratory qualitative and quantitative stage. Semi-structured interviews were conducted as part of the qualitative stage. Within the first iteration of the analysis of the results power relations and transactive memory systems emerged as important factors affecting knowledge processes in Bulgarian organisations. After this initial analysis the literature was reviewed afresh in relation to these two factors and their effect on knowledge processes. However, for consistency the review of these factors is presented in the literature review chapter which may not reflect precisely the chronology of the research.

3.2 Knowledge Management

Knowledge management has emerged as a concept as a result of the increasing importance of knowledge in the areas of management, organisation studies and information systems (Al-Alawi et al., 2007). In the same way that knowledge does not have one universal definition, KM is often considered as difficult to define. This is why Singh and Soltani (2010) look at it in a broad context and define it as "the process through which organisations generate value from their intellectual and knowledge-based assets" (p. 146). The generation of this value involves the sharing of knowledge within and between companies. The significant role of KM is indisputable for companies because they evolve in a continuously changing environment where what has taken place in the past may or may not reoccur in the future. Innovation cycles have shortened and organisations need to be dynamic and proactive. The only way for organisations to become dynamic and proactive is by understanding their own experiences and by leveraging their knowledge through KM practices (Singh and Soltani, 2010; Skyrme and Amidon, 1997). Hislop (2009) views KM as an umbrella term "which refers to any deliberate efforts to manage the knowledge of an organisation's workforce" (p. 59). Furthermore, the author argues that this can be achieved through ICT and through managing social processes. However, KM has somehow been equated predominantly with the information processing epistemology and is tightly connected with coding, storing and retrieving knowledge via ICT (Hislop, 2002). Such a perspective is presented by Alavi and Leidner (1999) who explain that KM "refers to a systemic and organizationally specified process for acquiring, organizing and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work" (p. 6).

Such conceptualisations have received a number of criticisms as they are located within the information processing perspective and the epistemology of possession where knowledge is assumed to be an object that can be codified, stored, managed and passed around (Alvesson and Kärreman, 2001; Tsoukas and Vladimirou, 2001; Alvesson, 2001). Swan et al. (1999) distinguish between a cognitive network model of KM primarily focused on IT and information processing, and a community networking model of KM where the emphasis is put on dialogue and active networking. Further to this Alvesson and Kärreman (2001) describe KM as an oxymoron since "the more management, the less knowledge to 'manage', and the

more 'knowledge' matters, the less space there is for management to make a difference" (p. 996). In an attempt to re-conceptualise knowledge managament as a concept, the authors suggest a new typology of KM approaches which differentiates between modes of managerial interventions and mediums of interaction. In their typology the authors outline four KM approaches: normative control (prescribed interpretations, managerial attempts to engineer and control individuals through organisational values and identity), community (emphasis on creating knowledge sharing culture and nurturing social relations), extended library (emphasis on information exchange through extensive use of technology) and enacted blueprints (managers provide guidelines and templates to be followed by the organiational members producing the required results) (Alvesson and Kärreman, 2001, p. 1005).

Following the epistemology of practice perspective Tsoukas and Vladimirou (2001) argue that "knowledge management…is primary the dynamic process of turning an unreflected practice into a reflective one by elucidating the rules guiding the activities of the practice, by helping give a particular share to collective understandings, and by facilitating the emergence of heuristic knowledge" (p. 990). This relates to the practice perspective by stressing the importance of action and socialisation. The authors go on to say that "managing knowledge does not narrowly imply efficiently managing hard bits of information but more subtly sustaining and strengthening social practices…In knowledge management digitalisation cannot be substituted for socialization" (Tsoukas and Vladimirou, 2001, p. 991). Building on this criticism, KM research is recognised to fall in three traps: the 'IT trap', overreliance on technology to solve all knowledge-sharing problems; the 'managerial trap', over-imposing of managerial opinion in relation to knowledge sharing, and the 'individual learning trap', more emphasis is put on the individual rather than on the social interactions and relationships (Sherif et al., 2006).

Resulting from the brief discussion on KM, two contrasting approaches to knowledge management are evident: "one suggests that knowledge should be disseminated efficiently through the use of information technology-based systems, the other maintains that it is more important to encourage and share the ''knowing'' that arises directly from the experiences of employees" (Matsuo and Easterby-Smith, 2008, p. 30). However, even within the different approaches to KM it is considered that knowledge sharing is an integral part of KM and even that the main purpose of KM is to support knowledge sharing (Huysman and de Wit, 2004; Jashapara, 2005).

3.3   Knowledge Sharing

As shown in the previous chapter, there are numerous views on knowledge classified within two epistemological perspectives: epistemology of possession and epistemology of practice (Cook and Brown, 1999). From the perspective of the epistemology of possession organisational knowledge follows the taxonomic view which is characterised by the notion of explicit and tacit knowledge (Tsoukas, 1996). From the perspective of the epistemology of practice knowledge is seen as a process enacted in people's everyday activities and practice (Blackler, 1995; Orlikowski, 2002).

Knowledge sharing following the taxonomic view of knowledge is related to the process of transferring knowledge as a commodity from one place, person, ownership, etc. to another (Liyanage et al., 2009; Chawla and Joshi, 2010; Syed-Ikhsan and Rowland, 2004). The purpose of such knowledge transfer is for the receiver to replicate the knowledge transferred from the sender (Szulanski, 1996; Szulanski et al., 2004). Liyanage et al. (2009) argue that "knowledge transfer is about identifying (accessible) knowledge that already exists, acquiring it and subsequently applying this knowledge to develop new ideas or enhance the existing ideas" (p. 122). When following the taxonomic perspective of knowledge, many scholars often use the terms 'knowledge sharing' and 'knowledge transfer' interchangeably implying conveyance of knowledge from one person, unit, organisation to another (Foss et al., 2010).

However, the real issue with knowledge sharing following the taxonomic perspective is that knowledge "is normally treated as functional resource" (Alvesson, 2001, p. 865). Furthermore, Hicks et al. (2009) stress that "the reason why 'knowledge transfer' is problematic, is not because knowledge is sticky [as described by Szulanski (1996) and Szulanski et al. (2004)], but because the meaning of the knowledge being transferred is different for the sender than it is for the receiver" (p. 293). However, negotiating the meaning would not solve the transfer problem as Hicks et al. (2009) explain that "regardless of whether it is 'knowledge' or 'meaning' that is being transferred—both rely solely on the metaphor of 'transfer'. But the 'transferring' of knowledge or meaning will always be one step short of the 'using' of it, or, one step short of knowing" (p. 294).

From a practice perspective, the taxonomic view and the notion of knowledge transfer and transfer of "best practices" are identified as problematic because a "best practice" in one context might not be the "best" in another and knowledge is assumed to be an object that can be transferred directly 'as-is' from one place to another (Orlikowski, 2002). Organisations often take care of knowledge as a resource – implement information and communication technologies, source more experts, provide more training, implement "best practices", but they often overlook knowing and participating (Hicks et al., 2009). This problem was clearly presented in the example of transferring Western practices to the Bulgarian context as described in Chapter 1. The aftermath of the attempt to transfer Western practices to the Bulgarian context was that transfer "as-is" is not possible because the context of the environment and the culture need to be taken into account (Michailova and Hollinshead, 2009). Newell and Galliers (2006) stress that "knowledge is not…a 'resource' that can simply be transferred; nor is it 'embedded' in organizational processes… Rather, from this perspective, knowledge is seen to emerge as people interact recurrently in the context of established routines and procedures." (p. 442). Schön (1983), cited in Orlikowski (2002), illustrates this perspective by providing an example of five professionals whose skilful practice was not based on some a priori knowledge but rather:

> When we go about the spontaneous, intuitive performance of the actions of everyday life, we show ourselves to be knowledgeable in a special way. Often we cannot say what it is that we know.... Our knowing is ordinarily tacit, implicit in our pattern of action and in our feel for the stuff with which we are dealing. It seems right to say that our knowing is in our action (p. 251).

This example illustrates that the focus is on the 'knowledgeability' of action. This view further challenges the assumptions of the taxonomic view by arguing that knowing in practice "does not exist "out there" (incorporated in external objects, routines, or systems) or "in here" (inscribed in human brains, bodies, or communities). Rather, knowing is an ongoing social accomplishment, constituted and reconstituted in everyday practice" (Orlikowski, 2002, p. 252). Further to this, Styhre (2003) describes knowledge as a fluid which is embedded in people's relationships and emerges in practice and as such "the fluid is always in conflict with managerial objectives that are based on full control and determinate positions" (p. 35). This is why the functionalist view of knowledge is more favourable within organisations as knowledge processes are more easily manageable and controllable (Alvesson, 2001; Alvesson

and Kärreman, 2001; Dudezert and Leidner, 2011). An example of knowledge emerging in practice through improvisation and collective efforts is provided by Weick (1987). In this example a group of Hungarian soldiers who found themselves lost in the Alps during a snowstorm were able to find their way and pitch a camp after they discovered a map. Interestingly, the map was actually of the Pyrenees, but its discovery is related to a "situationally enacted capability-constituted through reading the map, using it to calm themselves and make sense of their surroundings, and then beginning to take purposive action towards finding a way out of the mountains" (Orlikowski, 2002, p. 253). In this way the soldiers improvised and acted upon the situation to its successful resolution.

Based on the different views of knowledge, knowledge sharing processes can be researched from different perspectives following either epistemology of possession or epistemology of practice. As presented in Chapter 2 this study adopts the 'bridging epistemologies' perspective (Cook and Brown, 1999). From this perspective knowledge still possesses its explicit and tacit characteristics but it participates in a "generative dance" with knowing and practice (Cook and Brown, 1999). Following the taxonomic view, knowledge sharing in this research is defined as the degree to which people within organisations share both tacit and explicit knowledge (Bock et al., 2005; Yang and Chen, 2007). Despite the exchange of explicit and tacit knowledge, important aspects of every knowledge process are those interactions where, through dialogue and socialising, knowledge is constructed and transformed (Newell et al., 2009; Orlikowski, 2002). This leads to the proposition of a knowledge process referred to here as Knowledge Interactions (KI). Knowledge interactions are here broadly defined as knowledge processes based on dialogue and interactions. Furthermore, both knowledge sharing and knowledge interaction processes and factors affecting such processes are investigated.

3.4   Factors Affecting Knowledge Sharing/Knowledge Interactions

The first objective of this study is to e*xplore how knowledge is shared in Bulgarian organisations and what key factors affect knowledge sharing*. Bulgarian organisations have not yet been subject to such investigation, thus it is important to review the existing literature in order to identify the key factors affecting knowledge sharing processes.

The literature review suggests that the main factors which influence knowledge sharing processes are (in no particular order of dominance): organisational culture, rewards, motivation, trust, networks and technology. Power relations and transactive memory systems, which appeared as important factors affecting knowledge processes in Bulgarian organisations (see Footnote 2), currently remain underexplored in the literature. The effects of the identified factors on knowledge sharing and knowledge interactions are explored in detail in the following section.

3.4.1.   Organisational culture

The literature review suggests that organisational culture is a very important factor in influencing knowledge processes. McDermott and O'Dell (2001) distinguish between two dimensions of organisation culture – visible and invisible. The invisible aspects are the unspoken set of values which are deeply rooted within the company. This dimension is defined by Schein (1985) as the artefacts, beliefs, values, practices and assumptions which are shared by all members of the organisation. Conversely, the visible aspects are the artefacts of the culture which include adopted values, the philosophy and the mission statement of the company, the structure of the organisation, the stories, the myths, the working environment and the language (McDermott and O'Dell, 2001). From that perspective culture is referred to as an organisational climate and is seen as the routinised norm in the organisation that either encourages people to apply maximum effort or prevent them from doing so (Park et al., 2004; Bock et al., 2005).

In general the research has shown that organisational culture has a great impact on the sharing of knowledge (McDermott and O'Dell, 2001; Al-Alawi et al., 2007; Wong, 2005). McDermott and O'Dell (2001) suggest that if there is a knowledge-sharing culture in place the transferring of knowledge is easier and smoother since in this type of culture people share the same values and ideas. Within such a culture sharing comes naturally to people, as opposed to them feeling forced to do it. According to Davenport and Prusak (1998) culture is what predetermines the success of any knowledge project, not the actual knowledge content or the technology. Storey and Barnett (2000) note that "getting employees to share what they know is no longer a technology challenge, it's a corporate culture challenge" (p. 148). More recent studies elaborate on that point and emphasise that it is not the communication channel

that supports knowledge sharing but rather the organisational culture (Vuori and Okkonen, 2012). This could be achieved through a distinct connection between the immediate organisational goals, the deep organisational values and the sharing of knowledge. Knowledge sharing has to appeal to something deeper and it should not be taken for granted that people will share knowledge just because this is 'the right thing to do' (O'Dell and Grayson, 1998). Furthermore, a knowledge sharing culture can be enhanced through social and informal interactions (Wu et al., 2007; Taminiau et al., 2009). However, research shows that informal networking is not a preferred means for coordination as opposed to more formal coordination mechanisms (Tsai, 2002). In relation to knowing in practice Newell and Galliers (2006) stress that practice transfer and learning are based predominantly on social networks and informal dialogue. Thus networks within organisations need to be nurtured to help build a sharing culture within them.

The general perception is that organisational culture is the driver for successful knowledge sharing processes. However, this assumption is challenged in a number of ways. A number of questions open to debate arise including how culture should be defined, what constitutes a corporate culture and what the attributes of such culture are and whether organisational culture always has a positive effect on knowledge processes. A number of studies bring more clarity in relation to these questions. For example, Suppiah and Sandhu (2011) examine three types of organisational culture: clan, market and hierarchy. They conclude that clan culture has a positive effect on knowledge sharing processes while both market and hierarchy affect these processes negatively. Another differentiation is made between cooperative and competitive organisational cultures where cooperative culture enhances knowledge sharing while competitive culture inhibits it (Jashapara, 2011). According to Riege (2005) building a cooperative culture depends on the synergy between three main factors: motivation and encouragement to share; flat and open organisational structure; and technology. Zarraga and Bonache (2005) emphasise that creating a sharing atmosphere highly relies on an actively involved leader, rewards, training and social events. They reinforce the concept of 'high care' which needs to be promoted within organisation for successful knowledge sharing. Von Krogh (1998) introduced the idea of care to others in a relationship which encourages knowledge sharing by promoting mutual trust, active empathy, access to help, leniency in judgment, and courage. Another study conducted by Al-Alawi et al. (2007) focuses on organisational culture in relation to factors such as trust, communication, information systems, rewards and organisational structure. Bock et al. (2005)

relate organisational culture/climate to dimensions of affiliation, fairness and innovativeness. Further, Bock et al. (2005) explain that the organisational culture/climate is affected by deeper organisational factors such as power relations. Thus more research in this area is needed as opposed to just blaming the organisational culture for the failure of the knowledge sharing processes (Hall and Goody, 2007).

The concepts of organisational culture and organisational structure are closely related (Riege, 2005; Zarraga and Bonache, 2005; Al-Alawi et al., 2007). The dominant view is that hierarchical structures obstruct knowledge processes (Dasgupta et al., 2009; Disterer, 2003; Al-Alawi et al., 2007; Riege, 2005). It is argued that knowledge sharing flourishes in flat and open structures with fewer boundaries where information flows easily (Syed-Ikhsan and Rowland, 2004; Riege, 2005). Structures that are hierarchical and bureaucratic can hinder communication and knowledge transfer (Disterer, 2003; Joia and Lemos, 2010). This view is shared by Wilkesmann et al. (2009) who establish that in hierarchical structures it is not so much about cooperation but more about competition which obstructs knowledge transfer. For knowledge transfer to take place, and particularly for tacit knowledge transfer, people should be accessible when their knowledge is required, regardless of their position in the hierarchy (Joia and Lemos, 2010). Dasgupta et al. (2009) contend that knowledge should not be blocked in pyramid structures but that learning networks should be implemented so that knowledge can flow across boundaries. Moreover, sharing knowledge is an entirely voluntary decision and it cannot be forced through a hierarchical structure (Kaser and Miles, 2002). This view is questionable as a strictly controlled environment based on formal structure which limits what people can do or cannot do creates a barrier to knowledge transfer (Fahey and Prusak, 1998; Sun and Scott, 2005; Szulanski, 1996). An emphasis within the literature is put on the role of the leaders and on the rewards provided to enhance knowledge sharing.

3.4.2.   Rewards

Leaders have a major role to play in promoting greater knowledge sharing and interactions between people. They can provide support mechanisms for people to collaborate across the boundaries of the organisational structure (O'Dell and Grayson, 1998; Husted and Michailova, 2002). In order to support collaboration between people and encourage sharing, it is argued that managers should introduce appropriate reward systems (Al-Alawi et al., 2007).

The role of rewards to enhance knowledge sharing has been a well-researched subject and the results are quite controversial. There is an on-going debate on whether rewards really stimulate knowledge sharing. The dominant view is that the lack of rewards for people who learn and share is a great barrier to knowledge sharing (Disterer, 2003; Szulanski, 1996; Gupta and Govindarajan, 2000; Cabrera and Cabrera, 2005; Zarraga and Bonache, 2005) as knowledge sharing needs to be incorporated within the organisational practices (Davenport and Prusak, 1998; Joia and Lemos, 2010). However, other scholars consider that the introduction of rewards cannot provide long-term benefits and stimuli for knowledge sharing as people need to feel satisfied and rewarded by the work they do (McDermott, 1999; McDermott and O'Dell, 2001; O'Dell and Grayson, 1998). Moreover, reward systems can impact negatively on knowledge sharing and especially on the sharing of tacit knowledge because directly connecting rewards to the capacity to share personal knowledge may affect the way people feel about this process and reduce their sense of satisfaction in sharing for its own sake (Seba et al., 2012). In a way, rewards can have the opposite effect as people are only inclined to share if they are rewarded for it (Kaser and Miles, 2002). Following the same line of reasoning, Husted and Michailova (2002) argue that rewards do not increase people's motivation for knowledge sharing.

3.4.3.   Motivation

Motivation is another factor considered to influence knowledge processes and it has been the focus of many studies (Hau et al., 2013; Vuori and Okkonen, 2012; Joia and Lemos, 2010; Wilkesmann et al., 2009; Zboralski, 2009; Osterloh and Frey, 2000). A lack of personal willingness to share is a major barrier to knowledge transfer as people often perceive it as additional work (Lam and Lambermont-Ford, 2010; Szulanski, 1996; Disterer, 2003).

In general there are two types of motivation – extrinsic and intrinsic (Osterloh and Frey, 2000; Cabrera and Cabrera, 2002; Liyanage et al., 2009). Employees are extrinsically motivated when they satisfy their needs indirectly through obtaining mainly monetary benefits. According to Osterloh and Frey (2000) the typical extrinsic incentive is pay for performance. Extrinsic motivation is assumed to support the transfer of explicit knowledge but fails in relation to tacit knowledge (Lam and Lambermont-Ford, 2010). Employees are intrinsically motivated when their actions directly result in immediate satisfaction such as

successful fulfilment of work tasks and objectives. Intrinsic motivation assists the creation and transfer of tacit knowledge (Osterloh and Frey, 2000). However, intrinsic motivations are more ambiguous than the use of the 'carrot and stick' approach. In addition, intrinsically motivated employees may work against the employer as they might have undesirable motivations such as envy or desire for dominance (Osterloh and Frey, 2000). Despite the fact that motivation is recognised as an important factor affecting knowledge processes, motivation is regarded as an individual quality which relates back to the notion of knowledge being a transferrable commodity where people need to be motivated and willing to pass it around.

If knowledge is viewed as an object, there is an exchange of codified knowledge which is extrinsically and monetarily motivated. If knowledge is viewed as tacit, embedded within people, then motivation is about increasing one's reputation and status by doing the right thing (Wasko and Faraj, 2000). If knowledge is viewed from a community perspective then it is considered as a public good and the motivation is hence to achieve reciprocity so that if one helps someone else, then one expects help in return (Wasko and Faraj, 2000). The community view is related to the practice view (Newell et al., 2006). From a community practice perspective the individual motivations are not as important as the relationships between people. Within such relationships a high level of trust is required to promote knowledge sharing and interactions (Matsuo and Easterby-Smith, 2008).

3.4.4.   Trust

Trust is recognised as an important factor for knowledge sharing processes (Foos et al., 2006; Davenport and Prusak, 1998; Joia and Lemos, 2010; Al-Alawi et al., 2007; Roberts, 2000). It is thought that willingness to share depends on trust (Holste and Fields, 2010). High levels of trust promote knowledge sharing (Matsuo and Easterby-Smith, 2008; Vorakulpipat and Rezgui, 2008; Willem et al., 2006; Willem and Scarbrough, 2006) and the lack of trust is a barrier to the transfer of knowledge (Riege, 2005; Sun and Scott, 2005). Trust is also seen as a main prerequisite for the successful transfer of tacit knowledge (Inkpen and Dinur, 1998, Roberts, 2000) while the transfer of explicit knowledge is considered to be based less on trust as it does not require the same level of socialisation (Inkpen and Dinur, 1998). Thus trust could be seen as a driving factor for knowledge interactions as they are highly based on

socialising activities and dialogue.

While there is a general consensus within the literature on the positive effects of trust on knowledge processes, what constitutes trust is relatively unclear. The concept of trust is found to be multifaceted and there is no consensus on its meaning (Adler, 2001). One view of trust focuses on the shared norms within a group and is characterised by honesty and cooperative actions between the members of the group or the organisation (Mishra, 1996). Mayer et al. (1995) take an interpersonal view and describe trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (p. 712). Furthermore, the authors differentiate between three dimensions of trustworthiness: benevolence, integrity and ability. Ability is described as trust in someone's skills and competences, such individuals are highly trusted to do tasks related to their areas of expertise. Benevolence trust is described as "the perception of a positive orientation of the trustee toward the trustor", for example between a mentor (trustee) and a protégé (trustor) (Mayer et al., 1995, p. 719). Integrity trust is related to the relationship between the trustee and the trustor and the degree to which "the trustee adheres to a set of principles that the trustor finds acceptable" (Mayer et al., 1995, p. 719).

Four dimensions are suggested by Mishra (1996): concern, reliability, competence and openness. The competence dimension of trust relates to people's competences and the trust the managers have in these competences. The openness dimension of trust is related to the openness and honesty between the managers and the subordinates. The concern dimension of trust relates to the reassurance that the other party will not engage in opportunistic behaviours and will not take unfair advantage of the trustor. The reliability dimension of trust is related to the consistency, credibility, reliability and dependability between words and actions (Mishra, 1996). Another differentiation is made between affect-based trust and cognition-based trust by McAllister (1995). The cognitive dimension of trust is described in that "we choose whom we will trust in which respects and under what circumstances, and we base the choice on what we take to be 'good reasons', constituting evidence of trustworthiness" (Lewis and Weigert, 1985 cited in McAllister, 1995, p. 25-26). Affect-based trust is related to the emotional aspects of trusting relationships along with care, concern and belief in the reciprocity of these sentiments (McAllister, 1995).

More recent studies on trust adopt different combinations of these dimensions. For example, Yang and Farn (2009) adopt a combination of affect-based trust and shared values and explore their effect on tacit knowledge sharing. Their findings show that both dimensions of trust have a positive effect on tacit knowledge sharing. Usoro et al. (2007) explore trust in relation to knowledge sharing from three perspectives: benevolence, integrity and competence. All three dimensions are found to have positive influence on knowledge sharing. Wu et al. (2007) consider affect-based trust as an important factor and the results identify that it affects positively both knowledge sharing and learning. Mooradian et al. (2006) explore the effect of interpersonal trust on knowledge sharing within and between teams from two perspectives: trust in peers and trust in management. Their results indicate that trust in peers significantly affects knowledge sharing within and between teams while trust in management has not exhibited significant effect on neither of them. Additionally, Leana and Van Buren (1999) conceptualise trust as an important aspect of social capital. That perspective has become popular in management and IS studies (for example Maurer et al., 2011; Yang and Farn, 2009; Chow and Chan, 2008; Sherif et al., 2006).

Despite the variety of different conceptualisations, Davenport and Prusak (1998) argue that without trust all knowledge initiatives are doomed to fail, regardless of the support of technology. The authors claim that trust must be visible, ubiquitous, should start from the top, and that it should be embedded within the culture. Schoorman et al. (2007) argue that "trust is based in relationships" (p. 345). It is noted that people tend to share knowledge and particularly tacit knowledge more freely within trusting relationships (Kaser and Miles, 2002). These trusting relationships develop within networks (Tsai and Ghoshal, 1998).

3.4.5. Networks

Human networks are key drivers for successful knowledge sharing and interactions (McDermott and O'Dell, 2001). Within organisations there are formal and informal networks. Informal relationships between employees are thought to give a more accurate picture of how work is done in an organisation rather than the formal relationships established officially by the structure in place (Cross et al., 2002). Empirical research highlights that common coffee breaks, lunches, breakfasts and meetings around the water fountain cultivate knowledge sharing due to the fostering of personal proximity and informality (Lilleoere and Hansen,

2011; Corti and Storto, 2000; Brown and Duguid, 1991). Davenport and Prusak (1998) stress that "in a knowledge-driven economy talk is real work" (p. 90). This kind of talk might be considered more as a gossip than real work, but what sounds like gossip can be the sign of the transferring of knowledge and the updating of the network (Davenport and Prusak, 1998).

Human contacts and relationships are extremely important for the organisation so that it does not find itself in a situation where "the left hand not only doesn't know what the right hand is doing, but it also may not even know there is a right hand" (O'Dell and Grayson, 1998, p. 157). Szulanski (1996) recognises that one of the difficulties in transferring knowledge is to identify the need for knowledge as well as to find the knowledge to satisfy the need. O'Dell and Grayson (1998) call this situation 'ignorance', where someone needs knowledge but does not know where to find it, as well as the opposite case where someone has the knowledge but does not know who needs it. The same idea is corroborated by Hansen et al. (1999) who identified the same phenomenon especially in a multiunit organisation. This might be related to the difficulty people have in recognising the value of their knowledge and identifying whether it is valuable to their colleagues (Disterer, 2003, Joia and Lemos, 2010). In relation to this problem, human networks help people to find out who knows what and who does what (McDermott and O'Dell, 2001; Tsai, 2001; Reagans and McEvily, 2003).

Communities of Practice (CoPs)

Recent literature is more focused on the concept of communities of practice as opposed to informal networks (Guechtouli et al., 2013; Jeon et al., 2011; Wolf et al., 2011; Zboralski, 2009). The concept emphasises that informal learning and knowledge sharing can be fostered in networks as the members of the community form a sense of identity and belonging to the network (Becker, 2007). CoPs first emerged in instances of learning through apprenticeship and situated learning (Lave and Wenger, 1991). Wenger et al. (2002) define CoPs as groups of people who share an interest or passion about a subject or an issue and who are willing to increase knowledge on this subject by interacting between themselves. Organisations can to some extent cultivate the CoPs as they can recognise them, encourage their formation and support their functioning (Wenger et al., 2002). McDermott and Archibald (2010) explain that "informal employee networks, or communities of practice, are an inexpensive and efficient way for experts to share knowledge and ideas" (p. 85). Furthermore, the authors point out that "communities work best if they have clear accountability and management oversight" (p. 85). Accountability and explicit goals make communities of practice very similar to teams,

however, the literature recognises a number of distinct features that differentiate them (McDermott and Archibald, 2010; Wolf et al., 2011; Zboralski, 2009):

- CoPs have a long term view while teams focus on specific deliverables.
- The leaders in the CoPs are there to support the community but they do not have any authority over the members of the community.
- CoPs are not limited to the boundaries of the organisation or their peers, but they try to expand their network and resources.
- CoPs keep the knowledge in their domain with "a view toward solving problems that have not yet been discovered" (McDermott and Archibald, 2010, p. 87).
- CoPs are built upon passion, interest in a subject, commitment and identification with the expertise of the other members.
- The community stops operating when the interest to maintain the group disappears.
- Members of the community are self-selected and membership is voluntary.
- Motivation within CoPs is intrinsic by nature as opposed to the dominating 'carrot and stick' practice within the formal organisation.

The ease of knowledge sharing and collaboration within CoPs stems from the informality and family-like atmosphere between the members (Thompson, 2005). Even though the development of CoPs is a difficult process, their development and cultivation is argued as necessary to ensure success (Wenger et al., 2002). However, Thompson (2005) reveals that organisational attempts to structure and channel this informality result in destruction of the CoP. There is a fine line between seeding and controlling these communities which requires resources which may be unavailable to organisations, especially to small and medium-sized organisations. Research has identified three main reasons for the failure of cultivated CoPs: the community members have restricted access to organisational information; power relations and the extent to which the communities are monitored and controlled in their activities; and working on an unexciting topic. Thus, there should be a balance of managerial interventions on CoPs (Wolf et al., 2011).

The importance of informal networks is strongly evident in the Chinese working culture where such networks, referred to as guanxi, are considered crucial for knowledge processes. The literal meaning of guanxi provided by Yang (1994), cited in Huang et al. (2011) is "a relationship between two or more individuals that is implicitly based on reciprocity and

mutual interest" (p. 558). Davison et al. (2013) stress the positive impact guanxi networks have on the informal communication and knowledge sharing. Another term describing social networks in Soviet Russia is blat. Blat networks are described as friendship networks which facilitate the exchanging of individual favours and access to information and resources (Michailova and Worm, 2003). However, the context of these networks is slightly different as during communist times there had been a shortage of resources and blat networks were useful sources of information, resources and privileges (Michailova and Worm, 2003).

3.4.6.   Technology

Technology is considered to facilitate knowledge transfer between people as well as information transmission and communication (Fahey and Prusak, 1998, O'Dell and Grayson, 1998, Singh, 2007). Scholars agree that technology is an excellent means of sharing knowledge as it crosses the boundaries of time and space (Singh, 2007). Most companies do not see technology as a barrier to knowledge management and often identify KM with technology (KPMG, 2000). According to the KPMG report, organisational efforts in relation to KM equate to implementation of new ICT. However, companies have identified a number of non-technological barriers to knowledge sharing that are considered dangerous to investment in the Knowledge Management System (KMS). Some of the barriers identified are: inadequate communication, lack of embedment in the use of KMS within work practices, lack of training, absence of personal benefits from using KMS, lack of senior management support; lack of time to learn and become familiar with the system (KPMG, 2000).

One of the issues with the use of IT is that "technological contact is equated with face-to-face dialogue" (Fahey and Prusak, 1998, p. 273). Technology is a good facilitator when transmitting data and information but it cannot substitute human interactions, meetings and dialogue. Topi et al. (2006) investigate how people build knowledgeability by using an enterprise resource planning system (ERP). In opposition to their expectations, the authors find that knowledgeability in using the ERP system is built through the use of informal notes rather than through the formally available materials and training provided. To further strengthen the role of informality, Prieto and Easterby-Smith (2006) explain that knowledge sharing via social interactions enhances the development of dynamic capabilities, while knowledge sharing using ICT was found to be less supportive of dynamic capabilities

development. Another issue with the implementation of technology is the fact that it is assumed that after implementation people will use it to share information and to apply the information that is made available (Brown and Duguid, 1991; Davenport and Prusak, 1998; Storey and Barnett, 2000; O'Dell and Grayson, 1998). Davenport and Prusak (1998) describe very well that:

> Technology alone won't make a person with expertise share it with others. Technology alone won't get an employee who is uninterested in seeking knowledge to hop onto a keyboard and start searching or browsing. The mere presence of technology won't create a learning organization, a meritocracy or a knowledge-creating company (p. 142).

The majority of companies invest in establishing intranets and KMS systems which aim to enhance the sharing and managing of knowledge. Davenport (2005) cited in McAfee (2006) conducted a survey among knowledge workers and the use of technology. The survey showed that all knowledge workers use e-mail extensively, while intranet, instant messaging and extranet are used considerably less. However, 26% of the participants felt that e-mails were overused, 21% felt overwhelmed by the amount of e-mails, 15% of the people pointed out that their productivity had diminished, and more than 50% shared that it was difficult to find what they were looking for using the intranet. More recent studies assert that KMS cannot successfully enhance knowledge sharing without taking social and organisational aspects into account (Padova and Scarso, 2012). This limitation is even more strongly recognised from the practice-based perspective (Newell and Galliers, 2006; Currie and Kerrin, 2004).

Web 2.0

More recently, a new dimension has been added to knowledge management practices, the umbrella of Web 2.0 technologies and platforms such as wikis, blogs, social networking sites (Ardichvili et al., 2003; Paroutis and Saleh, 2009; McAfee, 2006). These technologies and their distinctive socially-driven features are thought to stimulate and even bring passion to the sharing of knowledge, which it has been argued helps overcome the limitations of the technologies currently used in organisations (Kaiser et al., 2007; McAfee, 2006). McAfee (2006) explains that "current technologies are not doing a good job of capturing knowledge. New platforms focus not on capturing knowledge itself, but rather on the practices and output

of knowledge workers" (p. 23). The main problem with the traditional technologies is that they are predefined and used to send static information which, in the case of e-mails, results in an information overload (Schneckenberg, 2009). This has led companies to introduce Web 2.0 technologies within their business practices. The key objective of these new technologies is to allow for greater social networking behaviours within the corporate context and enhance collaboration between people (Schneckenberg, 2009). Paroutis and Saleh (2009) have investigated the motivations and barriers of employees' willingness to engage and share knowledge through Web 2.0 technologies. The following Table 3.1 summarises their findings:

Employees' motivations to using Web 2.0	Employees' barriers to using Web 2.0
The ability to communicate beyond space and time limitations;	The concern of people that they might find themselves isolated in the use of these technologies;
Keeping each other updated with latest events;	Lack of support and recognition;
Finding out what the latest activities of the other employees are;	Information overload;
Discussing ideas and finding solutions to certain problems;	Lack of trust in the accuracy of the information available on these platforms;
Broadening their personal and professional networks.	Lack of trust in how the shared information will be used by others.
	Fear of publishing sensitive information.

Table 3.1: Employees' motivations and barriers to using Web 2.0

People who are not actively involved in using Web 2.0 technologies would consider using them if benefits, rewards and recognition were in place as well as training on how to use these technologies (Paroutis and Saleh, 2009). As a result the traditional tools, mainly e-mail, seem to be more valued than the new Web 2.0 technologies such as blogs, wikis or various social networking tools (Paroutis and Saleh, 2009). It is argued that the average person often undervalues the benefits of the new Web 2.0 technologies (Paroutis and Saleh, 2009). Strong managerial support is needed in order to leverage Web 2.0 technologies successfully (McAfee, 2006; Schneckenberg, 2009). Furthermore it is stressed that "the empowerment of employees is a necessary precondition for successfully implementing web 2.0-based information systems" (Schneckenberg, 2009, p. 234).

3.4.7.   Power relations

The majority of the literature on knowledge sharing ignores the issues of power and the overall assumption is to treat power as 'unproblematic' (Gordon and Grant, 2004). However, power relations are recognised as an important factor affecting knowledge processes (Marabelli and Newell, 2012; Nicolini, 2011; Contu and Willmott, 2003; Willem and Scarbrough, 2006). Thus scholars urge for further research on power relations within organisations as they are considered to be part of everyday life (Blackler, 1995; Marshall and Rollinson, 2004; Heizmann, 2011; Contu and Willmott, 2003).

In the literature the concept of power is quite ambiguous with no consensus on what constitutes power (Jasperson et al., 2002). For example, French Jr and Raven (1959), cited in Raman and Bharadwaj (2012), differentiate between three types of power: legitimate, expert and referent. Legitimate power is related to power stemming from the hierarchy where people occupying higher levels have the legitimate right to influence the behaviours of others. This is supplemented by coercion and is described as A forcing B to do something that B otherwise would not do (Raman and Bharadwaj, 2012; Kärreman, 2010). Expert power on the other hand stems from the expertise and the knowledge people possess, while referent is related to the access to resources. Bradshaw-Camball and Murray (1991) differentiate between three types of organisational power: functionalist, interpretive and radical. The functionalist perspective is situated within the structural-functionalist paradigm and power is treated as objective. Within the functionalist perspective, the authors identify two schools: the pluralist and the rationalist. The pluralist view "focusses on overt stakeholder behaviours such as coalition formation and bargaining", while the rationalist view "focusses on the legitimate authority of top management and the intended rationality of its decision making activities" (Bradshaw-Camball and Murray, 1991, p. 381). The interpretivist view relates to the interpetivist paradigm which holds that reality is socially constructed. Power from that perspective is exercised by controlling others without them being aware of the control mechanism to achieve one's goals. The radical perspective relates to the radical structuralist paradigm where power is not ascribed to individuals or their relationships but rather it is "social relationship embedded in a structure of selection rules for dealing with the world system" (Clegg, 1979 cited in Bradshaw-Camball and Murray, 1991, p. 383). This review of the literature shows that power can be manifested in different forms.

Within management, organisation studies and information systems literature, the two most dominant perspectives on power are epistemic, power as a restraining force, and systemic, power as a productive force (Kärreman, 2010; Hislop, 2009). As a restraining force, power is understood as something that makes people do things other people want them to do. As a productive force, power is seen as a resource, rather than as a restriction, the theory to which Michael Foucault is the main contributor (Kärreman, 2010; Lawrence et al., 2012; Hislop, 2009). From the epistemic perspective power is unevenly distributed within organisations and is regarded as a positional or personal resource (Hales, 1993 cited in Hislop, 2009). The same author further differentiates between four power sources: physical, based on the capacity to force and harm others; economic, money and capital; knowledge, individual expertise and control over relevant knowledge; and normative, control over ideas and values. Knowledge as power is a prominent perspective within the knowledge sharing literature where it is stressed that by sharing people give away their power and advantage in the organisation (Ardichvili et al., 2003; Chawla and Joshi, 2010; Yang and Maxwell, 2011; Willem et al., 2006). It is emphasised that the more power games exist within the organisations the less people share knowledge (Willem et al., 2006). Concerns over losing expert power increase when knowledge-sharing occurs through the corporate KMS technology where the ownership of the knowledge may become lost and may not lead to increase of reputation and benefits for the individual (Wang and Noe, 2010). However, from this perspective knowledge and power are perceived as objects where, by giving away knowledge, people give away their power within the organisation. Moreover, the more powerful people are not necessarily the most knowledgeable and even worse money can buy knowledge in terms of hiring experts and external consultants (Hislop, 2009; Lehr and Rice, 2002).

Foucault's ideas (Foucault, 1977, 1980) have received great endorsement in the management and information systems literature (e.g. Young et al., 2012; Doolin, 2004; Heizmann, 2011). The Foucauldian perspective emphasises moving away from the notion of power as a possession of those who can use it in instrumental ways. Instead the focus is on emergent character of power and instead of a property power should be "conceived … as a strategy . . . that one should decipher in it a network of relations, constantly in tension, in activity, rather than a privilege that one might possess" (Foucault, 1977, p. 26). Foucault sees power as socially constituted and enacted through practices and interactions where actors have an equally important role in its construction as opposed to power being ascribed to

human agency or structures. Power is relational and as such it is exercised through different mechanisms of social relations, micro-strategies and manoeuvres (Foucault, 1980). Central to Foucault's perspective is the idea of disciplinary power and the panopticon where prisoners learn to be obedient and self-disciplining because they are not certain exactly when they are being observed by the jailers (Foucault, 1977). Adopting that perspective has been very fruitful in IS studies where ICT technology is used as a tool of surveillance aiming to achieve self-disciplining behaviours from people in organisations (Hislop, 2009).

However, Foucault's view is not free from criticism. The use of ICT as a surveillance tool has been questioned since KM systems have limited abilities in capturing highly tacit knowledge and especially, since people engage in informal communication and interactions (McKinlay, 2002). As such informal communication may be potentially seen as way to avoid the negative effect of strong power relations. Additionally, Foucault's view of power is found to be very abstract and not practical which makes it difficult to research power. For example Fairclough (1992) notes that Foucault's conceptualisation on power is too distant from the social life and that he fails to present practical examples of such power relations in action. Even in the example of the panopticon, despite the fact that the jailers and the prisoners occupy the same space where social power dominates, Foucault himself recognises that rules and domination still exist as the jailers are in more advantageous position in relation the prisoners (Foucault, 1977). Sewell Jr (2005) explains that this is an attempt to control how people think. In the panoptiocon the jailers affect and control the prisoners by creating the impression of not being watched and the existence of social control. In the organisation the management affects and controls the workers either directly by means of domination and oppression or through the organisational culture. This resembles the critique provided by Habermas (1990) who emphasises that power is in a form of domination, oppression and repression. This phenomenon is vivid even in studies adopting Foucault's perspective. For example Heizmann (2011) follows Foucault's views on power but concludes that there are evident epistemic power relations which negatively affect knowledge sharing among dispersed teams within a multinational company. Heizmann (2011) uncovers that the head office exerts had control over the regional practitioners and the latter had limited possibilities to assert their voices.

Power may be manifested in different ways but the epistemic traits of power are deeply rooted in organisations and as such they are considered to affect the organisational system and

the knowledge processes. Raman and Bharadwaj (2012) in their study investigate the influence of power differentials in practice transfer. They have adopted the pluralist power perspective and the knowing in practice perspective in the context of healthcare. Through the pluralist lens, they distinguish between authoritative and non-authoritative coercion and influencing others. Authoritative coercion exists in a situation "when power differential across work roles is high" (Raman and Bharadwaj, 2012, p. 1596). When the work roles have comparable, as opposed to asymmetrical, power then is observed a non-authoritative influence based on negotiations for best practice transfer. Their research concludes that authoritative power obstructs the successful transfer of practices while non-authoritative power can enhance the transfer and can be considered helpful to the organisation since it is based on collaboration aiming to serve the organisational interests as opposed to self-interests (Raman and Bharadwaj, 2012). Similar effects of epistemic power are demonstrated in Russian organisations where one of the main reasons for knowledge hoarding appears to be "accepting and respecting a strong hierarchy and formal power" (Michailova and Husted, 2003, p. 62). This is so because hierarchical structures and strong formal power force people to focus on their self-interest as opposed to collaboration and sharing with others. Additionally, more powerful people consider themselves to be more knowledgeable based on the fact that they occupy higher position in the hierarchy. Thus the voice of the people occupying lower levels in the hierarchy is generally not considered which obstructs knowledge sharing (Michailova and Husted, 2003).

Bunderson and Reagans (2011) adopt the view that power is a social hierarchy which "differentiates in power and status among organisational actors" (p. 1182). The authors investigate the influence of social hierarchy in relation to three processes: anchoring on shared goals, risk taking and experimentation and knowledge sharing. The authors conclude that power differentials distract people from collective learning, compromise risk taking and experimentations and decrease knowledge sharing as well as "equal consideration of different members and insights" (Bunderson and Reagans, 2011, p. 1186). High power and status can lead people to ignore the contributions of others occupying lower levels. The authors pose a very relevant question of "what do we know about the extent to which power and status differences might affect the probability that the perspectives and insights of each actor will be given an equal and fair hearing?" and urge for further research of power relations (Bunderson and Reagans, 2011, p. 1185).

3.4.8.   Transactive memory systems

Transactive memory system (TMS) refers to a specialised division of labour where people create mental maps of who knows what and who knows who (Choi et al., 2010). The idea originated from Wegner (1986) through observing dating couples. He found that the dating partners were using each other as an external memory device. More recently, this concept has been explored in relation to team performance where it is found that transactive memory systems enhance team performance (Akgun et al., 2006; Majchrzak et al., 2007; Jarvenpaa and Majchrzak, 2008; Choi et al., 2010). Few papers focused on the effect of TMS on knowledge processes and found that a developed TMS leads to effective knowledge sharing, knowledge application and informal knowledge sharing (Oshri et al., 2008; Lewis et al., 2005; Choi et al., 2010; Davison et al., 2013).

Transactive memory systems are characterised by three dimensions: specialisation, credibility and cooperation (Lewis, 2003). Specialization describes who knows what within the organisation, credibility concerns the reliability of other people's knowledge and cooperation stands for the ability to work smoothly and efficiently in teams (Lewis, 2003). It is suggested that the more developed the TMS the greater the delegation of tasks within a group or organisation; the greater the trust in others' competence; and the greater the ability of the people to coordinate their activities (Lewis, 2003; Jarvenpaa and Majchrzak, 2008; Ren and Argote, 2011; Liang et al., 1995). Transactive memory systems are found to exist at individual, team and organisational levels (Oshri et al., 2008; Peltokorpi, 2012; Brandon and Hollingshead, 2004; Ren and Argote, 2011). From an organisational standpoint TMS is seen as embedded within organisational coordination networks (Peltokorpi, 2012). TMS affects practical executions of tasks by providing a pool of expertise to and of others. In this way, TMS is considered to enhance knowledge contributions within organisations (Faraj and Sproull, 2000; Kanawattanachai and Yoo, 2007; Alavi and Tiwana, 2002).

TMS is considered to be a practical integrated memory in people's minds which provides mental maps of who knows what and who knows who (Choi et al., 2010; Argote and Ren, 2012). As such social interactions and face-to-face communication are vital for creating and updating this memory (Lewis, 2004; Brandon and Hollingshead, 2004). Studies on virtual dispersed teams recognise that such interactions are constrained and promote the role of KMS

to develop and support TMS (Alavi and Tiwana, 2002; Oshri et al., 2008). Choi et al. (2010) found that technology has a positive effect on TMS development. However, despite the recognised facilitating role ICT has on TMS, its development is richer, more accurate and deeply rooted in the social interactions and dialogue between people (Hollingshead and Brandon, 2003). The authors further emphasise that if the interpersonal relationships and interactions are not present a TMS is unlikely to develop. Thus, TMS is characterised as a collective process where transactions between individuals create a link to other people's expertise (Nevo and Wand, 2005). In this way people create a link to other people's knowledge without knowing it themselves. It is stressed that in order for an organisation to make full use of its intellectual capital, people should know who knows what and should know whom to ask for help when performing a specific task (Shami et al., 2007). It is stressed that usually when people need information they turn for help to people rather than to impersonal sources (Akgun et al., 2006). Elaborating on that, Jarvenpaa and Majchrzak (2008) emphasise that people draw on their network to build TMS. Overall, TMS has been recognised as an important factor for enhancing organisational capabilities (Ren and Argote, 2011) but the research on the relationship between TMS and knowledge processes is scarce and scholars urge for more research in this area (Choi et al., 2010; Davison et al., 2013).

3.5   Summary

In this chapter a review of the knowledge sharing literature was conducted. Deeper exploration into what constitutes knowledge sharing was realised. As a result of this review, this study differentiated between two knowledge processes – knowledge sharing and knowledge interactions, where the latter concept is introduced in this research. Knowledge sharing follows the epistemology of possession perspective and is defined as the degree to which people within organisations share both tacit and explicit knowledge (Bock et al., 2005; Yang and Chen, 2007). Knowledge interactions are grounded in the epistemology of practice perspective and are defined as knowledge processes based on dialogue and interactions. Building on these two knowledge processes, a systematic literature review was conducted in order to identify the key factors influencing these processes. These factors are: organisational culture, rewards, motivation, trust, networks, technology, power relations and transactive memory systems. While the latter two emerged from the analysis of the semi-structured

interviews, they also appeared underexplored within the literature which calls for more research in these areas.

In the next chapter a number of theories are reviewed. The aim is to identify the most suitable theory that can help explore and explain knowledge interactions as a new construct as well as to incorporate the identified factors and explain the relationships between these factors and the knowledge processes.

4   THEORETICAL BACKGROUND

4.1   Introduction

The previous chapter outlined the two knowledge processes of interest to the current study, namely knowledge sharing and knowledge interactions, where knowledge interactions are suggested as a new construct based on the epistemology of practice. Additionally, a number of factors affecting these knowledge processes were identified, where some of these factors appear underexplored in the current state of the literature. The factors identified are: organisational culture, rewards, motivation, trust, networks, technology, power relations and transactive memory systems.

The aim of the present chapter is to review the potential theories that can help explore and explain the two knowledge processes and these identified factors. Most importantly, the theory needs to be suitable to explain the construct of knowledge interactions as well as to provide opportunity for incorporating the concepts of power relations and transactive memory systems. In order to achieve this, a number of theories in relation to knowledge processes are explored and deconstructed. These theories are: *communication theory, social capital theory, communities of practice, boundary objects* and *activity theory*, where the first two are theories situated within the epistemology of possession perspective, while the latter three follow the epistemology of practice perspective.

Subsequently, this chapter outlines activity theory in more depth, which is deemed the most suitable and appropriate theory to accommodate the construct of knowledge interactions as it challenges both the deterministic view and the social constructionism view by emphasising collective activities through which knowledge is constructed and reconstructed (Allen et al., 2013). Additionally, activity theory makes it appropriate to incorporate the concepts of power relations and transactive memory systems.

4.2   Review of Theories

This section explores the main theories used to study knowledge sharing processes in a quest to identify the most suitable theory to explore and explain knowledge interaction processes. The theories reviewed are: *communication theory, social capital theory, communities of practice, boundary objects theory* and *activity theory*.

4.2.1.   Communication theory/sender-receiver model

Within knowledge sharing literature the majority of studies have adopted the generic sender-receiver model (Hislop, 2002; Ko et al., 2005; Hotho et al., 2012). The sender-receiver model relies on five main components, namely, the sender of the message, the message, the transmission channel, the noise and the receiver of the message. Joshi et al. (2007) provide a detailed description of the model:

> Within this perspective, the message corresponds to the knowledge content that is being transferred. A sender corresponds to the knowledge source involved in transferring knowledge or the generalised knowledge resource. A receiver, commonly referred to as knowledge recipient, is the knowledge transfer destination or the entity which receives and internalises the knowledge content. A channel corresponds to the medium, such as face-to-face, phone, computers, through which the knowledge is transferred (p. 325).

As is evident from the quote above, within the sender-receiver model, knowledge is seen as a transferable object. When applying communication theory, different studies emphasise the various aspects of the model. For example, Szulanski (1996) explores all aspects; Kang et al. (2010) focus on the identity of the sender and the receiver; Gupta and Govindarajan (2000) focus on the motivation of the source, the transmission channel, the motivation to acquire knowledge and the absorptive capacity of the recipient. However, these studies ignore the actual message and the potential noise that may distort the message and lose its meaning with the receiver. Communication theory is less about the meaning, action and construction of knowledge but it is assumed to depend on the amount of common knowledge between the sender and the receiver (Reagans and McEvily, 2003; Tortoriello et al., 2012).

Szulanski et al. (2004) adopt a sender-receiver model to investigate the trustworthiness of the source on the successful outcome of knowledge transfer. The authors neglect the role of the receiver in the process as well as the interaction between the two parties. In their view, the ultimate purpose of the recipient in the knowledge transfer process is to replicate and reproduce a 'template' sent by the source. The main assumption is that knowledge is codified and the central purpose of knowledge transfer is in its accurate transmission. There is an expectation that after the sender has sent his/her knowledge the receiver will be able to replicate it to achieve the desired results. This becomes problematic as the distorted message may be replicated and a game of Chinese whispers ensues. Similar focus solely on the source characteristics are observed in other studies (e.g. Reagans and McEvily, 2003; Joshi et al., 2007). Studies taking this perspective often undermine the role of the receiver. As knowledge is treated as an object the most important aspect of the knowledge transfer process is the capability of the sender and the transmission channel used to transfer the codified knowledge as shown in the examples above. From that perspective technology plays a central part in the knowledge sharing process as a reliable transmission channel. Despite the central role of technology within sender-receiver model, technology as a medium of power is not present in the current state of the theory.

Other studies concentrate on the importance of the recipient for the success of the knowledge transfer process. Davy (2006) argues that the receiver is the key to the success of knowledge transfer and his/her role is to interpret the message and create new knowledge. This view breaks through the usual passive role the receiver plays, where the main goal is just to replicate the message. However, the centrality of on-going interactions between parties in the development of new knowledge is not acknowledged and a one-way dynamic is still assumed. The sender-receiver model is a linear, one-way dynamic model mainly emphasising the individual, predominantly the knowledge sender, and his/her motivations to share. However, individuals are intrinsically social and their activities are guided by the surrounding environment (Allen et al., 2011). Context is currently absent from the sender-receiver model which is seen as another major drawback.

Some scholars have stressed the importance of the completeness of the knowledge being transferred. For Lin et al. (2005) knowledge is a 'good' and the success of the transfer depends on the completeness of the information. The authors recognise the effect of 'signal jamming' and the ability of both the sender and the receiver to distort the message. In such

scenarios the knowledge transfer is considered unsuccessful as it solely depends on the completeness of the message. This reveals another paradox since knowledge is emergent, context specific and constantly evolving and transforming, thus it cannot be seen as complete. In contrast, sender-receiver theory is mainly concerned with the amount of knowledge sent and received (Lin et al., 2005). Evidently, the sender-receiver model focuses only on micro-perspective, solely on the individuals or the knowledge characteristics. Social relationships and institutional factors are greatly undermined within this sender-receiver framework. In an attempt to overcome some of the limitations of the rigid sender-receiver model, some scholars have blended the sender-receiver model with social capital theory (e.g. Wei et al., 2011; Kang et al., 2010).

4.2.2. Social capital theory

The majority of the factors identified as important antecedents for successful knowledge sharing concern the relationship between the parties involved. A widely used theory that sheds more light into the quality of the relationships between people during knowledge processes is social capital theory. The suitability of the theory is assessed in this section.

Generally, social capital is thought to exist in the relationships between people (Chow and Chan, 2008) and is about "everyone you know, everyone you knew, everyone who knows you even though you do not know them" (Edelman et al., 2002, p. 13). The literature provides a number of different conceptualisations of social capital from both micro and macro perspective consisting of numerous classification criteria (Adler and Kwon, 2002; Payne et al., 2011; Molina-Morales and Martínez-Fernández, 2009). To add to the inconsistencies in defining social capital, it is observed that "every contribution to this growing literature on social capital seems to use its own definitions" (Huysman and Wulf, 2006, p. 44). A well-established conceptualisation of social capital from a collective organisational perspective is provided by Nahapiet and Ghoshal (1998). The authors define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (p. 243). Further, Nahapiet and Ghoshal (1998) provide a framework to understand social capital in terms of relational, cognitive and structural dimensions. The relational dimension accounts for the relationships in terms of trust, reciprocity, expectations and obligations. The cognitive dimension provides

shared language, codes, goal and narratives amongst the parties. The structural aspect describes the network of actors along with their strong and weak ties and network characteristics (Nahapiet and Ghoshal, 1998).

While Nahapiet and Ghoshal's framework is a well-established framework when applying social capital theory, the literature shows that different studies focus on different aspects of social capital (Wei et al., 2011; Kang et al., 2010). Moreover, there is no unity in the way different studies, using Nahapiet and Ghoshal's framework, conceptualise social capital, thus the concept is found to be problematic in terms of its operational definitions (for example Inkpen and Tsang, 2005; Wasko and Faraj, 2005; Wong et al., 2008; Wei et al., 2011; Hau et al., 2013). These examples reveal the purposeful use of the social capital framework and it is questionable whether they have advanced the initial framework and whether these studies have clarified the ambiguous field of social capital. A review from Chow and Chan (2008) further reveals the discrepancies in the use of the three dimensions. Furthermore, a common fallacy observed in the majority of the studies using social capital is that it is assumed that social capital is a necessary and sufficient condition for knowledge sharing to take place. A study conducted by Wei et al. (2011) differs on this point and shows that social capital explains only 17% of the variability in knowledge transfer, thus leaving 83% unexplained, which shows that there are more factors that affect knowledge sharing.

Further to this, there is a call for expanding social capital theory by exploring institutional attributes and factors (Gooderham et al., 2011). This is especially relevant as sources of social capital are embedded in the social structure of the community (Adler and Kwon, 2002). Thus the understanding of the wider community is of vital importance. Social capital may be seen as only partially describing the context in terms of the relationships between the subjects. However, it mainly concerns the harmonious aspects of the organisational system and the prevailing view is that social capital is an organisational 'good'. This detracts from the premise that high levels of social capital may have destructive undertones and may lead to organisational stagnation and decay (Molina-Morales and Martínez-Fernández, 2009). Differentials in power relations call into question the static nature of organisational relationships. The nature of power relations is predominantly ignored within social capital theory; with some exceptions (e.g. Willem and Scarbrough, 2006). Additionally, transactive memory which is an important social factor is not found within social capital theory, and this is also a limitation.

Even though the notion of social capital enhances the understanding of the knowledge sharing and interactions processes in terms of relationships between the actors involved, it is noticed that there is still an embedded assumption that knowledge is a commodity transferred from one person or unit to another. Even within social capital theory, scholars count the number of ties and frequencies of interactions with specific people rather than focusing on the nature of interactions, dialogue and action (e.g. Kang et al., 2010). This view contradicts the practice-based perspective where knowledge is constructed in action.

4.2.3. Communities of practice theory

A theory that overcomes the one-way dynamics in knowledge processes observed in the sender-receiver model and in social capital theory is Communities of Practice (CoPs) theory. The core concept of CoPs theory is that people learn and share knowledge through participation. In-depth operationalisation of the concept of CoPs as well as related research has been provided in Chapter 3. This section reviews CoPs as a theoretical framework to guide practice research.

The concept of communities of practice originated from situated learning which explored learning through apprenticeship (Lave and Wenger, 1991). From that perspective the identity of the members and the level of participation are central to the learning and knowledge processes. In the CoP context the notion of knowledge as a commodity is overcome by an emphasis on practice-based perspective which "sees knowledge as located in relationships between people engaged in a particular practice" (Marabelli and Newell, 2012, p.19). Knowledge, therefore, is not an 'asset' of the community, but rather an activity which is formed through practice (Gherardi, 2009).

The central aspect of CoPs theory is identity – the identity of the 'old-timers' and the 'newcomers' (Lave and Wenger, 1991). While, there is hinted power-dynamics in the participation and the status of the different members as it is assumed that the 'old-timers' possess greater power through their access to knowledge (Lave and Wenger, 1991), the effect of such power differentials is not accounted for in the current conceptualisation of CoPs theory. However, even if 'old-timers' are recognised for their expert power within the community, there may not be such recognition within the formal hierarchy of the organisation

(Yanow, 2004). Additionally, the whole idea around identity is somehow seen as problematic. This is because identity within CoPs appears to be considered as a concrete, rigid entity defining the activities and the level of participation within the community. However, people can be members of multiple CoPs and thus have multiple identities (Koliba and Gajda, 2009). It is also suggested that individual identity is shaped not only by the involvement in multiple CoPs but also by the wider organisational environment (Handley et al., 2006). Such predispositions have not received much attention in the current state of the literature and theory.

From CoPs perspective, learning happens through negotiation of meaning and identity within the community (Wenger, 1998), which in effect reflects a social constructionist view of learning (Fox, 2000). From that perspective CoPs have received a great deal of criticism for being more focused on the community than on the aspect of practice (Brown and Duguid, 2001; Lindkvist, 2005). From a social constructionism perspective it could be further suggested that in different communities learning happens differently (Fox, 2000; Koliba and Gajda, 2009). Therefore, a central question becomes "what aspects of those differences are determined by more macro factors of occupational organization, structure and purpose – the large-scale version of a community – and what by particular, localized patterns of social interaction – the small-scale version?" (Hodkinson and Hodkinson, 2004, p. 5). Such important aspects affecting learning and interactions are not accounted for by CoPs theory. Therefore, a limitation in this theory is that it ignores the wider structure and context where interactions take place.

CoPs theory does not take into account the exact nature of the relationships between people. They are assumed to be harmonious as they are based on voluntary membership and shared interest. However, this may not always be the case and contradictions may exist. Current conceptions of CoPs often overlook issues of power. In the light of that limitation, Roberts (2006) stresses that CoPs should no longer be treated as existing in vacuum. Contu and Willmott (2003) call for the incorporation of power relations within situated learning theory and CoPs, and recognise that most research is focused on consensus within CoPs rather than on conflict and contradictions. It appears that power relations are neglected at a number of different levels. On the one hand, power relations within the CoPs are neglected, whereas on the other hand power relations between different CoPs and the rest of the organisation

remain underexplored. Given the centrality of knowledge and power, it is evident that power relations will shape the interactions and relationships between organisational members. Thus not only are relationships within CoPs not accounted for but the relationships with management are also ignored within CoPs theory (Østerlund and Carlile, 2005; Su et al., 2012).

In CoPs there is also a danger of practices becoming routinised. There is the potential for the CoPs to become static and develop their own predispositions (Roberts, 2006). In agreement with the latter criticism it is recognised that CoPs can "become resistant to other interpretations [of knowledge] that they have not themselves validated by trial and error. This resistance, given the inevitable solidarity that comes to characterize well-established communities of practice, becomes a barrier to innovation and a barrier to the transfer of knowledge across CoPs" (Zorn and Taylor, 2004, cited in Koliba and Gajda, 2009, p. 107). Thus, sharing knowledge across different CoPs and developing shared practices between them is seen as another issue (Handley et al., 2007; Hong and O, 2009). Localised activities within CoPs hint at another danger, of the inability of CoPs to reach out to the rest of the organisational and network members and thus the lack of opportunities to create a memory of who knows what and who knows who within the company. As such, transactive memory, if present at all, is localised within the community and in the long turn may lead to decay as interactions do not span the community boundary.

Currently, CoPs have been used mainly as part of qualitative research. It is stressed that specific variables that characterise CoPs need to be developed and "thereby move beyond Wenger's (1998) narrow construction of CoPs as a tightly coupled ideal type" (Koliba and Gajda, 2009, p. 112). Further to this, the authors suggest that research should tackle the question of what variables characterise communities of practice and provide defining characteristics of CoPs where different CoPs can be "mapped" against such characteristics.

While CoPs have received a great deal of attention within the literature as useful formations for knowledge sharing, the analytical power of CoPs as a theory is still limited in a number of areas: the notion of identity does not account for multiple identities of people participating in multiple CoPs, the operationalization of CoP variables, the relationships within and between CoPs, the relationship between CoPs and the wider organisation and power relations, taking into account the wider environment and organisational factors.

4.2.4. Boundary objects theory

Boundary objects theory sheds more light into people's interactions and collaboration activities through using a shared object/artefact. Originally, the emphasis of boundary objects theory is to understand how different communities collaborate in the context of heterogeneity (Star and Griesemer, 1989). Boundary objects allow heterogeneous communities/working groups to create a shared understanding of their different practices (Lee, 2007). 'Boundary objects' as originally described by Star and Griesemer (1989) are:

> those scientific objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each. Boundary objects are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites (p. 393).

The knowledge sharing literature provides numerous examples of boundary objects such as ERP systems, project management tools, documents, schedules, system prototypes (Sapsed and Salter, 2004; Pawlowski and Robey, 2004; Levina, 2005, Levina and Vaast, 2005; Barrett and Oborn, 2010). It seems that boundary objects to a greater extent have been equated with technological tools. It is argued that a positive effect on communication and collaboration is not a property of the boundary object per se, but on the way the objects are used (Levina, 2005; Levina and Vaast, 2005). Thus, Levina (2005) urges for a shift from the object to the practices that make use of the object. The focus should not be on the object in that context as a tool, but on how this tool is used and what effect it has on the outcome.

As boundary objects intrinsically promote cooperation between heterogeneous communities, they have received great popularity within CoPs theory and are described as "artefacts, documents, terms, concepts, and other forms of reification around which communities of practice can organise their interconnections" (Wenger, 1998, p. 107). Scholars have explored different ways of collaborating across CoPs through boundary objects. It is recognised that knowledge from one CoP does not readily fit into another CoP (Oborn and Dawson, 2010). In order to overcome this bar the authors suggest three steps: organising discussions on where to establish roles and protocols; acknowledge other's perspectives by highlighting assumptions and negotiating; and challenging assumptions using juxtaposing views and questioning. Furthermore, the authors recognise the importance of role

interplay/identity and shift of power dynamics but do not focus on these issues (Oborn and Dawson, 2010).

In another study, Hsiao et al. (2012) draw lessons from boundary objects to facilitate adaptive learning across CoPs. They reveal that the adaptive nature of boundary spanning passes through three stages: identifying problem boundaries, orchestrating collective responsibilities; and developing a systematic understanding across boundaries. Carlile (2002) looks deeper into boundary objects theory and describes three approaches to knowledge boundaries. Syntactic approach – it is stemming from communication theory where establishing a shared syntax ensures communication between the sender and the receiver. This approach views knowledge as an object. Semantic approach – it recognises that the syntactic messages are problematic and stresses that the interpretation of the message is different which makes communication difficult. From that perspective knowledge is seen as cognition. And third pragmatic approach where knowledge cannot be separated from practice which requires different CoPs to alter their current knowledge and collaboratively create new knowledge. Across CoPs boundary objects establish a shared context that 'sits in the middle' where an effective boundary object is a means for individuals to learn about their dependencies and differences across boundaries (Carlile, 2002, p. 452). However, the meaning boundary objects convey could be ambiguous and nonetheless these objects can be subject to power and conflict (Boland Jr and Tenkasi, 1995). It is recognised that the use of boundary objects exhibit double standards: balance between actors and communities on one hand, monitor and control people's activities on the other (Kimble et al., 2010). Other challenges in the use of boundary objects as a collaboration and communication tool is their marginal nature, they become obsolete and have "limited shelf life" (Sapsed and Salter, 2004, p. 1531).

Even though boundary objects theory enhances the understanding of knowledge sharing and interactions processes through the use of shared artefacts/objects, and thus emphasises their mediating role during people's interactions, such objects appear to be predominantly material. Additionally, the wider organisational context, environment and relationships between people are not accounted for within the theory. While boundary objects have been found to be a good supplementary theory to other theories such as CoPs in terms of spanning boundaries and creating shared understanding among communities, on its own the theory lacks analytical power relating to the complex interplay between context, social relationships and use of social tools to enhance knowledge processes within organisations.

4.3 Activity theory

Activity theory is a practice-based theory which assumes that knowledge and knowing are constantly evolving through collective activities (Blackler, 1995). This dynamic view of knowledge which assumes that knowledge is a production of collective practice resonates with the practice-based view adopted in this study. Activity theory suggests that people's activities are directed towards an object to achieve an outcome and are affected by the wider context in terms of community, division of labour, rules and tools mediating people's interactions (Engeström, 1987).

Activity theory origin, development and overview

Activity theory has its origins in Russian psychology and education and it was first presented by Lev Vygotsky. He emphasised the interaction between the people and the world in terms of culture and society and stressed that this interaction is not direct but it is mediated by tools as shown in Figure 4.1.
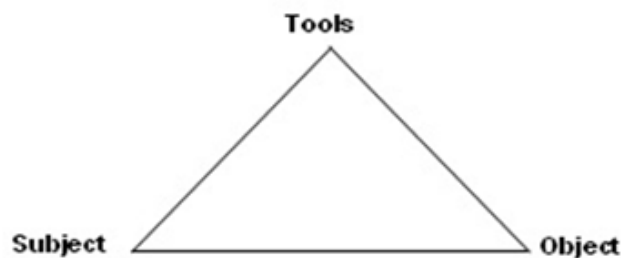
Figure 4.1: Activity theory (Vygotsky, 1978, p. 40)

Vygotsky (1978) explains that the interaction between the subject and the object is always mediated by tools such as language, symbols and signs. Tools are understood as technical tools and psychological tools. The development of the individual is viewed as a dynamic social process thus the emphasis is put on the collective rather than on separate individuals. This idea is also present in his concept of Zone of Proximal Development (ZPD). This concept explains that with the help of others, children can overcome their own current limitations and advance considerably in their future development and progress. Further, Vygotsky (1978) defined ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (p. 86).

Leont'ev (1978) drifted away from the original theory of Vygotsky by putting the emphasis on the object-oriented activity. The author emphasises that the object is what motivates the subject. As such activity theory aims to explain how the object and its outcome are achieved using tools. Thus, depending on the object and the desired outcome the mediating artefacts may have different effects. Leont'ev (1978) further developed a hierarchy of activities by decomposing the activities in terms of actions and operations. Actions are considered as conscious processes directed towards the achievement of the object. Over time and with practice these actions become routinised operations which are regarded as non-conscious processes. Leont'ev (1978) directed activity theory more towards individuals' motives and goals with their concrete actions and operations, disregarding the collective and social foundation of the theory.

By drawing on Vygotsky's notion of mediation and collectivism and Leont'ev's focus on the object and activity, Engeström (1987) extends activity theory to account for the wider social context of the activity in terms of rules, community and division of labour as shown on Figure 4.2. As a result, the current conceptualisation of activity theory incorporates the context where activities take place. From an activity theory perspective it is not assumed that activities happen in a vacuum but rather they are viewed as mediated by the tools used and moulded by the context where they occur. Within the current body of literature it is recognised that these theories overlook the importance of context and it is further stressed that they should avoid "treating individuals as if they can be understood in isolation from their contexts" (Blackler et al., 2000, p. 297). Context from an activity theory perspective is a dynamic variable which is based on past activities, giving rise to the present and setting the environment for the future (Allen et al., 2011).
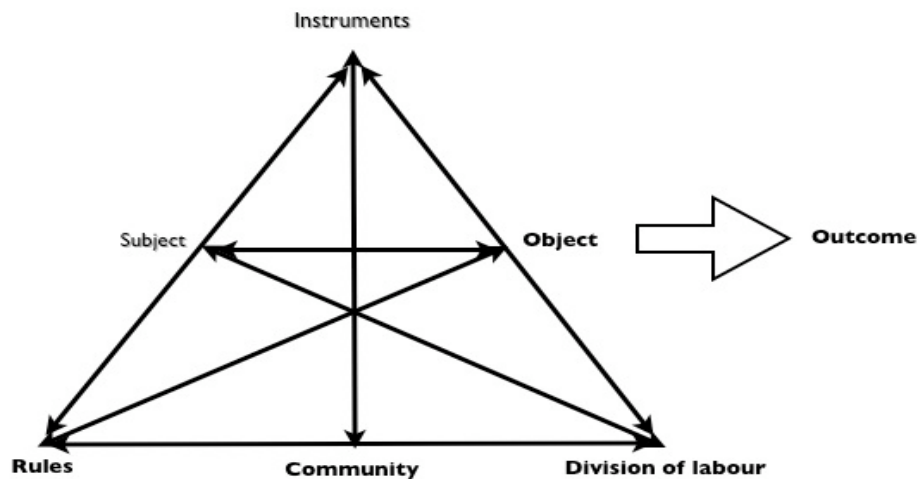
Figure 4.2: Extended activity theory (Engeström, 1987, p. 78)

Within the activity system the subject performs an activity directed towards the object, which results in an outcome (Engeström, 1987). The subject is the actor who performs the activity. The activity is defined as "a form of doing directed to an object" (Kuutti, 1996, p. 27). The object is defined as the "thing that is being transformed or created" (Blackler and Regan, 2006, p. 3). Objects can be physical/material, humans or ideal/intangible/abstract (Kaptelinin and Nardi, 2006; Nicolini, 2013). Objects are considered to be "shared for manipulation and transformation by the participants of the activity, thus establishing (causal) relationships among the different elements which constitute the activity system" (Nicolini, 2013, p. 111). Therefore the elements of the system serve to fulfil the object. The manipulation and the transformation of the object result in an outcome.

The instruments/tools mediate the activity between the subject and the object and they can be both physical/technical and social/psychological. Allen et al. (2011) describe that "tools are physical artefacts, while signs refer to language, memory, skills and so forth (the word tools is almost exclusively used in the literature to refer to both physical artefacts and signs)" (p. 781). From an activity theory perspective technology is considered to be a tool rather than a central focus of interest (Kaptelinin and Nardi, 2006). Thus activity theory overcomes the overemphasis on technology observed in the existing body of literature as well as present in sender-receiver model and boundary objects theory. Activity theory transcends the material aspect but it does not underplay the role of technology as a tool mediating activities between the subjects and the objects. As is evident from studies adopting activity theory, technology is still an integral part of the activity system (Engeström, 2000; Blackler et al., 1999; Igira and Aanestad, 2009). However, rather than viewing technology as means to an end, it is seen as a dynamic tool mediating the activities. As such the notion of tools transcends the physical, material aspect and accounts for social and psychological aspects such as memory and skills. A transactive memory system (TMS) can be viewed as an aspect of division of labour in terms of a division of knowledge (Blackler et al., 1999). However, TMS could also be used as a valuable tool, as suggested in this study[3], to identify the knowledge and expertise required for the successful achievement of a task, which may be scattered throughout the whole organisation.

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[3] As explained in the previous chapter, power relations and TMS emerged as important factors during the first iteration of the analysis of the semi-structured interviews. During the second stage of the qualitative analysis, the tenets of activity theory were used to explain the emerging factors. At that stage it was suggested that TMS is a tool within the activity system and power relations were considered as part of the division of labour.

Further to this Engeström (1987) expands activity theory by incorporating three additional elements: community, division of labour and rules. The rules comprise the norms and procedures that regulate the activities within the community (Engeström, 1987; Foot, 2001). The community portrays the environment where the activity takes place with others who, to some extent, share the same objective of work (Engeström, 1987; Foot, 2001). In activity theory the community can be seen as different things: it can be technological portals, informal networks, CoPs, organisations, networks of organisations (Ryu et al., 2005). Furthermore, Allen et al. (2011) explain that the community "comprises individuals and groups, which are governed by a continuously refining explicit and implicit division of labor" (p. 783). The division of labour describes people's roles and responsibilities within the community. It accounts for both horizontal differentiation of tasks and roles as well as the vertical differentiation of power, status and access to resources and rewards (Engeström, 1987; Foot, 2001; Nicolini et al., 2012; Nicolini, 2013). Thus a potential source of power could be found within the division of labour. Different forms and manifestations of power could be situated elsewhere within the activity system. For instance, in medical settings it is noted that power may be situated in the report which is used as a tool (Engeström, 2000). Additionally, activity systems are dynamic and what is seen as a tool in one system may be another element in a different activity system, for example an object (Allen et al., 2011). From the perspective of knowledge seen as power, power may be situated within the object. It could be also argued that power could be situated within the rules governing the activity system (Blackler, 2011). This reveals that activity theory is able to incorporate power relations as integral part of the organisational life (Blackler, 1995).

4.3.1. Tenets of activity theory

Knowledge/knowing

Activity theory acknowledges that knowledge is dependent on the context and it is enacted through actions and interactions. It is argued that "rather than studying knowledge as something individuals or organisations supposedly have, activity theory studies knowing as something that they do and analyses the dynamics of the systems through which knowing is accomplished" (Blackler, 1995, p. 1039). Knowledge/knowing from an activity theory perspective is described as mediated, situated, provisional, pragmatic and contested (Blackler, 1995). Knowledge is considered mediated as it is manifested in activity systems through

mediating artefacts such as collaboration, language, technology and control (Allen et al., 2011). Knowledge is regarded as situated since knowing is specific to different contexts and is located within particular space and time. Knowledge is provisional as it is constantly developing and transforming. It is also pragmatic as it is directed towards a goal and a purpose. Furthermore, Blackler (1995) extends activity theory perspective to account for knowledge as contested, which refers to the relationship between power and knowledge. The author acknowledges that currently activity theory is weak in analysing the relationship between power and knowledge and urges research to look deeper into this relationship and incorporate it within the activity system. Engeström (2000) stresses that close attention should be paid to the relationships within the community as well as the activities and artefacts that enact knowledge/knowing. The view of knowledge held in activity theory is, to a greater extent, in alignment with the view adopted in this study.

Collective activity

Activities are understood as collective phenomena which are performed within the activity system (Engeström, 1987). Engeström (2001) describes activity systems as "collective, artefact-mediated and object-oriented activity system" (p. 136). Moreover, Engeström and Kerosuo (2007) suggest that activity theory encompasses the idea of moving the unit of analysis from the individual to the collective in the field of organisational learning. This tenet is in alignment with the perspective taken in this study where knowledge is explicit and tacit, individual and collective and enacted in practice (Cook and Brown, 1999).

Mediation

Mediation is a fundamental aspect of activity theory developed by Vygotsky (1978). He recognised that mediation can be external and internal. It starts as external mediation, for example, when children are learning to count they make use of external tools such as fingers and abacus. During the course of practice and experience, counting becomes internalised and children start counting in their heads. In the light of this study an example can be provided with TMS. TMS is developed through external means such as meeting other people, collaborating in a common project, reviewing people's CVs and job descriptions. Through continuous interaction such memory becomes internalised where a person creates a mental map of who knows what and who does what. This mental map serves as a mediator for the subsequent interaction between these subjects.

The idea of mediation is that intelligence and consciousness do not reside in people's minds or heads but in their interactions with each other through the use of artefacts (Miettinen, 1999; Nicolini, 2013). Thus mediating artefacts are both a result of previous experiences as well as constructed and re-constructed through actions and they guide the expansion, transformation and refinement of people's practices (Engeström and Blackler, 2005; Miettinen and Virkkunen, 2005). Blackler (2011) emphasises that it is through mediation that power, institution, culture and history are manifested in human actions. All actions are culturally, historically and socially situated and are context specific and thus every action is seen as 'action in context' (Nicolini, 2013, p. 107). This is why incorporating and investigating the context is of vital importance for organisations and even more so in relation to knowledge processes. Additionally, Engeström (1999b) explains that artefacts are inseparable elements in every human activity and elaborates that the focus of investigations should be on the relationships between the elements of the activity system. This is in line with the aim and objectives of the current study to investigate the key factors affecting knowledge processes as well as the relationships between these factors.

Object-oriented activity

All human activities are directed to something in the world, i.e. towards an object and an outcome. Thus by analysing the object one can look more deeply into the activities people perform and the factors mediating these activities in order to achieve the object. Objects are viewed as prospective outcomes where outcomes are the realised objects in the course of undertaken actions. The object is described as real, constructed and emergent and actors may have a partial understanding of the object and the reality (Engeström and Blackler, 2005). Further to this Engeström and Kerosuo (2007) emphasise that "the object is multi-faceted and open to innumerable partial interpretations which stem from the different perspectives and mediating instrumentalities available to different members of an activity system occupying different positions within its division of labor" (p. 338). The important point presented by activity theory is that neither the subject nor the object predetermine the success of the outcome. It is the activities carried out in the specific context, with the help of artefacts and others, which affect and transform the subject and the object. Following this reasoning, this study starts from the object and the outcome and drills down into exploring the factors enhancing or obstructing the occurrence of the outcome as well as identifying the relationships between these factors within the activity system.

Tensions and Contradictions

Activity systems are comprised of multiplicity of different views, rules and artefacts (Thompson, 2004). As Nicolini (2013) describes "division of labour creates different positions for the participants, and different mediation tools and symbols bring into the system multiple layers and strands of history embodied in rules, conventions and artefacts" (p. 114). Thus, activity systems are ascribed with internal conflict and contradictions. Activity theorist describe that "the objective reality is a living organism unfolding through emergence and resolution of its internal contradictions" (Engeström, 1995, p. 404). These internal conflicts and contradictions drive the expansion of the activity system (Engeström, 2008, Allen et al., 2011). Engeström (1999a) provides a good explanation of such contradictions within the activity system:

> When an activity system adopts a new element from the outside (for example, a new technology or a new object), it often leads to an aggravated secondary contradiction where some old element (for example, the rules or the division of labor) collides with the new one. Such contradictions generate disturbances and conflicts, but also innovate attempts to change the activity (p. 3).

In light of this present study new elements also may form, for example new people joining the community, people changing their position or people making use of new artefacts that could lead to tensions and internal contradictions, implementing new regulations and technologies or presenting new ways of working. However, if new elements are not present, there may be existing contradictions within the activity system which will be explored in this study. Moreover, these contradictions are seen as opportunities for new development and innovation (Engeström, 2008). Engeström (1987) explains that contradictions may emerge in any of the six elements of the activity system triangle. Within the presented framework on Figure 4.2, the contradictions may be primary and secondary. The primary contradictions appear within the element while the secondary contradictions emerge between the different elements (Allen et al., 2013). Moreover, these contradictions are sometimes related to paradox (Hemetsberger and Reinhardt, 2009). Paradox is defined as the "simultaneous presence of opposites" (Prenkert, 2006, p. 472). Engeström (1990) emphasises that "inner contradictions of activity systems shall be analysed as the source of disruption, innovation, change and development of that system" (p. 77).

In summary, some of the central questions activity theory aims at exploring are: "What are the tools and signs that are available for different participants and how are they used to construct the object of activity?"; "How do tools mediate activity?"; "How do different kinds of tools mediate differently?"; "What are the inner contradictions of the activity?" (Blackler and Regan, 2009, p. 174; Littlejohn, 2007, p. 10). Based on these probes, activity theory helps refine the initial questions set in this study. These questions are: (1) What are the factors that affect knowledge sharing and knowledge interaction processes? (2) What is the relationship between these factors within the activity system? (3) How do these factors affect the knowledge processes? Why are such phenomena observed? (4) What are the contradictions observed within the activity system regarding the knowledge processes?

The next section compares activity theory with the theories previously reviewed: sender-received model, social capital theory, communities of practice and boundary objects theory.

4.3.2. Activity theory in relation to sender-receiver model, social capital, communities of practice and boundary objects theories

A common fallacy within the sender-receiver model is that the sender is the subject, the receiver is the object/destination and knowledge is used as a tool that needs to arrive at the destination in order to be replicated. Within activity theory, for the current study, knowledge is seen as the object of the activities and the interactions between the actors. It is not merely something to be exchanged but the activities of the actors are motivated by it and are focused on constructing, transforming, updating and reconstructing knowledge. Thus, the object is knowledge/knowing and through continuous collective interactions the subjects construct and reconstruct this knowledge. It is a dynamic collective process rather than dyadic linear transfer such as the sender-receiver model.

In relation to the channel as an important part of the sender-receiver model, activity theory holds a similar view as the channel can be seen as a tool within activity theory. However, the concept of tools from an activity theory perspective encompasses both material and abstract forms. For example, transactive memory as a tool enhancing knowledge processes cannot be incorporated in the current rigid view of the sender-receiver model. As described earlier, the sender-receiver model overemphasises the use of technology as a tool

for the successful knowledge sharing. From an activity theory perspective technology is just a tool used to enhance interactions between people but it transcends the physical technological aspect and accounts for abstract psychological aspects as well. Unlike the sender-receiver model, activity theory puts the emphasis on human interactions, social relationships and the wider community.

Similar to activity theory, social capital theory takes the social relationships into account. However, social capital theory is solely focused on a narrow view and ignores a number of other factors that influence the knowledge processes. A number of areas where both social capital theory and the sender-receiver model fall short are: knowledge is considered to be an object that is exchanged in a straightforward manner between people and organisations; they do not take into account the context where the activity takes place; issues of power are not integrated within these two theories; transactive memory systems are also a factor that is not considered by the two theories; there is an implicit assumption of harmonious exchange of knowledge where tensions, contradictions and paradoxes are not seen as aspects of the knowledge processes. Activity theory takes into account the social aspects of interactions, the wider community aspects along with rules and division of labour, as well as the specific tools used during the interaction of the actors to achieve the outcome. Additionally, these activities and interactions are not seen as harmonious but as aspects of conflict and contradictions which are embedded within the activity system.

A more diverse picture of interactions and constructing knowledge is provided by the CoPs theory. While CoPs theory recognises that knowledge is constructed in practice, a central aspect of this practice lies in the participants' identity which positions novices and newcomers in an unfavourable situation. From an activity theory perspective identity is seen as a fluid, flexible and dynamic concept which changes according to the activities. Activity theory provides the possibility for multi-perspective and multi-identity analysis (Allen et al., 2011; Engeström, 2000; Thompson, 2004). Adopting a plethora of multiple perspectives in relation to the activities shows that the identities within organisational activity systems are not robust and they are in a constant state of flux. This is demonstrated in practice by Engeström (2000) when investigating the work of a junior hospital physician. The study shows that the identities of the hospital workers are not constant and they change and adapt accordingly to the activities they undertake. This is in contrast with CoPs theory where there is a rigid separation based on identity between 'old-timers' and 'newcomers'.

Additionally, CoPs may be seen as part of the activity system. Activity theory framework is seen as an appropriate platform to incorporate CoPs within it and provide a deeper understanding of the community dynamics, identities, power relations and the wider organisational context (Engeström et al., 2007; Blackler et al., 2000). On one hand CoPs can be the subject of the activity, on the other CoPs may characterise the actual community. CoPs can be seen as part of an activity system in relation to learning from others (Ryu et al., 2005). Moreover, CoPs are loosely defined, without accounting for existing power relations and governing rules. The communication between communities and with the wider organisation is unclear and power relates solely to members' identities. As such CoPs cannot explain the interrelation between complex organisational phenomenon, mediating artefacts and the wider organisational context.

Boundary objects are the only concept similar to the concept of mediation in activity theory but again they do not represent the context where the activity takes place. Boundary objects as focal points in knowledge processes are found to be limiting from an activity theory perspective. Macpherson and Jones (2008) explain that "mediating artifacts, or boundary objects, provide an opportunity to develop new shared conceptions of activity and new modes of action" (p. 177). Thus, the authors equate boundary objects with mediating artefacts/tools found in the activity theory framework. From this point of view boundary objects are only one of a number of aspects which correspond to tools. Moreover, the community aspects as well as division of labour and rules within the organisation or between communities and organisations are lacking in the concept. Howard-Grenville and Carlile (2006) provide a general critique towards all practice theories that they do not pay enough attention to material and institutional aspects. However, this is not the case with activity theory where tools and the context, in terms of rules, community and division of labour, play an important role in the activity system and actors' actions. Additionally, activity theory is the only theory which provides opportunities to investigate tensions and contradictions as embedded aspects within the activity system.

4.3.3. Application of activity theory in the field of knowledge sharing

Activity theory has been successfully applied within the areas of human-computer interaction and computer-supported cooperative work with the vivid contribution of Kari

Kuutti, Bonnie Nardi and Victor Kaptelinin. To a lesser extent it has been utilised in management and organisation studies where the biggest contributors are Yrjö Engeström, Frank Blackler, David Allen, Davide Nicolini and Allan Macpherson. The application of activity theory in the field of knowledge sharing has been very limited. An attempt has been made by Lin et al. (2008) to investigate knowledge flow barriers within a healthcare unit. The framework the authors have applied is the original Vygotsky's triangle which they have extended with Engeström's aspect of community. The other elements (rules and division of labour) have been omitted in their framework. The authors describe that in knowledge flow processes important elements are the knowledge sender (the subject), the knowledge receiver (the object), the context (the community) and the mechanisms (the tools) where knowledge characteristics are considered part of tools. As such knowledge is considered to be a tool which is exchanged between a sender and a receiver. Thus, it seems apparent that they are following the rigid sender-receiver model of knowledge flow where the sender, the receiver and the knowledge characteristics are the main aspects of interest. As its basis this approach is very contradictory as sender-receiver model assumes that knowledge is a commodity that can be transferred and replicated. However, activity theory looks deeper into the context, the relationships and the mediating artefacts used to achieve the outcome. The study of Lin et al. (2008) fails to describe further what mechanisms are required to enhance knowledge flows and they only state that the lack of mechanisms is a barrier to successful knowledge transfer. Similarly, the context is only explored from a leadership and rewards point of view. No account has been taken for the existing rules and division of labour. Also contradictions and tensions are not considered as part of the analysis. Their study is another example where power issues have been ignored. It also fails to shed more light on the key questions posed by activity theory presented earlier in this section. However, methodologically it is noteworthy for applying both qualitative and quantitative methods within the framework of activity theory.

4.3.4. Activity theory limitations

While activity theory is considered most appropriate to examine the questions posited in this current study, it is not free of limitations.

First, paradoxically, while activity theory is a practice-oriented theory viewing knowledge as enacted in practice, the majority of the studies employing activity theory place knowledge as a tool within the activity system (e.g. Engeström, 2000; Allen et al., 2011; Igira and Aanestad, 2009; Prenkert, 2006). The only other study investigating knowledge flows using activity theory also considers knowledge characteristics as part of tools (Lin et al., 2008). This limitation is overcome in this study by examining knowledge/knowing as object towards which the activities are directed and manifested in knowledge sharing and knowledge interactions.

The second limitation recognised within activity theory is the overlooking of power relations (Blackler, 1995, 2011). While Wheelahan (2007) points out that the bigger danger within an activity system is the existence of unequal power relations, their incorporation within empirical studies is not evident. The author suggests that if learning is locked only within the activity system, these unequal power relations may put the individual at their "mercy" (p. 12). While contradictions and tensions are central to activity theory, power relations, which are part of everyday life, are overlooked in the current state of the theory (Blackler and McDonald, 2000; Kaptelinin and Nardi, 2006). More specifically Blackler and McDonald (2000) stress that the issues of hierarchy and institutional power are not elaborated on in organisational learning studies. Blackler (2011) calls for more research in this area and acknowledges that there are many different kinds of power. However he urges researchers, rather than going into the depth of "what is power", to focus their enquiry on "what kinds of behaviour, relationships, and outcomes does the notion of power sensitise us to?" (Blackler, 2011, p. 729). Following this conceptualisation the current research further investigates the effect of power on knowledge processes within Bulgarian organisations.

Third, the concept of transactive memory systems and their effects within the activity system appear under-theorised within activity theory. The current study explores the effect of TMS as a tool mediating people's activities in relation to the two knowledge processes.

Lastly, while tensions and contradictions are seen as embedded within the activity system, the current use of the theory has not emphasised identification of existing contradictions and paradoxes (Prenkert, 2006). Additionally, within activity theory there has not been an emphasis on analysis of tensions, contradictions and paradoxes in relation to knowledge processes, which is seen as a limitation. Prenkert (2006) deems that paradoxes are

at the heart of activity system and they need to be investigated as an intrinsic part of the analysis. Through examining and resolving of the contradictions and tensions within the activity system Allen et al. (2013) has shown the ability of activity theory to theorise change. Allen et al. (2013) strongly emphasise that "a key benefit of activity theory framework is that it allows diverse approaches to be accommodated within a larger theoretical framework" (p. 850). Thus the following section will explore the possibility of accommodating critical realism within the activity theory framework.

4.3.5. Activity theory and critical realism

The complementarity of activity theory and critical realism is explored in this section which also aims to overcome some of their limitations and advance both perspectives. The scarce literature on activity theory and critical realism sees activity theory and critical realism as complementary (Allen et al., 2013; Wheelahan, 2007; Mingers, 2011; Mukute and Lotz-Sisitka, 2012). How they could enhance each other and how they will be used in the current study is presented in the following section.

The compatibility assessment of the two perspectives starts with investigating the ontological and epistemological assumptions of activity theory and critical realism. It is stressed that the main focus of critical realism is "on ontology, not epistemology" (Sayer, 2000, p. 78). The strong ontological positioning of critical realism posits that there is an independent and layered reality existing 'out there' separate from the individual. Conversely, activity theory is presented more as an epistemological theory focusing on the collective activity towards a common object (Mukute and Lotz-Sisitka, 2012). Ontologically, the activity theory principle of object-orientedness assumes that "human beings live in a reality that is objective in a broad sense: the things that constitute this reality have not only the properties that are considered objective according to the natural sciences but socially and culturally defined properties as well" (Kaptelinin and Nardi, 2006, p. 67). Thus critical realism can contribute to activity theory ontologically as the stratified ontology urges researchers to investigate how the different elements of the activity system interact in order to enact or obstruct the outcome (Clark et al., 2007). Critical realism allows for ontological depth as it goes beyond the events and explores the underlying structures and mechanisms that enable or obstruct the occurrence of the events.

While critical realism is described as "ontologically bold", it is also agreed to be "epistemologically cautious" (Wynn and Williams, 2012, p. 789). The epistemological position of critical realism is that independent, layered reality cannot be broken down to individuals' understanding as people's interpretations of reality differ (Sayer, 2000). As such activity theory can enhance critical realism epistemologically by placing emphasis on knowing as mediated, situated, provisional, pragmatic and contested within the activity system (Blackler, 1995). Activity theory emphasises the importance of the cultural and historical aspects of context, thus helping to put the study into perspective of the relevant context (Allen et al., 2013). In particular Elder-Vass (2010) cited in Allen et al. (2013) points out two problematic areas within the perspective of critical realism: how to deal with nonmaterial objects and the relationship between the subject and the object. Firstly, activity theory sees the object as both material and nonmaterial and neither of them has priority over the other. Secondly, activity theory investigates the relationship between the subject and the object through the lens of constant interaction and the use of mediating artefacts (Allen et al., 2013).

Another aspect of interest between activity theory and critical realism is the discrepancy in the position of individual and the social. Archer (1995) argues that the individual is the primary entity and that it exceeds society. Wheelahan (2007) explains that "Archer under-socialises the individual. She argues that "we can have non-social relations with non-social reality" (p. 8). The majority of research on organisational learning overemphasises the individual and undermines the broader social and cultural context as well as power relations involved in learning (Wheelahan, 2007; Blackler, 2011). Activity theory provides a balanced picture of subjects' activities which take place within a context and are mediated by tools to achieve the desired outcome. As such the emphasis is put on the collective aspect of a wider social and cultural context where the activity is taking place.

Rather than towards the differences, Allen et al. (2013) direct one's attention towards the similarities in the views of critical realism and activity theory. Firstly, both critical realism and activity theory recognise the material and the social aspects and go beyond the conventional duality of positivism and constructivism. Foot (2001) explains that activity theory "transcends the tension between social constructivism and determinism by regarding humans and human practices as simultaneously in relation to the natural/material realm through tools, and to the social realm through culturally and historically-shaped collective

activity" (p. 32). Secondly, the notion of mediation is present in both perspectives (Allen et al., 2013). One of the suggested milieus for further development of activity theory is the one of mediation. Kaptelinin and Nardi (2006) prompt for "extending the notion of mediation beyond tools" (p. 256). This study develops the notion of mediation by investigating mediation at different ontological layers as adapted from the perspective of critical realism.

The current study views activity theory and critical realism as complimentary. A common trend observed in the use of critical realism in empirical studies is that critical realism is used as a theoretical framework rather than a philosophical position (Morton, 2006; Volkoff et al., 2007; Jashapara, 2007; Bygstad, 2010; Tourish, 2013). This has not been considered as a limitation or misuse of critical realism perspective. For this study, rather than using critical realism as a main theoretical framework, it is used as complimentary to activity theory framework, where critical realism contributes to activity theory by providing depth of the mediating artefacts, namely exploration of the deeper levels of structures and causal mechanisms that enhance or obstruct the events/outcome that could otherwise be missed (Mukute and Lotz-Sisitka, 2012).

4.4   Summary

In this chapter a number of prominent theories used to investigate knowledge sharing processes were reviewed. The aim was to identify the most suitable theory to explore and explain the new construct of knowledge interactions as well as the factors affecting the knowledge processes, where theories were found weak in incorporating power relations and transactive memory systems in particular. The deconstruction of the main stream theories opened up new possibilities and opportunities to investigate knowledge sharing and knowledge interaction processes through other theories. Activity theory in particular was found very useful to inform and guide the current research as it is a practice theory focused on dynamic collective activities directed to an object to achieve an outcome. The achievement of the outcome is dependent on the wider context and the mediating factors within the activity system. Activity theory also emerges as an appropriate framework to incorporate the underexplored factors of power relations and transactive memory systems.

So far this research has outlined the problem definition and the Bulgarian context in Chapter 1. The epistemological and philosophical positioning, adopted in this study, were discussed in Chapter 2. In Chapter 3 the existing literature on knowledge sharing was reviewed. Also in this chapter the new construct of knowledge interactions was introduced. Additionally, and a number of important factors affecting knowledge processes were identified. Following the emergence of a new construct as well as a number of factors underexplored in the literature, in the present chapter potentially suitable theories were reviewed. The next chapter presents the methodology adopted, the data collection and the qualitative analysis performed.

5   RESEARCH METHODOLOGY AND QUALITATIVE ANALYSIS

5.1   Introduction

This chapter is focused on the research methodology adopted in this study in order to answer the research questions and achieve the objectives set out in Chapter 1. This study adopts a mixed methods approach which appears to be the most suitable approach for the purpose of the study. The chapter outlines the reasoning for adopting a mixed methods approach, describes the mixed methods design and presents the challenges faced during the data collection in a transition context. A small number of scholars have raised the issue that data collection in transition societies is different and have attempted to expose the subtle distinctions between data collection in a Western context and data collection in an Eastern European and other transition contexts (Clark and Michailova, 2004; Michailova, 2004; Michailova and Liuhto, 2001). Respectfully, the challenges faced by the researcher are explained in-depth in this chapter.

The chapter goes into more detail regarding organising and conducting semi-structured interviews and presents the qualitative data analysis. The analysis of the qualitative semi-structured interviews results in the development of an activity theory framework explaining knowledge processes in Bulgarian organisations.

5.2   Conducting Research in Bulgaria

Generally, data collection and fieldwork in the Eastern European context has assumed the conventions of Western research. Conversely to the well-established Western literature on research methodology, conducting research in Eastern Europe significantly differs from the established pathway and posits its own challenges. When conducting research in transition societies researchers are encouraged to be creative (Michailova and Clark, 2004) as "field

work in Eastern Europe is not the art of the possible, the art is to make it possible" (Michailova and Liuhto, 2001, p. 20). In general, the process of gathering data is considered 'normal' and researchers rarely share their personal experiences (Michailova and Clark, 2004). However, field research in transforming societies poses numerous challenges, and Michailova and Clark (2004) present an overview of the methodological issues researchers face during fieldwork in transforming societies. Their framework is presented in Figure 5.1.
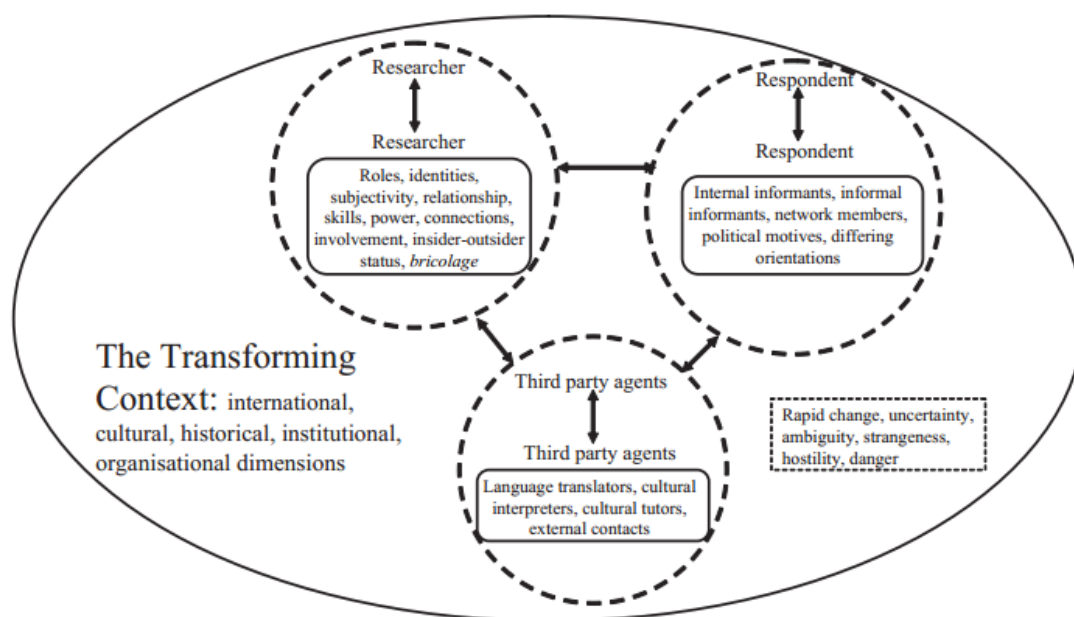
Figure 5.1: Field research in transforming societies (Michailova and Clark, 2004, p. 8)

There are four main pillars in the framework presented above: *the context, the researcher, the respondents and the third party agents*. Regarding *the context*, the authors stress the importance of contextualising fieldwork as well as paying close attention to the characteristics of transforming societies. Within such societies are found dominating feelings of mistrust, fear, avoidance of strangers and lack of transparency (Michailova and Clark, 2004). The role of *the researcher* is of great importance in order to conduct research in transition economies because of the understanding of the context. However, the interactions between the researcher and *the respondents* are not predetermined, but are on-going and often quite uncertain. An important role in the relationship between the researcher and the participants is played by *the third party agents* who may recommend potential respondents, present the researcher, establish the first contact, negotiate access on behalf of the researcher, and even embed the researcher within organisations (Michailova and Clark, 2004). Third parties such as the informal, personal networks, friends and family play a crucial role in

gaining access to respondents. Establishing personal contact is essential especially in a hostile environment such as Bulgaria (Michailova, 2004).

The professional network of LinkedIn, a third party tool used in this research, proved very useful and valuable for gaining access to respondents in Bulgaria. The researcher created a detailed profile on LinkedIn. This way she was able to reach out to a large network of professionals, join groups, follow companies and engage in professional discussions. As a result a substantial number of contacts were gathered and during the course of the research they were included in a productive manner. The development of the current Web 2.0 technologies affects the web of people's personal, social and work life. As a result such technologies are seen as an additional pillar in conducting research. Thus, the initial framework presented by Michailova and Clark (2004) is extended by the researcher by incorporating the utilisation of such professional networks and social media technologies in gaining access in transition societies. The extended framework is presented on Figure 5.2.
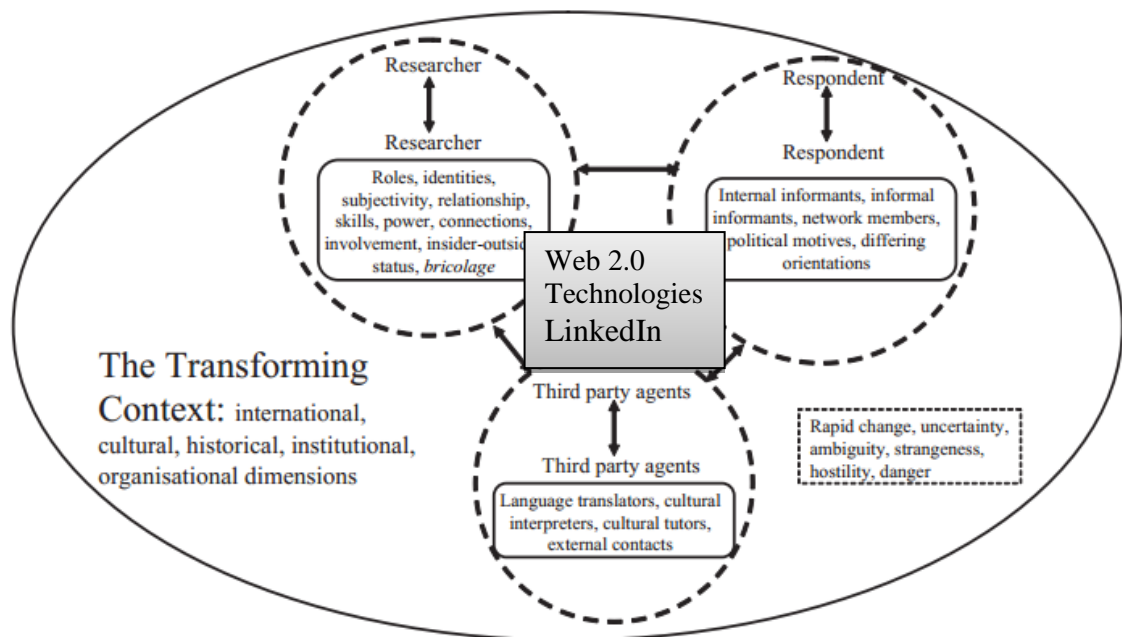
Figure 5.2: Extended framework of field research in transforming societies

After presenting the research landscape in transition societies, in that respect in Bulgaria, the next sections delve deeper into the specific methods used and challenges faced during data collection in Bulgarian organisations. Next, a mixed methods approach is presented as an appropriate methodology to be adopted in the current study.

5.3   Mixed Methods

Mixed methods are considered as the third methodological movement/paradigm, preceded by quantitative and qualitative methodologies which are respectively the first and the second movement/paradigm (Teddlie and Tashakkori, 2009; Venkatesh et al., 2013; Johnson and Onwuegbuzie, 2004). Creswell and Plano Clark (2011) provide a detailed description of mixed methods:

> Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of qualitative and quantitative approaches in many phases of the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone (p. 5).

There are a number of motives guiding the use of mixed methods approach. The next section looks deeper at the rationale and motivations for adopting mixed methods approach and the way these methods are applied in this study.

5.3.1.   Mixed methods motivation and design

Different mixed methods designs are recognised for different research purposes. Creswell and Plano Clark (2011) recognise four mixed methods designs: triangulation, embedded, explanatory and exploratory. Triangulation is evident when merging qualitative and quantitative data to understand the phenomenon investigated. Embedded design uses either qualitative or quantitative data to answer a research problem under the umbrella of a large quantitative or qualitative study. Explanatory design is evident when qualitative data is used to explain quantitative results. Exploratory design is evident when quantitative hypotheses and relationships are informed by qualitative result. Furthermore, the research designs are differentiated between concurrent (qualitative and quantitative methods and analysis are performed in parallel) and sequential (the different methods are performed in different phases)

(Creswell et al., 2003). As such triangulation and embedded designs are concurrent, while explanatory and exploratory designs are sequential. Additionally, Venkatesh et al. (2013) describe seven purposes for adopting mixed methods: complementarity, completeness, developmental, expansion, corroboration/confirmation, compensation and diversity. Table 5.1 provides a description for each of the purposes listed.

Purpose/Reason	Description
Complementarity	Used in order to provide complementary views regarding the phenomenon of investigation.
Completeness	The aim is to obtain a complete picture of the phenomenon under investigation.
Developmental	Used in sequential designs where the results of one of the methods informs the other method. E.g. the results of the qualitative interviews informs hypotheses and scale development.
Expansion	The results of one of the methods (e.g. the qualitative study) are used to expand and explain results from previous study (e.g. the quantitative study).
Corroboration/ Confirmation	Mixed methods are used in order to confirm findings where for example results obtained from quantitative studies are confirmed through qualitative studies.
Compensation	The combination of different methods compensates the weaknesses of the individual methods.
Diversity	The aim is to obtain divergent results and views regarding the phenomenon investigated.

Table 5.1: Purposes for using mixed methods (Venkatesh et al., 2013, p. 6)

The decision to adopt mixed methods along with their design and purpose is driven by the research questions, the aims and objectives, and the context (Creswell and Plano Clark, 2011; Venkatesh et al., 2013; Teddlie and Tashakkori, 2009). The aim of this research is to explore and explain how people interact and share knowledge in Bulgarian organisations. This current research is exploratory in nature and requires combination of both qualitative and quantitative methods to achieve the aim and objectives set in the study.

Another important aspect supporting the decision for adopting mixed methods is the context. In terms of tools and techniques to be used in transition contexts such as Bulgaria, it is recommended that both qualitative and quantitative methods should be used in order to enhance the research process, the analysis, the range of findings and the scope of the conclusions (Steger, 2004; Balaton, 2004). The literature reveals that quantitative techniques are predominantly employed to test hypotheses based on the Western culture and theories (Davison et al., 2013; Clark and Michailova, 2004). Lorentzen (2004) calls for contextualising research and asserts that hypotheses should be derived in accordance to the context not just replicated from other studies in a very different context. In order to avoid conducting research

irrelevant to the Bulgarian context a mixed methods approach is adopted in this study where the research starts first with qualitative interviews, so that the context and other cultural specifics are incorporated in the questionnaire constructs. Moreover, the use of mixed methods results in a much broader picture of the knowledge processes within Bulgarian organisations.

5.3.2. Application of mixed methods in the field of knowledge sharing

A review of IS studies conducted by Venkatesh et al. (2013) revealed that the main reasons to use mixed methods are developmental and completeness. Another interesting result is that in IS research quantitative methods are the dominant methods within the mixed approach (Venkatesh et al., 2013). Further Venkatesh et al. (2013) note that "although the current state of methodological diversity in IS research is encouraging, there is a dearth of research in IS that employs a mixed methods approach (i.e., use of both qualitative and quantitative methods in a single research inquiry)" (p. 2). The review of the use of mixed methods in the KS literature conducted in this study exhibits similar results. A very small number of studies make use of mixed methods approach. Examples of mixing qualitative and quantitative methods are provided by Wu et al. (2007), Wong et al. (2008), Zhao and Anand (2009), Willem et al. (2006), Newell and Edelman (2008), Lee et al. (2010).

It is recognised that there are different ways to combine qualitative and quantitative methods (Bryman, 2012). For example, Wu et al. (2007) have adopted a mixed methods approach to study the effect of affect-based trust and social interaction on knowledge sharing and learning intensity in organisations in Taiwan. The authors have employed a two-stage process. In the first stage they have conducted interviews in order to obtain statements to guide the subsequent questionnaire development. In the second stage a questionnaire has been developed and sent to a wider audience in order to test the derived statements. Similarly, Wong et al. (2008) in their study of the effect of power relations on inter-unit knowledge transfer in firms in Singapore, have adopted a mixed methodology informed by interviews in the first phase, followed by a questionnaire. Another example is provided by Zhao and Anand (2009) in a study investigating knowledge transfer in the Chinese automotive industry. Similarly, they have first conducted an exploratory study comprised of interviews followed by a survey strategy. As the authors explain "The qualitative analysis of the field data helped us

to define our key constructs and design survey items for measuring these constructs" (p. 970). These three studies are examples of application of mixed methods following sequential exploratory design with developmental purpose.

Other examples of how mixed methods are applied in the KS field are provided by Newell and Edelman (2008) and Willem et al. (2006). Willem et al. (2006) have used a combination of interviews and survey techniques to investigate coordination between units of a British multinational company. They have conducted the interviews and the questionnaires in parallel. The authors explain that:

> the two were combined by examining to what extent the qualitative data confirmed or contradicted the conclusions from the quantitative data and whether qualitative data revealed insights into why we found these conclusions. Thus, the qualitative interview data were used, on one hand, as cross-checking for the findings of the quantitative analysis and, on the other hand, to place the quantitative findings in context allowing us to explore the meaning of the quantitatively derived conclusions (p. 545).

This quote shows that the authors have followed concurrent triangulation design with confirmation, diversity and expansion purposes. Similarly, Newell and Edelman (2008) have collected qualitative and quantitative data in parallel in a single British organisation. The authors have followed concurrent triangulation design with confirmation, diversity and expansion purposes as they have focused on the similarities and differences the two methods reveal in project-based learning. Another variation of combining qualitative and quantitative methods is found in a study by Lee et al. (2010). These authors have employed a mixed research methodology to investigate knowledge sharing and team performance in a large Australian company. Conversely to the examples provided so far, Lee et al. (2010) have first conducted the quantitative study, followed by the qualitative study so that "the qualitative data…support the quantitative findings" (p. 480). Their application of mixed methods follows sequential explanatory design with corroboration/confirmation purposes. However, the advantage of using mixed methods is that the results will not only show convergence but also divergence as shown in the studies conducted by Newell and Edelman (2008) and Willem et al. (2006).

The review of how mixed methods are used in the KS field shows that to a greater extent the context of study predefines the way the methods are combined. In well-researched contexts quantitative studies come first or are conducted in parallel with qualitative studies. Conversely, in less researched contexts, where the Western theories cannot be readily applied, an exploratory qualitative phase is primary and the results from the qualitative study inform the questionnaire development. The Bulgarian context is largely underexplored, thus the mixed methods design in this study is sequential exploratory where qualitative semi-structured interviews are conducted first followed by an online questionnaire. The purpose of mixing the methods in this particular way is developmental where the results of the interviews help the hypotheses and scale development. The relationships proposed based on the qualitative results are tested in the quantitative study. This way multidimensional results are achieved focused not only on the causal effects of what has happened but exploring the mechanisms of how and why the phenomenon has happened (Tashakkori and Teddlie, 2010a). Moreover, the combination of the two methods provides a more complete picture of the knowledge processes as well as an opportunity for convergence and divergence of the results obtained using the different methods (Tashakkori and Teddlie, 2010b).

When conducting mixed methods a recurring question is one of which paradigm goes best with a mixed methods approach. Since this study has adopted a critical realism perspective, the question becomes whether mixed methods approach and critical realism are compatible. The next section will elaborate on these questions.

5.3.3. Mixed methods and the problem of 'suitable paradigm'

The majority of the IS studies reviewed by Venkatesh et al. (2013) and the KS studies reviewed earlier lack a clear research paradigm and philosophical positioning. Research paradigms are an important aspect of mixed methods as it is considered that the paradigm determines how the research will be conducted (Tashakkori and Teddlie, 2010b). Tashakkori and Teddlie (2010b) describe six paradigm options when conducting mixed methods research: *a-paradigmatic stance*, where paradigms are considered as not important for practice; *substantive theory stance*, where the theoretical orientations are more important to the research as opposed to the philosophical ones; *complementary strengths stance*, where the different methods should be kept separate according to their philosophical roots; *multiple*

paradigms, where a combination of paradigms is applied as a single paradigm; *dialectic stance*, where consideration of opposing views is viewed as an advantage in research; and *single paradigm stance* that "welcomes or even requires a mix of methods" and is "not troubled by issues of incommensurable philosophical assumptions" (Greene, 2007, p. 82). These six options are summarised into three main stances *a-paradigmatic stance*, *multiple paradigm stance* and *single paradigm stance/alternative paradigm stance*, where substantive theory stance, complementary strengths stance and dialectic stance are combined within the multiple paradigms stance (Venkatesh et al., 2013; Hall, 2012).

Three alternative single paradigm stances are suggested in the literature: *pragmatism, transformative–emancipatory, and critical realism* (Venkatesh et al., 2013; Tashakkori and Teddlie, 2010b). According to the pragmatic view "research approaches should be mixed in ways that offer the best opportunities for answering important research questions" (Johnson and Onwuegbuzie, 2004, p. 16). Pragmatists place emphasis on practical, applied research where the methods are chosen to be able to answer the research question (Johnson and Onwuegbuzie, 2004). Researchers who hold a pragmatic view avoid debates around ontology and epistemology as they study what they deem to be appropriate in a way they find to be appropriate (Tashakkori and Teddlie, 1998). Research from pragmatist perspective is guided by practical experiences as opposed to theories and facts. Furthermore, the meaning of concepts is valuable only if it has some practical implications. Pragmatists are anti-philosophy oriented and believe that their values in conducting research are leading (Johnson and Onwuegbuzie, 2004; Teddlie, 2005).

> Pragmatists decide what they want to research guided by their personal value systems; that is, they study what they think is important. Then they study the topic in a way that is congruent with their value system, including variables and units of analysis that they feel are the most appropriate for finding answers to their research questions (Teddlie, 2005, p. 215).

The transformative–emancipatory paradigm is another alternative paradigm for mixed methods research (Mertens, 2003). Within this paradigm the emphasis is put on discriminated and oppressed individuals and as such trust and understanding between researchers and participants is vital (Venkatesh et al., 2013). It is deemed suitable for mixed methods approach when researching diverse groups (Mertens, 2003).

The third single/alternative paradigm deemed appropriate for mixed methods research is the one of critical realism (Venkatesh et al., 2013; Hall, 2012). Critical realism is considered an ideal paradigm for mixed methods research as:

> …it accepts the existence of different types of objects of knowledge – namely, physical, social, and conceptual – that have different ontological and epistemological characteristics and meaning. Therefore, it allows a combination of employing different research methods in a research inquiry to develop multifaceted insights on different objects of research that have different characteristics and meaning (Venkatesh et al., 2013, p. 17).

The current study adopts critical realism as a single stance paradigm for conducting mixed methods research. Using mixed methods from a critical realism perspective is greatly encouraged as, in this way, a phenomenon can be studied from multiple levels (Mingers et al., 2013; Reed, 2005; Zachariadis et al., 2013). Mingers (2004) describes how the different methods could be used within the critical realist framework. Firstly, quantitative methods can be used at the exploratory phase aimed at identifying initial patterns to be deeply investigated during a subsequent qualitative study. Secondly, quantitative methods can be applied to identify causal relationships and explain how these relationships operate under certain conditions (Mingers, 2004). Qualitative methods from a critical realism perspective allow for the identification of complex concepts, themes and relationships which are difficult to tease out with quantitative measures (Mingers, 2004). The majority of studies adopting critical realism perspective and mixed methods tend to use quantitative methods as a preliminary study followed by deeper qualitative study (Zachariadis et al., 2013; McEvoy and Richards, 2006). However, in this way an explanatory research design is followed where the researchers are required to apply a theory and constructs that might not be representative of the context, especially underexplored contexts such as Bulgaria. As this current research is exploratory the data collection and analysis start with the qualitative semi-structured interviews in order to contextualise the study and to identify the factors that affect knowledge processes in the Bulgarian context. Based on the results of the qualitative study and in combination with the existing body of literature, hypotheses are developed and tested at a larger scale. For that reason, this research follows the critical realism methodology guidelines presented by Leca and Naccache (2006):

- Phase one of the study adopts semi-structured interviews to identify the factors that impact on the knowledge processes. This way the research starts from the event/the

outcome and allows the determination of the factors operating at the deeper levels of structures and mechanisms and the relationship between them in order to explain the outcomes/events. This step is necessary in order to understand the underlying structures, mechanisms and contextual specifics that are not readily evident but which give rise to or obstruct the occurrence of the knowledge processes in Bulgarian organisations.

- In phase two a model is built to test the identified factors at the empirical surface level. As suggested by Leca and Naccache (2006) in this phase "researchers build a hypothetical model, involving structures and causal powers located in the domain of real, which, if it were to exist and act in the postulated way, would provide a causal explanation of the phenomena in question" (p. 635). The quantitative study aims at testing the effect of the identified factors on two knowledge processes: knowledge sharing and knowledge interactions.

- Phase three suggested by Leca and Naccache (2006) is to "subject the postulated explanation to empirical scrutiny" (p. 635). In this phase the hypothesised model is tested. The aim is to test how these factors affect the outcomes and whether the different factors have different effect on the two knowledge processes. Further explanations of the results are provided by the initial interviews.

The main steps of mixed methods research guided by critical realism perspective are presented in Table 5.2.

Method	Key objectives	Implications for the next steps
Literature Review	Identify the key factors influencing knowledge sharing processes. Examine the underexplored factors in the main stream research.	Guidance for interview schedule development. Guidance for hypotheses development. Use for construct development.
Exploratory semi-structured Interviews	Narrow down the research – contextualisation and parsimony of the most relevant factors for the Bulgarian context. Develop activity theory framework explaining the results.	Identify the relationships between the factors. Design a research model and develop hypotheses based on the results of the exploratory semi-structured interviews in combination with the literature review.
Hypotheses and Construct Development	Identify the relationships between the factors. Develop a research model and develop hypotheses. Identify appropriate measures in prior research. Develop new items based on the newly emerging constructs.	Update questionnaire items for the main study.
Quantitative Pilot study	Test reliability and validity of the whole instrument.	
Quantitative Main study	Test the suggested hypotheses. Identify emerging tensions and contradictions within the activity system. Identify any unusual or ambiguous results.	Analyse and explain the results. Describe the existing and emerging contradictions in the activity system.
Discussion	Provide explanations of the quantitative results in a form of a dialogue with the existing literature. Provide explanations for the emerging contradictions.	Theoretical and practical implications.

Table 5.2: Mixed methods research approach undertaken in this study

While a mixed methods approach is shown to be beneficial it is also recognised as a challenging approach. The main challenges of mixed methods research approach are described by (Johnson and Onwuegbuzie, 2004; Creswell and Plano Clark, 2011):

- Requires considerable amount of time, effort and skills;
- Can be difficult for one researcher to learn and carry out both qualitative and quantitative research;
- Challenges regarding data collection and access;
- Development of new constructs;
- Testing reliability and validity of the constructs.

In order to overcome the identified challenges the research activities were carefully planned and facilitating technology was used. A breakdown of the activities performed and tools used at every stage of the data collection and analysis are provided in Table 5.3.

Research Activities	Resources and tools utilised
Interview Schedule Development	Literature Review
Exploratory Interviews	Skype, Face-to-Face, Telephone
Sampling Technique	Snowball, Purposive
Negotiating Access	Telephone, Email, Third party agents
Transcription and Analysis	NVivo
Hypotheses and Construct Development	Semi-structured interviews and literature
Questionnaire Pilot Study	Online – Zoomerang
Sampling Technique and data collection	LinkedIn, Databases, Snowball
Reliability and Validity	SPSS – Cronbach's alpha, Factor Analysis
Questionnaire Main Study	Online – Zoomerang
Sampling Technique and data collection	Databases, Snowball, LinkedIn
Reliability and Validity	SmartPLS –Outer loadings, Factor analysis, Cronbach's alpha, Average variance extracted, Discriminant validity
Statistical Analysis	SmartPLS –PLS analysis SPSS – MANOVA

Table 5.3: Research activates and tools used throughout the study

5.4   Exploratory qualitative study

Different methods and techniques for conducting qualitative research are available. The main data collection techniques include observations, interviews and use of documents (Easterby-Smith et al., 2012; Bryman and Bell, 2007; Robson, 2011; Bryman, 2012). This study makes use of interviewing as a data collection technique in order to get rich and deep data in relation to the knowledge processes within Bulgarian organisations.

5.4.1.   Exploratory qualitative semi-structured interviews

Qualitative interviews are divided on highly structured (questions with fixed wording and strictly fixed order), semi-structured (the interview protocol serves as a guide to the major topics that need to be covered during the interview) and unstructured (the interview has a general direction but develops though the conversation) (Easterby-Smith et al., 2012; Robson, 2011; Bryman and Bell, 2007; Bryman, 2012). This study utilised semi-structured interviews. Qualitative exploratory semi-structured interviews are used to gain a deeper understanding of phenomena underexplored in the Bulgarian context (Easterby-Smith et al., 2012; Robson, 2011). Semi-structured interviews are informal conversations guided by low structured open questions allowing the interviewer to pose 'probing' questions and develop new questions during the course of the dialogue (Easterby-Smith et al., 2012; Robson, 2011). This technique gives the interviewee sufficient freedom to expand on particular points, tease out examples of day-to-day practices and interactions as well as factors/artefacts affecting these interactions. The aim of the qualitative interviews for this study is to identify the underlying factors affecting knowledge processes, to establish the parsimony of factors that have the most significant impact in the Bulgarian context and to determine the relationships between these factors.

The questions for the exploratory semi-structured interviews are informed by the literature review. A set of ten questions were developed to guide the interview. The general guidance followed when designing the interview protocol was to avoid long questions, double barrelled questions, leading and biased questions (Easterby-Smith et al., 2012; Robson, 2011; Bryman, 2012). The formulated questions were reviewed by two academics. Subsequently, the original English version of the interview protocol was back translated in Bulgarian by two

bi-lingual Bulgarian professionals. When contacting potential participants, both the English and the Bulgarian versions were provided for their attention in advance. The original and the translated version are presented in Appendix A.

5.4.2.   Challenges when conducting qualitative interviews

Qualitative semi-structured interviews are very useful in order to gain insights and deeper understanding of a particular phenomenon. However, conducting interviews can be challenging. Some of the major challenges are recognised to be (Easterby-Smith et al., 2008; Fontana and Frey, 2005):

- *Organising, conducting and analysing interviews can be quite time consuming* – the process requires great efforts in getting access, negotiating time and location, recording the interviews, transcribing, and translating. This challenge is addressed at length in the following section. More specifically, this issue is addressed in the light of the Bulgarian context.

- *Skills to tease out the necessary information.* In this study, this was achieved through the use of probing questions and by urging the participants to expand on certain areas.

- *Skills to obtain trust.* This was achieved by providing as much information as possible to the participants prior to the interview along with an ethical statement.

- *Need to keep the interviewees focused and at ease.* The interviews were carried out in Bulgarian which put the participants at ease and provided them with the opportunity to express themselves in their native language which resulted in deeper insights.

- *Use of appropriate language and no special terms.* During the interviews no special terms were used and language was kept simple and precise.

The challenges when conducting qualitative research are even greater in Eastern European transition economies. Michailova and Liuhto (2001) provide a list of obstacles, false expectations and ways to go forward when conducting qualitative research in such societies:

- The first problem is "identification of the field, getting the access to it, and entering it" (p. 16). The authors warn that relying on publicly available information, or registries and databases would not lead to success as there is a lack of reliable databases,

business information and registries. Research should rely predominantly on personal networks, friends and family. The authors strongly recommend that researchers should "make intensive use of informal contacts, such as relatives and friends" (p. 16). The experience of the researcher in this current study resonates with this main data collection obstacle. The researcher made use of informal and professional networks to reach out to potential participants.

- Another problem identified is the "secrecy and mistrust in the investigated organisation" (p. 16). This problem is related to fear among the participants of how the information will be used. The recommendations provided are to rely on insiders, win the trust of the upper levels and reassure the participants that this research is conducted as part of a degree abroad. The detailed information about the purpose of the study, along with the interview questions and the ethical statement helped create trusting atmosphere.

- Another barrier is identified in "respondents' suspicion and fear when the researcher uses a tape recorder when conducting interviews" (p. 16). The researcher in the current study did not encounter suspicion towards the use of audio recorder amongst the participants who agreed to take part in the study. This could be due to the fact that in the current information era people are more used to the application of technology for research and training purposes. As such, the audio recorded did not make the participants feel uncomfortable.

These are some of the challenges evident when conducting qualitative research in transition societies. The way these challenges were overcome to gain access in Bulgarian organisations is presented in the following section.

5.4.3.   Sampling technique and negotiating access

The process of negotiating access is described by Hayes (2005) as a "long and winding road" (p. 1193). Thus researchers are urged to consider potential pitfalls and difficulties and develop diverse data collection strategies (Hayes, 2005). It has certainly proved rather challenging and hard to negotiate access in Bulgarian organisations. Thus, in this study different strategies were employed to get access:

- Use of databases, registers, the official trade directory;

- Become a member of different professional organisations and institutes;
- Use of personal contacts, friends and family and snowball strategy;
- Use of professional social networks – LinkedIn.

The information in the various databases and registries appeared scarce, not up-to-date, lacking executives' names and personal email addresses. This forced the researcher to go to the website of each company and try to find out more information. If the emails were located, a first contact was established by sending a personal email to the executives. The initial emails sent were followed up by phone calls trying to speak directly to the key executives – if eventually their names have been found. Calling the companies has been supplemented with another obstacle – getting through to the managers. If getting to that stage proved difficult, convincing the secretary to put the researcher through to the manager was even more difficult. If eventually the researcher managed to talk to someone senior, a new email had to be sent, more reminders and persuasion to be done. The process was easier when the researcher was recommended by an insider, close friend or a third party. The LinkedIn strategy proved immensely beneficial to identifying valid email addresses and names and in contacting potential participants via discussions in groups and private messages.

The main sampling technique in qualitative studies is purposive sampling (Bryman, 2012; Miles et al., 2014). Purposive sampling is a non-probability sampling guided by the research question (Bryman, 2012). As a general guideline the intention was to target mainly the sectors of IT and Software and Management Consulting as fast developing and innovative sectors. Companies that operate in these industries have to keep up constantly with many dynamic changes and are deemed as knowledge-intensive (Alvesson, 2004). Moreover these two industries showed the greatest innovative activity in Bulgaria, as shown in Chapter 1. However, as the study is exploratory, the sample was kept broad so that a bigger picture of the knowledge processes as well as issues around these processes is revealed. Thus, overall the research was not restricted in the industry and the size of the firm and the position of the participants. As part of the purposive sampling a snowball technique was used to collect data. Snowball sampling starts initially with small number of participants who are considered suitable for the purpose of the research. Subsequently, these participants recommend other potential participants (Bryman, 2012; Saunders et al., 2011). In order to get to the initial group of participants the research made extensive use of personal and professional networks.

Data access and collection is extremely challenging in Bulgaria and in similar transition contexts. In relation to the issue of getting access to data it appears that a number of other scholars have experienced such problems. For example, Hutchings (2004) in an attempt to conduct research on Australian expatriates in China has found that the only way of getting access to data was through guanxi networks. Not only are guanxi very important for the way business is done, but they are also crucial for conducting research. The author shares that she had to join a number of guanxi networks and in this way she managed to meet people who helped her. Thus the author stresses that the key to gaining data access lies within "recognising the importance of personal contact" (Hutchings, 2004, p. 146). Furthermore, Nojonen (2004) explains that in transition and transforming societies such as Eastern Europe and China, the way to get data access is through gift giving, socialising, lunches and dinners, and by attending banquets and parties. This was very much the case during the data collection process of the current study where the researcher attended banquets, informal lunches and drinks to reach out to potential participants. Importantly, joining groups on LinkedIn helped the researcher to get in contact with more people. Whenever it was possible the researcher attended formal and informal events organised by these LinkedIn groups. The experience of the researcher in the current study proves that the key to successful data collection was the utilisation of personal and professional networks.

All interviews were conducted in Bulgarian. At the beginning of the interview the researcher presented herself, explained the purpose of the study, described the format of the interview and requested permission to record the conversation. The participants were reassured that the data would be kept strictly confidential, that the study was anonymous and no names of people and companies would be revealed. All participants granted their permission for the interviews to be recorded. The interviews differed in time, length and method used to conduct them. The duration of the interviews lasted between forty and ninety minutes. The interviews were conducted via Skype, over the phone or face-to-face. The interviews were in a form of an interactive dialogue where strict format was not followed, but the researcher made sure all the areas were covered by the end of the interview (King and Horrocks, 2010). At the end of each interview the respondents who participated were kindly asked to recommend other potential participants. In the course of six months the researcher managed to conduct twenty semi-structured interviews. The issues of non-response issues are explored in the next section.

5.4.4.   Non-response

As described earlier, for the purpose of this study a variety of data collection strategies were employed. Each of these strategies posited its own challenges. However, despite all the efforts put into gathering data the issue of non-response was quite prominent. This section provides a concise summary of the non-response issues experienced by the researcher.

- No reliable databases;

- Inaccurate and out-of-date information in the databases;

- No personal details of key executives – names and email addresses;

- No response when email sent to the office email address such as: companyname@office.bg or companyname@info.bg;

- Challenge to negotiate with the secretary to put the researcher through to the manager;

- High level of suspicion and distrust – who the researcher is and how did she manage to get the details of the company or the person;

- Agreeing to participate and pulling out later;

- Being too busy;

- Do not have the right person to answer the questions;

- Too time consuming;

- Do not like the idea of an interview;

- Prefer to give written answers;

- Prefer more structured questions in a form of survey;

- The company is too small.

In an attempt to deal with non-response issues, the researcher adjusted accordingly to meet the need of participants' availability and requirements. The interviews were carried out in the most suitable time for the participants and via the medium preferred by them. Thus some interviews were carried out over the phone, over Skype, or face-to-face. Ethical considerations were clearly stated in advance to all participants.

5.4.5. Ethical considerations

Ethical considerations are very important for conducting research. Precautions need to be taken in advance in order to avoid harmful situations to either of the parties involved (Miles et al., 2014; Easterby-Smith et al., 2012). There are two main areas around which ethical principles should be organised: protecting the interests of the participants and clearly communicating the aims and the findings of the research (Easterby-Smith et al., 2012).

Following the research ethics principles and Royal Holloway guidelines, ethical statements were produced and approved at both the qualitative and the quantitative stages of this study. They are presented in Appendix A and Appendix B. With qualitative research ethical issues are a particular challenge as the participants answer open-ended questions and everything they say is audio recorded (Bryman, 2012). The researcher's task is to inform every potential participant of the overall interview process, the questions asked, the purpose and the outcome of the research as well as to reassure the participants that no personal or organisational information will be revealed to third parties. Thus, the aims and objectives of the study were clearly formulated and presented to each participant in advance. The position of the researcher as a doctoral student at Royal Holloway, University of London was made clear from the very first contact. The participants were provided with an ethical statement guaranteeing their anonymity and confidentiality along with the interview protocol in phase one and the link with the questionnaire items in phase two. During the interviews an audio recorder was used only after permission was granted by the participants. As explained earlier this was not found to be an issue and the participants felt at ease despite the recording. Furthermore, the participants were reassured that the information was going to be used solely for research purposes. Additionally, for the survey no personal or company data was required. There was only one field in the questionnaire, set as optional, that provided the opportunity for the participants to write their email if they would like an executive summary of the results.

Following the steps described above ethical considerations were addressed in advance and no harm was caused to any of the participating parties.

5.5   Qualitative data analysis

This section presents the analysis of the qualitative semi-structured interviews. Through the qualitative data analysis the first two objectives of this study are addressed, i.e. *explore knowledge sharing processes in Bulgarian organisations and what key factors affect these processes* and e*xplain the relationships between the identified factors and knowledge sharing and knowledge interaction processes in Bulgarian organisations*. To start with, the demographics of the sample are portrayed, followed by the thematic analysis conducted.

5.5.1.   Demographic characteristics of the sample

Twenty semi-structured interviews were conducted with people working in organisations in Bulgaria. The participants occupy different positions within the companies. The sample consists of 10 Top Managers, 5 Middle Managers, 5 Operation Managers/Employees. Thus multiple perspectives of knowledge sharing processes were revealed. Because of the exploratory nature of the study the sample is not limited to specific industry or size of the organisations. The breakdown of the industries in which the companies operate is presented in Figure 5.3.
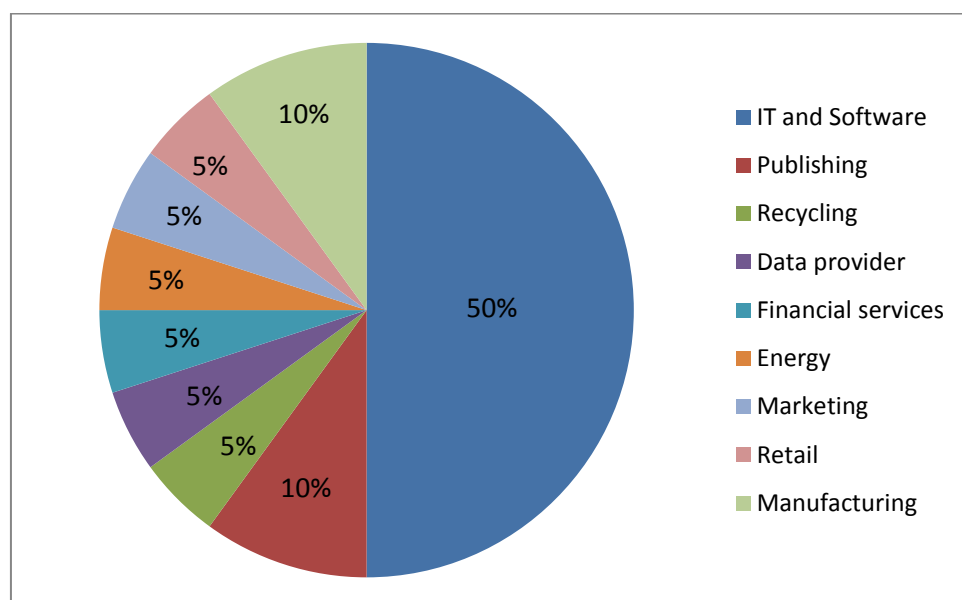
Figure 5.3: Number of firms in each industry in the sample

As shown in Figure 5.3 the study considered a wide range of companies in different industries. However, it is to be noted that the majority of the companies are from the IT and

Software sector. Other industries were not excluded, so that a bigger picture could be revealed. The same type of reasoning was applied for the size of the companies which justifies why this study used a sample of companies of all sizes – micro, small, medium and large where small and medium-sized companies generally dominate in the study. A breakdown of the size of the organisations in the sample is presented in Table 5.4.

Enterprise size per number of employees	Percentage in the sample
Micro < 10	**10%**
Small < 50	**40%**
Medium < 250	**40%**
Large ≥ 250	**10%**

Table 5.4: Enterprise size per number of employees and percentage in the sample

According to the European Commission guidelines the size of organisations can be determined based on the number of employees working in the organisation. As shown in Table 5.4 firms with less than 10 employees are considered as micro, between 10 and 49 as small, between 50 and 249 as medium and above 250 as large (European Commission, 2014b). Two interviews were conducted in micro firms, two in large firms, eight were conducted in small firms and eight in medium-sized firms.

5.5.2. Thematic analysis

Qualitative analysis is generally divided into tight and loose with a continuum between the two (Miles and Huberman, 1994). Tight analysis is conducted to get an understanding of a phenomenon guided by the existing theoretical contributions to the field. This type of analysis provides initial focus and guidance for the research. Loose analysis is recommended for examining a new phenomenon in an unknown culture. Loose analysis requires a substantial amount of time and a number of different case studies in order to grasp the complexities of the new phenomenon (Miles and Huberman, 1994). Seen as a continuum, the methodology literature provides different alternatives for conducting qualitative analysis ranging from analytic induction and content analysis through thematic analysis in the middle, to grounded theory on the loose extreme of the range (Bryman, 2012; Bryman and Bell, 2007; Easterby-Smith et al., 2012; Robson, 2011; Easterby-Smith et al., 2008; Braun and Clarke, 2006).

This study explores a phenomenon which is not new but has not been explored in the Bulgarian context so far. This is why this study follows the general guidelines of thematic analysis which is situated in the middle between well-known phenomena and a new context. Through thematic analysis themes, subthemes and patterns evident from the data are identified (Braun and Clarke, 2006; Bryman, 2012; Attride-Stirling, 2001). This type of analysis is very useful to organise, describe, analyse and report the data in great detail, but also helps in interpreting the themes and emerging patterns. Thematic analysis is highly flexible and considered independent of predefined theories and epistemology (Braun and Clarke, 2006; Boyatzis, 1998). Furthermore, Braun and Clarke (2006) describe thematic analysis as a

> …method, sitting between the two poles of essentialism and constructionism, and characterised by theories such as critical realism…, which acknowledge the ways individuals make meaning of their experience, and, in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of "reality". Therefore, thematic analysis can be a method which works both to reflect reality, and to unpick or unravel the surface of "reality" (p. 9).

From that perspective, thematic analysis fits well with critical realism perspective and is considered most appropriate analysis to address the research questions and objectives set in this study. In order to conduct a thematic analysis a set of guidelines are provided (Braun and Clarke, 2006; Robson, 2011; Attride-Stirling, 2001). Attride-Stirling (2001) describes three stages of conducting thematic analysis: Stage A: *Reduction or breakdown of text*, Stage B: *Exploration of text*, and Stage C: *Integration of exploration*.

5.6 Stage A: *Reduction or Breakdown of Text* – Coding Interviews

A number of steps are performed in order to analyse the data as part of Stage A: (a) f*amiliarise yourself with the data*, (b) *generate initial code*, (c) *identify themes*, and (d) *construct a thematic network*.

The analytic process starts with f*amiliarising yourself with the data*. As part of this step all interviews were transcribed using NVivo and translated in English by the researcher. It

was essential for the researcher to translate the interviews herself as she could reproduce the spirit and the meaning expressed by the interviewees. The researcher is familiar with the peculiarities of the language as well as with the meaning put into the words and the intonation at the time of the conversation. The translated versions were checked against the original by two bi-lingual Bulgarians and subsequently the English versions were verified by a native English speaker. Subsequently the translated interview transcripts were imported into NVivo to conduct the analysis.

The next step of the thematic analysis is *generating initial code*. Codes are described as "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998, p. 63). Moreover, it is stressed that "coding is analysis" (Miles et al., 2014, p. 72). The aim of coding is to combine, organise, reorganise the data in codes and themes, reflect on it and make sense of its meaning. The codes represent statements and ideas from the interviews. Miles and Huberman (1994) describe codes as "tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Codes are usually attached to 'chunks' of varying size – words, phrases, sentences or whole paragraphs" (p. 56). These codes are assigned to what is called in NVivo 'nodes'. Nodes can be 'free nodes' which are non-hierarchical and 'tree nodes' which structure the free nodes in a hierarchical way (Easterby-Smith et al., 2012). The coding into free nodes is described as a first-order coding (King and Horrocks, 2010; Miles and Huberman, 1994). One and the same code could be part of number of different free nodes thus revealing underlying relationships, causations and contradictions. The first-order coding results in a number of free nodes which are not structured in any way. This way the free nodes emerge from the data (Easterby-Smith et al., 2012). This stage of the analysis resulted in the following list of free nodes:

Affiliation	Formal Networks	Management	Retain Information
Appraisals	Friends	Matrix	Rewards
Atmosphere in the	Hierarchy	Mistakes	Rules
Firm	Informal Networks	Motivation to share	Social Events
Barriers to KS	Innovation	Movement within the	Staff Interchangeability
Cigarette Breaks	Interchangeability	organisation	Teamwork
Collaboration	ISO Procedures	Networks	Technology
Communication	Knowledge	Obsolete Knowledge	What and whom others
Competition	Knowledge	Personal contact	know/TMS
Control	Interactions	Physical set up of the	Training
Culture	Knowledge Sharing	Firm	Transparency
Environment	Learning	Position in the firm	Trust
Firm activity/industry	Lessons Learned	Power	Values of the company
Firm Size			Web 2.0

The next step of the thematic analysis is *identifying themes*. At this stage the loose free nodes are grouped into tree nodes and into sets of higher levels concepts and themes which represent the factors affecting knowledge processes in Bulgarian organisations. This process is described as second-order coding where nodes are grouped and combined according to their meaning and relationships (King and Horrocks, 2010; Miles and Huberman, 1994). Themes, sub-themes and patterns are formed based on the data. NVivo allows for the coding of 'nodes', 'sets' of themes, 'relationships' and 'memos' which helps to perform a more systematic analysis (Easterby-Smith et al., 2012). The factors affecting knowledge sharing processes in Bulgarian organisations emerging from the data are organised in themes and are presented in Table 5.5. At this stage two new themes/factors emerged as important factors affecting knowledge processes within Bulgarian organisations. These are power relations and the awareness of who knows what and who within the organisation, i.e. transactive memory systems. While the majority of the factors/themes were generated around the themes of the interview protocol, hence the prior literature, these two factors emerged from the data. These factors are not unknown to the existing body of knowledge but they appeared as currently underexplored within the literature. However, their effect appeared to be of key importance in relation to knowledge processes in the Bulgarian context.

Lastly, after the themes/factors are identified, the next step of the thematic analysis is to *construct a thematic network* where themes are reviewed and refined. At this stage an activity theory framework is used to provide the underlying theoretical elements around which the thematic network is build. Such use of activity theory is not unusual, another example can be found in Allan Macpherson's thesis (Macpherson, 2006). When using activity theory as part of the analysis a number of steps should be followed. First the subject, object and the outcome should be identified. Second, starting from the object/the outcome, the aim of the analysis is to identify the community, the tools, the rules, the division of labour, to develop an activity system diagram and to identify inner contradictions within the developed activity system framework (Prenkert, 2006). Following these steps a thematic network is first developed, presented in Table 5.5.

Activity theory element/theme	Factors/themes emerging from the data
Subject	Collective Teamwork Staff interchangeability Motivation to share Position in the organisation
Object/Outcome	Knowledge Knowing Knowledge Sharing Knowledge Interactions
Tools	Communication tools Personal contact Technology Web 2.0 Transactive Memory Systems Who knows what/who Collaboration Trust is people's knowledge Social events
Community	Firm size, Industry Community characteristics: Formal and Informal networks: Teamwork Social events Informal gatherings Trust: At lower levels Between different levels
Rules	Organisational Culture/Climate Environment/Atmosphere Affiliation Values Rewards Appraisals Rules and Procedures Transparency Competition
Division of Labour	Power Relations Hierarchy Management Control Competition

Table 5.5: Thematic Network

5.7   Stage B: *Exploration of Text* – Interviews' Analysis and Findings

Based on the developed thematic network in Stage A of the thematic analysis, Stage B concerns the exploration of this network via the text of the interviews. This part of the analysis reveals the findings from the semi-structured interviews around the overarching themes aiming to produce the activity system framework diagram at the end of this stage.

5.7.1.   Object/Outcome

The outcomes in the activity system are the two knowledge processes, knowledge sharing and knowledge interactions, which are the result of construction and transformation of the object, i.e. knowledge/knowing. In the Bulgarian context the concept of knowing in practice and thus knowledge interactions is somehow distinct as people tend to learn on the spot, help each other to resolve problems in practice, show each other and explain to each other how to do things while performing on the job. Participants explain that this is achieved through "explaining things to each other and you see how things are getting done as you are doing the job". The need to interact is paramount as in the majority of the companies people are not provided with any form of induction or formal training. Instead, they have to quickly adapt and learn on the job. In Bulgarian organisations, the easiest way to adapt to a new environment is by getting help from people familiar with that environment. As one participant explains "when a new member of staff joins, you show him how to do things so that he can do the work. We do not have one-month training course for all newcomers, but new people should be able to start working straight away". Moreover, it is stressed that "the best way to learn something is if someone shows and trains you". The findings highlight the new construct of knowledge interactions as a prominent construct in Bulgarian organisations.

Additionally, business in Bulgaria has to catch up with the advancements in developed countries. Thus, there is constantly something new that needs to be explored and learned and thus it is difficult for knowledge to be locked into databases or in people's heads. To support that view, an illustrative example from the IT industry is presented.

In the IT sector things are constantly changing: in the hardware sector new things come out every few months, in the software are maybe every 2-3 years. In the computer networks field innovations happen more slowly, let's say every 2-3 years, but when it happens the new thing is totally different from the one before and in this case your previous knowledge becomes good experience but it is not directly used any more. For example 5-6 years ago computer networks were built with coaxial cables, now they are built with unshielded twisted pair (UTP) cables or they are wireless, and no one can find a working network with coaxial cables any more. This is an example of how something that was valid a few years ago is no longer valid, this knowledge becomes superfluous and gets replaced by new knowledge.

5.7.2. Subject

In light of the dynamic and practice nature of knowledge, there is an emphasis on the importance of collective knowledge as opposed to individual knowledge and participants stress that "if people work together and help each other the results will be much better than if they play solo pursuing their own interests". Furthermore, the participants share the opinion that "a person cannot keep up with everything by himself. In this sense collective knowledge has a greater chance to succeed than the individual one". As such the emphasis is placed on the collective as a subject.

The interviews demonstrate that Bulgarian companies rely on teams and teamwork. It is strongly emphasised that "it is not only one person doing [the job], it is a team of 2-3 people, sometimes more, and they share between each other". The team principle is widely used it is stressed that "by sharing more things the bonds in the team get stronger and this results in a better team for the future when we work together". Within organisations in Bulgaria the principle of staff interchangeability is still strongly present. From that perspective, similar tasks are distributed to more than one person so that "we try to use the people interchangeably, not only for one person to be able to do something, but to also have others who can do it". This mentality appears to be widely spread in the way business operates. The rationale behind it is that if a particular know-how is concentrated in one person "he becomes a 'single point of failure' and when this person leaves the company, the latter cannot function any more". In order to avoid such situations employees are used interchangeably.

In terms of motivating people, Bulgarian organisations appear to be somehow undeveloped as it is considered that people are "motivated by default". Motivation to share appears to be predominantly down to the individuals and their personal character and is not something that needs to be encouraged and nurtured in Bulgarian organisations. As the results show that motivation is predominantly an individual factor, it is not included in subsequent analysis and the quantitative study.

5.7.3.   Rules

From an activity theory perspective rules are described as the norms and procedures that regulate the activities within the community (Engeström, 1987; Foot, 2001). The analysis of the semi-structured interviews shows that within the Bulgarian context organisational culture/climate represents the rules of the activity system. The emphasis in Bulgarian organisations is not on deep values and beliefs but on the working environment, the friendly atmosphere, the existing procedures and standards, and on affiliation with the organisation. As such the rules that govern the activity system are characterised by the climate and the working atmosphere within the organisation. A vivid aspect of the organisational culture/climate is the affiliation with the organisation where participants explain that the "job is not only a job but it is a cause". The participants put great emphasis on the working environment and insist that a friendly, open environment and a good collegial atmosphere are essential aspects enhancing knowledge processes within Bulgarian organisations. This sentiment is highlighted by some participants as "the environment defines whether people will share or not" and that "a friendly atmosphere and trust help the easy sharing of news and specific knowledge and practices". Within a friendly environment people seem to be more open to interact and the findings highlight that people generally prefer to talk, to ask someone when they do not know something or to discuss something with others. One participant clearly explains that a good working environment is:

> …a well balanced team, there are no separate groups, and everyone wants to help his colleagues in order to get better. There is no open competition for a position or anything like that which makes people keep information to themselves. Everyone is ready to help everyone else at any time.

Despite the great recognition of teamwork, the majority of the rewards provided in Bulgarian companies are based on individual achievements which may lead to competition between people. Only few participants share that the rewards and bonuses are based on teamwork achievements and feedback from teammates. But even where rewards are present they are not directly linked to the employees' engagement in knowledge processes as knowledge sharing processes are not considered as part of the evaluation and reward system. For that reason rewards are excluded from further analysis and the quantitative study.

5.7.4.   Tools

Tools are described as the material and abstract artefacts that mediate people's activities within the activity system. The analysis of the semi-structured interviews demonstrated that such tools within Bulgarian organisations are communication tools and transactive memory systems.

Communication
Communication within Bulgarian organisations is characterised as formal and informal. One participant clearly distinguishes between formal and informal communication channels.

> Formal channels include trainings, presentations, workshops, [technological means such as] chats, forums, blogs, the internal system, emails. The informal channels on the other hand are obvious - this happens between the colleagues spontaneously not in pre-organised environments, but while they are having lunch together, or while they smoke cigarettes somewhere together, or while drinking coffee, they discuss professional issues and not only professional.

Within Bulgarian organisations the internal communication can be quite formalised where it mainly relies on emails, meetings, chats, phone conversations and considerably less on Web 2.0 technologies or any special KM systems. The most utilised technological means are the traditional emails and chats where emails appear to be the management's preferred channel for communication as they leave a written trail which can be easily tracked. Only two companies out of the twenty use Web 2.0 technologies as a means of communication. The Web 2.0 technologies mainly used are blogs and forums. In general online social networks are

used a lot less. The reason behind their limited use within Bulgarian organisations is that their internal use is either banned or employees' online presence is strictly monitored. However, some participants hold the view that "if we want to be in tune with the modern technologies we cannot just say that we do not use them". So it appears that there is potential for embracing Web 2.0 technologies. Thus, this study further explores the use of Web 2.0 as an interactive tool enhancing knowledge processes.

Technology does not seem to be given priority in the Bulgarian context for reasons such as: it is time consuming and difficult to use, information overload, it is not considered effective, people do not like to put things in writing and generally personal contact is preferred. It was pointed out that because of the Bulgarian mentality people generally do not like to put things in writing and "live face-to-face communication is more frequent and effective than the written one" and furthermore that "despite the high level of electronic communication, live contact still cannot be replaced". Generally people prefer to talk, to ask someone when they do not know something, to discuss something with others while having a cigarette break, over coffee or lunch. Even within organisations that are technologically oriented it is stressed that technology is secondary.

> For me the technology is secondary, it is a device that is convenient or inconvenient. What is more important is the culture and not to have boundaries for the communication so it is more important to have the right culture in place and people will find the most appropriate way to communicate. Often the most appropriate way is when we go for lunch in our micro-canteen. I think that sometimes the informal contact during lunch is a much better way than the blog for example. Other time the blog is more effective as it is accessible to everyone without having to organise formal meetings and so on. So for me the way they communicate and use the technology is a personal choice.

Other participants share similar views regarding the communication means. A good illustrative summary is provided by one participant explaining that within the company they use "intranet, email, some colleagues use Skype but it is not so popular, and the other thing is personal contact. I personally prefer personal contact". As technology does not appear as a key tool facilitating knowledge processes within Bulgarian organisations, it is not included in further analysis and in the quantitative study.

Transactive Memory Systems

The importance of personal contact is recognised also in the development of transactive memory systems resulting in the creation of mental maps of who knows who and who knows what within the organisation. The use of TMS as a tool is evident from the interviews as the participants explain that "it is always the case where you need something urgently so whenever you need to know the right thing at the right time now, it is the best thing to ask someone who knows and who has already done this". In order to find the right person and the right expertise the interviews reveal that in bigger organisations people use job descriptions and organisational charts, while in smaller organisations the process is a lot more ad-hoc where "if you do not know who knows what you need, then you go and ask verbally: "Do you know about this, do you know about this, do you know about this?" If you know someone that is likely to be aware of this problem or has experienced a similar problem, then possibly you can write him an email directly". Thus, a developed TMS serves as a tool enhancing knowledge processes in Bulgarian organisations.

For the development of TMS the findings suggest informal networks, social events and gatherings to be very powerful antecedents as "people [who are] part of your informal network would be able to point you out to a colleague of yours that would give you the needed information". Some participants explain that the highest concentration of TMS is located in the 'smoking room' and they share that the 'smoking room' is a good starting point when you need to find someone who holds a specific expertise. It is further emphasised that solving problems is not only about knowledge but about "history". This history is the transactive memory system the organisation has built and it has a very positive effect on knowledge processes as illustrated by the following quote:

> We have people with great experience in the company where this experience includes knowledge and history. This is very important because if I do not know something or I do not know how to find the most suitable person for a job, I call for example one of the retired colleagues and ask him "do you remember who did these all these years ago, can you remind me the case and tell me who to ask for more details?". So finding the suitable person is part of the experience and the knowledge that have been gained. The more knowledge you gain…, you might not know everything, but you know where to find what you need.

5.7.5.   Community

The community where the activity takes place is within the organisation which appears to be characterised by the level of trust and by the networks existing within the organisation.

Formal and Informal Networks

The interviews suggest that formal teams are afforded greater attention by the managers and they are valued more than the informal groups. The participants recognise that informal groups exist, people go to smoke together, they go together to the pub after work, they organise events together and they are friends in life not only colleagues at work. However, the participants hold controversial opinions about the effect of such groups. Generally, managers consider formal groups to be more beneficial for knowledge processes than informal groups as "the formal networks are clearly defined" and "based on competences while the informal networks are based on leisure where they exchange know-how particularly associated with their hobbies". To go even further, one manager expresses the view that management is not supposed to know what is going on in these informal groups and points out that "through informal communication, people share information that is not supposed to be known at the upper levels of the hierarchy. So I do not know much about the informal communication".

While formal networks are preferred by the upper levels, the lower levels stress the importance of informal networks and it is pointed out that "the informal networks are absolutely necessary… People get to know each other that way and it is a disadvantage if there are no informal networks". The positive effect of informal networks is recognised by a few managers who point out that "…during lunch a professional conversation starts and, as a result of it, a lot of new and clever ideas are generated. After that, when they come back in the office, they share them and implement them". The value of such formations to promote knowledge processes is recognised in the fact that informal environments put people at ease which makes sharing easier. Thus, existing formations and networks need to be used in the best possible way by getting "these people to work together in a team because they will work better together rather than mixing them with different personalities and age groups", as suggested by one participant.

While in general the effect of informal networks on knowledge processes is greatly neglected, the positive effects of socialising and informal communication are recognised among the participants and are claimed as absolutely necessary for the formation of a friendly working environment. Companies organise special events which aim to get people together so that they meet and get to know each other and socialise outside the office because "the informal events, they are there to help you create contacts, to get to know people that you don't know and for you to know who does what and what knowledge you can get from these people". The Christmas party is the one with the longest traditions and it is part of the culture in every organisation in Bulgaria and even in times of recession it is one not to be missed. In addition companies organise teambuilding events, away days, trips to the cinema and many other socialising activities to get people together to talk and interact with one another. When people communicate in an informal environment without reservations, personal connections and friendships are formed. Relating back to the friendly atmosphere, it is recognised that informal gatherings and networks greatly enhance the achievement of such atmosphere as "gathering in an informal environment, without suit and tie, removes a big part of the formal expressions as people remove their masks, so undoubtedly they help a lot in creating a friendly atmosphere".

Trust

Amongst Bulgarian managers, trust is recognised as a central factor for knowledge sharing and knowledge interactions, for the relationships between people and for the functioning of the organisation as a whole. The participants put a strong emphasis on trust and some of them go as far as to say that "without trust nothing happens" and that "trust is crucial and if you lose it then the work becomes impossible". Building close and trusting relationships with people "is like putting money in a bank account and from the moment when you need them you are able to withdraw them". Trust is recognised by managers and employees as an important building block of every organisation. However, the interviews demonstrate that levels of trust differ between the different hierarchical levels. It appears that trust and communication at lower levels is considerably higher. An illustrative quote displays this discrepancy.

> At the lower levels there is a full trust and no problems with communication. At the upper levels there is room for improvement. I personally do not have any problems with communication as I am with the people all the time but other managers encounter such problems. The other thing is that I have been in their position and they accept me as one of them and I do not have any problem communicating with them, but other staff, especially newly employed managers have difficulties with communication.

The quote above shows that employees trust managers that have been in their positions and who spend time to interact with them, in the words of one participant "I trust fully one of the managers as he is in the office every day and he takes things personally". To illustrate the depth of the problem, some managers even hold the opinion that if the management pays the salaries to the employees, that is enough to build trust and respect between managers and employees. This shows the absolute necessity for higher involvement from upper levels in order to build trusting relationships between the different levels. Other ways of improving trust between higher levels and lower levels is with more transparency where things are not hidden but communicated openly and people have their say. The discrepancy in the trust levels between managers and employees is further deepened by the fact that employees do not know what managers are doing and vice versa managers in general do not engage and interact with the lower levels, but predominantly give orders and control people.

5.7.6.   Division of Labour

As described in the previous section, trust is higher at lower levels in the organisation and levels of communication and trust diminish further up the hierarchy. Issues of control become more prominent at higher levels. By going up the hierarchical ladder the distance between people seems to grow and inter-personal relationships appear to matter less for people at the top. When looking deeper into social relationships not everything is harmonious and flawless, and it becomes evident that power relationships play a significant role in knowledge processes in Bulgarian organisations. The exploratory findings suggest that power relations mainly stem from the hierarchical structure and hence they are considered part of the division of labour within the activity system.

One participant who has recognised the destructive effect of strong power relations stresses that "I do not like to divide people between them and us, or between managerial and non-managerial level, because at the end of the day it is one and the same team". However, the participant further recognises that the hierarchy is very problematic in Bulgaria and that "people in Bulgaria often feel discomfort towards the hierarchy". The hierarchy is felt to be an obstacle when people give an honest opinion or when they need to be critical.

> …[the strict hierarchy] might impact on occasions, when people need to give an honest and genuine opinion. For people it is difficult to criticise openly their boss and often for the boss it is difficult to receive open criticism. This is part of the Bulgarian culture and this is one of the things that requires years so that we can show that we are a different organisation.

The quote above shows that people from lower levels cannot voice their opinions or provide criticism to peers and upper levels. This could be due to the fact that the managerial levels cannot take criticism, and as a result the strict hierarchy is still worshiped in Bulgarian organisations. There is a general view that people at higher levels are more knowledgeable and it could be partly for this reason that they cannot take criticism.

In the majority of organisations the hierarchical structure prevails. From these structures stem strong power relations, control and domination. The work is organised in a way "to make the boss happy" with strict control over employees from lower levels. The problem with strong power relations is illustrated by the participants who explain that "in Bulgaria many people who go up on the career ladder have the attitude where they think that they are 'great' and do not treat people from lower levels as equal". Furthermore, there is a lack of communication and transparency between levels which has a number of consequences. One consequence is that "people from the lower levels do not know what people from the upper levels do". Another consequence is that coordination between the managers worsens and each manager expects different things from the employees.

> The problem is that we have 3 managers and there are always three different opinions and if they do not communicate things properly everyone expects something different. One of them is always with us in the office and he knows everything but he does not trust everyone, the other manager comes sometimes and the third one comes very rarely so he does not know what is happening.

The quote shows that different managers have different levels of involvement in the day-to-day practices, if any. This additionally distances the upper and the lower levels. The divide between employees and management is worsened by the fact that many managers actively encourage competition between their employees. As one participant points out "I want my people to compete with each other, because this leads to better results and to bonuses. They sometimes cry, they argue, they even fight, but in the end it leads to better results". The manager contends that it is perfectly possible for people to be friends in life while competing in their jobs and adds that "…we love each other very much and we have fun together, but when it is down to work everyone knows their place and they do their job, because otherwise they will be fined or fired". This example draws attention to issues of management domination and control and to the complexities of the interconnections between trusting relationships, power, domination and control.

Additionally, the majority of the managers are predominantly result-oriented and how the job is actually done is out of their sphere of direct attention. Business in Bulgaria is not people-oriented and it is assumed that as far as the salaries are paid then the level of satisfaction of the employees will be high. But how people interact to produce the required results and their needs are not a primary concern for the upper management. Similarly, the prohibition of using Web 2.0 technologies is a clear example of controlling people. The negative attitude towards informal groups and networks are also a sign of power differentials within Bulgarian firms. Contrary to the negative effects of power relations, not only in knowledge processes but in the overall environment and the relationships within organisations, the hierarchy is respected and majority of the managers find it useful: "the structure is hierarchical, we do not believe in flat structures. The hierarchical structure helps because the rights and the responsibilities are clear. The hierarchical structure is easier for managing people". Moreover, managers are assertive that "Overall there should be control".

The analysis of the semi-structured interviews resulted in developing the activity system framework explaining knowledge processes within Bulgarian organisations, presented in Figure 5.4.

TOOLS

- Web 2.0 technologies
- Transactive memory systems

SUBJECT

- The collective

OBJECT → OUTCOMES

- Knowledge/ Knowing
- Knowledge sharing
- Knowledge Interactions

RULES

- Organisational culture/climate

COMMUNITY

- Informal networks
- Trust

DIVISION OF LABOUR

- Power relations
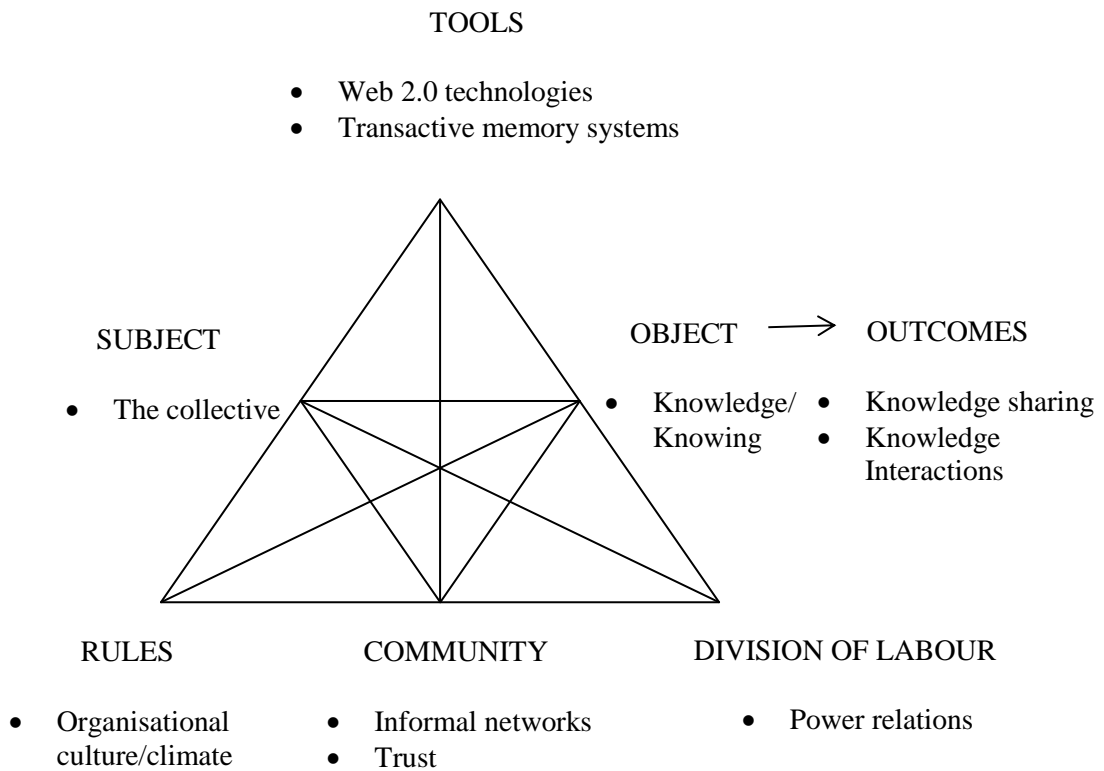
Figure 5.4: Activity system framework explaining knowledge processes in Bulgarian firms

5.8   Summary

This chapter presented the methodology undertaken in this research. The challenges faced in respect to collecting data in Bulgaria, as well as the various strategies employed to help overcome these challenges, were portrayed. Subsequently the use of mixed methods was presented and justified. The mixed methods approach adopted in this study is an exploratory sequential approach where qualitative semi-structured interviews are conducted first, followed by a quantitative questionnaire.

Subsequently, the organisation and the execution of the qualitative study were presented. It tackled issues of conducting qualitative research in transition economies, negotiating access to data and sampling techniques. Based on the twenty semi-structured interviews conducted, the chapter then went deeper into the thematic analysis performed to analyse the qualitative data. In Stage A of the analysis the data was coded and grouped into

emerging themes/factors affecting knowledge processes in Bulgarian organisations. These factors were mapped in a thematic network guided by activity theory elements/themes. Stage B of the analysis went deeper into analysis of the actual text of the interviews and an activity system framework was developed. Stage C of the analysis is presented in the next chapter and it goes deeper into discussion of the findings which helps to inform the research model and the hypotheses development. Thus the following chapter presents the hypotheses and scale development as well as administering a pilot questionnaire where issues of reliability and validity are given due consideration.

6   INITIAL DISCUSSION, HYPOTHESES AND SCALE DEVELOPMENT

6.1   Introduction

Drawing on the results of the qualitative analysis and the activity system framework developed based on this in Chapter 5, the findings of the semi-structured interviews are discussed in the light of the literature as part of Stage C of the thematic analysis. The first section of this chapter is focused on the discussion of the semi-structured interviews' findings. Also, at that stage, the critical realism's notion of layered ontology and causation are incorporated in the analysis. Subsequently, in this chapter the development of the research model is illustrated and testable hypotheses are formulated based on an updated activity system framework derived from the results of the exploratory qualitative study and critical realism's perspective. To test the proposed hypotheses, this chapter focuses on the development of the measurement scale. Some constructs are adapted from previous research, while others are newly developed to reflect the findings of the exploratory study.

New measurement items are developed for Knowledge Interactions as a newly suggested and formulated construct in this study. Additionally, within the current literature there is a lack of suitable measurement scales for the constructs of Power Relations, Informal Networks and the use of Web 2.0 technologies. In this way four new constructs are developed and four are adapted from previous empirical studies (Knowledge Sharing, Trust, Organisational Culture/Climate and Transactive Memory Systems).

Subsequently a pilot questionnaire was conducted to test the reliability and the validity of the constructs before proceeding with the main quantitative study. The methodology issues for data collection in the pilot study as well as the results of the reliability and the validity analysis are reported in this chapter.

6.2 Stage C: *Integration and Exploration* – Discussion of Interviews' Findings

In Stage A of the analysis of the semi-structured interviews the factors affecting the knowledge processes were identified: organisational culture/climate, trust, informal networks, Web 2.0, power relations and transactive memory systems. These factors were grouped into overarching themes provided by activity theory which resulted in the development of the thematic network (see Table 5.5). In Stage B of the analysis the thematic network and the factors identified were explored via the text of the semi-structured interviews. This exploration resulted in the development of the activity system framework explaining knowledge processes in Bulgarian organisations. The activity system framework describes how the interactions between the subject and the object achieve the outcome where such interactions are affected by the wider community, the division of labour, the governing rules and the tools used (see Figure 5.4). The last stage, Stage C of the thematic analysis refers to *Integration and Exploration* where the identified patterns and themes are interpreted (Attride-Stirling, 2001). In that stage the findings are discussed in relation to the existing literature and the relationships between the factors are established in order to develop a testable research model and hypotheses. To help establish the relationship between the factors the critical realism's notion of causation is incorporated.

6.2.1. Critical realism analysis

Critical realism's notion of stratified reality and causation increasingly attract interest in research, however, it is unclear how to conduct analysis from that perspective as there are limited practical exemplars (Mingers et al., 2013; Bygstad and Munkvold, 2011; O'Gorman, 2013). Critical realism posits that the observable events are enacted by deeper mechanisms and structures. But how to identify these deeper mechanisms and structures is recognised to be the main challenge of critical realism analysis (Mingers et al., 2013). The aim of critical realism's analysis is to find the key mechanisms and structures that provide the most plausible explanation of the events (Mingers et al., 2013; Bygstad and Munkvold, 2011). In order to achieve that, Mingers et al. (2013) suggest a methodology referred to as DREI: "describe the events of interest; retroduce explanatory mechanisms; eliminate false hypotheses; identify the correct mechanisms" (p. 797). Retroduction means that based on an empirical observation, the

causal mechanisms and deep structures that might explain that outcome/event are hypothesised (Sayer, 2000; Bygstad and Munkvold, 2011; Wynn and Williams, 2012). The identification of mechanisms and structures happens through retroduction which is achieved through iterative analysis between the data and the literature (O'Gorman, 2013) blended with a great dose of creative thinking (Bygstad and Munkvold, 2011). A more detailed methodological approach is described by Bygstad and Munkvold (2011). The authors outline six steps of critical realism analysis: (1) identification of events; (2) identification of key components; (3) theoretical re-description; (4) identification of candidate mechanisms – retroduction; (5) analysis of selected mechanisms and outcomes; and (6) validation of explanatory power. Following Bygstad and Munkvold's (2011) steps for conducting critical realism analysis, first the events are discussed.

6.2.2.   Events

The events, or 'outcomes' following the activity theory terminology, are the two knowledge processes – knowledge sharing and knowledge interactions.

In the Bulgarian context, the findings suggest that spontaneous knowledge interactions are more prominent than conventional knowledge sharing following the taxonomic view. Some participants in the current study stress that there is no point in storing knowledge because what has been yesterday is not going to be tomorrow. In this way knowledge sharing is not so much about building knowledge repositories and lessons learned and transmitting this accumulated knowledge as it is about collective practice, constant interactions and dynamically constructing and transforming knowledge. Additionally the participants stress that sometimes explaining how to do things is more difficult and inefficient as opposed to showing someone and engaging in the practice of doing it together. Knowledge interactions were initially broadly defined as knowledge processes based on dialogue and interactions. The results of the semi-structured interviews help further shed light on this new construct. Knowledge interactions are based on spontaneity where people show each other how things are done and they perform the tasks collectively as such their practice is situated in a group/collective and knowledge is deeply rooted in their practice.

Reviewing examples of knowledge sharing practices in other developing/transition economies such as Russia and China shows that the taxonomic perspective on knowledge is

still the dominating one (e.g. McAdam et al., 2012; Huang et al., 2011; Michailova and Hutchings, 2006; Michailova and Husted, 2003 follow Nonaka's conceptualisation). However, it is argued that knowledge cannot be separated from the context, or be converted from tacit to explicit and vice versa (Orlikowski, 2007; Newell et al., 2009). Instead, knowledge is seen as context dependent, emerging, and dynamic (Newell et al., 2009). This dynamic aspect of knowledge is evident in the Bulgarian context as it is a newly emerging economy where people need to constantly learn. This learning happens on the job through knowledge interactions. Similar to the Bulgarian context, China is described as a relationship-based economy, where informal communication is preferred and explicit knowledge is scarce as knowledge is highly contextualised (Martinsons, 2008; Burrows et al., 2005). In a more recent study Davison et al. (2013) strongly emphasise informal knowledge sharing in China which "involves a personal approach whereby questions and answers are processed during discussions and conversations" (p. 92). This conceptualisation of informal knowledge sharing could be seen as similar to the construct of knowledge interactions. However, Davison et al.'s (2013) propositions remain solely theoretical and a construct of informal knowledge sharing is not developed. In this current study, based on the exploratory findings, a new construct for knowledge interactions is developed.

While the results show that knowledge interactions are more prominent in the Bulgarian context, the participants did not differentiate explicitly between the two knowledge processes deemed in this study as knowledge sharing and knowledge interactions. Knowledge sharing is defined as the degree to which people within organisations share both tacit and explicit knowledge (Yang and Chen, 2007; Bock et al., 2005). Knowledge interactions are defined as collective interactions based on spontaneity, intuition and showing each other how things are done in practice. Both knowledge processes are considered as outcomes in the activity system respectively events following the critical realism's terminology. At the end of step 1 the events/outcomes are identified and defined. Following activity theory as a main theoretical framework the main components of the activity system were defined and described, which was explained thoroughly as part of the analysis in Chapter 5. Step 2 and step 3 have already been executed and an activity theory theoretical framework was developed. The main components of the derived activity system framework are: organisational culture/climate (constituting the rules of the organisation); Web 2.0 and TMS (tools mediating the activity within the organisation); informal networks and trust (characterising the community); and power relations (embedded in the division of labour). At that stage of the analysis it is

important to identify how these factors are related within the activity system, which factors are the deeply embedded structures within the system, which are the mediating mechanisms and how their interaction enhances or obstructs the occurrence of the two events. This is achieved through step 4 and step 5 of critical realism's analysis where the candidate mechanisms and structures are identified and analysed.

6.2.3.   Mechanisms

The aim of the analysis, at this stage, is to identify the mechanisms and the deeper structures that give rise to the events/outcomes. The mechanisms are first assessed on their potential to explain the outcomes and then it is examined whether their effect is affected by deeper organisational factors, i.e. structures. The mechanisms determining knowledge processes within Bulgarian firms appear to be organisational culture/climate, transactive memory systems and Web 2.0 technologies.

Organisational culture/climate

The participants put a great deal of emphasis on the working environment/the organisational culture/climate as an important factor determining the success of the knowledge processes in Bulgarian organisations. The results demonstrate that organisational culture/climate has a positive effect on knowledge processes as in an open, friendly environment people are ready to share and help each other. Such a result is in alignment with previous empirical findings (Bock et al., 2005; Al-Alawi et al., 2007; Suppiah and Sandhu, 2011; Wilkesmann et al., 2009). In this way organisational culture/climate appears a plausible mechanism explaining knowledge processes. However, while the climate in the organisation is important for knowledge processes, it is highly dependent on the deeper context and relationships within organisations, represented by the community characteristics and division of labour within the activity system. Therefore, by looking at the deeper context it is suggested that trusting and power relations and informal networks mould the organisational culture/climate and thus appear to be the deeply embedded structures which affect the mechanisms. Currently little is known about the effect power, trust and informal networks have on organisational culture/climate, which are further tested in the quantitative study.

Transactive Memory Systems

Transactive memory systems, or as described in the interviews the awareness of who the right people that can help are, is pointed out as a main driver for knowledge processes in Bulgarian organisations. Importantly, the findings suggest that a developed TMS has a positive effect on knowledge processes as people know whom to ask when they need a particular expertise. In this way TMS is found to be a mechanism which provides a plausible explanation of the occurring knowledge events. However, similar to organisational culture/climate, TMS development depends on deeper organisational structures found in the community characteristics and the division of labour. The findings suggest that informal networks are an important platform which help to enhance TMS development as "people [who are] part of your informal network would be able to point you out to a colleague of yours that would give you the needed information". Such a connection is also pointed out in the literature as people draw on their networks when they need some information and in this way a TMS is built (Akgun et al., 2006; Jarvenpaa and Majchrzak, 2008). As such a developed transactive memory system is a tool within the activity system which mediates the interactions between the actors as it defines the awareness of 'who knows what' within the activity system (Choi et al., 2010; Faraj and Sproull, 2000). Such memory is recognised to develop over time and primarily through direct interactions with colleagues, observation of team co-members in action, joint activities, socialising and participation in informal networks (Lewis, 2004; Brandon and Hollingshead, 2004; Hollingshead and Brandon, 2003; Jarvenpaa and Majchrzak, 2008). The results of the semi-structured interviews hint that the strong power relations existing within organisations could also affect the TMS development. In organisations with a strict hierarchy, people from lower levels are expected to "ask their line manager first" when in need of a particular expertise to resolve a problem, and "if the line manager cannot solve the problem it is taken to higher levels". This way it is considered that the manager is the one with the developed memory and he/she serves as a single point of reference. This could be seen as an obstacle to TMS development among employees. TMS helps in finding the expertise needed, which is not necessarily located in the line manager. Therefore the strong power relations as deeply embedded structures may have a negative effect on TMS development. Thus the effect of TMS on the outcomes may be affected by the deeper context/structures.

Web 2.0

Web 2.0 is also considered to be a mechanism within the activity system which

mediates people's activities and aims to enhance knowledge processes. The findings show that technology is generally considered secondary within Bulgarian organisations. This could be to some extent because of the lack of investment in technology and specialised KMS systems within Bulgarian organisations. In Chapter 1 some alarming figures were presented on the use of ICT within Bulgarian organisations where only 19.7% of the enterprises have ERP systems, and only 15.1% use CRM systems (NSI, 2013a). In terms of Web 2.0, 35.1% of all enterprises are using social media (NSI, 2013a). To add to the small number of organisations making use of social media, the interviews show that the use of Web 2.0 technologies is banned in the majority of the Bulgarian organisations. This demonstrates that deeper organisational structures affect the mechanisms and the way people use tools to achieve the outcomes. However, the use of Web 2.0 technologies as necessary and valuable interactive tools is further investigated in the quantitative study. In this way it is tested whether Web 2.0 is an important mechanism/tool explaining knowledge processes.

6.2.4.   Structures

From a critical realism perspective, the deep structures are embedded within organisations and are not readily visible but they affect the mediating mechanisms and cause or obstruct the occurrence of the events/outcomes. The results of the semi-structured interviews and the analysis conducted so far suggest that the deeply embedded structures within Bulgarian organisations, in relation to knowledge processes, are trusting relationships, power relations and informal networks.

Power Relations

The findings show that the majority of the organisations in Bulgaria follow a strict hierarchical model of operation. Power relations in Bulgarian organisations stem from the hierarchy and the position people hold within the organisation has a significant effect on the knowledge processes within organisations. As such power relations have epistemic characteristics affecting not only the two knowledge processes but the overall organisation (Blackler, 1995, 2011; Kärreman, 2010; Hislop, 2009; Gruenfeld et al., 2008). Furthermore, Gruenfeld et al. (2008) stress that it is likely that people at higher hierarchical positions may treat others in instrumental ways as "the purpose of organizational hierarchy, almost by definition, is to formalize who is allowed to be used as a means to an end, and by whom" (p.

113). It is evident that in Bulgarian firms, people occupying higher levels in the hierarchy do not consider others to be 'equal' and people from lower levels are perceived as a means to an end without much consideration given to their views and opinions.

This mentality is also present in similar contexts such as Russia and China (Michailova and Husted, 2003; McAdam et al., 2012; Michailova and Hutchings, 2006). Michailova and Husted (2003) describe that in Russia there is a notion that managers are the greatest and "they often talk in terms of "subordinating" (podchinyat) people rather than leading them, and they believe this to be one of the manager's most important functions" (p. 63). As a result opinions coming from the lower levels in the hierarchy are not considered, as it is deemed that the higher in the hierarchy you are the more knowledgeable you are. Similar dismissal of knowledge originating from lower levels is also evident in Chinese organisations. In addition, the Chinese are described as hierarchy-conscious, where respecting the hierarchy and the more senior (in rank) members of staff is a norm (McAdam et al., 2012). It is evident that in such contexts the hierarchy is still very much worshiped by the managers and respected by the employees. Thus the hierarchy and the stemming strong power relations are deeply embedded structures in the way organisations function. Power relations not only affect the knowledge processes but the overall activity system.

In relation to the important question posed by Bunderson and Reagans (2011): "what do we know about the extent to which power and status differences might affect the probability that the perspectives and insights of each actor will be given an equal and fair hearing?" (p. 1185), it appears that in Bulgarian organisations people from lower levels are not given equal hearing and their opinions are rarely considered. The other question to be explored next is: "what kinds of behaviour, relationships, and outcomes does the notion of power sensitize us to?" (Blackler, 2011, p. 729).

Trusting relationships
Apart from the clear divide in power, there is also a clear divide in the levels of trust between people in Bulgarian organisations. The findings suggest that in Bulgarian firms trust is one of the most, if not the most, important aspects affecting the functioning of the whole organisation. Thus trusting relationships appear to be part of the deeper structures within the activity system along with power relations. An interesting question arises also how the trusting and power relations coexist deeply enrooted in the structure of the organisations. The

literature provides diverse explanations of the duality of trust/power without a consensus on this topic. On one side it is considered that if there is a strict control within the organisation trust is not a key factor because when strict control mechanisms are in place the potential for opportunistic behaviours is suppressed which reduces the need for trust as employees are subservient to managerial hierarchies (Brass et al., 2004). Other scholars follow the view that organisations with highly trusting environments are lacking strict control mechanisms (Willem and Scarbrough, 2006) as it is considered that trust "reduces ambiguity and uncertainty" (Staples and Webster, 2008, p. 622).

Within Bulgarian organisations the concepts of trust and power are closely related. Such duality is not unusual and Clegg (2009) describes that trust and control are inter-related structures within organisations. The author further explains that "trust is based on predictability of behaviour" (p. 324) where power and control affect this predictability. As such "many organisations attempt to 'manage' trust as a means of control" (p. 324). Other studies recognise that trust, rewards and identification with the organisations could be seen as manifestations of manipulating employees (Knights et al., 2001; Bijlsma-Frankema and Costa, 2005). The duality between trust and power within Bulgarian organisations appears to be quite intense as illustrated in the following example "we love each other very much and we have fun together, but when it is down to work everyone knows their place and they do their job, because otherwise they will be fined or fired". Another example is found in the following illustrative quote:

> Without trust things cannot go well, if there is no trust, there is no progress. These people are friends outside of the firm. In my company there is a friendly atmosphere, it is supported by me, we organise teambuilding events, parties, New Year party…, we take pride in the friendly atmosphere. Well, still, the hierarchical structure requires a little bit of distance between the management and the employees.

High levels of trust and power relations exist within Bulgarian organisations. But the findings show that trust is considerably higher at lower levels. Further up the hierarchy, power differentials prevail and trust and communication diminish as "in Bulgaria many people who climb up the career ladder have the attitude of thinking that they are special and they do not treat people from lower levels as 'equal'". Therefore, there is a need to differentiate between trust among peers and trust between employees and management.

These results shed light in a new direction regarding knowledge processes. It appears that in Bulgarian organisations knowledge hoarding and hostility are not situated at the lower levels, as might have been expected based on the case in Russia described by Michailova and Husted (2003), but miscommunication, mistrust and lack of knowledge processes are present between the levels, and the further up the hierarchy the worse the communication and trust between people become. The majority of the existing literature is preoccupied with recommendations on how to motivate employees at lower levels to share (Husted et al., 2012; McDermott and O'Dell, 2001; Vuori and Okkonen, 2012; Michailova and Husted, 2003). The general conclusion within the literature follows the stance that "it can be assumed that the barriers come from motivational factors: if knowledge sharing is not working, it is a question of not being motivated enough" (Vuori and Okkonen, 2012, p. 596). Knowledge sharing in Bulgaria is taken for granted and expected from employees and motivation is not on the managerial agenda. Rewarding people for knowledge sharing is not seen as necessary as this is part of their duties, moreover, paying a salary to people is seen as a sufficient reward. However, it is argued that you cannot pay for knowledge sharing, such behaviours can only be encouraged and facilitated (Husted et al., 2012; Bock et al., 2005). Thus managers need to be engaged in practice and lead by example, not just impose rules and bans in an attempt to control people and force them to share knowledge.

Informal Networks

Despite the strong power relations and their negative effect on knowledge processes, people within Bulgarian organisations appear to share and interact as this is the only way to do their job. This is tightly related to the earlier question of "what kinds of behaviour, relationships, and outcomes does the notion of power sensitize us to?" (Blackler, 2011, p. 729). The answer, in relation to knowledge processes in Bulgarian organisations, is found to be: engaging in knowledge processes via informal communication and informal interactions supported by informal networks. Thus the results suggest that informal networks are deeply embedded structures within Bulgarian organisations.

As strong power relations appear to have a negative effect on the knowledge processes, employees construct their own ways of interactions and communication in an attempt to avoid the constraints of the senior management's control. Informal networks are seen as deeply embedded structures within the activity system. They are integral part to every Bulgarian organisation as people get together in groups and rely on their informal network for help. But

people in Bulgarian organisation hold different views on the effect such formations have on the knowledge processes. The effect of informal networks is also considered to be dubious within the existing literature. Some studies focus on the effect of social interactions and refer to these interactions as "activities designed and implemented by team leaders and companies to promote knowledge transfer" (Wu et al., 2007, p. 239). The effect of such social interactions is found to lead to greater help between people and greater knowledge sharing (Wu et al., 2007). Within Bulgarian organisations social events such as team building events, birthday parties and Christmas parties are organised, but the day-to-day social interactions are most vividly present within informal networks and are not formally encouraged by the upper levels.

Other studies emphasise informal networks and coordination which are not imposed and guided by the higher levels (Willem and Buelens, 2009). However, the effect of these networks is controversial. Informal networks can be perceived as an obstacle to knowledge sharing as they might constitute a source of politicking and power and lead to opportunistic behaviours (Willem et al., 2006; Willem and Scarbrough, 2006; Willem and Buelens, 2009). In contrast it is argued that when social networking and interactions are not imposed by the higher levels they greatly enhance knowledge sharing and lead to better communication (van den Hooff and Huysman, 2009; Willem and Buelens, 2009; Willem et al., 2006; Willem and Scarbrough, 2006). As such social interaction is considered to have a positive effect on tacit knowledge sharing (Hislop, 2002; Yang and Farn, 2009). Similarly, Swan et al. (2007) argue that knowing is embedded within social interactions, which suggests that such interactions have a positive effect on knowing.

The results from the semi-structured interviews suggest a similar duality in the effect of informal networks. People from the upper hierarchical levels do not consider informal networks beneficial as they see informal networks as sources of conflict between different groups as well as promoting their own groups' vision and values as opposed to following the established organisational ones. However, a possible explanation is provided from the lower levels where the participants express that "the managers are afraid of informal leaders as they feel threatened that they will take their positions". Further the participants explain that sometimes if the informal leader leaves the company, the whole team leaves with the leader. From that perspective, managerial levels prefer to diminish the effect of such groups. However, even if the upper levels prefer such groups to cease to exist, everyone

acknowledges that they do exist and that these groups are embedded within every organisation. People from lower levels feel assured that such informal networks have an undeniably positive effect on knowledge processes and interactions between people.

The discussion of the findings in Stage C of the analysis helped to explore the level of operation of the identified factors and their causality in terms of structures, mechanisms and events as described by critical realism perspective. This way critical realism was integrated within activity theory to help achieve ontological depth and explore the different mediation levels. As a result the activity system framework (see Figure 5.4) was revisited to accommodate these levels and the updated framework is presented on Figure 6.1.

TOOLS (MECHANISMS)

- Web 2.0 technologies
- Transactive memory systems

SUBJECT

- The collective

OBJECT ⟶ OUTCOMES (EVENTS)

- Knowledge/ Knowing
- Knowledge sharing
- Knowledge Interactions

RULES (MECHANISMS)

- Organisational culture/climate

COMMUNITY (STRUCTURES)

- Informal networks
- Trust

DIVISION OF LABOUR (STRUCTURES)

- Power relations
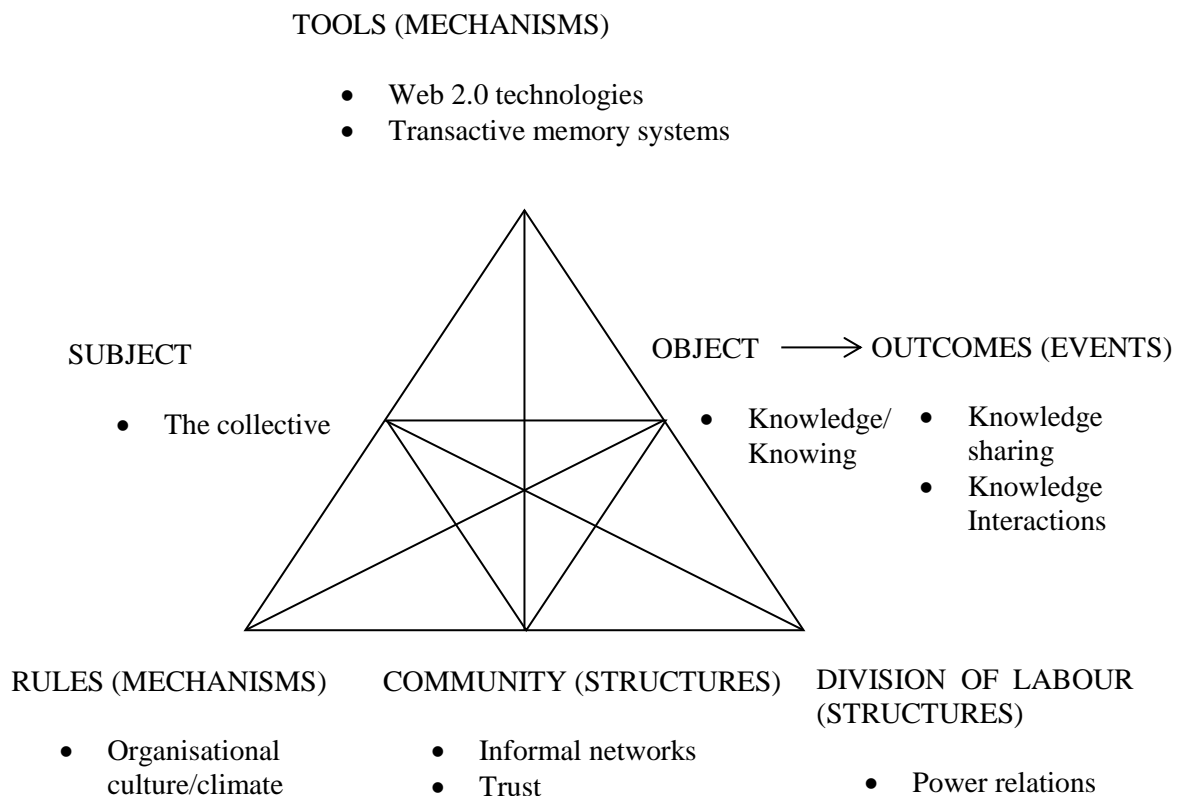
Figure 6.1: Updated activity system framework

The subject in the activity system, explaining knowledge processes in Bulgarian organisations, is the collective, the object of the activities is knowledge/knowing directed to the achievement of the outcomes/events: knowledge sharing and knowledge interactions. The deeper structures that affect knowledge processes in the Bulgarian context as well as the whole activity system are represented by the community characteristics and the division of

labour. These are the levels of trust, the informal networks and the strongly embedded power relations. The mediating mechanisms enabling or constraining the effect of the deeper structures are located within the organisational rules and tools which are the organisational culture/climate, the transactive memory system and the use of Web 2.0 technologies.

The updated activity system framework is further used to design a testable theoretical research model. Based on the research model and in the light of the literature and the results of the semi-structured interviews a number of hypotheses are suggested. The model is validated through a large-scale quantitative study which reveals the explanatory power of the model deemed to be the last stage of the analysis. The research model and the hypotheses are outlined in the following sections.

6.3   Hypotheses Development

The activity system framework (see Figure 6.1) based on the finding from the semi-structured interviews and critical realism's notion of causation helps to build the theoretical research model, formulate the hypotheses and facilitates the construct development.

6.3.1.   Research model

The results of the semi-structured interviews provided a rich picture of the organisational activity system, where the deep structural levels are identified along with the mediating mechanisms which foster or hinder knowledge sharing and knowledge interactions. As a result the updated activity system framework (see Figure 6.1) is used as a basis for designing an operational theoretical research model exploring and explaining knowledge processes within Bulgarian organisations. The model is called the Organisational Knowledge Sharing and Interactions Model. Initially, the use of Web 2.0 technologies was included in the model for this study as a prominent tool/mechanism enhancing knowledge processes. After the first iteration of analysis, Web 2.0 did not show a significant relationship with knowledge sharing and knowledge interactions, and for that reason it was removed from the model. This could be due to the fact that Web 2.0 technologies are not tolerated and are even banned in some Bulgarian organisations. These technologies do not appear to have been implemented and

utilised to their full potential in Bulgarian organisations. The exclusion of Web 2.0 from the model is in accordance with critical realism analysis as the aim of the analysis is not to find as many mechanisms as possible but to identify the key ones (Mingers et al., 2013; Bygstad and Munkvold, 2011; O'Gorman, 2013). Web 2.0 did not appear to be a key mechanism/tool and it was naturally omitted from further analysis. The research model is presented in Figure 6.2 and it is the basis for the hypotheses development.
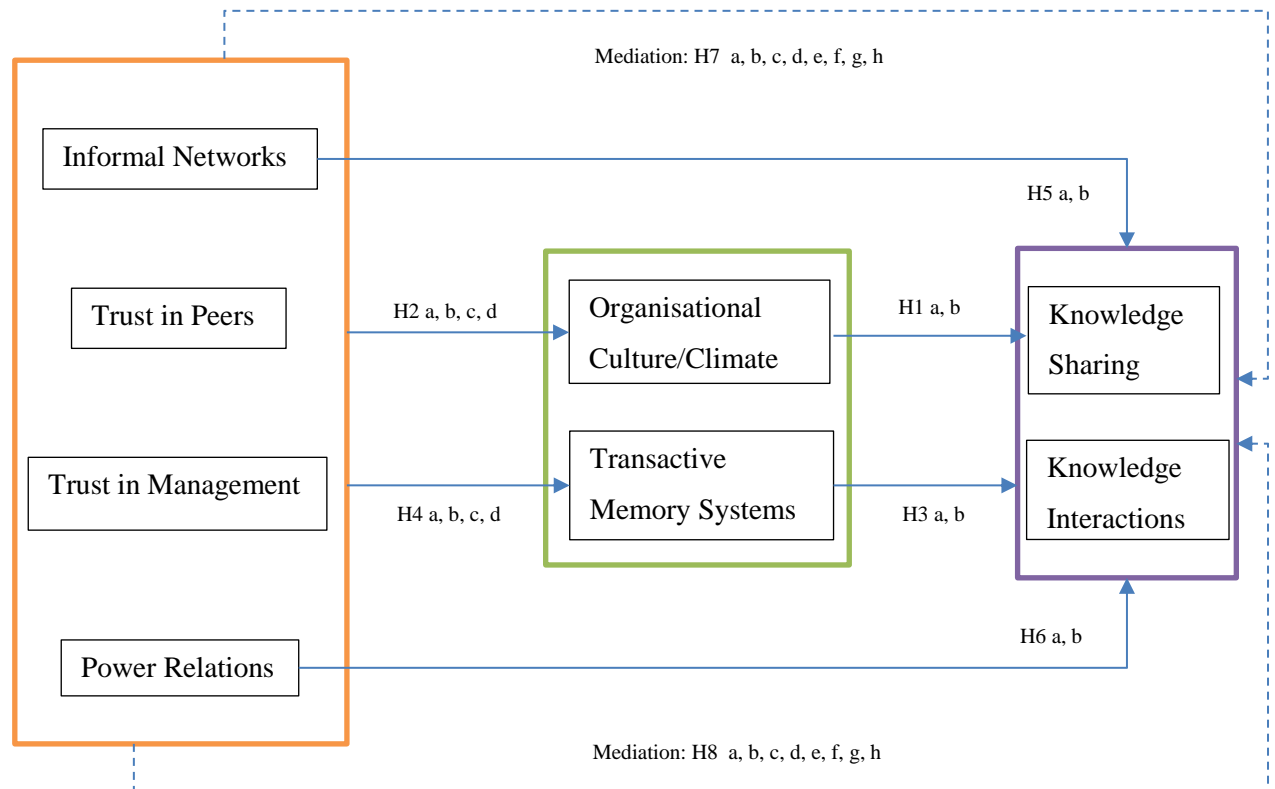
Figure 6.2: Organisational Knowledge Sharing and Interactions Model

Drawing on the theoretical research model developed, it is predicted that the suggested deeper structures (i.e. informal networks, trust and power relations) will have a direct effect on the suggested mechanisms (i.e. organisational culture/climate and transactive memory systems). The interviews showed a variation in the degrees of trust between the different hierarchical levels. To incorporate these differences a distinction is made between two levels of interpersonal trust: trust in peers and trust in management. It is further suggested that informal networks and power relations will have a direct effect on the outcomes knowledge sharing and knowledge interactions. At the level of mechanisms it is predicted that organisational culture/climate and TMS will have a direct effect on the two knowledge processes. Apart from the direct effect, this study explores the mediating effects of the

organisational culture/climate and TMS. The final set of hypotheses consists of 16 non-mediation hypotheses and 16 mediation hypotheses.

6.3.2.   Non-mediation hypotheses

This section explains the development of the sixteen non-mediation hypotheses.

Organisational Culture/Climate

Research has shown that a cooperative and supportive organisational culture has a positive effect on knowledge sharing (McDermott and O'Dell, 2001; Bock et al., 2005; Al-Alawi et al., 2007; Wilkesmann et al., 2009; Suppiah and Sandhu, 2011). As described in the literature review, an important distinction is made between two dimensions of organisational culture – deep/invisible dimension and surface/visible dimension (McDermott and O'Dell, 2001). The results of the semi-structured interviews revealed that in Bulgarian organisations organisational culture is not related to the deep values and beliefs. It is presented as an emergent friendly environment with aspects of affiliation and fairness as well as open communication and transparency. As such within the Bulgarian context organisational culture is depicted as the surface/visible layer which, within the literature, is described as organisational norms and climate. Bock et al. (2005) explain that "climate refers to a contextual situation at a point in time and its link to the thoughts, feelings, and behaviors of organizational members" (p. 89). A climate supportive of knowledge sharing predisposes free-flow of information, pro-social norms and tolerance towards mistakes and is operationalised in terms of three aspects: affiliation, fairness and innovativeness (Bock et al., 2005). Such operationalisation of organisational culture/climate is in alignment with the results of the semi-structured interviews and thus it is adopted in this study. This leads to the following two hypotheses:

H1a: Organisational culture/climate characterised by affiliation, fairness and innovativeness will have a positive effect on knowledge sharing.

H1b: Organisational culture/climate characterised by affiliation, fairness and innovativeness will have a positive effect on knowledge interactions.

As explained earlier this study is focused on culture/climate at a surface level which is considered as a mediating mechanism within the activity system. In alignment with this intermediary position, it is explained that the organisational climate is subject to manipulation and transformation by other factors (Bock et al., 2005). The general assumption evident in the literature is that organisational culture is the primary determinant when knowledge processes fail (Hall and Goody, 2007). Opposing this general view, Hall and Goody (2007) argue that "the term culture is deployed as a euphemism for power issues" (p. 188) and they urge researchers to look more deeply into the effect power relations have on knowledge processes. Furthermore, Bock et al. (2005) stress that the climate is "subject to direct manipulation by people with power" (p. 89). Thus if strong power relations prevail in the organisation, this would have a negative effect on the organisational culture/climate. However, the effect of power on organisational culture/climate appears underexplored. This gap is addressed in the current study.

Conversely to the negative effect of power relations, the results from the semi-structured interviews suggest that trusting and informal relationships have a positive impact on the organisational culture/climate. The literature suggests that trust has a positive effect on the perceptions of the organisational climate and openness of communication (Muchinsky, 1977; Fulk et al., 1985; Dirks and Ferrin, 2001). Through a meta-analysis study on the concept of trust, Dirks and Ferrin (2001) reveal that trust affects positively the climate in the organisation. More specifically, their analysis points towards studies that found trust in management to have a positive effect on fairness and acceptance of decisions as well as on commitment and affiliation with the organisation. Further trust in peers and in the leader is found to have a positive effect on organisational citizenship behaviour (Muchinsky, 1977; Fulk et al., 1985; Dirks and Ferrin, 2001). However, trust as an antecedent of organisational climate has not been the subject of exploration in recent studies. The predominant view considers trust as part of the organisational culture (Al-Alawi et al., 2007). However, the results of the interviews revealed that trust between people, as well as a friendly and informal atmosphere, are aspects that define the working culture/climate. As explained earlier, this study distinguishes between trust in peers and trust in management in order to account for the difference in trust levels among peers and between peers and management. The terms are borrowed from Mooradian et al. (2006). This study aims to advance the understanding of the effects trust in peers and trust in management, informal networks and power relations have on organisational culture/climate and it is hypothesised that:

H2a: Informal networks will have a positive effect on organisational culture/climate.

H2b: High trust in peers will have a positive effect on organisational culture/climate.

H2c: High trust in management will have a positive effect on organisational culture/climate.

H2d: Strong power relations will have a negative effect on organisational culture/climate.

Transactive Memory Systems

TMS is a practical memory in people's heads which provides mental maps of who knows what and who knows who (Wegner, 1986; Brandon and Hollingshead, 2004; Choi et al., 2010). Research in TMS has found that teams with a developed transactive memory system perform better (Liang et al., 1995; Ren and Argote, 2011; Argote and Ren, 2012). However, a number of studies stress that TMS influence team performance through knowledge processes such as knowledge sharing (Choi et al., 2010; Davison et al., 2013). Part of the knowledge sharing process is to locate the people with the expertise needed and disclose the information to the team (Davison et al., 2013). In this way TMS was found to have a positive effect on knowledge sharing as it allows people to connect and access specialised expertise (Choi et al., 2010; Davison et al., 2013). The importance of TMS in knowledge processes is further evident from the results of the semi-structured interviews. In the Bulgarian context it appears immensely important to know whom to ask, to know what others are doing and who can help with a particular task. This leads to the suggestion of the following two hypotheses:

H3a: More developed transactive memory systems will have a positive effect on knowledge sharing.

H3b: More developed transactive memory systems will have a positive effect on knowledge interactions.

Through the hypotheses above, it is expected that TMS will have a positive effect on knowledge sharing and knowledge interactions. However, the literature poses an equally important question of what antecedents lead to the formation of a TMS (Ren and Argote, 2011; Choi et al., 2010; Davison et al., 2013; Ashleigh and Prichard, 2012). Studies in this area are limited and there is a call for further investigating factors that may influence TMS

development (Choi et al., 2010). In an attempt to fill this gap, this research has identified a number of factors that affect TMS, namely: trust, informal networks and power relations. In relation to trust, Ashleigh and Prichard (2012) suggest that trust would lead to greater TMS development as it promotes greater declaration of knowledge in the team and in this way a bigger picture of who knows what and who does what is revealed. This study builds on these results and tests the effect of both trust in peers and trust in management on TMS development.

Research in TMS has emphasised the positive effect of formal training on the development of TMS (Lewis et al., 2005; Jarvenpaa and Majchrzak, 2008). Face-to-face communications and interactions are also considered as important aspects enhancing TMS development (Lewis, 2004; Alavi and Tiwana, 2002; Jarvenpaa and Majchrzak, 2008). As shown in the results from the semi-structured interviews, in Bulgarian organisations formal training is scarcely present. A lot of the communication and interactions happen in informal environment and networks. The findings from the interviews stressed the significant effect informal networks have on TMS development in Bulgarian organisations. In support of this proposition, it is suggested that guanxi in China will strengthen TMS as in China the communication is predominantly informal, based on personal contact and gaunxi networks (Davison et al., 2013). In this way guanxi networks are considered to enhance interactions, communication and TMS development (Davison et al., 2013). Likewise, Willem and Scarbrough (2006) have found that informal networks are very useful in obtaining knowledge which is dispersed within the organisation. However, the direct effect of informal networks on TMS has not been tested empirically. Aiming to fill this gap, it is hypothesised in this study that informal networks will have a positive effect on TMS development.

Likewise, the direct effect of power relations on TMS has not been explored. The semi-structured interviews uncovered that people at higher positions in Bulgarian organisations may serve as inhibitors for TMS development as they may be the single point of reference. This means that whenever employees need certain information and expertise, they are expected to refer to their managers as skipping hierarchical levels is generally frowned upon in Bulgarian organisations. Thus, if strong power relations prevail this may have a negative effect on TMS as people will be forced to return solely to their managers for help. In this way people are limited to a single point of reference rather than being able to reach out to the

whole network and this will obstruct their awareness of who knows what and who does what in the organisation.

This study suggests that informal networks, trust and power relations affect TMS formation which results in the following hypotheses:

H4a: Informal networks will have a positive effect on transactive memory systems.

H4b: Higher trust in peers will have a positive effect on transactive memory systems.

H4c: Higher trust in management will have a positive effect on transactive memory systems.

H4d: Strong power relations will have a negative effect on transactive memory systems.

Power Relations

Power is an important and overlooked issue in the area of knowledge processes where the majority of the existing research follows an implicit underlying assumption of "equal power and status" (Bunderson and Reagans, 2011, p. 1191) or power as 'unproblematic' (Gordon and Grant, 2004). In order to avert such generic assumptions, researchers are urged to include power into the analysis of knowledge processes as it is seen as integral part of organisational life (Blackler, 1995, 2011; Contu and Willmott, 2003; Willem and Scarbrough, 2006; Nicolini, 2011; Marabelli and Newell, 2012). The results of the semi-structured interviews showed that within Bulgarian organisations power is manifested as a form of domination and control where the motto 'control in the highest form of trust' prevails. Therefore, this study treats power as an epistemic, authoritative power stemming from the hierarchy where domination and control prevail (Kärreman, 2010; Lehr and Rice, 2002; Raman and Bharadwaj, 2012).

The body of knowledge around epistemic, authoritative power suggests that in organisations where hierarchical power dominates knowledge sharing is obstructed (Bunderson and Reagans, 2011; Suppiah and Sandhu, 2011). It is argued that if management is not willing to delegate and share power and authority, people will be reluctant to share

knowledge (Davison et al., 2013). Similarly, practices and interactions that are related to knowledge interactions also are affected by strong power relations. It is stressed that "while knowledge resides in action, not all action is equal: some actions "matter more" to those involved" (Marabelli and Newell, 2012, p. 23). It is considered that when power relations dominate there will be a conflict of interests in the process of knowledge transfer (Blomkvist, 2012). As explained by Ferner et al. (2012) "institutional context provides actors with power capabilities with which to facilitate, block or modify transfer" (p. 164). Power relations can affect learning and knowledge processes within organisations as people from higher levels may neglect contributions from people at lower levels, ignore others qualities or not adopt others' perspectives (Gruenfeld et al., 2008; Bunderson and Reagans, 2011). Bunderson and Reagans (2011) summarise that:

> Power and status differences can (a) distract members from collective learning goals,
> (b) compromise risk-taking and experimentation, and (c) decrease the open sharing
> and equal consideration of knowledge and insight (p. 1186).

As shown in the results of the semi-structured interviews, in Bulgarian organisations there is unequal hearing and consideration of the opinions of employees from lower levels. Additionally further up in the hierarchy communication, trust and interactions diminish which leads to the propositions that power may have a negative effect on the knowledge processes:

H5a: Strong power relations will have a negative effect on knowledge sharing.

H5b: Strong power relations will have a negative effect on knowledge interactions.

Informal Networks

The literature and the results of the semi-structured interviews exposed the double-sided perception of the effect informal networks have on knowledge processes. Despite the multiple views, informal networks are considered as an important factor enhancing both knowledge sharing and knowledge interaction processes in organisations (Willem et al., 2006; Willem and Scarbrough, 2006; Willem and Buelens, 2009; Wu et al., 2007; Swan et al., 2007; van den Hooff and Huysman, 2009). A concept parallel to informal networks is that of guanxi networks in China. Guanxi are considered to have a significant positive effect on knowledge

processes and especially on tacit knowledge transfer (Huang et al., 2011). Despite the controversial views about the effect of informal networks on knowledge processes shown in the results of the semi-structured interviews, it is important to point out that predominantly people from higher levels did not consider informal networks beneficial. People from the lower levels were confident that such informal networks are absolutely necessary and that they have a significant positive effect on knowledge processes and interactions. Thus, in this study it is hypothesised that informal networks will have a positive effect on both knowledge sharing and knowledge interactions where the effect on knowledge interactions is anticipated to be much stronger as such interactions rely predominantly on informal communication and interactions.

H6a: Informal networks will have a positive effect on knowledge sharing

H6b: Informal networks will have a positive effect on knowledge interactions.

6.3.3.   Mediation hypotheses

The mediating effects of organisational culture/climate and transactive memory systems are vaguely explored in the literature which opens up a gap and an opportunity to further explore them. From an activity theory and critical realism perspective the achievement of the outcomes/events is mediated by the mechanisms within the activity system. The effect of the deeper structures on the outcome is manifested, enabled, obstructed and altered through these mechanisms. The identified mechanisms (organisational culture/climate and transactive memory systems) are tested as mediators between the deeper levels and the outcomes/events. Therefore, it is suggested that informal networks, trust in peers, trust in management and power relations will affect organisational culture/climate and transactive memory systems which, in turn, will affect knowledge sharing and knowledge interactions. For the mediating effect of organisational culture/climate the following hypotheses are proposed:

H7a: Organisational culture/climate will mediate the effect of informal networks on knowledge sharing.

H7b: Organisational culture/climate will mediate the effect of trust in peers on knowledge sharing.

H7c: Organisational culture/climate will mediate the effect of trust in management on knowledge sharing.

H7d: Organisational culture/climate will mediate the effect of power relations on knowledge sharing.

H7e: Organisational culture/climate will mediate the effect of informal networks on knowledge interactions.

H7f: Organisational culture/climate will mediate the effect of trust in peers on knowledge interactions.

H7g: Organisational culture/climate will mediate the effect of trust in management on knowledge interactions.

H7h: Organisational culture/climate will mediate the effect of power relations on knowledge interactions.

For the mediating effect of transactive memory systems another set of eight hypotheses are proposed:

H8a: Transactive memory systems will mediate the effect of informal networks on knowledge sharing.

H8b: Transactive memory systems will mediate the effect of trust in peers on knowledge sharing.

H8c: Transactive memory systems will mediate the effect of trust in management on knowledge sharing.

H8d: Transactive memory systems will mediate the effect of power relations on knowledge sharing.

H8e: Transactive memory systems will mediate the effect of informal networks on knowledge interactions.

H8f: Transactive memory systems will mediate the effect of trust in peers on knowledge interactions.

H8g: Transactive memory systems will mediate the effect of trust in management on knowledge interactions.

H8h: Transactive memory systems will mediate the effect of power relations on knowledge interactions.

6.4   Scale Development

In order to test the research model and the suggested hypotheses reliable and valid instrument needs to be developed. This section explains the scale development for this study. The scale built in this study consisted of four constructs adapted from existing research (Organisational Culture/Climate, Transactive Memory Systems, Knowledge Sharing and Trust, where it is differentiated between Trust in Management and Trust in Peers) and four newly developed constructs for the purpose of the study (Power Relations, Informal Networks, Web 2.0 and Knowledge Interactions). However, as already explained, the construct of Web 2.0 was omitted from the final research model. All constructs were measured using 7-point Likert scales ranging between 1 strongly disagree, 4 neither agree nor disagree and 7 strongly agree. For instrument development, when adapting existing scales only whole scales are adopted as they have been previously tested by the authors in respected studies and have been confirmed reliable and valid (Bryman, 2012). The following sub-sections describe the process of scale development for each construct in turn.

6.4.1.   Construct for Organisational Culture/Climate

As described in the previous section, the construct for Organisational Culture/Climate is adapted from Bock et al. (2005). The authors define organisational climate as a "contextual situation at a point in time and its link to the thoughts, feelings, and behaviours of organizational members" (p. 89) and operationalise the concept in terms of affiliation, innovativeness and fairness (Bock et al., 2005). The measures for organisational culture/climate are divided as follows: 4 items measuring affiliation, 3 items measuring innovativeness and 3 items measuring fairness. All three sub-constructs have exhibited good Cronbach's alpha results in the original Bock et al.'s (2005) study: Affiliation: Cronbach's alpha = 0.898; Fairness: Cronbach's alpha = 0.870, and Innovativeness: Cronbach's alpha = 0.874. The authors have addressed content, convergent and discriminant validity for the constructs and have confirmed adequate validity. The items were adapted for organisational context as opposed to departmental or individual contexts as in the original wording. The definitions of the constructs, together with the items are provided in Table 6.1, 6.2 and 6.3 for affiliation, innovativeness and fairness respectively.

Definition	Affiliation: "The perception of togetherness" (Bock et al., 2005, p. 94)
Label	Item
	Affiliation. In our organisation:
AFF1	People keep close ties with each other.
AFF2	People consider other members' standpoint highly.
AFF3	People have a strong feeling of 'one team'.
AFF4	People cooperate well with each other.

Table 6.1: Measures for Affiliation

Definition	Innovativeness: "The perception that change and creativity are encouraged, including risk-taking in new areas where one has little or no prior experience" (Bock et al., 2005, p. 94)
Label	Item
	Innovativeness. Our organisation:
INN1	Encourages suggesting ideas for new opportunities.
INN2	Puts much value on taking risks even if that turns out to be a failure.
INN3	Encourages finding new methods to perform a task.

Table 6.2: Measures for Innovativeness

Definition	Fairness: "The perception that organizational practices are equitable and neither arbitrary nor capricious" (Bock et al., 2005, p. 94)
Label	Item
	Fairness. In our organisation:
FRN 1	We can trust our boss's evaluation to be good.
FRN 2	Objectives which are given to us are reasonable.
FRN 3	Our boss does not show favouritism to anyone.

Table 6.3: Measures for Fairness

6.4.2.   Construct for Trust

Trust has been the subject of numerous investigations and the body of literature provides a number of existing scales. The following Table 6.4 presents empirical research in the area of trust describing the type of trust investigated as well as the number of items along with their reliability and validity checks.

Author(s)	Trust type	No of items	Reliability Cronbach's Alpha:	Validity addressed
Seba et al. (2012)	Personal knowledge-based trust and institution-based trust	4	0.89	Convergent and discriminant validity
Choi et al. (2008)	Trust in terms of expectations shared between people	4	0.942	Convergent and discriminant
Maurer et al. (2011)	Trust among colleagues regarding their competence and goodwill	3	0.784	Convergent and discriminant validity
Wu et al. (2007)	Affect-based trust based on concern and care for others	5	0.80	Not addressed
Huang et al. (2011)	Affect-based and cognition-based trust	5 5	0.876 0.876	Convergent and discriminant
Mooradian et al. (2006)	Trust in peers Trust in management	3 3	0.81 0.85	Convergent and discriminant validity

Table 6.4: Empirical studies related to trust

As shown from the results within Bulgarian organisations there are differences in the levels of trust between employees from the lower levels and between the hierarchical levels. Thus this study follows the operationalisation of the trust provided by Mooradian et al. (2006) who distinguish between trust in peers and trust in management. In this way an interpersonal view of trust is followed where trust is defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer et al., 1995, p. 712). Mooradian et al.'s (2006) constructs of trust have exhibited high levels of reliability: Trust in Peers: Cronbach's alpha=0.81; Trust in Management: Cronbach's alpha=0.85. The authors have also performed convergent and discriminant validity checks and the constructs have been confirmed as reliable and valid in the original study. The items are adapted to the organisational level and the exact wording is presented in Tables 6.5 and 6.6.

Label	Item
	Trust in Peers. In our organisation:
TIP1	If we got into difficulties at work we know our colleagues would try and help us out.
TIP2	We can trust the people we work with to lend us a hand if we need it.
TIP3	Most of our colleagues can be relied upon to do as they say they will do.

Table 6.5: Measures for Trust in Peers

Label	Item
	Trust in management. In our organisation:
TIM1	Management at our firm is sincere in its attempts to meet the employees' point of view.
TIM2	We feel quite confident that the firm will always try to treat us fairly.
TIM3	Our management would be quite prepared to gain advantage by deceiving the employees. (reverse coded)

Table 6.6: Measures for Trust in Management

6.4.3. Construct for Transactive Memory Systems

To date the majority of the empirical studies on TMS follow the measurement scale developed, tested and validated by Lewis (2003). The latter designed a 15-item scale following the three TMS dimensions: specialization, credibility and cooperation. Some studies have applied the original 15-item measurement model (Pearsall et al., 2010), others have narrowed down the measurement model to 6 items (Jarvenpaa and Majchrzak, 2008; Choi et al., 2010). In order to explore TMS in this study the 6-item TMS scale, suggested by Jarvenpaa and Majchrzak (2008) and retested by Choi et al. (2010), is followed. The reliability of the TMS construct tested by Choi et al. (2010) is at a very high level with Cronbach's alpha = 0.90. Additionally, the authors have addressed content, construct and discriminant validity for the TMS construct and have confirmed the construct as reliable and valid. Table 6.7 provides the wording of these items which have been adapted to the organisational level for the purpose of this study.

Definition	TMS is defined as an individual memory in combination with communication and transactions that takes place between people and meta knowledge of "who knows what" and "who knows who" (Wegner, 1986; Choi et al., 2010). TMS is operationalised in terms of three dimensions: specialization, credibility and cooperation (Lewis, 2003).
Label	Item
	TMS. In our organisation:
TMS1	People have specialized knowledge of some aspects of our task.
TMS2	People are comfortable accepting procedural suggestions from other people.
TMS3	People trust that other people's knowledge is credible.
TMS4	People are confident of relying on the information that other people bring to a discussion.
TMS5	People know each other and have the ability to work together in a well-coordinated fashion.
TMS6	People have the capability to respond to tasks-related problems smoothly and efficiently.

Table 6.7: Measures for Transactive Memory Systems

6.4.4.   Construct for Knowledge Sharing

As already discussed, knowledge sharing is considered the extent to which people within organisations share both explicit and tacit knowledge (Bock et al., 2005; Yang and Chen, 2007). The literature provides a plethora of different ways to measure knowledge sharing. Some studies measure knowledge sharing in terms of time spent to share knowledge (Willem and Buelens, 2009). Other studies focus on the frequency of sharing knowledge (Monteiro et al., 2008). An extensively followed construct of the intention to share tacit and explicit knowledge is developed by Bock et al. (2005). A number of studies have applied Bock et al.'s (2005) scale (e.g. Choi et al., 2008; Hau et al., 2013). Other studies have focused solely on measuring tacit knowledge sharing (Holste and Fields, 2010). The latter construct consists of four items solely for willingness to share tacit knowledge. The current study adopts a construct provided by Yang and Chen (2007) who emphasise the actual sharing between organisational employees as opposed to their intentions to share. Four items concern explicit knowledge sharing, three items measure tacit knowledge sharing. However, the combination of the items for tacit and explicit knowledge sharing forms the construct of Knowledge Sharing with seven items. The same logic is followed in the current study. The authors have addressed the reliability of the construct and Cronbach's alpha has been established to be 0.82. Validity issues have also been addressed through exploratory factor analysis and the Knowledge Sharing construct has been confirmed as reliable and valid. Table 6.8 provides the exact items used to measure knowledge sharing.

Definition	Knowledge Sharing – the degree to which people within organisations share both tacit and explicit knowledge (Yang and Chen, 2007; Bock et al., 2005).
Label	Item
	Knowledge Sharing. In our organisation:
KS1	People share business proposals and reports with each other.
KS2	People share business manuals, models, and methodologies with each other.
KS3	People share each other's success and failure stories.
KS4	People share business knowledge gained from news, magazines, and journals.
KS5	People share know-how from work experiences with each other.
KS6	People share each other's know-where and know-whom.
KS7	People share expertise obtained from education and training.

Table 6.8: Measures for Knowledge Sharing

6.4.5. Construct for Informal Networks

The majority of the mainstream literature equates informal networks with communities of practice (van den Hooff and Huysman, 2009; Jashapara, 2005). However, communities of practice were not evident as formations in Bulgarian organisations. Rather the emphasis was put on informal networks as predominant networks existing within Bulgarian firms. Such informal networks are more ad-hoc, informal social formations based on friendship, as opposed to clearly defined CoPs based on shared interests around a specific topic. Social interactions are recognised as an important part of such informal networks. A measurement scale for social interactions is operationalised by Wu et al. (2007). However, the assumption in Wu et al.'s (2007) measurement is that the social interactions are formally stimulated, which is only partly valid for the Bulgarian context. There are parties and social events organised by the companies, but within informal networks relationships and interactions are mainly informal without the involvement and the encouragement of the hierarchy. A number of items on informal networks are inspired by and adapted from Willem et al. (2006) who emphasise informal collaboration, friendship and personal contact. The rest of the items for the construct Informal Networks are newly developed for the purpose of this study based on the results of the semi-structured interviews. The newly developed construct for Informal Networks is presented in Table 6.9.

Label	Item
	In our organisation:
INFN1	We tend to coordinate our activities informally.
INFN2	We consult each other privately rather than using formal mechanisms.
INFN3	We contact our friends in the organisation whenever we need information.
INFN4	We use our personal networks to get things done.
INFN5	We tend to meet informally (coffee breaks, lunches, cigarette breaks, etc.) and generate new and clever ideas.
INFN6	In the informal networks there are informal leaders who motivate and drive the others.
INFN7	Informal groups can be harmful to the organisation. (reverse coded)
INFN8	Different informal groups confront each other in the organisation. (reverse coded)

Table 6.9: Measures for Informal Networks

6.4.6. Construct for Power Relations

Power relations in Bulgarian organisations stem from the hierarchy where management domination and control prevail. Measurement constructs in that area are rare and limited.

Some papers provide conceptual models for studying power relations without operationalising specific measures and without testing empirically the effect of power on knowledge processes (e.g. Bunderson and Reagans, 2011; Ferner et al., 2012). A measurement scale on power is provided by Willem et al. (2006) who emphasise power games within the organisation, favouritism and taking advantage of others within the organisation. Aspects of Willem et al.'s (2006) operationalization of power have already been incorporated within the measures for Fairness and Trust in Management. The construct of Power Relations developed for the purpose of this study emphasises control, authority and managerial domination within organisations as prominent aspects that emerged from the results of the semi-structured interviews. The newly developed scale is provided in Table 6.10.

Definition	Epistemic power - understood as something that makes people do things other people want them to do. Such power is unevenly distributed within organisations and is regarded as a positional resource (Kärreman, 2010; Hislop, 2009; Gruenfeld et al., 2008; Lehr and Rice, 2002)
Label	Item
	In our organisation:
PR1	Management is very dominant. (reverse coded)
PR2	People feel oppressed. (reverse coded)
PR3	There is no strict control over people's work.
PR4	People are unduly critical of each other. (reverse coded)
PR5	People are not afraid to voice their opinion.
PR6	People make their own decisions without fear of management criticism.
PR7	People are not easily exploited by others.
PR8	Powerful people are the ones who have the most knowledge. (reverse coded)

Table 6.10: Measures for Power Relations

6.4.7. Construct for Knowledge Interactions

The construct for knowledge interactions is developed based on the results of the semi-structured interviews with guidance from the general literature on knowing in practice (e.g. Orlikowski, 2002; Newell et al., 2009; Marabelli and Newell, 2012). There is no measurement scale available. As mentioned earlier Davison et al. (2013) define informal knowledge sharing as a process which happens during discussions and conversations, but the authors do not operationalise a construct following this definition. As shown in the results of the semi-structured interviews, knowledge interactions within Bulgarian organisations are based on spontaneity where people show each other how things are done and they perform the tasks collectively. As such the predominant perception is that people's practice is situated in a

group/collective and knowledge is deeply rooted in their practice. In order to incorporate the findings and develop a new construct for Knowledge Interactions, all the items are newly developed for the purpose of this study. The exact items are presented in Table 6.11.

Definition	Knowledge Interactions – collective interactions based on spontaneity, intuition and showing each other how things are done in practice.
Label	Item
	In our organisation:
KI1	Often we react spontaneously and we know intuitively how to do certain tasks.
KI2	Often we cannot explain to others how we do certain things. (reverse coded)
KI3	Often the best way to help others is to show them how the task is accomplished in practice.
KI4	Our knowledge is deeply rooted in our daily practices.
KI5	Often by improvising we discover great solutions.
KI6	Through everyday practices people increase their competences and capabilities in any area.
KI7	Our know-how is embedded in the activities of the group/community.
KI8	We use a trial-error approach to do things in the organisation.

Table 6.11: Measures for Knowledge Interactions

6.4.8.   Construct for Web 2.0

The construct for Web 2.0 aims at measuring the use of different interactive platforms such as emails; wikis; blogs; forums, social networking sites and micro-blogging sites. The operationalisation of the construct is provided in Table 6.12

Label	Item
	How would you assess your daily use of the following tools for knowledge sharing?
WEB1	Emails
WEB2	Wikis
WEB3	Blogs
WEB4	Forums
WEB5	General social networking sites (eg. Facebook, Google +, etc.)
WEB6	Professional social networking sites (eg. LinkedIn, Talent me, Xing, etc.)
WEB7	Micro-blogging sites (eg. Twitter, etc.)
WEB8	Video conferencing (eg. Skype, etc.)

Table 6.12: Measures for Web 2.0 technologies

6.5 Questionnaire Methodology

In Chapter 5 was presented the methodology for the exploratory qualitative study. This section presents the methodology for the quantitative study. Data collection and sampling issues are discussed, followed by the reliability and validity results of the pilot questionnaire.

6.5.1. Conducting surveys

Surveys are a very good technique for obtaining data on opinions and behaviours in organisations (Easterby-Smith et al., 2012). The well-established forms of surveys are: postal survey, web-based survey, structured interview survey and telephone interview survey. Conducting surveys offers advantages and challenges. Some of the advantages are considered to be the relatively short period of time to collect data and the relatively low cost. It is recognised that it is likely that participants will provide honest answers as the surveys are anonymous. Additionally the questionnaires provide the flexibility of combining both closed and open-ended questions. More importantly, the results of the questionnaire are generalisable to a wider population (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011).

A number of challenges are also recognised when adopting a survey strategy to collect data (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011). The actual questions need to be well prepared and articulated, the wording needs to be precise. The questions need to be self-explanatory as the researcher cannot prompt and probe the answers from the participants as the level of involvement is much lower in comparison to the one during interviews. When employing survey strategy for data collection there is the challenge of low response rate and often people do not complete the whole questionnaire. There is a high risk of errors occurring when compiling the results and creating the Excel spreadsheet. The latter risk is considerably higher with postal surveys, and much lower with online surveys. Additionally, misunderstandings in the questions cannot be detected, this is why it is deemed absolutely necessary to conduct a pilot study before leveraging the main survey (Oppenheim, 2000; Bryman and Bell, 2007). Furthermore, with questionnaires there is a danger of encountering reliability and validity issues (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011).

The survey strategy is adopted in this study in order to test the research model on a wider scale thus providing opportunity for obtaining opinions of a large number of participants and generalising the results. In order to overcome some of the challenges identified above, a pilot questionnaire is conducted prior to the main survey. In this way the constructs are tested and any reliability and validity issues are addressed. The form of survey adopted in this study is an online web-based survey.

Online web-based survey

In the current technological era, web-based surveys are becoming increasingly prominent as they are easy and convenient for both the participants and the researchers (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011). The survey is taken online and the results are sent directly to the online database used to create the survey, in this case Zoomerang. This considerably reduces the possibility of errors occurring during the data entry process as the survey software produces an outcome of all responses in an Excel spreadsheet which is ready to be imported into any statistical analysis software (Easterby-Smith et al., 2012). In relation to other forms of survey, the web-based survey is much quicker and at a much lower cost to distribute, it is easier to check for false completions as well as for partially completed questionnaires. On the downside, when the survey is conducted online the access to respondents is more limited; respondents may experience technical issues and generally a lot more time is spent before leveraging the survey in designing it online (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011).

Apart from the general challenges when conducting quantitative research, which were pinpointed in the previous section, a number of additional problems are identified specifically to Eastern European transition economies. Michailova and Liuhto (2001) summarise potential problems in the areas of sampling, questionnaire design and data collection. The sampling and data collection strategies for this study are outlined below.

6.5.2. Sampling

A distinction is made between two sampling techniques when employing a survey strategy: probability and non-probability sampling techniques (Easterby-Smith et al., 2012;

Bryman, 2012; Robson, 2011; Saunders et al., 2011). Both sampling techniques are examined and the challenges faced are described in the following sections.

Probability sampling

With the probability sampling each respondent has an equal chance to participate in the survey. Types of probability samples are: simple random sample, systematic, stratified and cluster sample (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011; Saunders et al., 2011). In order to obtain a probability sample, researchers need access to well-developed and up-to-date company registers. This was found to be a major issue in the current study as such registers of Bulgarian companies are non-existent. The researcher embarked on various different strategies to obtain corporate data. Access to different registries was pursued such as Emerging Markets Information Service, the official Trade Register, Open Access Websites, Private Catalogues, Membership Lists of different Organisations and Institutions. The survey was made available through such institutions and organisations in order to increase the chance of obtaining a more random sample. In general the survey was targeted at IT and Software and Management Consulting industries as representatives of dynamic innovative industries where new things emerge every day, the business needs to keep up-to-date with new knowledge and people have to learn constantly. However, other industries were not excluded from the study in order to reveal a bigger picture of knowledge processes in Bulgarian organisations. A similar strategy was followed in the qualitative study, where the majority of the companies that took part were from the IT and Software sectors but other industries were also included.

A number of problems occurred following the probability strategy: the data in the sources listed above appeared to be highly unreliable, inaccurate and not up-to-date. The official registries contained extremely limited data and provided only the company name, postal address, and at times the corresponding website. No names of executives and personal emails were made available in such registries, at best a generic email was provided in the format of companyname@companyname.com/.bg or office@companyname.com/.bg. It is recognised that a high level of non-response occurs when requests for participation are sent to non-personal emails (Michailova and Liuhto, 2001). Additionally, reminder emails were sent every two weeks. It is difficult to estimate how many responses were obtained using

probability sampling techniques as it is difficult to differentiate between the natural non-response and the non-response caused by "deficient enterprise registers" (Michailova and Liuhto, 2001, p. 25).

Non-probability sampling

With non-probability sampling there are a number of techniques which can be employed by the researchers – quota, purposive, snowball and convenience (Easterby-Smith et al., 2012; Bryman, 2012; Robson, 2011; Saunders et al., 2011). The researcher made extensive use of purposive and snowball sampling techniques. To execute purposive sampling, specific organisations were targeted with the request to distribute the survey amongst their members. Most successfully the researcher utilised the professional network of LinkedIn. As described in the previous chapter, a detailed and accurate profile was created in order to increase trust and awareness and reach out to potential participants. The researcher joined numerous discussion groups with Bulgarian professionals and the survey was made available in these discussion groups. Also private messages were sent to the members of these respective groups with a request to take part in the survey. This way, the groups were targeted purposefully, but each member had an equal opportunity to participate. But this was only limited to LinkedIn members as opposed to the wider population. Once initial contact with potential participants was established, the researcher kindly asked them for further help. This is where the snowball effect occurred as a number of LinkedIn members agreed to spread the survey further. Similarly, personal contacts, friends and family were used to reach out to wider population, again in a snowball manner. These sampling and data collection strategies were used both for the pilot and for the main quantitative study. The pilot study resulted in 37 fully completed and usable responses, while for the main study a sample of 229 fully completed and usable responses were obtained. Ethical statements were provided as part of every email and message sent to potential participants (see Appendix B). Confidentiality and anonymity were guaranteed and clearly stated in the questionnaire and no personal names and data were gathered.

6.5.3.   Non-response

It is very difficult to estimate the response and non-response rates as different techniques were used to collect the data. A possible way to calculate partial non-response is to compare how many people have viewed the survey, how many have partially completed it and how many have fully completed it (Vuori and Okkonen, 2012). Unfortunately, during the course of the survey, the initial online survey software Zoomerang merged with another online survey software SurveyMonkey and such data was no longer available. The only data available was how many surveys have been started and how many have been finished:

> Total Started Survey (Bulgarian version) : 220
> Total Finished Survey (Bulgarian version): 188 (85.5%)
>
> Total Started Survey (English version):   44
> Total Finished Survey (English version) : 41 (93.2%)

This gives a total number of responses 229 and response rate of 89.35% which may not be an accurate representation of the actual response rate.

6.6   Pilot Study

The purpose of the pilot study is to test the measurement scale reliability and validity, especially for the newly developed constructs. It is stressed that pilot testing the instrument is of vital importance before leveraging the main study (Oppenheim, 2000; Bryman and Bell, 2007). The pilot questionnaire was developed using online survey software called Zoomerang. The measurement instrument consisted of 61 questions measured on a Likert scale from 1 strongly disagree, 4 neither agree nor disagree to 7 strongly agree. The questionnaire was designed in both English and Bulgarian – it was back translated by two bi-lingual Bulgarians. 37 fully completed and usable responses were obtained for the purposes of the pilot study.

6.6.1. Demographic characteristics of pilot study sample

Demographic characteristics relevant to this study were the industries where the organisations operate, the size of the companies and the position people hold within the company. Table 6.13 depicts the various industries in the sample. Table 6.14 provides a summary of the different firm sizes represented in the sample. Finally, Table 6.15 depicts the position people hold within the organisations.

Industry	Number in the sample
Information and communication	10 (27%)
Wholesale and retail trade; repair of motor vehicles and motorcycles	4 (11%)
Transportation and storage	4 (11%)
Financial and insurance activities	2 (5%)
Electricity, gas, steam and air conditioning supply	2 (5%)
Administrative and support service activities	2 (5%)
Water supply, sewerage, waste management and remediation activities	1 (3%)
Art, entertainment and recreation	1 (3%)
Other service activities	11 (30%)

Table 6.13: Industry distribution in the sample

Firm size	Number in the sample
Micro	19%
Small	24%
Medium	19%
Large	38%

Table 6.14: Firm size and representation in the sample

Position in the organisation	Number in the sample
Director/Executive/Senior Manager	3%
Middle Manager	30%
Supervisor	8%
Technical Staff	30%
Admin Staff	8%
Other	21%

Table 6.15: Position in the organisation and representation in the sample

6.6.2. Pilot study reliability and validity

In order to ensure reliability and construct validity of the measurement Cronbach's alphas were calculated and factors analysis for each of the constructs conducted (Gefen and Straub, 2005). Cronbach's alpha is a measure for reliability which ensures that the instrument

is consistent with itself and that the same result will be obtained if retested (Oppenheim, 2000; Gefen and Straub, 2005). In order to ensure adequate reliability Cronbach's alpha should be greater than 0.7 (Nunnally, 1978). To ensure validity it is first necessary to examine whether the construct items relate strongly with one another and load on their respective construct (Spector, 1992). This is an important step especially for the newly developed constructs which have not been tested in prior studies. Factor analysis is very useful in identifying sub-dimensions of different components within the same construct. For the purpose of the pilot study, an exploratory factor analysis was preformed to identify any separate components that may exist within the individual constructs. The following Table 6.16 presents the initial construct items and the final items after performing the reliability and validity checks. The Cronbach's alpha scores range from .740 to .931 which satisfy the requirement to be greater than 0.7. Cronbach's alphas are reported for each construct based on the final construct items which represent a single factor, meaning that each of the construct items within a construct loads highly onto this construct. Table 6.17 presents those items which were deleted because of low factor loadings or low reliability scores. The detailed procedure of conducting the reliability and validity analyses for the pilot study is presented in Appendix C.

Construct	Number of items	Items Deleted	Cronbach's Alpha	Number of items after reliability and validity checks
Organisational Culture/Climate: Affiliation Fairness Innovativeness	4 3 3		.892 .898 .753	4 3 3
Trust in Management	3		.835	3
Trust in Peers	3		.931	3
Transactive Memory Systems	6		.895	6
Knowledge Sharing	7		.938	7
Power Relations	8	PR8 PR3,PR4	.817	5
Informal Networks	8	INFN6 INFN7 INFN8	.740	5
Web 2.0	8	WEB1,WEB2	.772	6
Knowledge Interactions	8	KI2, KI8 KI5	.756	5

Table 6.16: Reliability and validity results

Construct	Items Deleted
Power Relations	PR3. There is no strict control over people's work. PR4. People are unduly critical of each other. (reverse coded) PR8. Powerful people are the ones who have the most knowledge. (reverse coded)
Informal Networks	INFN6. In the informal networks there are informal leaders who motivate and drive the others. INFN7. Informal groups can be harmful to the organisation. (reverse coded) INFN8. Different informal groups confront each other in the organisation. (reverse coded)
Web 2.0	WEB1. Emails WEB2. Wikis
Knowledge Interactions	KI2. Often we cannot explain to others how we do certain things. (reverse coded) KI8. We use a trial-error approach to do things in the organisation. KI5. Often by improvising we discover great solutions.

Table 6.17: Items deleted because of low factor loadings or low reliability scores

The constructs have been assessed in terms of reliability and validity. The next chapter looks more deeply into reliability and validity issues by differentiating between reflective and formative constructs.

6.6.3. Implications for the main study

The first implication for the main study is the reduced number of questions. As a result of the pilot study, 11 items were deleted. This resulted in 50 items for the main study questionnaire. It proved absolutely necessary to conduct this pilot study prior to the main study to check reliability and validity for the newly developed constructs. The second implication for the main study concerns the phrasing of the control variables. It was noticed that a lot of the participants found it difficult to follow the predefined categories in terms of the industry where the organisation operates and the position they hold in the company. A preferred option appeared to be the one where the participants enter this information themselves by selecting "Other, please specify". Therefore, for the main study, both industry and position were designed as open-ended questions where respondents would indicate their position and the industry in which the organisation operates.

6.7   Summary

This chapter started with an initial discussion of the qualitative findings presented in Chapter 5 which helped establish the relationships between the identified factors affecting knowledge processes in Bulgarian organisations. This was achieved by following critical realism's notion of causation and resulted in an updated activity theory framework. The updated activity theory framework was used as a basis for the design of a new theoretical research model, Organisational Knowledge Sharing and Interactions Model. This new model inspired 32 hypotheses: 16 non-mediation and 16 mediation. In order to test the suggested hypotheses, the chapter depicted the detailed process of measurement scale development. Four constructs of the instrument were adapted from previous studies (Knowledge Sharing, Organisational Culture/Climate, Transactive Memory Systems and Trust where trust is divided into Trust in Peers and Trust in Management) and four were newly developed (Knowledge Interactions, Power Relations, Informal Networks and Web 2.0). However, the construct of Web 2.0 was omitted from the final research model.

The measurement scale developed was subsequently tested in a pilot study. The chapter revealed a number of challenges in conducting surveys in Bulgaria and how the researcher overcame them to collect the data. The pilot study resulted in 37 fully completed and usable responses. Via the results of the pilot study reliability and validity issues of the measurement scale were addressed which helped to inform and revise the questionnaire before conducting the main quantitative study.

The main study questionnaire obtained 229 fully completed and usable responses. In the next chapter reliability and validity issues are addressed more fully. The chapter also presents the statistical analysis of the survey results.

7   QUANTITATIVE ANALYSIS: MAIN STUDY

7.1   Introduction

In this chapter the Organisational Knowledge Sharing and Interactions research model developed in chapter 6 (see Figure 6.2) is tested. The analysis consists of two stages – validation of the measurement model and testing of the structural model, i.e. testing the hypotheses. This chapter provides a discussion around possible statistical techniques that can be employed to test the model. Differentiation is made between first-generation techniques (such as multiple regression) and second-generation techniques (Structural Equation Modelling (SEM) and Partial Least Squares (PLS)). The chapter goes into more detail comparing the two second-generation techniques, and it is argued that PLS is the most suitable analysis for the purpose of this study. PLS is used for testing both the measurement and the structural model (Hair Jr et al., 2014).

The first step in this chapter is to assess the measurement model in terms of reliability and validity of the constructs. SmartPLS 2.0 is used to perform the reliability and validity analyses where Cronbach's alpha, convergent and discriminant validity are addressed. Subsequently, the structural model with the proposed relationships and hypotheses is tested. First the sixteen non-mediation hypotheses are tested, followed by the sixteen mediation hypotheses, finishing with analysis of difference between different groups.

7.2   Evaluation of the Measurement Model

The first step in performing the analysis is to evaluate the measurement model. The measurement model is assessed in terms of reliability and validity, where reliability is an issue of measurement within the constructs, and validity is an issue of measurement between the constructs (Straub et al., 2004). The evaluation of the measurement models for reflective and formative constructs is different. The next section (7.2.1) presents the evaluation of the measurement model for the reflective constructs and in section 7.2.2 the evaluation of the formative constructs is portrayed.

7.2.1.   Reliability and validity for reflective constructs

Reflective measures are manifestations of the underlying construct and as such they reflect the constructs (Hair Jr et al., 2014; Roberts and Thatcher, 2009; Petter et al., 2007). Thus, the reflective indicators are highly correlated and are considered interchangeable (Roberts and Thatcher, 2009). It is important to note that measures, items and indicators are used interchangeably and they are described as "measures, also known as indicators or items, are observable, quantifiable scores obtained through self-report, interview, observation, or other empirical means" (Petter et al., 2007, p. 625). Each construct/factor includes a number of items/measures/indicators. The structure of a reflective construct is depicted in Figure 7.1 (Hair Jr et al., 2014).
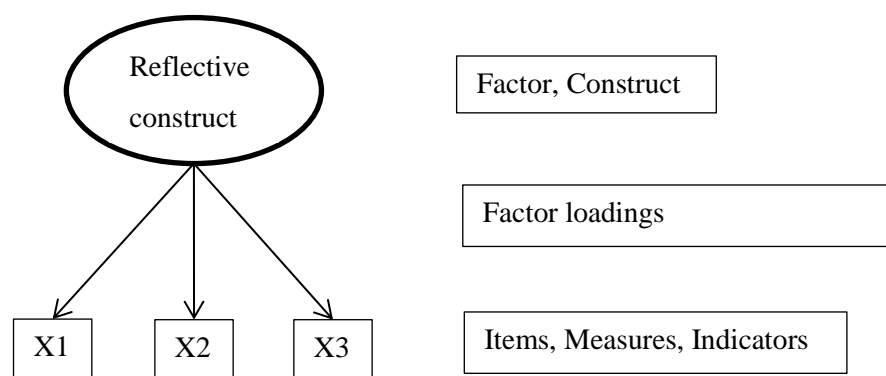
Figure 7.1: Reflective construct

The assessment of reflective constructs includes evaluating internal consistency reliability, convergent and discriminant validity (Straub et al., 2004; Hair Jr et al., 2014).

Reliability

Reliability determines the accuracy, the precision and the internal consistency of the measurement (Oppenheim, 2000). In a reflective construct the items should correlate highly with one another and are treated interchangeably which is measured by internal consistency reliability (Hair Jr et al., 2014; Roberts and Thatcher, 2009; Petter et al., 2007). Reliability ensures that the instrument is consistent with itself and the same result will be obtained if retested (Oppenheim, 2000; Bryman, 2012). Nunnally (1978) explains that reliability assures that "measurements are intended to be stable over time over a variety of conditions in which essentially the same results should be obtained" (p. 191). Reliability of the constructs is measured using Cronbach's alpha. Cronbach's alpha is a reliability criterion which measures reliability based on inter-correlations between the observable items (Hair Jr et al., 2014). The constructs are deemed reliable if Cronbach's Alpha is above 0.7 (Nunnally, 1978). The results show that Cronbach's alpha values of all constructs in this study are above 0.83. Thus the results indicate that the constructs exhibit adequate reliability levels. The exact values for each construct are presented in Table 7.1

Construct	Cronbach's Alpha
Affiliation	0.91
Fairness	0.89
Informal Networks	0.83
Innovativeness	0.88
Knowledge Interactions	0.86
Knowledge Sharing	0.94
Power relations	0.84
Trust in Management	0.87
Trust in Peers	0.93
Transactive Memory Systems	0.90

Table 7.1: Reliability results

After the reliability of the constructs was deemed adequate, the next step is to evaluate the validity of the measurement model. Validity describes to what extend the construct measures what it is intended and supposed to measure (Oppenheim, 2000; Bryman, 2012). Convergent and discriminant validity are addressed to ensure construct validity of the measurement model.

Convergent validity

Convergent validity indicates that "different measures of the same construct will relate strongly with one another" (Spector, 1992, p. 50). Convergent validity indicates whether the items measure the same concept and is measured by observing factor loadings and Average Variance Extracted (AVE) (Bagozzi et al., 1991; Hair Jr et al., 2014). High factor loadings show that the items have much in common. Items with loadings less than 0.4 should be removed, items with loadings between 0.4 and 0.7 should be closely inspected and removed if this will increase the reliability or the AVE. However, the general recommendation is that factor loadings should be greater than 0.6 (Hair Jr et al., 2014). Using these criteria three items with loadings between 0.4 and 0.7 were deleted from the instrument (see Table 7.2).

Construct	Items Deleted
Power Relations	PR3. People are not afraid to voice their opinion. (reverse coded) PR1. Management is very dominant. (reverse coded)
Trust in Management	TIM3. Our management would be quite prepared to gain advantage by deceiving the employees. (reverse coded)

Table 7.2: Items deleted

The results of the factor loadings analysis are presented in Table 7.3 below:

	AFF	FRN	INFN	INN	KI	KS	PR	TIM	TIP	TMS
AFF1	**0.85**	0.49	0.41	0.51	0.47	0.57	0.45	0.47	0.59	0.62
AFF2	**0.90**	0.58	0.29	0.62	0.41	0.61	0.58	0.55	0.63	0.66
AFF3	**0.92**	0.60	0.32	0.64	0.47	0.61	0.57	0.58	0.60	0.65
AFF4	**0.87**	0.52	0.31	0.57	0.45	0.61	0.52	0.53	0.68	0.66
FRN1	0.58	**0.92**	0.27	0.69	0.50	0.65	0.68	0.80	0.53	0.67
FRN2	0.53	**0.89**	0.31	0.62	0.52	0.55	0.61	0.73	0.50	0.62
FRN3	0.57	**0.90**	0.16	0.67	0.35	0.56	0.67	0.75	0.49	0.56
INFN1	0.39	0.33	**0.82**	0.43	0.55	0.47	0.42	0.40	0.39	0.52
INFN2	0.19	0.14	**0.81**	0.24	0.48	0.28	0.19	0.21	0.31	0.37
INFN3	0.28	0.17	**0.79**	0.20	0.44	0.29	0.24	0.20	0.33	0.37
INFN4	0.07	-0.02	**0.64**	0.08	0.34	0.10	0.01	0.00	0.15	0.17
INFN5	0.38	0.30	**0.78**	0.38	0.52	0.44	0.30	0.31	0.40	0.48
INN1	0.64	0.68	0.30	**0.91**	0.50	0.61	0.62	0.65	0.58	0.61
INN2	0.48	0.55	0.27	**0.85**	0.35	0.50	0.62	0.55	0.47	0.50
INN3	0.64	0.71	0.43	**0.93**	0.53	0.71	0.67	0.66	0.60	0.69
KI1	0.32	0.26	0.43	0.32	**0.67**	0.32	0.24	0.27	0.31	0.44
KI2	0.30	0.28	0.52	0.29	**0.78**	0.41	0.25	0.32	0.39	0.48
KI3	0.42	0.45	0.54	0.44	**0.90**	0.53	0.36	0.48	0.49	0.62
KI4	0.45	0.41	0.55	0.46	**0.86**	0.56	0.33	0.45	0.52	0.62
KI5	0.52	0.59	0.46	0.55	**0.81**	0.63	0.47	0.55	0.49	0.64
KS1	0.60	0.57	0.32	0.57	0.50	**0.83**	0.55	0.54	0.58	0.65
KS2	0.56	0.55	0.33	0.61	0.47	**0.85**	0.57	0.58	0.57	0.61
KS3	0.54	0.57	0.42	0.59	0.56	**0.87**	0.56	0.58	0.61	0.70
KS4	0.56	0.49	0.34	0.52	0.52	**0.82**	0.51	0.54	0.60	0.66
KS5	0.63	0.62	0.40	0.64	0.57	**0.92**	0.66	0.63	0.66	0.75
KS6	0.62	0.58	0.44	0.61	0.57	**0.88**	0.62	0.62	0.68	0.74
KS7	0.59	0.55	0.44	0.60	0.57	**0.89**	0.58	0.60	0.68	0.73
PR2	0.51	0.66	0.16	0.59	0.29	0.54	**0.85**	0.66	0.45	0.51
PR4	0.54	0.67	0.35	0.65	0.37	0.59	**0.90**	0.62	0.45	0.55
PR5	0.52	0.56	0.35	0.61	0.42	0.61	**0.86**	0.57	0.52	0.58
TIM1	0.59	0.79	0.36	0.64	0.52	0.64	0.66	**0.95**	0.60	0.69
TIM2	0.54	0.79	0.26	0.67	0.46	0.64	0.68	**0.94**	0.56	0.64
TIP1	0.64	0.52	0.43	0.57	0.55	0.69	0.50	0.58	**0.96**	0.79
TIP2	0.68	0.50	0.42	0.56	0.49	0.69	0.50	0.53	**0.96**	0.75
TIP3	0.66	0.56	0.37	0.60	0.51	0.66	0.53	0.60	**0.90**	0.75
TM1	0.53	0.44	0.47	0.48	0.64	0.56	0.36	0.46	0.58	**0.73**
TM2	0.62	0.56	0.39	0.59	0.55	0.69	0.56	0.59	0.67	**0.83**
TM3	0.66	0.58	0.52	0.63	0.64	0.74	0.57	0.61	0.78	**0.89**
TM4	0.55	0.53	0.46	0.48	0.59	0.63	0.50	0.57	0.66	**0.84**
TM5	0.66	0.61	0.35	0.57	0.52	0.66	0.54	0.61	0.69	**0.83**
TM6	0.57	0.62	0.38	0.54	0.49	0.65	0.57	0.62	0.60	**0.77**

Table 7.3: Factor loadings

The results show that the items load the highest on their own factors and all factor item loadings are above the recommended 0.6 value. Moreover, apart from two items (INFN4 and KI1), all other factor loadings are above 0.7. This indicates adequate convergent validity. The second measurement for convergent validity is the AVE. The AVE for each construct is measured by the sum of the squared items' factor loadings comprising the construct divided by the total number of items in that construct. For example in order to calculate AVE for Affiliation, the sum of the squared factor loading for each item (i.e. AFF1, AFF2, AFF3 and AFF4) is divided by 4. The result for AVE should be greater than 0.5 (Fornell and Larcker, 1981). This means that "the construct explains more than half of the variance in its indicators" (Hair Jr et al., 2014, p. 103). The results are presented in Table 7.4.

Construct	AVE
Affiliation	0.78
Fairness	0.82
Informal Networks	0.59
Innovativeness	0.80
Knowledge Interactions	0.65
Knowledge Sharing	0.75
Power relations	0.75
Trust in Management	0.89
Trust in Peers	0.88
Transactive Memory Systems	0.67

Table 7.4: Results of Average Variance Extracted (AVE)

All constructs exhibit AVE greater than 0.5, thus convergent validity of the measurement model is confirmed as adequate. Lastly, the measurement model is tested for discriminant validity.

Discriminant validity

Discriminant validity assesses that "measures of different constructs should relate only modestly with one another" (Spector, 1992, p. 50). In order to demonstrate that the constructs measure different concepts the square root of the AVE for each construct should be greater than the highest correlations with any other construct (Chin et al., 1997), meaning that each construct shares more variance with its own items than with any other measurement

constructs (Fornell and Larcker, 1981; Hair Jr et al., 2014). This is the same as comparing the AVE for each construct with the squared correlations between the constructs (Hair Jr et al., 2014). The results are presented in Table 7.5.

	AFF	FRN	INFN	INN	KI	KS	PR	TIM	TIP	TMS
AFF	**0.88**									
FRN	0.62	**0.90**								
INFN	0.37	0.27	**0.77**							
INN	0.66	0.73	0.38	**0.90**						
KI	0.51	0.50	0.62	0.52	**0.81**					
KS	0.68	0.65	0.45	0.68	0.62	**0.87**				
PR	0.60	0.72	0.34	0.71	0.42	0.67	**0.87**			
TIM	0.60	0.84	0.33	0.69	0.52	0.68	0.71	**0.94**		
TIP	0.70	0.56	0.43	0.62	0.55	0.72	0.54	0.61	**0.94**	
TMS	0.73	0.68	0.53	0.68	0.70	0.80	0.63	0.71	0.81	**0.82**

Table 7.5: Discriminant validity results

The values in bold presented on the diagonal are the square root of AVE for each construct, while the other values stand for the inter-construct correlations. The results show that the square root of the AVE for each construct is greater than the correlations between the constructs. Thus according to the Fornell-Larcker's criterion adequate discriminant validity is confirmed.

After evaluating the measurement model for the reflective constructs and confirming adequate reliability, convergent and discriminant validity, the next section presents the evaluation process of the formative constructs.

7.2.2.   Evaluation of formative constructs

Formative measures are the causes of the constructs (Hair Jr et al., 2014; Roberts and Thatcher, 2009; Cenfetelli and Bassellier, 2009). As such the indicators of the formative constructs are not interchangeable and high correlations between the formative indicators are not desirable (Cenfetelli and Bassellier, 2009; Roberts and Thatcher, 2009). The structure of a formative construct is presented in Figure 7.2.
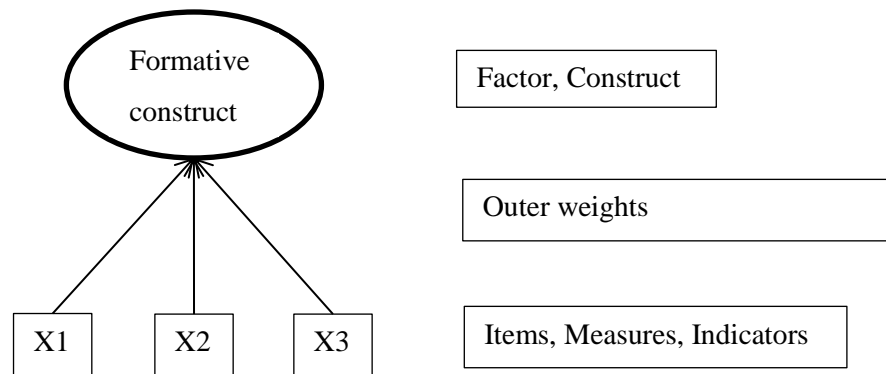
Figure 7.2: Formative construct

Formative constructs are not assessed based on correlation patterns which are used to evaluate reliability and validity for reflective constructs. As high correlation between formative measures is not desirable the reliability and validity assessment is not applicable for formative constructs. The quality of the formative measurement is assessed based on the significance of the outer weights and on ensuring there is no multicollinearity between the indicators, i.e. that they do not correlate highly (Hair Jr et al., 2014). To assess multicollinearity Variance Inflation Factor (VIF) and tolerance were calculated using SPSS. The research model in this study consists of one formative construct, Organisational Culture/Climate, which is a second-order formative construct comprised of three reflective constructs – Affiliation, Fairness and Innovativeness. Each of the three constructs is assessed for multicollinearity with the others. The level of multicollinearity is considered high if tolerance is less than 0.2 and VIF values are greater than 5 (Hair Jr et al., 2014) or VIF greater than 3.33 as suggested by Cenfetelli and Bassellier (2009). The results in Table 7.6 show that there is no multicollinearity between the formative constructs where the results satisfy both Hair Jr et al. (2014) and Cenfetelli and Bassellier (2009) criterion.

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Innovativeness	.473	2.116
	Fairness	.473	2.116

a. Dependent Variable: Affiliation

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Fairness	.617	1.621
	Affiliation	.617	1.621

a. Dependent Variable: Innovativeness

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Affiliation	.568	1.761
	Innovativeness	.568	1.761

a. Dependent Variable: Fairness

Table 7.6: Multicollinearity results for the formative constructs

After confirming that multicollinearity is not at a critical level, the outer weights of the formative indicators are assessed (Hair Jr et al., 2014). The outer weights are assessed for their significance, sign and magnitude (Cenfetelli and Bassellier, 2009). A bootstrapping technique is performed in SmartPLS in order to explore the outer weights. As Organisational Culture/Climate is a second-order formative construct with three reflective constructs it is important to assess whether these indicators truly form the construct and whether their contribution is significant. The results of the bootstrapping are presented in Table 7.7.

OC	Outer Weights	Significance level
Affiliation	0.45	0.01
Fairness	0.34	0.01
Innovativeness	0.34	0.01

Table 7.7: Outer weights and significance

As is evident from Table 7.7, all the weights are significant and positive, which means that an increase in the indicators would increase the formative construct. Thus the formative indicators significantly contribute to the formative construct of Organisational Culture/Climate.

7.3   Main Study Analysis

The analysis starts with presenting the demographic characteristics of the sample, followed by examination of the descriptive statistics and the correlations matrixes. Subsequently, the path coefficients are examined to test the hypotheses.

7.3.1.   Demographic characteristics of main study sample

Following from the pilot study, relevant demographic characteristics were: the industry where the organisation operates, the size of the firms and the position people hold within the company. Figure 7.3 presents a pie chart of the various industries in the sample following the United Kingdom *Standard Industrial Classification* of Economic Activities (SIC) used to classify businesses. Figure 7.4 reveals a pie chart of the different firm sizes represented in the sample. Finally, Figure 7.5 depicts the position people hold within the organisations.
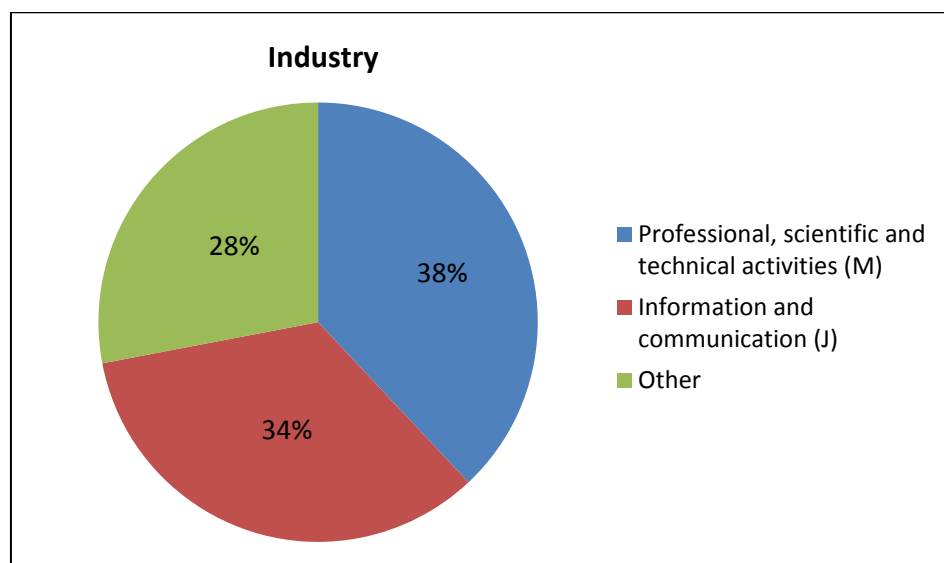
Figure 7.3: Industry
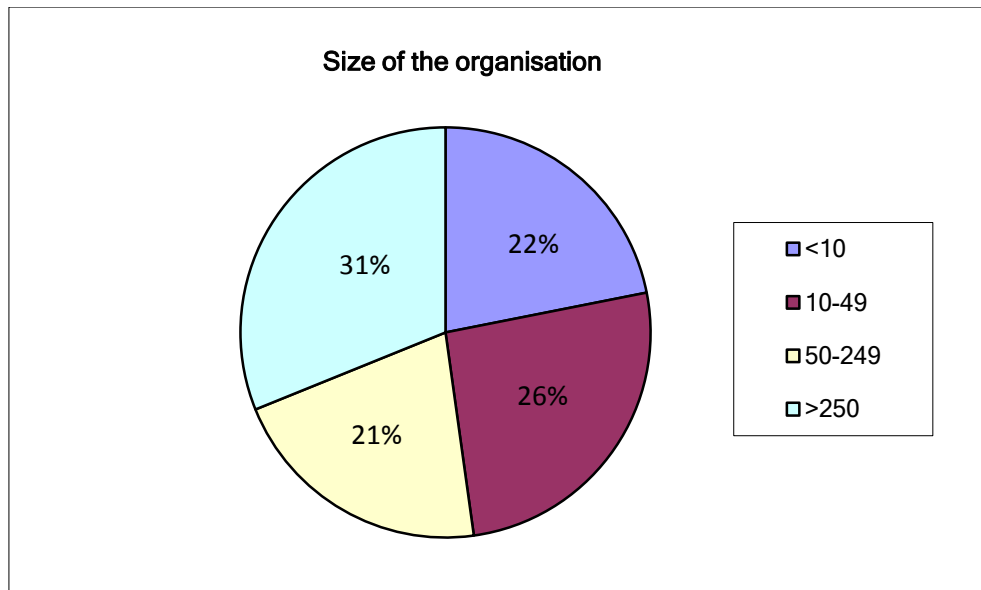
Figure 7.4: Firm Size
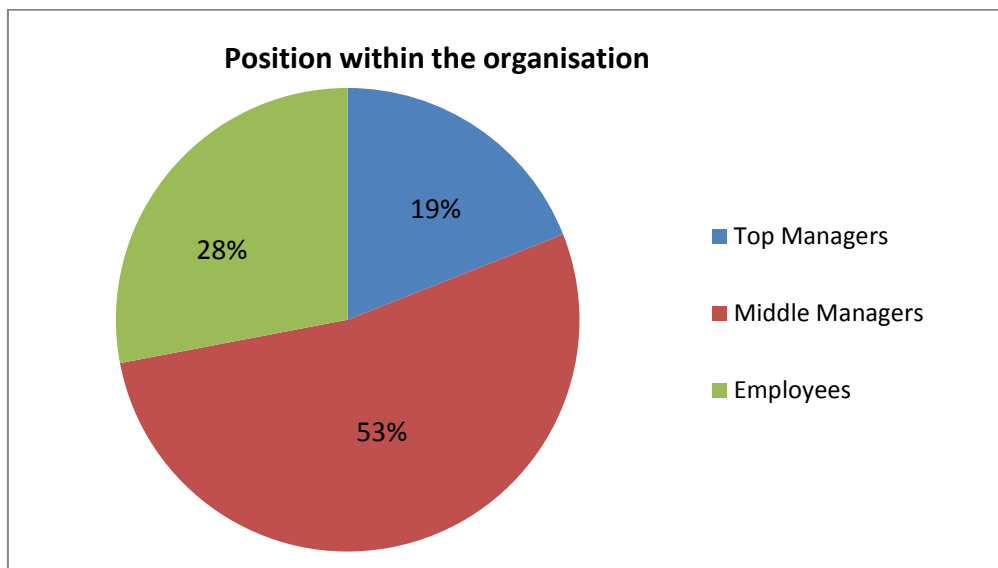
Figure 7.5: Position people hold within the organisation

The demographic characteristics of the sample show that the two major industries that comprise this sample are Information and communication (SIC code J, which includes IT and Software) and Professional, scientific and technical activities (SIC code M, which includes Management Consulting). In this way the sample represents the two targeted industries. The rest of the industries were not excluded and were united under the category 'Other'. In terms of firms' sizes, there is a good representation of each category: micro, small, medium and large. For the position, the majority of the participants in the sample occupy the position 'middle manager', followed by the position 'employee', and the smallest proportion in the sample is of people occupying 'top manager' positions. The last part of the statistical analysis

is focused on exploring if there are differences between the different industries, organisational sizes and positions people hold in relation to the outcome variables knowledge sharing and knowledge interactions.

7.3.2.   Descriptive statistics

Before testing the hypotheses, it is important to explore the data. Thus the descriptive statistics (mean and standard deviation) and the distribution of the data are explored. It is important at this stage to test the shape of the distribution and observe whether it deviates from the normal distribution. A normal distribution is observed when the values are symmetrically distributed around the mean (Field, 2013). Normal distribution can be assessed by examining two graphs: histograms and normality plots. Frequency distribution, also called a histogram, is a graph showing the frequency of each value occurring in the data sample, which if symmetrically distributed around the mean shows normally distributed data. Another graph is the normality plot − where the closer the values to the normality line, the more normally distributed that data is. Other tests of normality are the Kolmogorov–Smirnov test and Shapiro–Wilk test. If these tests show statistically significant values, the normal distribution assumption is violated. However, it is recognised that each of these tests has its limitations. Thus an examination of the levels of skewness and kurtosis is another way to examine the distribution. The distribution can deviate in two ways from the normal: it can be skewed − meaning it is not symmetrical where it can be skewed on the left (positively) or on the right (negatively) from the centre point, or the effect of kurtosis where the distribution is pointy or flat (Field, 2009, 2013; Rowntree, 1981). Skewness and kurtosis values around zero indicate a shape close to normal. If the skewness is positive, the values are greater than the mean; if the distribution is negatively skewed the values are lower than the mean. A kurtosis with negative value indicates a pointier, peaked distribution, while positive kurtosis indicates a flatter shape of the distribution (Rowntree, 1981; SPSS, 2013; Field, 2013). As a rule of thumb it is considered that a variable is reasonably close to normal if its skewness and kurtosis have values around ±1, some even suggested ±2 as an acceptable threshold (SPSS, 2013; Cameron, 2013).

The output of the descriptive statistics and all tests for normality performed in this study are presented in Appendix D. It is worth mentioning that the data exhibits some non-normally

distributed aspects. The two tests of normality, Kolmogorov–Smirnov test and Shapiro–Wilk test, exhibited significant results for all constructs meaning that the data is not normally distributed. However, further inspection of the plots and the skewness and kurtosis revealed that some constructs are reasonably normal, while others slightly deviated from a normal distribution. A common characteristic among all constructs is that all histograms are negatively skewed meaning that the values are lower than the mean. While the majority of the results for skewness and kurtosis are within the acceptable range (see Appendix D), a number of constructs exhibited slight issues of non-normality. These constructs are Trust in Peers, Transactive Memory Systems, Informal Networks, and Knowledge Interactions. These constructs exhibit skewness and kurtosis greater that ±1, but are still within the limit of ±2. The rest of the constructs are well under the ±1 threshold.

It can be summarised that some deviations from normality are present within the data, but without any major problems. However, inspecting whether the data is normally distributed is essential as it is important to consider any normality issues in the subsequent statistical tests performed. The next step of the quantitative analysis is to explore the correlations matrix.

7.3.3. Correlations

The correlation matrix represents the associations between the variables as well as the strength of their relationship. The correlation coefficients are assessed in terms of three aspects: whether the coefficient is statistically significant; the direction of the relationship: positive or negative; and the magnitude of how strong the relationship is (Field, 2013). Correlation coefficient values range between −1 and +1. A positive sign implies that if one of the variables increases the other one also increases. A negative sign implies the opposite relationship, where an increase in one of the variables is associated with a decrease in the other one. However, no causality is implied in correlations. In terms of the magnitude of the relationship, as a rule of thumb correlations of ±0.3 are considered quite weak correlations, between ±0.3 and ±0.5 are seen as moderate and above ±0.5 are deemed quite strong correlations (Field, 2013). The results of Pearson Correlation are presented in Table 7.8.

	TIP	TMS	KS	KI	INFN	TIM	PR	AFF	INN	FRN
TIP	1									
TMS	.811**	1								
KS	.722**	.799**	1							
KI	.542**	.693**	.605**	1						
INFN	.408**	.490**	.403**	.602**	1					
TIM	.610**	.707**	.675**	.510**	.286**	1				
PR	.541**	.631**	.662**	.401**	.282**	.714**	1			
AFF	.704**	.733**	.677**	.500**	.340**	.599**	.601**	1		
INN	.615**	.671**	.677**	.506**	.339**	.693**	.710**	.657**	1	
FRN	.561**	.683**	.647**	.490**	.232**	.837**	.725**	.619**	.726**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.8: Correlations matrix

The correlations are explored following the proposed hypotheses in order to get an interesting insight into the relationships between the variables. It is important to note that all relationships are significant at 1% level. With the first requirement for correlations met, the analysis focuses on the direction and the magnitude of the relationships.

In relation to H1a a significant positive relationship between Organisational Culture/Climate (OC) and Knowledge Sharing (KS) is expected. OC as a second-order formative construct comprises of three constructs: Affiliation, Innovativeness and Fairness. These three constructs correlate strongly and positively with KS: .677**, .677** and .647** respectively. This indicates that higher affiliation, innovativeness and fairness are associated with greater knowledge sharing. A similar trend is noticed in relation to H1b where affiliation, innovativeness and fairness are expected to significantly and positively relate to Knowledge Interactions (KI). The results show that the association between OC characteristics and KI is positive but moderate with values of .500** for affiliation, .506** for innovativeness and .490** for fairness. The relationship between OC characteristics and KI is less strong in comparison with the relationship between OC characteristics and KS. This suggests the possibility of OC exhibiting a greater effect on KS as opposed to on KI processes. This is further examined in the next step of the analysis.

In relation to H2a, H2b, and H2c it is expected that Informal Networks (INFN), Trust in Peers (TIP), and Trust in Management (TIM) will have a significant positive relationship with the OC characteristics, while Power Relations (PR) will be negatively related to OC (H2d). The results show a strong positive relationship between PR and the three OC characteristics:

affiliation (.601**), innovativeness (.710**), and fairness (.725**). It is important to note that the items in the construct of power relations have been reversed for the purpose of the analyses, as such the construct indicates that there are no strong power relations, domination, oppression and control within the company. In that respect the positive correlation signifies that a decrease in domination, oppression and control is associated with an increase in affiliation, innovativeness and fairness within the organisation. Interestingly, informal networks are positively but weakly correlated with affiliation (.340**), innovativeness (.339**), and fairness (.232**). This is an interesting result, which will be explored further in the effect informal networks exhibit on OC. In relation to trust in peers and trust in management strong and positive relationships are observed. Interestingly, higher trust in peers is associated with higher affiliation (.704** for TIP against .599** for TIM), while higher trust in management is associated with greater innovativeness (.693** for TIM against .615** for TIP) and fairness (.837** for TIM against .561** for TIP). Further, their causal relationship will be explored in the subsequent analysis.

In relation to H3a and H3b, the relationships between Transactive Memory Systems (TMS) and both KS and KI are inspected. The results show that TMS correlates very strongly and positively with both KS and KI where with KS the relationship is stronger .799** in comparison to .693** for KI. This undoubtedly indicates that an increase in TMS is associated with an increase in both knowledge processes.

For H4a, H4b, H4c and H4d the associations between informal networks, trust in peers, trust in management, power relations and TMS are investigated. The correlation between informal networks and TMS is positive and moderate with a value of .490**, this hints that an increase in informal networking is associated with an increase in TMS. Both TIP and TIM exhibit strong positive relationship with TMS where TIP (.811**) is more strongly associated with TMS in comparison with .707** for TIM. An increase in trust is associated with an increase in TMS. Similarly, power relations demonstrate strong positive relationship with TMS (.631**) which is interpreted as a decrease in the domination, oppression and control is associated with an increase of TMS.

Regarding H5a and H5b informal networks appear positively moderately associated with KS (.403**), and positively strongly associated with KI (.602**). These correlations indicate that an increase in informal networking is associated with an increase in knowledge processes.

However, the association between informal networks and KI is much stronger and this appears to be a key differentiator between the two knowledge processes. This stresses the informal nature of knowledge interaction processes where informal networks appear to have a very strong positive effect. While the debate in the literature is situated around the question of whether informal networks have positive or negative effect on knowledge sharing, this result indicates that their effect may well depend on the nature of the process. It could be that when people share tacit and explicit knowledge the effect of the informal network is less strong as opposed to when people engage in knowledge interactions which are driven by spontaneity, ad-hoc interactions and informality, as observed. This causal effect is further tested to get an ever deeper insight into the effect informal networks have on the two knowledge processes. With power relations in H6a and H6b a reverse trend is noticed where PR is positively moderately associated with KI (.401**) and positively strongly associated with KS (.662**). The interpretation of these two relationships indicates that an increase in domination, oppression and control is associated with a decrease of KS and KI, where the effect is much stronger in relation to knowledge sharing processes. The association of strong power relations with knowledge interactions appears moderate and it could be related to the fact that knowledge interactions are more strongly associated with informal networks. This initial correlation analysis shows that there is tension in the relationships between informal networks, power relation and the two knowledge processes. The subsequent analysis will further investigate the causal influence informal networks and power relations exhibit on KS and KI.

Beyond the investigation of the associations between the variables hypothesised in the research model, some interesting correlations are observed. The association between power relations and informal networks, despite being positive, is very weak with a value of .282**. This could be interpreted in two ways: the more people participate and rely on informal networks, the less strong is the effect of power relation, domination and control and vice versa a decrease in power relations, domination and control may enhance informal networking and formation of informal networks. Additionally, informal networks are positively but weakly related to TIM (.286**) and positively moderately related to TIP (.408**). This is an interesting relationship as the results of the semi-structured interviews showed that usually trust within informal networks is higher and vice versa that informal networks help to increase trust among people. This seems to be the case among peers but not between the employees and the management. The reason could be that in general the upper levels do not participate in

such networks and quite often dismiss their value to the organisations and to the knowledge processes. This result further confirms the existing tension between the underlying structures of informal networks, trust and power relations. Additionally, power relations and trusting relationships are strongly positively associated with a value of .541** for TIP and .714** for TIM. In terms of the duality between power and trust this means that a decrease of domination, oppression and control is associated with an increase of trust between peers and an even greater increase in trust in management and vice versa an increase in trust is associated with a decrease of power relations. The results of the interviews revealed that bizarrely within Bulgarian organisations high levels of trust and power relations exist concurrently. The tension between the underlying structures will be further explored in relation to KS and KI during the PLS analysis.

Another interesting association is observed between the two knowledge processes. Knowledge sharing and knowledge interactions appear positively strongly associated with a value of .605**. This result further indicates that the two processes are not mutually exclusive but they are complimentary as suggested by Cook and Brown (1999). This strong positive correlation indicates that an increase in either of the processes is associated with an increase in the other knowledge process. For example if people share tacit and explicit knowledge their interaction in practice may increase and vice versa if people engage in performing a task together, the subsequent exchange of tacit and explicit knowledge may increase. However, such hypotheses were not postulated and such effects are outside of the scope of this study.

After the initial exploration of the data, the subsequent analysis aims to test the hypotheses and the proposed model. For that purpose a Partial Least Squares analysis is performed.

7.3.4. Partial Least Squares analysis

The model presented in Figure 7.6 is the model proposed in this study which is going to be tested using PLS analysis. PLS is employed in the current research for the following reasons:

- Formative measures and model complexity;

- Non-normally distributed data;

- Exploratory research – this study is exploratory in nature proposing and testing paths that are not based on a robust theoretical model (Ringle et al., 2012; Gefen et al., 2011; Hair Jr et al., 2014);
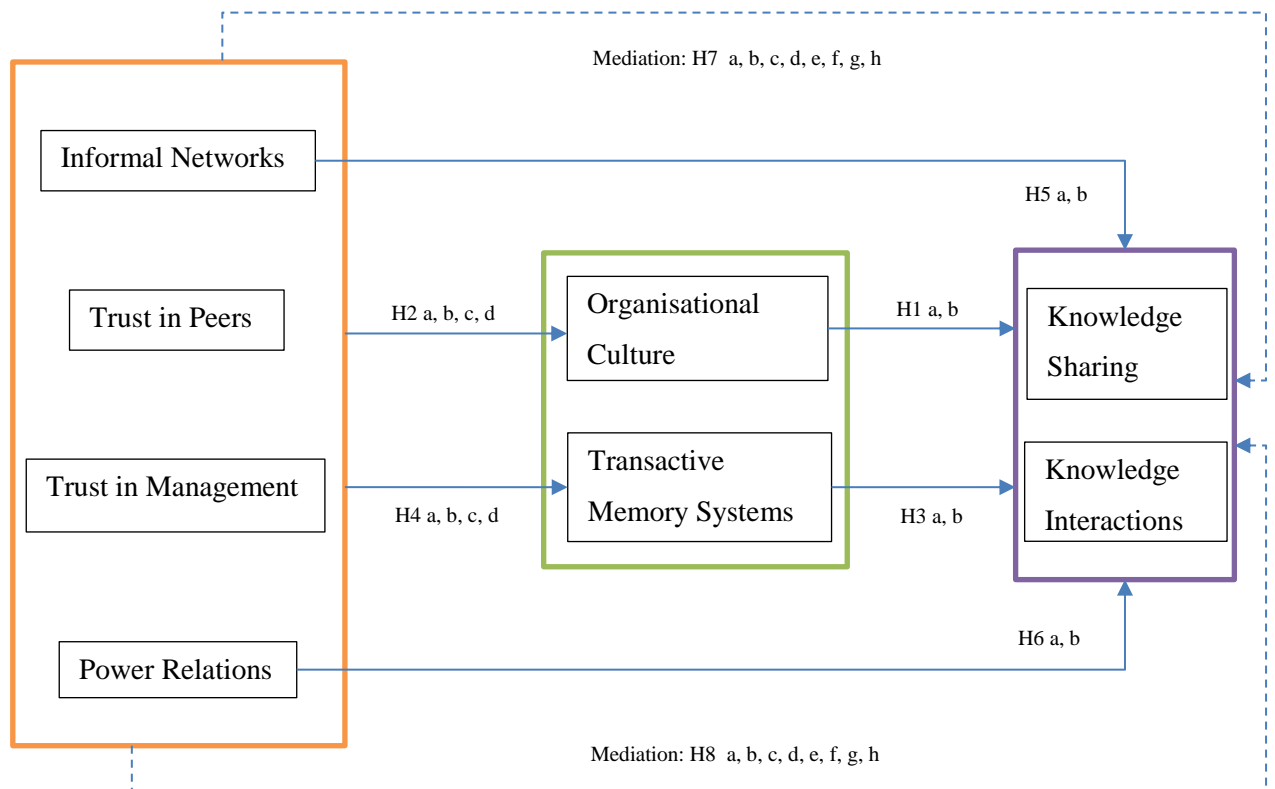
Figure 7.6: Organisational Knowledge Sharing and Interactions Model

A number of statistical analyses are available in order to test the proposed relationships in the research model. This study employs PLS analysis for the reasons stated above, but before proceeding with the analysis a rationale for the choice of PLS is presented. In the literature it is distinguished between first-generation (regression-based approaches) and second-generation techniques (SEM and PLS) in multivariate analysis which allows for the simultaneous analysis of multiple variables (Haenlein and Kaplan, 2004; Hair Jr et al., 2014; Gefen et al., 2000).

First-generation techniques

First-generation techniques include regression-based approaches such as multiple regression, analysis of variance and factor analysis (Haenlein and Kaplan, 2004; Hair Jr et al., 2014). It is recognised that such techniques have been widely applied in social sciences; however, they are found to be limiting (Hair Jr et al., 2014; Haenlein and Kaplan, 2004). Haenlein and Kaplan (2004) provide three main weaknesses and limitations of the traditional regression approaches. The first limitation of regression models is their simple model structure. The conventional multiple regression models consist of one dependent variable and a number of independent variables. However, it is argued that life is complex and multivariate, thus studying variables in isolation is not appropriate (Shugan, 2002;Haenlein and Kaplan, 2004). Regression models cannot handle multiple dependent variables and furthermore they do not provide a platform to test mediating and moderating effects between independent and dependent variables. The model tested in this study consists of two dependent variables and two mediating variables (this essentially increases the dependent variables to four) thus multiple regression analysis is not appropriate to test the model presented in Figure 7.4. Secondly, there is an underlying assumption in regression that all variables are observable. A variable is observable only "if its value can be obtained by means of a real-world sampling experiment" (McDonald, 1996, p. 239). Thus the majority of variables are not directly observable and only a few variables, such as age and gender, could be considered observable. In that respect all variables in this study fall into the area of the unobservable variables, for which regression does not account. The third limitation of a regression technique is that it does not account for measurement error. In order to overcome these limitations alternative methods to test models and hypotheses have acquired great popularity, namely SEM and PLS (Haenlein and Kaplan, 2004; Hair Jr et al., 2014).

Second-generation techniques (SEM and PLS)

Second-generation techniques such as SEM and PLS allow for the simultaneous modelling of complex relationships with multiple dependent and independent constructs (Haenlein and Kaplan, 2004; Gefen et al., 2000). In such models a distinction is made between exogenous and endogenous latent variables, where "the former being variables which are not explained by the postulated model (i.e. act always as independent variables) and the

latter being variables that are explained by the relationships contained in the model" (Diamantopoulos, 1994, p. 108). Additionally, SEM and PLS allow for the construction of unobservable variables where each variable/factor/construct is measured by a number of items/indicators/measures.

Another great advancement from the first-generation techniques is that SEM and PLS allow for the combined analysis of the measurement and the structural models where the measurement error is analysed as an integral part of the models and factor analysis is performed simultaneously with hypotheses testing (Gefen et al., 2000).

The two techniques SEM and PLS share some common features as presented above, but they also have differences which are worth exploring before deciding which technique to perform.

Among the most important differences are that PLS is considered to work more efficiently with non-normally distributed data, small sample sizes and complex models (Gefen et al., 2000; Hair Jr et al., 2014; Hair et al., 2012a; Gefen et al., 2011; Henseler et al., 2009). SEM requires normal distributions, large sample size and it is noted that as model complexity increases SEM tends not to converge. Another significant difference is that PLS handles both reflective and formative measurement models, while SEM does not handle formative constructs easily (Gefen et al., 2000; Hair Jr et al., 2014; Hair et al., 2012a; Gefen et al., 2011; Henseler et al., 2009).

Furthermore the two techniques differ in their objective. SEM is used for theory-testing and explores 'goodness of fit' of the model. As such the research model needs to be based on a solid robust theory as SEM "uses model fitting to compare the covariance structure fit of the researcher's model to a best possible fit covariance structure" (Gefen et al., 2000, p. 26). PLS is exploratory in nature and is more appropriate for theory-building. PLS is "designed to explain variance, i.e., to examine the significance of the relationships and their resulting R^2" (Gefen et al., 2000, p. 27). As the objectives of the two analyses are different, so are their algorithms. The default algorithm for SEM is Maximum Likelihood which requires normally distributed data and "is theory-oriented, and emphasizes the transition from exploratory to confirmatory analysis (Jöreskog, 1982, cited in Henseler et al., 2009, p. 296). PLS is based on iterative Ordinary Least Squares as its estimation technique and is "primarily intended for

causal-predictive analysis in situations of high complexity but low theoretical information" (Jöreskog, 1982, cited in Henseler et al., 2009, p. 296). Essentially PLS estimates the path coefficients and maximises the R^2. To test the significance of these path coefficients, a bootstrap technique is performed to estimate the t-values of the paths. In order to support the hypothesised and estimated paths, the t-values need to be significant (Gefen et al., 2000, Hair Jr et al., 2014).

As shown the two techniques are quite different. The main reasons for conducting PLS analysis within management, information systems and marketing research are the following (Hair et al., 2012a; Hair et al., 2012b; Ringle et al., 2012):

- Non-normal data;
- Small sample size;
- Formative measures in the model;
- The focus is on prediction and explanation;
- Model complexity;
- Exploratory research;
- Theory development.

The reasons for performing PLS analysis in the current study are the following:

- This study proposes a number of relationships that have not been explored a priori. Based on its exploratory nature PLS is considered the more appropriate technique to test the hypotheses. This is further reinforced by other studies which emphasise that the "use of PLS is especially suited to exploratory studies […], where the measures […] are new and the relationships […] have not been previously tested" (Ainuddin et al., 2007, p. 56) and "PLS is particularly suitable for data analysis during the early stage of theory development where the theoretical model and its measures are not well formed" (Tsang, 2002, p. 841).
- The formative constructs and complexity of the research model. As described above model complexity is another important reason for conducting PLS analysis. The research model of this study includes two dependent variables (Knowledge Sharing and Knowledge Interactions) and two mediators (Organisational Culture/Climate and Transactive Memory Systems) as shown in Figure 7.4. Furthermore, the model

includes both reflective and formative constructs, where Organisational Culture/Climate is a second-order formative construct.

- Handling of non-normally distributed data. The method for analysis and testing the hypothesis includes PLS algorithm for determining the path coefficients and bootstrapping procedure for estimating the t-values for each equation as well as its significance levels. The bootstrapping procedure is a nonparametric test which does not assume that the data is normally distributed (Ringle et al., 2012). As the data in this study showed some deviations from normal distribution this is the most appropriate test to be applied. The bootstrapping procedure is a procedure where "a large number of subsamples are drawn from the original sample with replacement" (Hair Jr et al., 2014, p. 130). The number of subsamples used to perform the analysis is 5000 and the number of cases is 229.

- While sample size is one of the main reasons to perform PLS analysis, in this study sample size issues are not observed as 229 responses were obtained.

After testing the measurement model and confirming adequate reliability and validity, as well as presenting the reasons for performing PLS analysis, the next section is focused on testing the structural model. First, the non-mediation hypotheses are tested, followed by testing of the mediation hypotheses.

7.4 Testing Non-Mediation Hypotheses

The first part of the analysis is to test the non-mediation hypotheses presented in Figure 7.6. The output of the test performed in SmartPLS is presented in Figure 7.7, followed by the path coefficients, t-statistics and significance levels in Table 7.9.
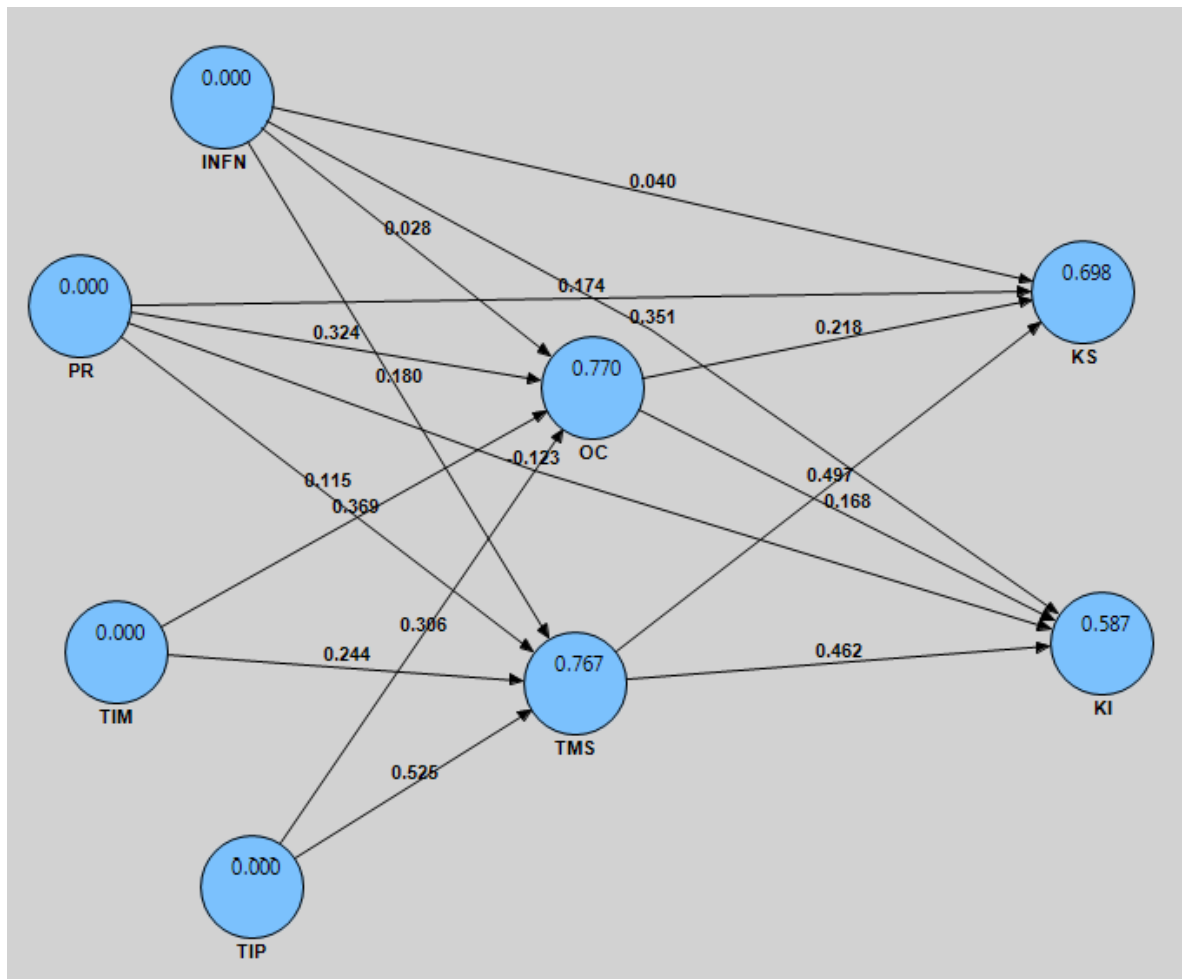
Figure 7.7: Output of PLS algorithm analysis

The structural model is first assessed based on the coefficient of determination of the endogenous latent variables (R^2 – how much of the variability in the endogenous/dependent variables is explained by the exogenous/independent variables). Guidance values for R^2 are provided by Chin (1998) where a results of 0.19 is considered weak, 0.33 is viewed as moderate and around 0.67 is deemed as substantial. The coefficient of determination on Figure 6.5 is presented within the circles. The results show that all the independent variables (IVs) explain 69.8% of the variability in the outcome variable Knowledge Sharing and 58.7% of the variability in the outcome variable Knowledge Interactions. This shows that the model

explains well the outcome variables with values around the substantial values recommended by Chin (1998).

In the case of Organisational Culture/Climate and Transactive Memory Systems as dependent variables, the results for R^2 are the following: the IVs explain 77% of the variability in the outcome variable Organisational Culture/Climate and 76.7% of the variability in the outcome variable Transactive Memory Systems. Similarly, these results show that the model explains well the dependent variables with values greater than the substantial values recommended by Chin (1998).

The next step to assess the PLS structural model is to estimate the path coefficients and assess them in terms of significance, sign and magnitude. The significance levels with the corresponding t-values are calculated by the nonparametric bootstrap procedure, where t-statistics are used to calculate the significance levels. The t-values of the hypothesised paths need to be significant in order to support the hypotheses, where t-values above 1.96 correspond to 0.05 significance levels, and t-values above 2.56 correspond to 0.01 significance levels (Gefen et al., 2000; Hair Jr et al., 2014).

	Original Sample (Beta)	T Statistics	Sig Level
INFN -> KI	0.351	5.891	0.01
INFN -> KS	0.040	0.827	NS
INFN -> OC	0.028	0.830	NS
INFN -> TMS	0.180	5.204	0.01
OC -> KI	0.168	1.964	0.05
OC -> KS	0.218	2.484	0.05
PR -> KI	-0.123	1.647	NS
PR -> KS	0.174	3.155	0.01
PR -> OC	0.324	5.322	0.01
PR -> TMS	0.115	1.597	NS
TIM -> OC	0.369	5.947	0.01
TIM -> TMS	0.244	3.888	0.01
TIP -> OC	0.306	6.222	0.01
TIP -> TMS	0.525	11.351	0.01
TMS -> KI	0.462	5.707	0.01
TMS -> KS	0.497	5.836	0.01

Table 7.9: Path coefficients, t-statistics and significance levels

The results for Hypotheses 1a and 1b show that organisational culture/climate has a significant positive effect on both knowledge sharing (β=0.218, p<0.05) and knowledge interactions (β=0.168, p<0.05). So both H1a and H1b are supported. In Hypotheses 2a, 2b, 2c, 2d organisational culture/climate is the dependent variable. The results for H2a conversely to the suggested proposition reveal no significant relationship between informal networks and organisational culture/climate (β=0.028, NS). Thus H2a is not supported. The results for H2b and H2c reveal that trust in peers (β=0.306, p<0.01) and trust in management (β=0.369, p<0.01) have a significant positive effect on organisational culture/climate. So both H2b and H2c are supported. The result for H2d reveals that the absence of strong power relations has a positive effect on organisational culture/climate (β=0.342, p<0.01). This is so because the negatively worded items were reverse coded and as a result, as it stands, the construct of power relations means that there are no strong power relations within the organisation. Thus H2d stating that strong power relations will have a negative effect on organisational culture/ climate is supported.

Since transactive memory systems are found to influence knowledge sharing (β=0.497, p<0.01) and knowledge interactions (β=0.457, p<0.01), both Hypothesis 3a and Hypothesis 3b are supported. Similarly, Hypotheses H4a, H4b and H4c are supported as informal networks (β=0.180, p<0.01), trust in peers (β=0.342, p<0.01) and trust in management (β=0.342, p<0.01) have a significant positive effect on transactive memory systems. However, Hypothesis H4d is not supported as the results show that there is no significant relationship between power relations and transactive memory systems (β=0.115, NS)

The next set of Hypotheses: H5a and H5b exhibit very interesting results. H5a is supported as the absence of strong power relations has a positive effect on knowledge sharing (β=0.174, p<0.01) thus the existence of strong power relations has a negative effect on knowledge sharing. Interestingly, the relationship between power relations and knowledge interactions is not significant and negative (β=-0.123, NS), thus H5b is not supported. More interestingly still, informal networks exhibit exact opposite effects on knowledge sharing and knowledge interactions. The results reveal that there is no significant relationship between informal networks and knowledge sharing (β=0.040, NS), thus Hypothesis H6a is not supported. However, Hypothesis H6b is supported since informal networks have a significant positive effect on knowledge interactions (β=0.351, p<0.01).

The results of the non-mediation hypotheses testing are summarised and presented in Table 7.10.

Hypothesis	IV	DV	Path Coefficient	t-value	Outcome
H1a	OC	KS	0.218	2.484**	Supported
H1b	OC	KI	0.168	1.964**	Supported
H2a	INFN	OC	0.028	0.830 (NS)	Not Supported
H2b	TIP	OC	0.306	6.222***	Supported
H2c	TIM	OC	0.368	5.947***	Supported
H2d	PR	OC	0.326	5.322***	Supported
H3a	TMS	KS	0.497	5.836***	Supported
H3b	TMS	KI	0.462	5.707***	Supported
H4a	INFN	TMS	0.180	5.204***	Supported
H4b	TIP	TMS	0.525	11.351***	Supported
H4c	TIM	TMS	0.244	3.888***	Supported
H4d	PR	TMS	0.116	1.597 (NS)	Not Supported
H5a	PR	KS	0.174	3.155***	Supported
H5b	PR	KI	-0.123	1.647 (NS)	Not Supported
H6a	INFN	KS	0.040	0.827 (NS)	Not Supported
H6b	INFN	KI	0.351	5.891***	Supported

Table 7.10: Results of non-mediation hypotheses testing

7.5 Testing Mediation Hypotheses

The method followed in this study to perform mediation analysis is that presented by Baron and Kenny (1986). The term mediator is clearly defined by Baron and Kenny (1986) as a third party variable "which represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest" (p. 1173). In this way the IV influences the mediator which sequentially influences the DV (outcome variable). Their model is presented in Figure 7.6.
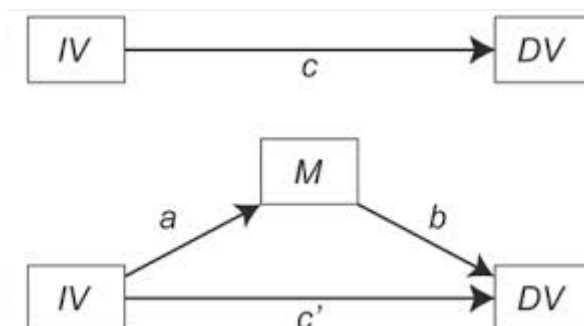
Figure 7.8: Mediation model (Baron and Kenny, 1986, p. 1176)

In order to test for mediation, Baron and Kenny (1986) explain that four steps need to be completed. Step 1: perform a regression analysis between the IV(s) and the DV to test path c as shown in Figure 7.6. This step determines whether there is an effect between the IV and the DV that can be mediated by ensuring that the IV has a significant effect on the DV. Step 2: perform a regression analysis between the IV and the Mediator (test path a) and ensure that the IV has a significant effect on the Mediator (plays the role of dependent variable in this case). In step 3 path b is examined and the Mediator (being effectively an independent variable) should have a significant effect on the DV. In Step 4 perform a regression analysis where both the IV and the Mediator (which plays the role of an independent variable in this case) are used as predictive variables on the DV. Test path b to ensure that the mediator still has a significant effect on the outcome variable. At this stage the direct effect of the IV on the DV (path c') should have lessened in comparison with the results in step 1 (path c). Subsequently, path c' should be examined to determine whether the mediation effect of the mediator variable is full, partial or none. Full mediation is observed when the IV has no direct effect on the DV. Partial mediation is observed when the IV still has a direct effect on the DV but it has lessened. No mediation occurs when the test fails at any of the described four steps. The mediation effects were tested using bootstrapping technique (Preacher and Hayes, 2008, Hayes, 2009).

This study has two mediators: Organisational Culture/Climate and Transactive Memory Systems. They were tested as mediators for both knowledge sharing and knowledge interactions. The results are presented in the following sections.

7.5.1. Organisational Culture/Climate (Mediator) for Knowledge Sharing

Step 1: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the DV – Knowledge Sharing (KS). As shown in Table 7.11 all IVs – informal networks (β=0.12, p<0.01), power relations (β=0.26, p<0.01), trust in management (β=0.20, p<0.01) and trust in peers (β=0.41, p<0.01) have a significant influence on knowledge sharing (the DV).

	Original Sample (Beta)	T Statistics	Sig Level
INFN -> KS	0.12	2.61	0.01
PR -> KS	0.26	4.03	0.01
TIM -> KS	0.20	3.08	0.01
TIP -> KS	0.41	6.39	0.01

Table 7.11: Step 1 in mediation relationship testing for KS

Step 2: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – Organisational Culture/Climate (OC). As shown in Table 7.12 informal networks ($\beta=0.03$, NS) fail on step 2 as it does not have a significant effect on Organisational Culture/Climate (the mediator). Thus organisational culture/climate does not mediate the relationship between informal networks and knowledge sharing and hypothesis 7a is not supported. All other IVs have a significant effect on the mediator; power relations ($\beta=0.32$, $p<0.01$), trust in management ($\beta=0.37$, $p<0.01$), and trust in peers ($\beta=0.30$, $p<0.01$).

	Original Sample (Beta)	T Statistics	Sig Level
INFN -> OC	0.03	1.00	NS
PR -> OC	0.32	5.36	0.01
TIM -> OC	0.37	6.02	0.01
TIP -> OC	0.30	6.16	0.01

Table 7.12: Step 2 in mediation relationship testing for KS (Mediator: OC)

Step 3: Conduct a regression analysis between the Mediator – organisational culture/climate and the DV – knowledge sharing. The results presented in Table 7.13 reveal that organisational culture/climate has a significant effect on knowledge sharing ($\beta=0.76$, $p<0.01$).

	Original Sample (Beta)	T Statistics	Sig Level
OC -> KS	0.76	21.60	0.01

Table 7.13: Step 3 in mediation relationship testing for KS (Mediator: OC)

Step 4: Conduct a regression analysis with both the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – organisational culture/climate as predictors of the DV – knowledge sharing. As described in Step 2 organisational culture/climate does not mediate the relationship between informal networks and knowledge sharing, thus Hypothesis 7a is not supported and this relationship is omitted in step 4. The results are presented in Table 7.14. In pairs: firstly the effect of organisational culture/climate on knowledge sharing; secondly the effect of the IVs on knowledge sharing.

	Original Sample (Beta)	T Statistics	Sig Level
OC -> KS	0.50	6.82	0.01
TIP -> KS	0.37	5.32	0.01
OC -> KS	0.61	8.53	0.01
TIM -> KS	0.19	2.82	0.01
OC -> KS	0.60	7.99	0.01
PR -> KS	0.21	2.92	0.01

Table 7.14: Step 4 in mediation relationship testing for KS (Mediator: OC)

Testing Hypothesis 7b where trust in peers is the IV, the effect of organisational culture/climate on knowledge sharing is still significant (β=0.50, p<0.01). The direct effect of trust in peers on knowledge sharing is significant but slightly reduced (from β=0.41, p<0.01 to β=0.37, p<0.01). Thus organisational culture/climate partially mediates the relationship between trust in peers and knowledge sharing and hypothesis 7b is supported.

Testing Hypothesis 7c where trust in management is the IV, the effect of organisational culture/climate on knowledge sharing is still significant (β=0.61, p<0.01). The direct effect of trust in management on knowledge sharing in step 4 is significant but slightly reduced (from β=0.20, p<0.01 to β=0.19, p<0.01). Thus organisational culture/climate partially mediates the relationship between trust in management and knowledge sharing and hypothesis 7c is supported. Testing Hypothesis 7d, where power relations are the IV, the effect of organisational culture/climate on knowledge sharing is still significant (β=0.60, p<0.01). The direct effect of power relations on knowledge sharing is significant but slightly reduced (from β=0.26, p<0.01 to β=0.21, p<0.01). Thus organisational culture/climate partially mediates the relationship between power relations and knowledge sharing and hypothesis 7d is supported.

7.5.2. Organisational Culture/Climate (Mediator) for Knowledge Interactions

Step 1: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the DV – Knowledge Interactions (KI). As shown in Table 7.15.

	Original Sample (Beta)	T Statistics	Sig Level
INFN -> KI	0.45	7.87	0.01
PR -> KI	-0.04	0.47	NS
TIM -> KI	0.28	3.72	0.01
TIP -> KI	0.21	2.75	0.01

Table 7.15: Step 1 in mediation relationship testing for KI

As is evident power relations (β=-0.04, NS) do not have a significant effect on KI, thus according to Baron and Kenny (1986) organisational culture/climate do not have mediating effect between power relations and knowledge interactions and hypothesis 7h is not supported. All other IVs – informal networks (β=0.45, $p<0.01$), trust in management (β=0.28, $p<0.01$) and trust in peers (β=0.21, $p<0.01$) have a significant influence on knowledge interactions (the DV).

Step 2: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – organisational culture/climate. Results are the same as in Step 2 of the KS analysis as shown earlier in Table 7.12. Informal networks (β=0.03, NS) fail step 2 as they do not have a significant effect on organisational culture/climate (the mediator). Thus organisational culture/climate does not mediate the relationship between informal networks and knowledge interactions and Hypothesis 7e is not supported. The other IVs have a significant effect on the mediator; power relations (β=0.32, $p<0.01$), trust in management (β=0.37, $p<0.01$), and trust in peers (β=0.30, $p<0.01$).

Step 3: Conduct a regression analysis between the Mediator – organisational culture/climate and the DV – knowledge interactions. The results presented in Table 7.16 reveal that organisational culture/climate has a significant effect on knowledge interactions (β=0.58, $p<0.01$).

	Original Sample (Beta)	T Statistics	Sig Level
OC -> KI	0.58	10.34	0.01

Table 7.16: Step 3 in mediation relationship testing for KI (Mediator: OC)

Step 4: Conduct a regression analysis with both the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – organisational culture/climate as predictors to the DV – knowledge interactions. The results are provided in Table 7.17. As described in Step 1 organisational culture/climate does not mediate the relationship between power relations and knowledge interactions. As described in Step 2 organisational culture/climate does not mediate the relationship between informal networks and knowledge interactions.

	Original Sample (Beta)	T Statistics	Sig Level
OC -> KI	0.38	4.41	0.01
TIP -> KI	0.28	2.98	0.01
OC -> KI	0.44	4.06	0.01
TIM -> KI	0.17	1.63	NS

Table 7.17: Step 4 in mediation relationship testing for KI (Mediator: OC)

Testing Hypothesis 7f where trust in peers is the IV, the effect of organisational culture/climate on knowledge interactions is still significant (β=0.38, p<0.01). The direct effect of trust in peers on knowledge interactions is significant but reduced (from β=0.41, p<0.01 to β=0.28, p<0.01). Thus organisational culture/climate partially mediates the relationship between trust in peers and knowledge interactions and hypothesis 7f is supported. Testing Hypothesis 7g where trust in management is the IV, the effect of organisational culture/climate on knowledge interactions is still significant (β=0.44, p<0.01). The direct effect of trust in management on knowledge interactions in step 4 is not significant (from β=0.20, p<0.01 to β=0.17, NS). Thus organisational culture/climate fully mediates the relationship between trust in management and knowledge interactions and hypothesis 7g is supported.

7.5.3.   Transactive Memory Systems (Mediator) for Knowledge Sharing

Step 1: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the DV – knowledge sharing. The results are the same as in the OC analysis shown earlier in the Table 7.11. All IVs – informal networks (β=0.12, p<0.01), power relations (β=0.26, p<0.01), trust in management (β=0.20, p<0.01) and trust in peers (β=0.41, p<0.01) have a significant influence on knowledge sharing (the DV).

Step 2: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – Transactive Memory Systems (TMS). The results are portrayed in Table 7.18.

	Original Sample (Beta)	T Statistics	Sig Level
INFN -> TMS	0.18	4.98	0.01
PR -> TMS	0.12	1.60	NS
TIM -> TMS	0.24	3.83	0.01
TIP -> TMS	0.52	10.90	0.01

Table 7.18: Step 2 in mediation relationship testing for KS (Mediator: TMS)

As shown in Table 7.19 Power Relations (β=0.12, NS) fail step 2 as they do not have a significant effect on transactive memory systems (the mediator). Thus transactive memory systems do not mediate the relationship between power relations and knowledge sharing and hypothesis 8d is not supported. The other IVs have significant effect on the mediator; informal networks (β=0.18, p<0.01), trust in management (β=0.24, p<0.01), and trust in peers (β=0.52, p<0.01).

Step 3: Conduct a regression analysis between the Mediator – transactive memory systems and the DV – knowledge sharing. The results presented in Table 7.19 reveal that transactive memory systems have a significant effect on knowledge sharing (β=0.80, p<0.01).

	Original Sample (Beta)	T Statistics	Sig Level
TMS -> KS	0.80	26.93	0.01

Table 7.19: Step 3 in mediation relationship testing for KS (Mediator: TMS)

Step 4: Conduct a regression analysis with both the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – transactive memory systems as predictors to the DV – knowledge sharing. The results are provided in Table 7.20.

	Original Sample (Beta)	T Statistics	Sig Level
TMS -> KS	0.78	17.79	0.01
INFN -> KS	0.03	0.62	NS
TMS -> KS	0.63	7.34	0.01
TIP -> KS	0.21	2.41	0.05
TMS -> KS	0.65	12.31	0.01
TIM -> KS	0.22	4.13	0.01

Table 7.20: Step 4 in mediation relationship testing for KS (Mediator: TMS)

Testing Hypothesis 8a where informal networks are the IV, the effect of transactive memory systems on knowledge sharing is still significant (β=0.78, p<0.01). The direct effect of informal networks on knowledge sharing in step 4 is not significant (from β=0.18, p<0.01 to β=0.03, NS). Thus transactive memory systems fully mediate the relationship between informal networks and knowledge sharing and hypothesis 8a is supported.

Testing Hypothesis 8b where trust in peers is the IV, the effect of transactive memory systems on knowledge sharing is still significant (β=0.78, p<0.01). The direct effect of trust in peers on knowledge sharing is significant but reduced in terms of coefficient values and a significance level (from β=0.52, p<0.01 to β=0.21, p<0.05). Thus transactive memory systems partially mediate the relationship between trust in peers and knowledge sharing and hypothesis 8b is supported.

Testing Hypothesis 8c where trust is management is the IV, the effect of transactive memory systems on knowledge sharing is still significant (β=0.63, p<0.01). The direct effect

of trust in management on knowledge sharing in step 4 is significant but slightly reduced (from β=0.24, p<0.01 to β=0.22, p<0.01). Thus transactive memory systems partially mediate the relationship between trust in management and knowledge sharing and hypothesis 8c is supported.

7.5.4.   Transactive Memory Systems (Mediator) for Knowledge Interactions

Step 1: Conduct a regression analysis between the IVs – informal networks, power relations, trust in management and trust in peers and the DV – knowledge interactions. The results are the same as in the OC analysis shown earlier in Table 7.15. Power relations (β=-0.04, NS) do not have significant effect on KI, thus the test fails at step 1 meaning that transactive memory systems do not have mediating effect between Power Relations and Knowledge Interactions and hypothesis 8h is not supported. All other IVs – informal networks (β=0.45, p<0.01), trust in management (β=0.28, p<0.01) and trust in peers (β=0.21, p<0.01) have a significant influence on knowledge interactions (the DV).

Step 2: Conduct a regression analysis between the IVs – informal networks, trust in management and trust in peers and the Mediator – transactive memory systems. Results are the same as in Step 2 of the KS analysis as shown in table 7.18. All IVs (apart from power relations which failed in step 1) have a significant effect on the mediator; informal networks (β=0.18, p<0.01), trust in management (β=0.24, p<0.01), and trust in peers (β=0.52, p<0.01).

Step 3: Conduct a regression analysis between the Mediator – transactive memory systems and the DV – knowledge interactions. The results presented in Table 7.21 reveal that Transactive memory systems have a significant effect on knowledge interactions (β=0.70, p<0.01).

	Original Sample (Beta)	T Statistics	Sig Level
TMS -> KI	0.70	15.58	0.01

Table 7.21: Step 3 in mediation relationship testing for KI (Mediator: TMS)

Step 4: Conduct a regression analysis with both the IVs – informal networks, power relations, trust in management and trust in peers and the Mediator – transactive memory systems as predictors to the DV – knowledge interactions. The results are provided in Table 7.22.

	Original Sample (Beta)	T Statistics	Sig Level
TMS -> KI	0.52	8.61	0.01
INFN -> KI	0.34	5.60	0.01
TMS -> KI	0.75	8.60	0.01
TIP -> KI	-0.06	0.61	NS
TMS -> KI	0.66	9.13	0.01
TIM -> KI	0.05	0.72	NS

Table 7.22: Step 4 in mediation relationship testing for KI (Mediator: TMS)

Testing Hypothesis 8e, where informal networks are the IV, the effect of transactive memory systems on knowledge interactions is still significant (β=0.52, p<0.01). The direct effect of informal networks on knowledge sharing in step 4 is significant but slightly reduced (from β=0.45, p<0.01 to β=0.34, p<0.01). Thus transactive memory systems partially mediate the relationship between informal networks and knowledge interactions and hypothesis 8e is supported.

Testing Hypothesis 8f where trust in peers is the IV, the effect of transactive memory systems on knowledge interactions is still significant (β=0.75, p<0.01). The direct effect of trust in peers on knowledge interactions in step 4 is not significant (from β=0.21, p<0.01 to β=-0.06, NS). Thus transactive memory systems fully mediate the relationship between trust in peers and knowledge interactions and hypothesis 8f is supported.

Testing Hypothesis 8g where trust is management is the IV, the effect of transactive memory systems on knowledge interactions is still significant (β=0.66, p<0.01). The direct effect of trust in management on knowledge interactions in step 4 is not significant (from β=0.28, p<0.01 to β=0.05, NS). Thus transactive memory systems fully mediate the relationship between trust in management and knowledge interactions and hypothesis 8g is supported.

A summary of the results for mediating hypotheses testing is presented in Table 7.23.

Hypothesis	Mediator	IV	DV	Outcome
H7a	OC	INFN	KS	Not supported No Mediation, failed at step 2
H7b	OC	TIP	KS	Supported Partial Mediation
H7c	OC	TIM	KS	Supported Partial Mediation
H7d	OC	PR	KS	Supported Partial Mediation
H7e	OC	INFN	KI	Not supported No Mediation, failed at step 2
H7f	OC	TIP	KI	Supported Partial Mediation
H7g	OC	TIM	KI	Supported Full Mediation
H7h	OC	PR	KI	Not supported No mediation, Failed at step 1
H8a	TMS	INFN	KS	Supported Full Mediation
H8b	TMS	TIP	KS	Supported Partial Mediation
H8c	TMS	TIM	KS	Supported Partial Mediation
H8d	TMS	PR	KS	Not supported No Mediation, failed at step 2
H8e	TMS	INFN	KI	Supported Partial Mediation
H8f	TMS	TIP	KI	Supported Full Mediation
H8g	TMS	TIM	KI	Supported Full Mediation
H8h	TMS	PR	KI	Not supported No Mediation, failed at step 1

Table 7.23: Results of mediation hypotheses testing

7.6   MANOVA

MANOVA (Multivariate Analysis of Variance) is performed to test the difference in knowledge sharing and knowledge interactions between different industries, organisations of different sizes and between the different positions people hold within the company as shown in Figure 7.9. MANOVA is used because this study has two dependent variables.
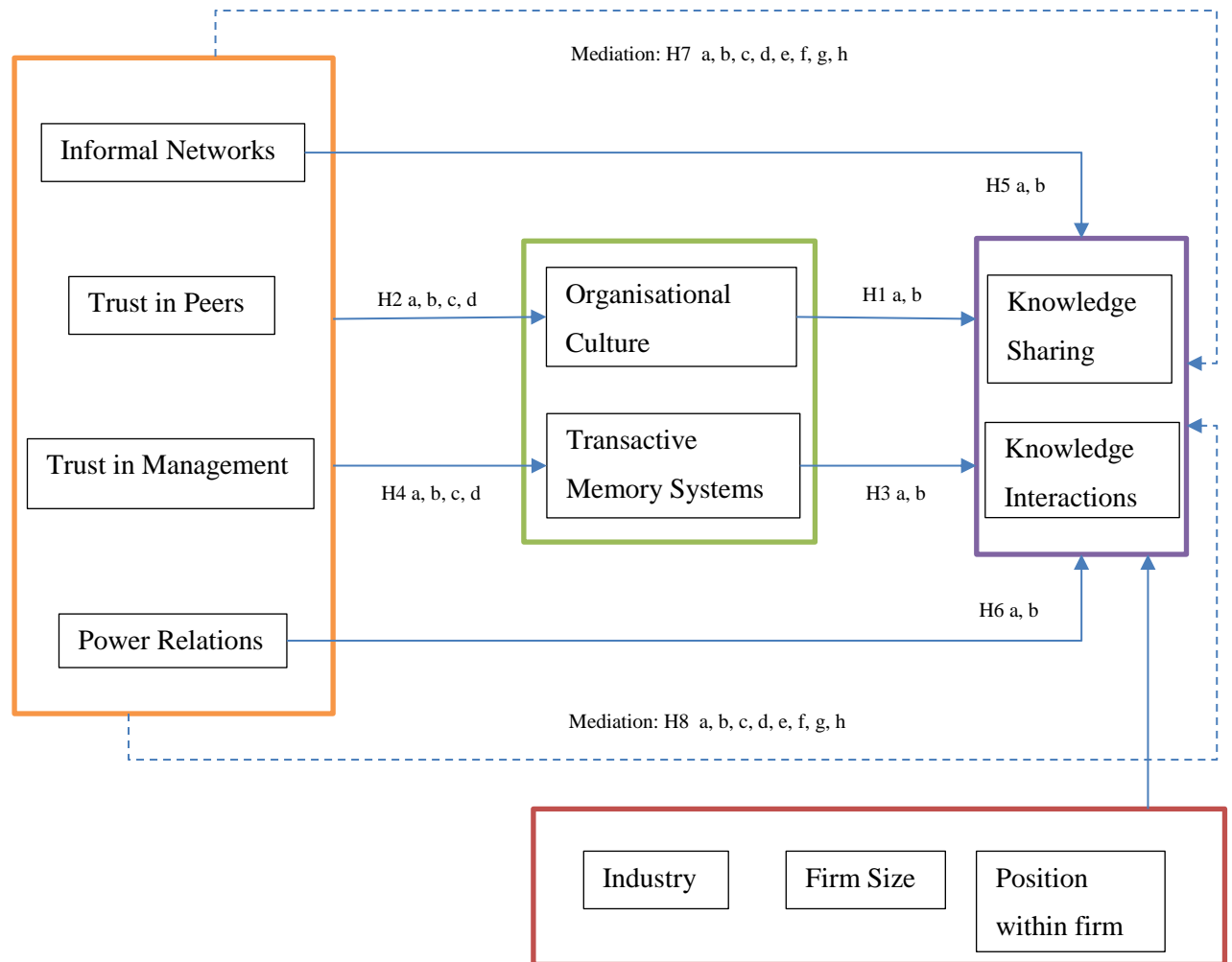
Figure 7.9: Control variables

MANOVA tests multiple dependent variables simultaneously while ANOVA deals only with one dependent variable at a time. MANOVA has very strict requirements in terms of normally distributed data, equal variance and equal sample size. As shown the data was a little bit skewed and the sample between groups is not equal. Equal variance is tested through Levene statistics performed during MANOVA analysis. When data deviates from the requirements it is recommended that MANOVA should be performed based on the ranks of

the mean. The results for both the industry and the organisational size pass the homogeneity of variance test but show no difference in knowledge sharing or knowledge interactions between the different industries or sizes. The only control variable which exhibits significant difference between groups is the position people hold within the company. Firstly, the assumption of equality of variances should be inspected and the statistic should be non-significant, i.e. p>0.05 in order to meet this requirement. As evident from Table 7.24 it is concluded that the variance is equal across groups and the analysis can proceed.

Box's Test of Equality of Covariance Matrices[a]

Box's M	2.036
F	.334
df1	6
df2	180760.268
Sig.	.919

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Position

Table 7.24: MANOVA equality of variance

The next step is to inspect if there is a significant difference between the groups. Four multivariate statistics (Pillai's Trace; Wilks' Lambda; Hotelling's Trace; Roy's Largest Root) are reported in Table 7.25.

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Position	Pillai's Trace	.040	2.244	4.000	442.000	.063
	Wilks' Lambda	.960	2.247[b]	4.000	440.000	.063
	Hotelling's Trace	.041	2.250	4.000	438.000	.063
	Roy's Largest Root	.036	3.991[c]	2.000	221.000	.020

a. Design: Intercept + Position
b. Exact statistic
c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 7.25: MANOVA multivariate statistics

If these multivariate statistics are significant p<0.05, it can be assumed that there is significant difference between the groups. Only Roy's Largest Root exhibits statistically significant results. However, as MANOVA tests the effect on two dependent variables KS and KI simultaneously, it could be that the different groups do not differ in their effect on the

combination of the two knowledge processes but may hinder some individual difference. As one of the statistics suggests there might be some significant differences, these differences are further inspected in the ANOVA outputs. Firstly, the Levene statistic confirms homogeneity of variance for both KS and KI as shown in Table 7.26.

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
KS_difference_rank_Pos	.560	2	221	.572
KI_difference_rank_Pos	1.649	2	221	.195

Table 7.26: Homogeneity of variance for position

Secondly, a significant difference in position is only evident in the case of knowledge sharing as shown in Table 7.27. It is possible that because difference between groups is observed only with one of the dependent variables (KS), the overall MANOVA was not significant.

		Sum of Squares	df	Mean Square	F	Sig.
KS_difference_rank_Pos	Between Groups	7111.064	2	3555.532	3.554	.030
	Within Groups	221084.051	221	1000.380		
	Total	228195.115	223			
KI_difference_rank_Pos	Between Groups	3990.702	2	1995.351	1.977	.141
	Within Groups	223037.956	221	1009.222		
	Total	227028.658	223			

Table 7.27: Differences between groups

Subsequently, the difference between the three position groups is investigated through Post-Hoc test which shows that there is a significant difference between top managers and employees presented in Table 7.28 and the means plot in Figure 7.10.

Multiple Comparisons

Dependent Variable		(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
KS_difference_rank_Pos	Tukey HSD	Top Managers	Middle Managers	-13.11828	5.67672	.056
			Employees	-15.94615*	6.30061	.032
		Middle Managers	Top Managers	13.11828	5.67672	.056
			Employees	-2.82786	4.92804	.834
		Employees	Top Managers	15.94615*	6.30061	.032
			Middle Managers	2.82786	4.92804	.834

*. The mean difference is significant at the 0.05 level.

Table 7.28: Post-hoc analysis
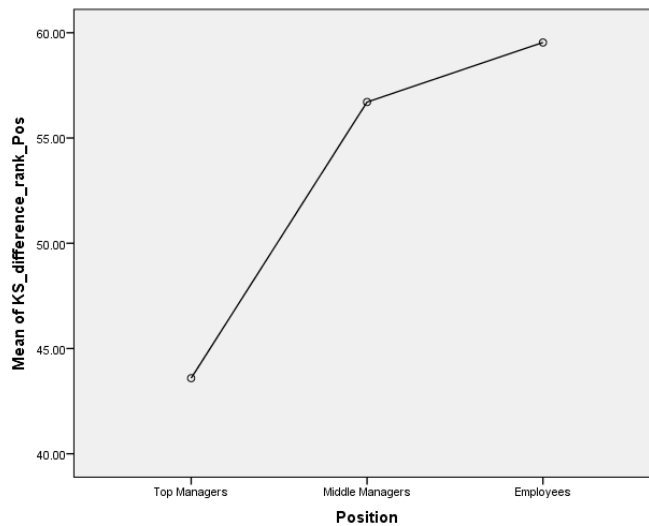
Figure 7.10: Means plot for Position

The results show that there is a significant difference in knowledge sharing between employees and top managers, where employees engage in knowledge sharing the most. Further up the hierarchy it is noticed that sharing diminishes.

7.7   Summary

This chapter presented the quantitative analysis of the main study. Firstly the measurement model was evaluated, where reliability and validity for the reflective measures were confirmed and no multicollinearity was exhibited between the formative measures. Subsequently, the hypotheses were tested. The results combined for both non-mediation and mediation hypotheses are presented in Table 7. 29.

Hypotheses	Results
H1a: Organisational culture/climate characterised by affiliation, fairness and innovativeness will have a positive effect on knowledge sharing.	Supported
H1b: Organisational culture/climate characterised by affiliation, fairness and innovativeness will have a positive effect on knowledge interactions.	Supported
H2a: Informal networks will have a positive effect on organisational culture/climate.	Not Supported
H2b: High trust in peers will have a positive effect on organisational culture/climate.	Supported
H2c: High trust in management will have a positive effect on organisational culture/climate.	Supported
H2d: Strong power relations will have a negative effect on organisational culture/climate.	Supported
H3a: More developed transactive memory systems will have a positive effect on knowledge sharing.	Supported
H3b: More developed transactive memory systems will have a positive effect on knowledge interactions.	Supported
H4a: Informal networks will have a positive effect on transactive memory systems.	Supported
H4b: Higher trust in peers will have a positive effect on transactive memory systems.	Supported
H4c: Higher trust in management will have a positive effect on transactive memory systems.	Supported
H4d: Strong power relations will have a negative effect on transactive memory systems.	Not Supported
H5a: Strong power relations will have a negative effect on knowledge sharing.	Supported
H5b: Strong power relations will have a negative effect on knowledge interactions.	Not Supported
H6a: Informal networks will have a positive effect on knowledge sharing.	Not Supported
H6b: Informal networks will have a positive effect on knowledge interactions.	Supported

Hypotheses	Results
H7a: Organisational culture/climate will mediate the effect of informal networks on knowledge sharing.	Not Supported
H7b: Organisational culture/climate will mediate the effect of trust in peers on knowledge sharing.	Supported
H7c: Organisational culture/climate will mediate the effect of trust in management on knowledge sharing.	Supported
H7d: Organisational culture/climate will mediate the effect of power relations on knowledge sharing.	Supported
H7e: Organisational culture/climate will mediate the effect of informal networks on knowledge interactions.	Not Supported
H7f: Organisational culture/climate will mediate the effect of trust in peers on knowledge interactions.	Supported
H7g: Organisational culture/climate will mediate the effect of trust in management on knowledge interactions.	Supported
H7h: Organisational culture/climate will mediate the effect of power relations on knowledge interactions.	Not Supported
H8a: Transactive memory systems will mediate the effect of informal networks on knowledge sharing.	Supported
H8b: Transactive memory systems will mediate the effect of trust in peers on knowledge sharing.	Supported
H8c: Transactive memory systems will mediate the effect of trust in management on knowledge sharing.	Supported
H8d: Transactive memory systems will mediate the effect of power relations on knowledge sharing.	Not Supported
H8e: Transactive memory systems will mediate the effect of informal networks on knowledge interactions.	Supported
H8f: Transactive memory systems will mediate the effect of trust in peers on knowledge interactions.	Supported
H8g: Transactive memory systems will mediate the effect of trust in management on knowledge interactions.	Supported
H8h: Transactive memory systems will mediate the effect of power relations on knowledge interactions.	Not Supported

Table 7.29: Summary of the results

The results showed that: 1) organisational culture/climate has a positive effect on both knowledge sharing and knowledge interactions; 2) informal networks do not affect organisational culture/climate but, as proposed, trust in peers and trust in management have a positive effect on organisational culture/climate while strong power relations affect organisational culture/climate negatively; 3) transactive memory systems have a strong positive effect on both knowledge sharing and knowledge interactions; 4) informal networks, trust in peers and trust in management have a positive effect on transactive memory systems while no relationship was found between power relations and transactive memory systems; 5) strong power relations have a significant negative effect on knowledge sharing but no effect on knowledge interactions; 6) conversely, informal networks have no effect on knowledge sharing and a strong positive effect on knowledge interactions; 7) organisational culture/climate mediates the relationships between trust in peers, trust in management, power relations and knowledge sharing, but no mediating effect was found in the relationship between informal networks and knowledge sharing; 8) organisational culture/climate mediates the relationships between trust in peers, trust in management and knowledge interactions, but no mediating effect was found in the relationships between informal networks, power relations and knowledge interactions; 9) transactive memory systems mediate the relationships between informal networks, trust in peers, trust in management and knowledge sharing but do not mediate the relationship between power relations and knowledge sharing; 10) Similarly with knowledge interactions, transactive memory systems mediate the relationships between informal networks, trust in peers, trust in management and knowledge interactions but do not mediate the relationship between power relations and knowledge interactions; 11) the results show that only one control variable, the position people hold within the organisation, affects knowledge sharing, where employees appear to share more knowledge in comparison to top managers. All other control variables – industry and company size do not affect either knowledge sharing or knowledge interactions and position does not exhibit an effect on knowledge interactions.

This study reveals some interesting results. In the next chapter the findings are discussed in the light of the existing literature.

8 DISCUSSION

8.1 Introduction

Building on the findings presented in Chapter 7, this chapter is organised around the discussion of the major findings of this study. Similarities and differences with the existing literature are drawn providing explanations for some underexplored areas and interesting findings.

The discussion in this chapter is organised in four directions: conceptualisation of knowledge sharing and knowledge interaction processes by comparing the two concepts, enhancing the new construct of knowledge interactions and urging more research in the area; advancements in activity theory as a result of this study; discussion of the major research findings; and finally the generalisability of the model designed in this research to other contexts.

8.2 Conceptualisation of the two knowledge processes: knowledge sharing and knowledge interactions

This research was inspired by the complexities of knowledge sharing as an organisational phenomenon. The research started by exploring the nature of knowledge and the essence of knowledge processes. This journey led to the distinction between two important organisational knowledge processes – knowledge sharing and knowledge interactions. The aim of this section is to reflect on these two knowledge processes and further conceptualise the new construct/concept of knowledge interactions.

Knowledge sharing, in this study, is defined as the degree to which people within organisations share both tacit and explicit knowledge (Yang and Chen, 2007; Bock et al.,

2005). As such, knowledge sharing accounts for the taxonomic view of knowledge following the perspective of the epistemology of possession (Cook and Brown, 1999). Knowledge interactions are introduced in this study as a new construct based on the perspective of the epistemology of practice (Cook and Brown, 1999) Knowledge interactions are defined as collective interactions based on spontaneity, intuition and on individuals showing each other how things are done in practice.

Bock et al.'s (2005) conceptualisation of knowledge sharing is widely-followed and defines knowledge sharing as "the willingness of individuals in an organization to share with others the knowledge they have acquired or created" (p. 88). From this perspective, whether it is tacit or explicit knowledge, it is assumed that knowledge is possessed by the individual and that sharing takes the form of sharing of documents or know-how. Other scholars make a clear distinction between the process of sharing tacit and explicit knowledge, where knowledge sharing is equated to the exchange of tacit knowledge and knowledge transfer is related to the transmission of explicit knowledge (Pinho et al., 2012). However, whether explicit and tacit knowledge sharing are viewed as separate processes or combined within the umbrella term knowledge sharing, knowledge is seen as an individual possession and knowledge sharing as a one-way, linear and static process (Hsu and Chang, 2012; Sosa, 2011; Wu et al., 2007). Conversely, knowledge interactions emphasise the collective action, the dynamic activity of engaging in practice and learning together. Another pitfall in the conceptualisation of knowledge sharing is that it is about transmitting existing knowledge from a sender to a receiver (Liyanage et al., 2009; Matsuo and Easterby-Smith, 2008). In knowledge interactions the focus is on constructing situational and problem-based knowledge with an emphasis on intuition and spontaneity (Orlikowski, 2002).

There is a prominent stream of views characterising tacit knowledge sharing as ascribed and stimulated by rich social interactions, while explicit knowledge sharing takes place mainly via information technology (Davison et al., 2013; Yang and Farn, 2009; Matsuo and Easterby-Smith, 2008). From this perspective there may be an overlap between tacit knowledge sharing and knowledge interactions, assuming that social interactions are the drivers of both processes. The distinction comes from the fact that while tacit knowledge is possessed by the individuals, knowing is collectively created and constituted through practice. There is a difference between one party explaining something to another party, and the two parties performing the activity together. As such tacit knowledge sharing is one step shorter

than knowledge interactions where doing and learning are embedded aspects (Michailova and Sidorova, 2011; Cook and Brown, 1999).

Another prominent perspective followed by a number of studies is that knowledge sharing is the process of making knowledge available to others (Vuori and Okkonen, 2012; Suppiah and Sandhu, 2011; Ipe, 2003). The emphasis from that perspective is put on the process of locating distributed knowledge and making it available to others (Choi et al., 2010; van den Hooff and Huysman, 2009). However, in this study it is argued that locating distributed expertise is a central part of developing TMS which proved an important antecedent factor for knowledge processes. What knowledge processes should be more concerned with is how this knowledge is used and applied once different expertise has been brought together. In the case of knowledge sharing, a transfer of existing knowledge is observed where the aim is to replicate this existing knowledge. In the case of knowledge interactions knowledge is collectively and dynamically constructed and customised in practice, where the idea is not to learn or replicate what someone else knows, but to collectively derive new solutions and practices based on joint action where different people contribute with their expertise. This is where knowledge sharing falls short on the aspects of creativity, knowledge customisation, innovation and learning (Easterby-Smith et al., 2008; Michailova and Sidorova, 2011; Wu et al., 2007). Knowledge interactions could be further related to experiential and expansive learning (Matsuo and Easterby-Smith, 2008; Engeström and Sannino, 2010). The expansive learning cycle starts through questioning the status quo of an existing practice, followed by an analysis of the situation, modelling a possible solution, examining and implementing the new model, reflecting on the process and consolidating the new practice (Engeström and Sannino, 2010). The element of questioning the status quo is not present in the process of knowledge sharing, thus it may be difficult to initiative an expansive learning cycle. However, by incorporating the element of questioning during the knowledge interaction processes expansive learning could be achieved (Matsuo and Easterby-Smith, 2008; Engeström and Sannino, 2010; Engeström, 2011; Michailova and Sidorova, 2011).

Additionally, a distinction between knowledge sharing and knowledge interactions could be made based on the type of tasks required to be performed. Drawing on Blackler's (1995) knowledge differentiation, it could be argued that knowledge sharing occurs more frequently in relation to routine tasks, while knowledge interactions are provoked by novel tasks where

knowledge construction, customisation and creativity are required (Matsuo and Easterby-Smith, 2008).

In an attempt to further conceptualise the new construct of knowledge interactions, this study urges researchers to be less preoccupied with what constitutes knowledge but instead to focus on the actual process and on the outputs of this process. The following Table 8.1 summarises the two knowledge processes in terms of epistemological perspective, process, task, outcome and factors affecting the two processes. The factors affecting knowledge processes are derived based on the results of the present study.

Knowledge Processes	Epistemology	Process	Task	Outcome	Factors
Knowledge sharing	Epistemology of possession	Linear, Static, Dyadic Transmitting knowledge from sender to receiver, More formal	Routine–reusing existing knowledge	Non-creative replication of existing knowledge	Organisational culture/climate, Power relations, Transactive memory systems
Knowledge interactions	Epistemology of practice	Dynamic, Collective, Spontaneous, Ad-hoc, Intuitive, Constructing knowledge in practice by showing each other and performing the tasks together, More informal	Novel–constructing problem-based knowledge	Learning, Innovation, Creativity and Knowledge customisation	Informal networks, Transactive memory systems, Organisational culture/climate to a lesser extent

Table 8.1: Conceptualisation of knowledge sharing and knowledge interactions

In this study knowledge interactions were investigated as a collective dynamic process based on spontaneity, intuition and on showing each other how things are done by performing the tasks together collectively. This study places emphasis on these aspects as these were prominent characteristics of Bulgarian organisations. However, the nature of the task and the outcome of knowledge interactions in terms of creativity, knowledge customisation, innovation and learning could be further integrated within the construct. In this way a more rounded picture of knowledge interactions could be built.

A number of studies have distinguished between tacit and explicit knowledge and have shown that the same factors influence tacit and explicit knowledge sharing differently (Huang et al., 2011; Hau et al., 2013; Matsuo and Easterby-Smith, 2008). However, existing studies have not distinguished between tacit, explicit knowledge and knowing in practice. Matsuo and Easterby-Smith (2008) have called for researchers to distinguish between knowing and knowledge sharing. This study explicitly distinguishes between knowledge sharing from a taxonomic perspective, and knowledge interactions following the practice perspective. The results of this study have shown that the same factors exhibit different effects on the two knowledge processes as presented in Table 8.1. Knowledge sharing appears to be strongly influenced by organisational culture/climate, power relations and transactive memory systems, while knowledge interactions are strongly affected by informal networks, transactive memory systems and to a lesser extent by organisational culture/climate. The presence of informal networks appears to be the main differentiator between the two knowledge processes, where such networks are a crucial driver for knowledge interactions but do not directly affect knowledge sharing. Thus, by emphasising the factors promoting knowledge sharing, knowledge interaction processes may be hindered.

The next section explores the second direction of the discussion, advancements of activity theory. Subsequently the third direction of the discussion goes into more depth in presenting the major research findings.

8.3   Advancements of Activity theory

Activity theory helps understand and explain knowledge processes by emphasising that activities are oriented towards an object/outcome, a goal which needs to be achieved. By elaborating on the aspect of activity, activity theory helps move the emphasis of knowledge as a possession, or as a thought, to knowledge as an action (Blackler, 1995). Knowledge is something that the collective strives to achieve rather than to store or possess. This perspective provides a sound foundation for incorporating, exploring and explaining the new concept of Knowledge Interactions.

It is argued in this study that the collective possesses meta-knowledge on other individuals' expertise which unites people to engage in knowledge processes in order to fulfil

the required tasks. The individual is part of a collective where the achievement of the desired outcome becomes a collective goal as opposed to an individual aim. In this way the emphasis is placed on the collective (Engeström and Kerosuo, 2007). In this study the two knowledge processes are the desired goals which the collective strives to achieve through their activities. Additionally, all activities directed towards achieving of these outcomes are mediated by the wider context, the environment, the social relationships and the physical and abstract tools within this environment (Engeström, 1987; Nicolini, 2013; Blackler, 2011). Activity theory helps to unravel the dynamic interplay of the key elements of the activity system that enable or obstruct the achievement of the goal/the outcomes.

By providing the foundations of an organisational activity system, activity theory allows researchers to investigate the context where the activity takes place, as well as to incorporate more abstract tools such as transactive memory systems. Activity theory also allows for investigating the interplay between power relations and the other elements of the activity system as it is recognised that power is inseparable part of the organisational life (Blackler, 1995, 2011). Importantly, from an activity theory perspective it is recognised that relationships and activities are not harmonious, but rather tensions, contradictions and paradoxes are an integral part of every organisational activity system. Every element of the activity system, as well as the interactions between the elements, are potential triggers for tensions and contradictions which affect the activities within the system (Allen et al., 2011). However, the perception of such tensions and contradictions within activity theory is that they are the driving force of development and innovation (Engeström, 2008; Allen et al., 2011).

Presented in Figure 8.1 is the developed activity system framework explaining knowledge processes within Bulgarian organisations.

TOOLS (MECHANISMS)

- Web 2.0 technologies
- Transactive memory systems

SUBJECT

- The collective

OBJECT ⟶ OUTCOMES (EVENTS)

- Knowledge/
Knowing

- Knowledge
sharing
- Knowledge
Interactions

RULES (MECHANISMS)

- Organisational
culture/climate

COMMUNITY (STRUCTURES)

- Informal networks
- Trust

DIVISION OF LABOUR
(STRUCTURES)

- Power relations
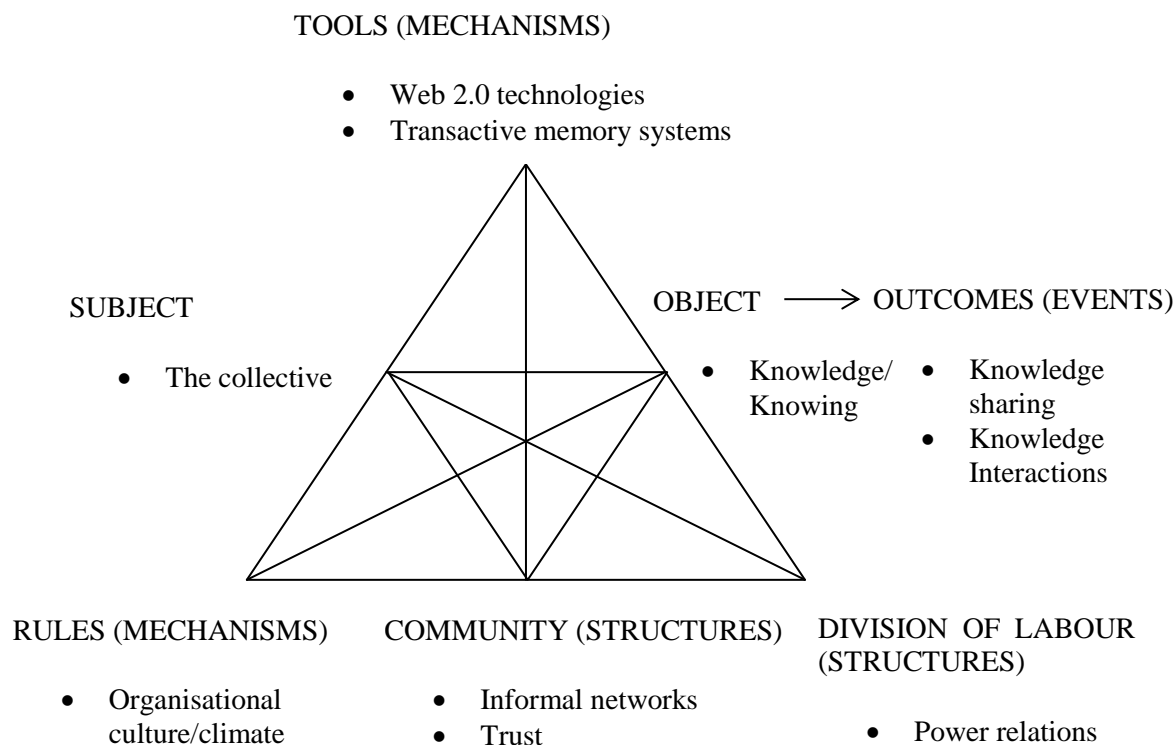
Figure 8.1: Activity system framework of knowledge processes in Bulgarian

organisations

The developed activity system in this study offers a different perspective on knowledge processes in comparison to the traditional use of activity theory. How this study advances activity theory is explained in the following sections:

Investigating knowledge processes

Firstly, activity theory is extended by considering knowledge sharing and knowledge interactions as outcomes where knowledge/knowing are seen as objects towards which the activities are directed. This study helped to overcome the static view of knowledge as a tool and investigated knowledge/knowing as the objects of people's activities. By perceiving knowledge as an object of the activity, the focus is shifted away from perceiving knowledge as something people possess to perceiving knowledge as constructed based on people's interactions. As such the focus is shifted from knowledge as a tool mediating the activity to being the goal of the activity.

One of the limitations in the current use of activity theory is that often knowledge is regarded as a tool. Existing studies frequently place knowledge, skills and experience along

with information as mediating tools within the activity system (Engeström, 2000; Allen et al., 2011; Igira and Aanestad, 2009; Prenkert, 2006). Considering knowledge as a tool could be seen as a paradox within activity theory as the main tenet of the theory is that knowledge/knowing are enacted in practice through the activities taking place within the activity system (Snowden, 2002). If knowledge is seen as a tool, parallels can be drawn with the sender-channel-receiver model and the relationship subject-tools-object. Example of such use of the theory was evident in Lin et al.'s (2008) study explained in Chapter 4. In their study Lin et al. (2008) are preoccupied with the qualities of knowledge such as tacit nature, complexity, uncertainty. However, in this study it is argued that the focus should not be on knowledge per se but on the behaviours and outcomes it leads to. As such by focusing on knowledge as an object resulting in knowledge sharing and knowledge interactions, activity theory provided an opportunity to investigate the effect of the elements of the activity system on the knowledge processes rather than solely on the qualities of knowledge.

Incorporating transactive memory systems

It is argued in this current study that knowledge itself is not a tool but that the index of other people's expertise, the transactive memory of the group, is the tool which helps to bring people together and engage in knowledge processes. As such, activity theory is extended by incorporating transactive memory systems as tools within the activity system. From an activity theory perspective tools can be material and abstract (Allen et al., 2011). The traditional tools described for using activity theory are physical, such as information systems, documents, paper forms, telephones, meetings, stethoscopes and other machines, the internet, as well as abstract tools such as knowledge, reputation, loyalty, experience (Engeström, 2000; Allen et al., 2011; Igira and Aanestad, 2009; Prenkert, 2006; Macpherson, 2005). Transactive memory systems are mental maps existing in people's heads and as such in this study they are regarded as abstract tools within the activity system. As explained earlier, it is not knowledge that mediates the activities between people but the index of what other people know and do which triggers and mediates their interactions. As such a developed transactive memory system provides a meta-knowledge of other people's expertise and is considered as a tool, a mental map mediating knowledge processes. The role of transactive memory systems within the activity system is currently underexplored. By investigating and incorporating transactive memory systems within the activity system, this study contributes to activity theory as it explored how awareness of what others do and whom they know affects the organisational knowledge processes. The results are discussed in the following section.

Incorporating power relations

An important advancement in activity theory is achieved by incorporating power relations as division of labour within the activity system. An important under-theorised aspect of activity theory is the notion of power (Blackler, 1995, 2011; Blackler and McDonald, 2000; Kaptelinin and Nardi, 2006). As discussed in Chapter 4 power could be found in every element of the activity system. In Bulgarian organisations strong power relations stem from the hierarchy. In the Bulgarian context power is manifested as epistemic, authoritative power where the ultimate goal of the activities is to "make the boss happy", as such power is observed as a medium for domination and control and is situated within the division of labour. The effect of power as a deeply embedded structure was tested on the other elements of the activity systems as well as on the two knowledge processes in an attempt to show the behaviours which this epistemic power sensitizes people to.

Mediation

Lastly, this study advances activity theory in terms of mediation. This extension is achieved by incorporating critical realism notion of causation into the analysis. This helped to identify the depth of operation of the elements of the activity system. The analysis demonstrated that the community characteristics and the division of labour are deeply embedded organisational structures that enable or obstruct the achievement of the outcome. The effect of these deeper structures is mediated by the rules and the tools people use to interact and share knowledge. This advancement is a response to a call from Kaptelinin and Nardi (2006) who prompt for "extending the notion of mediation beyond tools" (p. 256). In relation to knowledge processes, this study shows that activities are mediated by tools as well as by the rules existing in the environment, in this case organisations.

While the activity theory framework helps advance our understanding of the organisational knowledge processes in terms of the tools, rules, community and division of labour affecting these processes, this study advances activity theory by (1) investigating knowledge processes where knowledge is seen as the object of the activities; (2) incorporating transactive memory systems as tools; (3) incorporating power relations within the division of labour; and (4) extending the view of mediation to tools and rules. Also activity theory is advanced methodologically by testing the effect of the factors (or the so-called artefacts in activity theory terms) in a quantitative study. The major findings of the quantitative study are discussed in the following section.

8.4   Major Research Findings

In the light of the application of activity theory, in Chapter 4, a number of critical questions arose in relation to this study. These questions are: (1) What are the factors that affect knowledge sharing and knowledge interaction processes? (2) What is the relationship between these factors within the activity system? (3) How do these factors affect the knowledge processes? Why are such phenomena observed? (4) What are the contradictions observed within the activity system regarding the knowledge processes?

As shown in Figure 8.1 the factors affecting the two knowledge processes within the activity system are: organisational culture/climate (rules), trust and informal networks (community), power relations (division of labour) and transactive memory systems (tools). In order to understand how these factors are related and how they affect the two knowledge processes, the new Organisational Knowledge Sharing and Interactions Model was developed (see Figure 8.2) which resulted in sixteen non-mediation and sixteen mediation hypotheses. The results presented in Chapter 7 show which hypotheses were supported and which were rejected. In this section the focus is on some of the most noticeable and interesting findings.
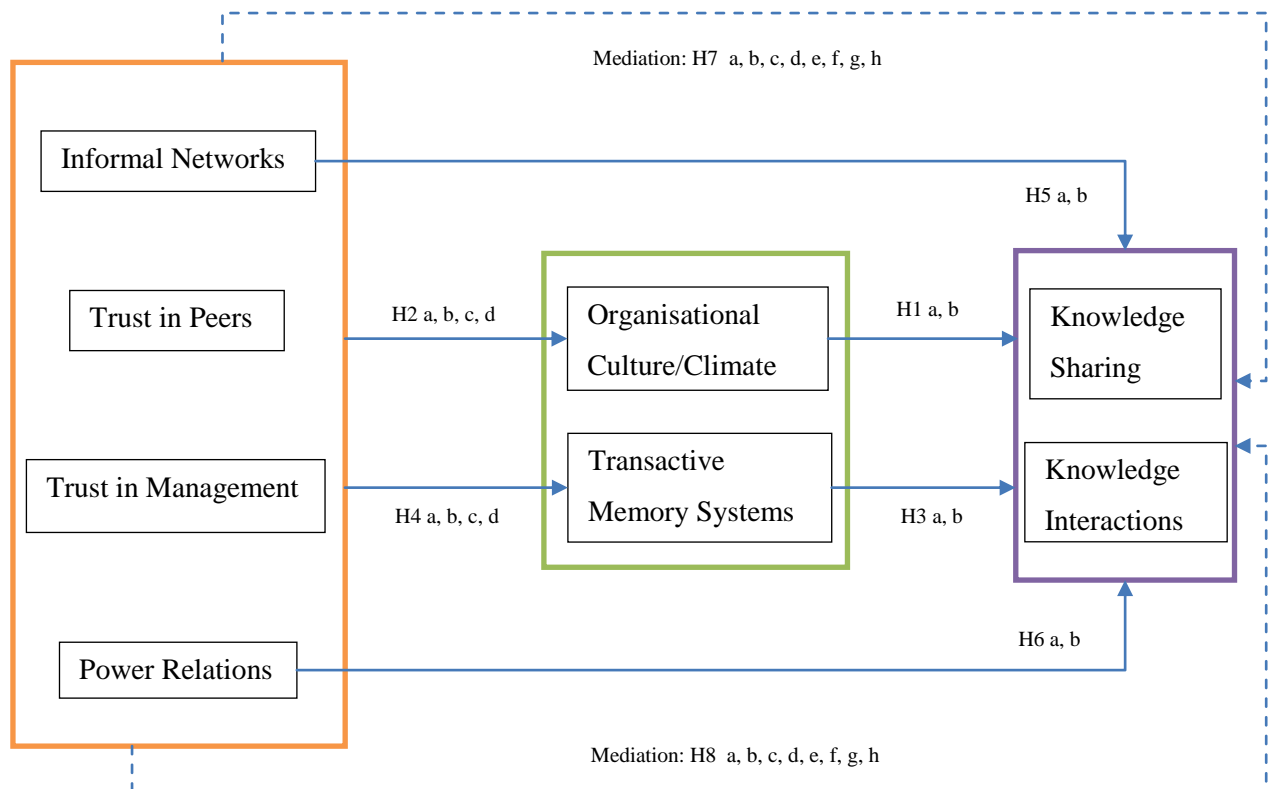

Figure 8.2: Organisational Knowledge Sharing and Interactions Model

The results showed that the same factors have different effects on the two knowledge processes which helps to further differentiate between the processes of knowledge sharing and knowledge interactions. Knowledge sharing is affected by strong power relations, transactive memory systems, and organisational culture/climate characterised by affiliation, fairness and innovativeness. Knowledge interactions are strongly affected by informal networks, transactive memory systems and to a lesser extent by organisational culture/climate. The discussion in the following sections is organised around these main differences.

Power relations

Power relations have a very different effect on the two different knowledge processes. The results of this study showed that strong power relations have a negative effect on knowledge sharing, while no relationship was found between power relations and knowledge interactions.

In general, power differentials are thought to affect negatively collective learning, experimentation and risk-taking as well as knowledge sharing and equal hearing from different organisational members (Bunderson and Reagans, 2011; Lammers et al., 2009; Gruenfeld et al., 2008; Galinsky et al., 2006; Michailova and Husted, 2003). The general assumption is that power is situated within knowledgeable people and that the sharing process commences only when these knowledgeable people wish to share their knowledge (Bunderson and Reagans, 2011). From this perspective knowledge is seen as power where the sharing depends upon the willingness of the possessor of this knowledge to participate. However, when strong epistemic power relations prevail people are forced into sharing, as explained by one participant, "when someone has learned something, I push him to teach someone else, this is something I require, it is not based on a good will". This is directly related to the conceptualisation of knowledge sharing where existing knowledge is located and passed to someone else whose goal is to replicate this knowledge.

However, it is argued that knowledgeability, skills and effort should not be assessed based on power as "it is dangerous to use the poor performance of low-power individuals, relative to high-power individuals, as evidence that power has been allocated on the basis of merit" (Smith et al., 2008, p. 466). What the authors argue instead is that "individuals who lack power are guided by situational constraints and circumstances, rather than by their own goals and values" (p. 446) and as such they are used as a means to an end (Gruenfeld et al.,

2008; Galinsky et al., 2006). While from an expert power perspective the emphasis is put on the "political use of knowledge to exploit power" (Bunderson and Reagans, 2011, p. 1188), from an epistemic power perspective people are seen as means to an end serving to fulfil the goals of those in power. The results showed that in Bulgaria it is power that exploits people and knowledge. From that perspective not only is knowledge seen as a commodity, but humans are also objectified through the "the tendency to view other people only in terms of qualities that serve one's personal goals and interests, while failing to consider those features of others that define their humanity" (Galinsky et al., 2006, p. 1072). As described in the initial discussion in Chapter 6, the further up people climb up the hierarchy the less they consider those from lower levels as equal and respectively their contributions are not given equal weight or their opinions an equal hearing. This naturally explains the negative effect strong epistemic power relations have on knowledge sharing.

While the results support the previous findings showing the negative effect of epistemic, authoritative power relations on knowledge sharing (Raman and Bharadwaj, 2012; Bunderson and Reagans, 2011; Gruenfeld et al., 2008; Ferner et al., 2012), this was not found to be the case in relation to knowledge interactions. The results of the current study showed that there is no direct relationship between strong epistemic power relations and knowledge interactions. The explanation of this result could be found in the nature of knowledge interactions as a process. It appears that because of their ad-hoc, informal, spontaneous and dynamic nature, knowledge interactions are not subject to direct control from upper managerial levels. Because of their informal and interactive nature, knowledge interactions rely predominantly on informal networks and transactive memory systems. What appears to be the case in Bulgaria, similarly to the Chinese context, is that it is not important "what you know", but is important "whom you know" (Davison et al., 2013, p. 104). Due to the fact that transactive memory systems thrive under informal conditions, strong power relations become an unrelated factor as people do not need to follow the hierarchy in order to find the right people and engage in knowledge interactions to achieve a particular goal/task. As management in Bulgarian organisations is mainly concerned with the result, i.e. the task being fulfilled, little attention is paid to the process by which the task is fulfilled.

The results of this study showed that the effect of power relations on knowledge processes depends on the process itself. When the process is seen as an exchange of a possession, i.e. knowledge from taxonomic perspective, managers assume that knowledge can

be shared and transferred, thus they treat it as an asset that can be controlled, along with the people who possess the knowledge (Marabelli and Newell, 2012; Alvesson, 2004; Galinsky et al., 2006). From a practice perspective, knowledge is manifested through action and practice and does not reside in individuals' heads or in external sources and "since knowing in practice is emergent and not fully controllable, adopting a set of best practices on how to effectively transfer (or not) knowledge could itself be risky for managers" (Marabelli and Newell, 2012, p. 18). Following the practice perspective, when the knowledge process is ad-hoc, based on spontaneous collective action, intuition and informality, such processes, i.e. knowledge interactions are difficult to control. The more managers attempt to control knowledge processes, the more people tend to engage in alternative behaviours and ways of interaction which are less prone to control and domination, i.e. knowledge interactions.

Informal networks

As discussed in Chapter 6 informal networks may have controversial effects on knowledge sharing (Hooff and Huysman, 2009; Willem et al., 2006; Willem and Buelens, 2009; Willem and Scarbrough, 2006). Similarly, the results of the semi-structured interviews demonstrated that within Bulgarian organisations people hold diverging opinions on the effects informal networks can have on knowledge sharing. However, the results of the quantitative study helped to shed more light onto this debate. The results of this study showed that there is no direct relationship between informal networks and knowledge sharing. However, the results also showed that informal networks have a strong positive effect on knowledge interactions. While the effect of informal networks on knowledge sharing may differ, as disputed in the existing literature, this study showed that in relation to knowledge interactions such effect is definitely positive. Therefore, their effect depends on the actual knowledge process. Thus based on the results it can be concluded that the main differentiator between knowledge sharing and knowledge interactions could be found in the informality stemming from informal networks and communication. This finding prompts for a deeper discussion of informal networks.

The fact that no relationship has been established between informal networks and knowledge sharing could be due to high levels of control and domination and to the general tendency to follow the hierarchy/the formal structures when engaging in formal knowledge sharing practices. This is further apparent from a study conducted by Willem and Scarbrough (2006) whose results suggest that some managers hold the view that "everything is strongly

formalized to avoid the uncertainty created by issues of trust and personal matters" (p. 1358). In relation to knowledge sharing, the general expectation within Bulgarian organisations is that if people are in need of particular information they "ask their line manager first and if the line manager cannot solve the problem it is taken to higher levels". Additionally, in the case where knowledge is stored somewhere on the system, the general practice is again to ask the managers as they are usually the ones who have access to the information stored on the system. In the majority of Bulgarian organisations, access to the system is restricted based on the level in the hierarchy. Thus even access to codified knowledge stored on the system is controlled by the managers. This strictly formal way of operating is recognised to be obstructive towards knowledge sharing and inevitably leads to a reduction of the effect of informal networks on knowledge sharing.

Additionally, as discussed in Chapter 6 informal networks are sometimes seen as a source of politiking and promoting the group's vision (Willem et al., 2006; Willem and Scarbrough, 2006; Willem and Buelens, 2009). Also informal networks could be seen as forms of resistance to the established power and bureaucratic rules (Duarte, 2006). This resistance could be perceived by the upper managerial levels as a some of form of threat, and hence attempts to dissolve such networks may be present in organisations. However, it has been acknowledged that "one of the unintended effects of bureaucracy is the emergence of informal practices and networks to counteract the effects of excessive formalism" (Duarte, 2006, p. 515). It is also established that informal networks can represent how things are done within organisations more accurately and that many of the interactions within organisations do not follow the formal organisational structure (Krackhardt and Hanson, 1993; Duarte, 2006; Abrams et al., 2003). However, managers seem not to always be entirely aware of how people spend their days and complete their tasks (Krackhardt and Hanson, 1993). Thus, the natural response of management is to introduce more rigid rules and strict control to hamper the work of the informal networks (Krackhardt and Hanson, 1993). While the direct effect of power relations on informal networks was not originally tested in the model, this relationship was explored for the purpose of expanding the discussion. The result shows that power relations have a supressing effect on informal networks ($\beta=0.343$, $p<0.01$), which means that strong power relations have a negative effect on informal networks. However, it is to be noted that this effect is not very strong and that informal networks do therefore coesxist with formal power-based and hierarchical structures within Bulgarian organisations.

The suppression of the formation of informal networks can also be seen as an attempt from management to prevent the possibility of strong leaders emerging within such networks. To achieve this, in some instances managers in Bulgarian organisations use 'informants' in order to receive updates from the informal circles and gatherings of employees. An example which relates to the communications and interactions occurring in the smoking room is provided by one participant who shared that "well I do not smoke but I have 'informants' in the department who do smoke and what I gather from them is that you can learn many things while smoking". In addition the participant explains that the use of 'informants' helps them understand what people are discussing and what their opinions, perceptions and thoughts on certain topics are. Subsequently, this information can be used by the manager to impact on people's opinions and perceptions. This way the managers in Bulgarian firms try to control the informal circles which exist within their organisations.

However, despite the measures taken to 'pseudo-control' such networks, informal networks exhibit a strong positive effect on knowledge interactions. When the knowledge process is ad-hoc, spontaneous and informal, it starts from the informal networks. This is also illustrated by one participant in the semi-structured interviews:

> because the sharing is done informally then the pyramidal structure is not used and does not have an impact, in a sense I don't have to go.., well a member of staff in my department does not have to go through me and get my approval or the approval of the higher management in order to exchange information with another departmental manager or an employee in another department. If it is informal it is not necessary, if it is formal is compulsory.

This is where the distinction can be made. When people engage in formal knowledge sharing this is to some extent predetermined by management, either by forcing people to share, pointing at people with the right expertise or authorising access to information stored on the system. Where the management is involved in locating existing knowledge within the organisation, informal networks have no effect in the knowledge process. On the contrary, informal networks are considered of vital importance to enhance social interactions (Swan et al., 2007). This present study showed that they are indeed essential to the improvement of knowledge interactions in Bulgarian organisations. However, within the existing literature the

pivotal role of informal networks is somehow overlooked or simply aggregated within the concept of communities of practice.

It is recognised that formal and informal networks coexist within organisations (Rank, 2008; Kratzer et al., 2008a; Kratzer et al., 2008b), but the role of informal networks in knowledge interactions and learning remains widely underexplored. Some studies devoted to investigating both formal and informal networks within organisations have identified that informal networks are denser and more stable over time than formal ones (Kratzer et al., 2008a; Kratzer et al., 2008b). In addition, it is recognised that formal networks may be disregarded or even replaced by informal networks (Rank, 2008). These findings challenge the well-established managerial preference for creating and supporting formal networks within organisations. Similarly in Bulgarian organisations, managers insisted on the fact that formal networks are valued more than informal ones. In a study exploring informal networks within the formal structures of organisations, Rank (2008) explains that the rationale behind the nurturing of formal networks is based on the assumption that lower hierarchical levels should solve problems at their levels without the involvement of higher hierarchical levels so that to reduce the information overload for top managers. However, the findings show that this could be observed only in the cases where a routine problem/task is being worked on. When the task is more creative or complex, it became clearer that informal networks were considerably more relied upon (Rank, 2008). Hence, informal networks can drive creativity and the completion of complex and non-routine tasks. Furthermore, a number of studies contend that a major factor that stimulates creativity and innovation is informal communication and networking (Leenders et al., 2003; Sundgren et al., 2005; Kratzer et al., 2008a; Amar et al., 2012; Krackhardt and Hanson, 1993). This is an additional element in the differentiation between knowledge sharing and knowledge interactions which could be found in the nature of the task, routine or novel/creative, as discussed earlier. Hence the fact that in Bulgarian organisations formal knowledge sharing processes are strongly promoted may result in innovation and creativity being hampered which could be one explanation as to why Bulgaria occupies one of the lowest places in Europe with regards to innovation.

Interestingly, within the literature there are ongoing debates regarding the possible interplay between formal and informal networks. It is recognised that formal structures may support and enable informality as it is likely that informal interactions and learning operates around formal teams, trainings, etc. (Janowicz-Panjaitan and Noorderhaven, 2008). However,

this may not necessarily be the case as in places such as the 'smoking room' informal networks get formed without following a formal structure. In Bulgarian organisations, informal networks are often formed and greatly nurtured in the 'smoking room', where a great inter-departmental mix is observed. The reverse connection, by which informal networks may affect formal ones, is less obvious. Nonetheless, it was suggested in the interviews that the formal structure and teams could be organised around the informal networks by getting people from the informal networks "to work together in a team because they will work better together rather than mixing them with different personalities and age groups". Furthermore, there are examples in the literature that show that strategic organisational changes can be facilitated and carried out based on the support from trustworthy people as part of existing informal networks (Krackhardt and Hanson, 1993; Amar et al., 2012). These are instances of strategic changes and performance related issues which are driven by employees who are part of informal networks and who are trusted by their peers.

Another discrepancy observed within the existing literature concerns the fact that often informal networks are described as and/or equated to communities of practice (e.g. Kratzer et al., 2008a; Nirmala and Vermuri, 2009; Swan et al., 1999; Abrams et al., 2003). Swan et al. (1999) use communities of practice as an umbrella term and include functional groups, business units, etc. and Kratzer et al. (2008a) consider that informal networks are examples of communities of practice driven by similarity, specialization and homophily. On the contrary, informal networks are by nature ad-hoc, spontaneous, self-regulating, not predetermined nor based on common knowledge and expertise, and thus do not readily fit into the description of communities of practice. To help bring further clarity to the concept of informal networks, it has been pointed out that "employees tend to form different informal networks depending on the types of relationships they maintain and the content of the information they exchange. These include friendship networks, professional-advice relationships, gossip-exchange circles and so on" (Rizova, 2006, p. 49). Other studies highlight the importance of informal social capital which refers to "informal groupings of individuals such as 'people who gather at the same pub'" (Putnam and Goss, 2002, p. 10 cited in Duarte, 2006, p. 517). Some of the distinct characteristics of informal networks are summarised below (Rizova, 2006; Duarte, 2006; Pyka, 2000; Abrams et al., 2003; Mors, 2010; Janowicz-Panjaitan and Noorderhaven, 2008). Informal networks

- Are based on voluntary communication and exchange of information and resources;

- Are marked by friendship and support;

- Are characterised by high levels of trust and reciprocity;

- Do not appear on the organisational chart and are difficult to identify;

- Serve as awareness mechanisms of what other people do and know, i.e. significantly contribute to TMS development as shown in this study;

- Are diverse as they help avoid duplicating roles and reach out to diverse expertise.

It has been observed in a number of studies that excessive formalization diminishes learning, communication and sharing (Pak and Snell, 2003; Thompson, 2005; Janowicz-Panjaitan and Noorderhaven, 2008). Janowicz-Panjaitan and Noorderhaven (2008) investigate formal and informal learning within strategic alliances by differentiating between two learning behaviours – formal and informal. Formalized behaviours can be seen as part of programmed events and visits, while informal learning is characterised by spontaneous interaction and knowledge sharing (Janowicz-Panjaitan and Noorderhaven, 2008). Thus, knowledge interactions are informal by nature as they are based on spontaneous interactions. The results of Janowicz-Panjaitan and Noorderhaven's (2008) study reveal that too much formalization stifles and obstructs learning, while informal learning behaviours were found to exhibit consistently positive effects on learning. This is because informal networks and informal learning behaviours are not restricted by the organisational hierarchy and boundaries and are not programmed by management as opposed to formal ones. Informal learning spontaneously emerges between people and it is based on friendship, trust, support and voluntary exchange of information and resources (Abrams et al., 2003; Duarte, 2006; Janowicz-Panjaitan and Noorderhaven, 2008).

The same logic applies to knowledge sharing and knowledge interactions. Knowledge sharing initiatives are programmed by management. On the other hand knowledge interactions are spontaneously initiated by people within organisations and thus by nature such interactions are informal and informal networks greatly contribute and enhance knowledge interactions. It can be stressed further that motivation to share knowledge diminishes with the increase of formality and formal interactions as then it is perceived as an obligation as opposed to "a voluntary seized opportunity" (Janowicz-Panjaitan and Noorderhaven, 2008, p. 1342). Additionally, informal networks are based on trust, friendship

and support. To further investigate the effect of informal networks on trust, two additional relationships were tested in this present work: the effect of informal networks on trust in peers and on trust in management. The results show that informal networks lead to higher trust among peers ($\beta=0.285$, $p<0.01$), but do not exhibit any effect on trust in management ($\beta=0.107$, NS). This could be due to the limited participation of the management in these informal networks and the general overlooking of the benefits of these networks. Also, in cases where informal networks are formed to avoid the strict hierarchy, it is unlikely that they will increase trust in management as they may be formed as a response to a lack of trust in the management. To further unpack this finding, two additional relationships were explored by testing the effect of power relation on both trust in peers and trust in management. The results undoubtedly show that power has a very strong effect on trust among peers ($\beta=0.445$, $p<0.01$) and an even stronger effect on trust in management ($\beta=0.672$, $p<0.01$). This effect is positive in the absence of strong power relations and negative in the presence of strong power relations. Thus managers have the potential to build strong trusting relationships by diminishing domination and control. The results of testing the additional relationships are presented in Figure 8.3.
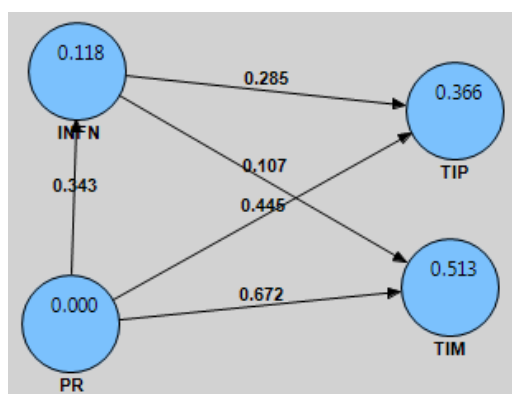
Figure 8.3: PLS algorithm analysis extending the initial OKSI Model

Another important characteristic of informal networks is that they may serve as awareness mechanisms (Rizova, 2006). The importance of this role for informal networks has been confirmed in the current study through the identification of the significant positive effect that informal networks have on transactive memory systems. Thus, in contrast with communities of practice which reveal only a limited picture of expertise and diversity within networks and organisations, informal networks help reach out to greater diversity of expertise and approach the right people who can help with a particular task. In Bulgarian organisations informal networks are the backbone of knowledge interactions and learning and are based on

diversity and access to diverse knowledge and expertise. This distinction has obtained limited attention within the literature, but has been recognised as a great advantage of informal networks, especially in relation to innovation (Mors, 2010). In addition, informal networks have been recognised for their important role in avoiding duplicating roles and responsibilities (Rizova, 2006). However, from the results of the semi-structured interviews it became clear that within Bulgarian organisations the duplication of roles not only is not avoided, but is in fact strongly encouraged so that people can be used interchangeably. This strategy relates back to the fear of opportunistic behaviours that the management tries to supress. However, if management was to leverage the potential of informal networks, avoiding duplicating roles would be an added benefit which could be supported by the existing informal networks.

Organisational Culture/Climate

The results of this study showed that organisational culture/climate characterised by affiliation, fairness and innovativeness has a significant positive effect on knowledge sharing and a less strong, but still positive, effect on knowledge interactions. These findings are in line with existing studies which categorised culture as an important factor for successful knowledge sharing (McDermott and O'Dell, 2001; Al-Alawi et al., 2007; Wong, 2005; Vuori and Okkonen, 2012; Bock et al., 2005; Xue et al., 2011). Regarding knowledge interactions, the results showed that culture is important but its effect on them is less strong in comparison to transactive memory systems and informal networks.

Importantly, in this study organisational culture/climate was shown to be affected and moulded by deeper organisational factors/structures and to mediate the relationships between the deeper structures and the two outcomes, knowledge sharing and knowledge interactions. The results showed that if power affects organisational culture/climate negatively, it would subsequently have a negative effect on the knowledge processes. As such, it is not the culture which is to blame for knowledge sharing failures within organisations (Hall and Goody, 2007). However, it was demonstrated to some extent that within Bulgarian organisations the blame is primarily placed on the culture and the working environment as it is asserted that "the environment defines whether people will share or not". But it appears that in this way managers use the organisational culture/climate as a mediating device of power. By putting the emphasis on the working environment as a primary factor responsible for the success/failure of the knowledge processes managers distract the attention from the strong epistemic power relations. Similar findings are observed in Ferner et al.'s (2012) study who

conclude that power has a direct effect on transfer practices through formal authority and an indirect effect by affecting the organisational norms and culture.

The influence of power on culture was investigated in this current study and the findings showed that strong power relations negatively affect the organisational climate within Bulgarian organisations. This way people feel less affiliated to the company, the opportunities for taking initiatives and innovativeness are limited. In turn such a hostile environment has a negative effect on knowledge sharing (Michailova and Husted, 2003). However, this mediating effect is only evident for the process of knowledge sharing. A mediating effect is not evident for the process of knowledge interactions as power relations do not affect knowledge interactions on the first place.

However, not only power relations but also trusting relationships and informal networks are considered to affect and mould the organisational culture/climate. The results showed that higher levels of both trust in peers and trust in management positively affect organisational culture/climate characterised by greater affiliation, innovativeness and fairness. As such trust within organisations is a prerequisite for a friendly and open working environment. These findings shift the conversation in a new direction where it is not the culture that gives rise to trust (e.g. Al-Alawi et al., 2007; van den Hooff and Huysman, 2009), but the trusting relationships are the determinants which shape the organisational culture/climate. Trusting relationships help create an environment where people feel affiliated with the company, fairly treated and provided with opportunities to take initiatives. As shown in the correlations analysis the greater the trust between peers the more they feel affiliated with the company, and the greater the trust in management the greater the fairness within the company. Such an environment in turn stimulates both knowledge sharing and knowledge interactions. A number of previous studies have attempted to test the effect of such relationships and found correlation between trust and organisational climate and between trust in management and fairness (Muchinsky, 1977; Fulk et al., 1985). However, correlations do not imply causation, thus such relationships have not been empirically confirmed prior to this current study.

While trusting relationships have a positive effect on the organisational culture/climate, the results showed that informal networks do not affect organisational culture/climate. This means that the informal networks do not stimulate greater affiliation, opportunities to take initiatives and fairness within organisations. This could be due to the fact that organisational

culture/climate is affected by strong power relations. A commonly held view by the Bulgarian managers was that the best working environment is the one without separate groups. As such informal networks do not affect the organisational culture/climate. Thus culture could be seen as a means of power. The factors primarily shaping and affecting the organisational culture/climate are the embedded trusting and power relationships. As discussed in Chapter 6, trust could also be seen as a means of power aiming at manipulating organisational members. However, the direct effect of power on trust was not tested in this study.

Transactive Memory Systems

In the current knowledge economy, it is vital for organisations to know their workforce and for people to know what others do and know. A central aspect of transactive memory systems is "the awareness of knowledge specialization among team members" (Kanawattanachai and Yoo, 2007, p. 785). The awareness of who knows what and who knows who is a great means to enhance knowledge sharing and knowledge interactions processes. Such results were shown in recent studies where transactive memory systems were found to have a significant positive effect on knowledge sharing, knowledge application and informal knowledge sharing (Choi et al., 2010; Davison et al., 2013). In this current study transactive memory systems appeared as one of the most significant factors in enhancing both knowledge processes. The driver for engaging in knowledge processes in Bulgarian firms is the awareness of who knows what and who knows who. Every task that involves the utilisation of knowledge of some sort starts with the need to locate the right person with the necessary expertise. An example was provided by one of the participants who explained that:

> The first and the most important thing is to get to know everyone so that he knows what you do and what you know as well as you know what he does. And when someone needs something, for example if I need someone who deals with tax-related issues and I know who the tax person is, I will call him personally and he will help me and if he cannot answer my question he will find the right person to do so.

As such, transactive memory systems development is very important as every knowledge process is initiated based on contacting others. Therefore establishing what fosters the development of transactive memory systems is an important issue.

However, depending on the process, TMS as a tool is used differently within Bulgarian organisations. In the case of knowledge sharing, people would find the necessary expertise through the hierarchy. In the case of knowledge interactions, locating the right person starts from the informal network. The results of this research showed that informal networks have a very strong effect on transactive memory systems development which reinforced the findings from the semi-structured interviews in which participants emphasised that "people [who are] part of your informal network would be able to point you out to a colleague of yours that would give you the needed information". Within the literature, such relationship has been highlighted only theoretically without being empirically tested. Davison et al. (2013) suggested that guanxi networks have a positive effect on TMS. This study empirically tested and confirmed the positive relationship between informal networks and TMS. The more people communicate in informal settings and within informal groups and networks, the more they become aware of who does what and who knows what and who within the organisation. In this way team and unit boundaries are transcended, and people create mental maps of other people's expertise beyond their immediate colleagues. A similar example is provided by Willem and Scarbrough (2006) where a long-standing problem has been resolved by locating the necessary expertise in another unit of the organisation through informal networking. This example emphasises the strong effect informal networks have when an expertise is needed and is not immediately obvious where this expertise is situated within the organisation. Additionally, within Bulgarian organisations places such as the smoking room are important places where TMS is developed as people from the whole organisations meet in such places. These results imply that the best way to develop TMS is by fostering it informally. This is in line with previous studies emphasising that a TMS can be developed predominantly through face-to-face interactions (Kanawattanachai and Yoo, 2007; Alavi and Leidner, 2001).

Increasingly research suggests that communication via digital technology could also enhance TMS development (Oshri et al., 2008; Choi et al., 2010; Davison et al., 2013; Majchrzak et al., 2013). However, in Bulgarian firms the use of interactive technology is often banned and such a connection could not be observed. Furthermore, it has been noted that formal training has a positive effect on TMS development (Lewis et al., 2005; Jarvenpaa and Majchrzak, 2008). As evident from the semi-structured interviews formal training is not very common in Bulgarian organisations and it appears that the development of TMS predominantly relies on informal networks and trusting relationships. However, organisations

should explore the possibility of using formal training and interactive technology to foster TMS development.

This study suggested that strong power relations have a negative effect on TMS but the results showed that power relations do not have an effect on TMS formation. A possible explanation could be the fact that TMS is developed mainly through informal networks and communication and as such power cannot obstruct its formation (Kanawattanachai and Yoo, 2007; Alavi and Tiwana, 2002). This relationship was proposed and tested empirically in this study for the first time which opens up new avenues for further research in this area.

Another factor that affects TMS development is trust. The results of this study showed that trust has a significant positive effect on TMS development. This is in line with the findings of Ashleigh and Prichard (2012) who suggested that "trustworthiness and trust play vital roles in TMS development" (p. 6). However, they concentrate solely on benevolent trust between employees. This study differentiated between two levels of trust: trust in peers and trust in management and found that higher trust in peers has a much stronger effect on TMS development as opposed to trust in management. This could be related to the informal communications and networks among peers where people would openly declare their expertise and would freely recommend others who have the required expertise which stimulates TMS development. Subsequently, TMS enhances the two knowledge processes as a mediator between trust and knowledge sharing and knowledge interactions.

In summary, the results showed that the same factors have different effect on the two knowledge processes – knowledge sharing and knowledge interactions. However, the interplay between these factors is not free of paradoxes, tensions and contradictions.

Paradoxes, tensions and contradictions

Paradoxes and contradictions are evident in that managers put the working environment and trust at the heart of knowledge sharing but the results imply that this is a convenient way to deflect attention from deeply embedded power issues. Similarly, rejecting informal networks as an important factor behind knowledge processes would be just a convenient excuse to serve upper levels. While managers recognise that informal communication and personal contact are vital for knowledge processes and are generally preferred by employees, they also fear such informal formations and attempt to control and suppress them. The results

showed that the tensions and contradictions within the activity system stem from the strong power relations. But such strong power relations urge people into alternative ways of interactions, in this case knowledge interactions.

8.5   Generalisability of the Results

The fourth direction of the discussion outlines how the findings represent the Bulgarian context as well as the generalisability of the results to developing and to developed contexts.

The results obtained in this study are comparable to hypotheses proposed in other studies exploring developing contexts. Similarities can be drawn with knowledge processes in Russia and China where informality is central to how things are done, strong power relations prevail and it is most important whom you know as opposed to what you know (Michailova and Husted, 2003; Davison et al., 2013). Davison et al. (2013) have suggested a theoretical model explaining informal knowledge sharing in China. By exploring knowledge processes in Bulgarian organisations, some aspects of the theoretical model developed by Davison et al. (2013) were supported. This indicates that knowledge processes in similar contexts could benefit from the newly developed model in this study. The model could be applied to the Russian and Chinese context, but equally to other post-communist transition contexts such as Romania and Poland. While there are strong indicators that the model would be valid in similar context, this remains subject to verification in the respective contexts.

In the light of the findings of the present study the aspect of power relations is worth examining for similarities and differences between developed and developing contexts. It appears that hierarchy and power, which are the sources of tensions and contradictions within Bulgarian organisations, are perceived as stable foundations as they give people a sense of security, order and clarity of duties. This study showed that the way power is exercised may obstruct knowledge processes within organisations. Similar effects of strong hierarchical power have been observed within the Russian culture (Michailova and Husted, 2003). However, examples from the Western contexts provide the other side of the coin, where hierarchy is increasingly reduced especially in knowledge-intensive firms where creativity and innovativeness are the drivers of the business. However, research has pointed out that the majority of these knowledge-intensive firms move towards what is called 'soft bureaucracy'

which is characterised by both formal and professional control (Robertson and Swan, 2004). It seems therefore that what companies really need to achieve is the 'golden middle'. Research also suggests that the negative effect of power and status can be moderated by socialised use of power where the collective goals dominate over the personalised self-interest (Bunderson and Reagans, 2011).

The results of this study showed that the effect the organisational factors have on the knowledge processes depend to a large extent on the actual processes. The distinction made in this study between knowledge sharing and knowledge interactions is a valuable distinction for any context. As such this study is considered to be applicable and valuable to various contexts and settings as it helps organisations explore different knowledge processes as well as understand the enablers and inhibitors of these processes. As knowledge evolves organisations everywhere, including in developed countries, cannot afford to be static. However, every new activity, tool or artefact (for example implementation of a new system) may lead to disturbances and tensions within the activity system which may affect these knowledge processes. The advantage of this new model is that it would allow for further expansion and incorporation of context specific factors affecting knowledge processes in other settings.

8.6   Summary

This chapter presented a discussion around re-conceptualisation of the knowledge processes by outlining and defining clear differences between the process of knowledge sharing and the process of knowledge interactions. Knowledge sharing is viewed as one-way dynamics following the transmission model while knowledge interactions are characterised by dynamic interactions, spontaneity and intuition where people perform the tasks collectively.

A discussion on the adaptation and extension of activity theory was also outlined. This study extended the theory by investigating knowledge sharing and knowledge interactions processes, by incorporating power relations within the division of labour and by presenting transactive memory systems as tools enhancing people's interactions. Additionally the concept of mediation was extended by differentiating between deep structures and mediating mechanisms following the critical realism notion of causation.

Subsequently a discussion of the findings was presented and the generalisability of the findings to other context was discussed. The next chapter outlines in detail the theoretical contributions and the practical implications of this research. Concluding remarks are presented in terms of the extent to which the aim and objectives outlined in Chapter 1 have been met, the limitations of the study are discussed and the avenues for future research are explored.

9   CONCLUSIONS

9.1   Introduction

Reflecting on the research process and the aim and objectives of this study, this chapter outlines the contributions to the Bulgarian context and to the knowledge management field achieved by addressing these objectives. The contributions are presented as theoretical and practical contributions and recommendations for enhancing knowledge processes in Bulgarian organisations. The chapter concludes with a discussion on the limitations of the work and the possibilities for further research.

9.2   Summary and Reflections on the Research Process

The aim of this research has been to explore and explain how people interact and share knowledge in Bulgarian organisations. The first question arising is: Why Bulgaria? Bulgaria is a post-communist transition economy which has recently joined the EU and is striving to achieve a knowledge economy where knowledge is the driving force of innovation and competitive advantage. In that respect Bulgaria occupies one of the lowest positions in Europe. As such Bulgarian organisations need to understand the value of knowledge and the importance of their intra-organisational knowledge processes. So the time and the context are appropriate for conducting this research. Consequently, the next question arising is: What is known about knowledge sharing processes in Bulgarian organisations? To date Bulgaria has not benefited from research regarding intra-organisational knowledge processes. The lack of previous studies in Bulgarian organisations proves to be a prospect for original and innovative work as well as providing a challenge. Research on knowledge sharing has proved to be very popular in organisational studies, management and information systems fields. However, a common trend in knowledge sharing studies is to follow the taxonomic view of knowledge, where knowledge is seen as a possession and a commodity which is conveyed between people

and places through the process of knowledge sharing (Liyanage et al., 2009; Hislop, 2009). Within the Bulgarian context such conceptualisation of knowledge was deemed inappropriate as demonstrated by the knowledge transfer practices from Western managers to Bulgarian managers (Hollinshead and Michailova, 2001) where sharing of best practices and knowledge 'as is' by the Western managers was unsuccessful. It was stressed that practices need to be customised to the context as knowledge is not readily applicable to a new context (Michailova and Hollinshead, 2009; Hollinshead and Michailova, 2001). Rather knowledge is collectively constructed and constituted in practice (Orlikowski, 2002; Marabelli and Newell, 2012). To reflect on the dynamic nature of knowledge processes, a new theoretical concept was introduced for a first time in this research, Knowledge Interactions, initially broadly defined as knowledge processes based on dialogue and interactions. Through the course of the research the knowledge interactions concept was refined and enhanced.

Subsequently, the main factors affecting knowledge sharing processes were identified from the literature. These are: organisational culture, rewards, motivation, trust, networks and technology. The question then became: Which factors affect knowledge processes in Bulgarian organisations? Are these factors and existing theories applicable to the Bulgarian context? Are there other important factors? At this stage, rather than adopting an already existing framework, the study was contextualised by conducting qualitative semi-structured interviews with Bulgarian employees, middle and top managers. Conducting qualitative semi-structured interviews to contextualise the study demonstrated to be a suitable methodological approach. However, collecting data in the Bulgarian context proved rather challenging and this stage was prolonged to a period of over six months for twenty interviews. The results of the interviews helped to further develop the construct of knowledge interactions which better explains the ad-hoc, informal, dynamic and collective interactions where people show each other how things are done in practice. Also through the initial analysis of the interviews two new factors emerged as important in Bulgarian organisations: power relations and transactive memory systems. These concepts have received relatively little attention in the existing literature with scarce empirical research. There are explicit calls in the literature to extend the research in these areas.

The emergence of new and underexplored factors which appeared to be important in the Bulgarian context posed a new challenge to this research: How to explain these initial results. A number of theories were reviewed for their suitability to explain the new knowledge

interactions concept and incorporate the underexplored factors of power relations and transactive memory systems. As a result of this review, activity theory appeared the most appropriate. Activity theory is a practice-based theory emphasising collective action. Furthermore, it is stressed that the collective activities within an organisational activity system are affected and mediated by the wider organisational elements/context: community, division of labour, rules and tools used during these activities. Thus, activity theory helps to locate the elements affecting the knowledge processes within an organisational activity system. Within Bulgarian organisations the prominence of knowledge interactions was demonstrated as the emphasis was put on collective action, and people showing each other how things are done in practice. However, from participants' points of view a clear differentiation between the two knowledge processes, i.e. knowledge sharing and knowledge interactions, was not made. Thus the effect of the identified factors needed to be tested by clearly differentiating the two knowledge processes. This led to the development of a new theoretical research model.

A new model was developed to explain knowledge sharing and knowledge interactions processes in Bulgarian organisations called the Organisational Knowledge Sharing and Interactions Model. The model is not a replica of an existing theoretical framework but is inspired by the context specificities, activity theory tenets and critical realism's notion of causation. The new model helps to explain how the factors are related, how they affect the two knowledge processes and to further differentiate between these processes. The model was tested using a large-scale questionnaire. Data collection challenges were present at that stage as well, but it appeared that people in Bulgarian organisations are more prone to take part in a questionnaire as opposed to in an interview. The results of the quantitative study demonstrated important differences between knowledge sharing and knowledge interactions as the same factors affected them differently. The main differences lie in the effect of power relations and informal networks.

The research process can be described as finding yourself in a maze. You start from what is known, you delve deeper into the unknown in order to explore and find explanations. The actual process is very iterative. Reflecting on the process of finding the way out of the maze, a chronological map of this research is created, presented in Figure 9.1.
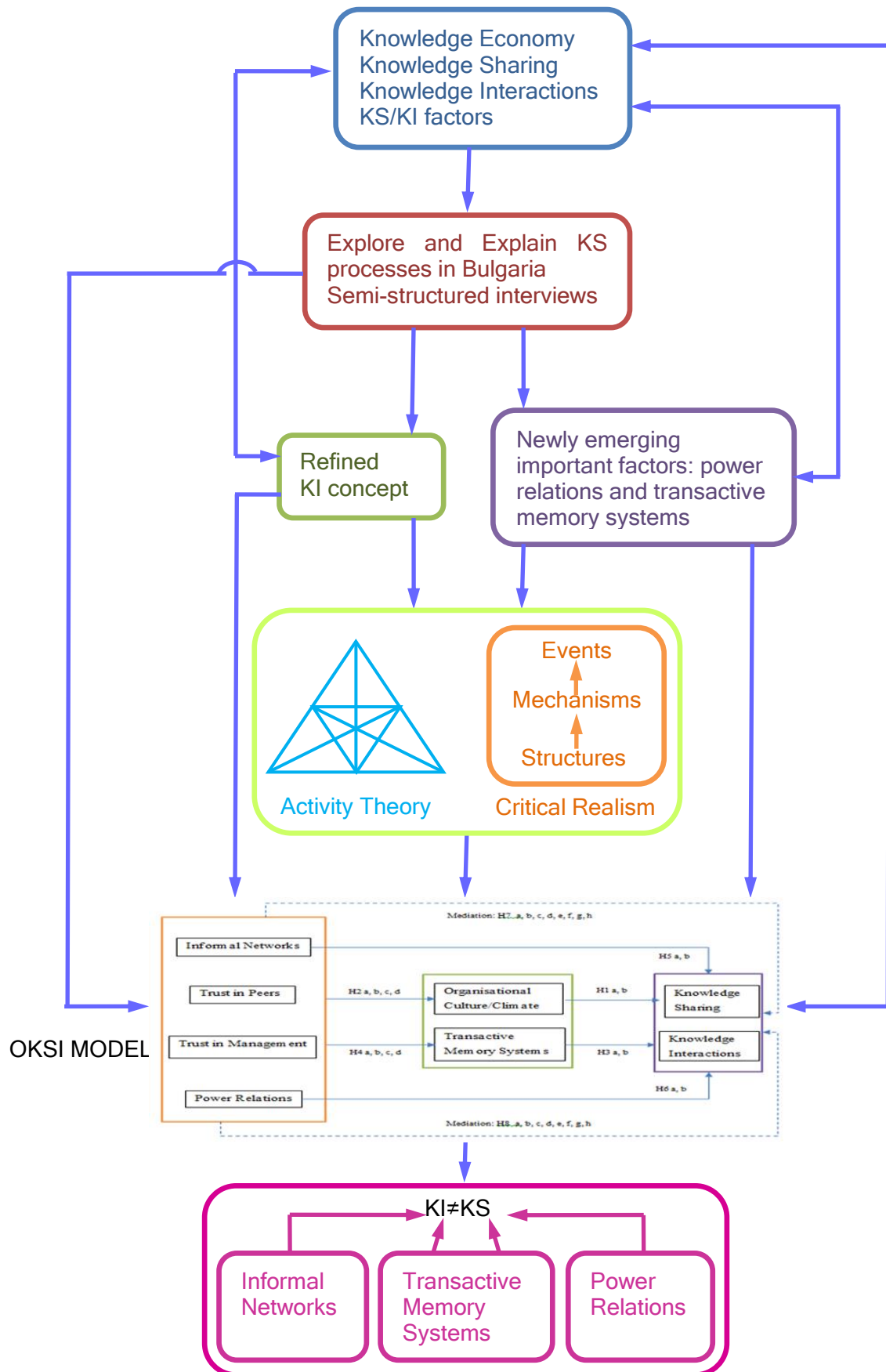
Figure 9.1: Map of my research

9.3 Theoretical Contributions of the Research

Four objectives provided the guidance for this study towards the completion of its aim. The achievement of the objectives resulted in five contributions: 1) exploring a new context – Bulgaria; 2) introducing a new knowledge process – Knowledge Interactions; 3) designing a new model explaining knowledge processes – Organisational Knowledge Sharing and Interactions Model; 4) applying a mixed methods research methodology; and 5) providing in-depth insights of knowledge sharing and knowledge interactions based on the empirical findings.

9.3.1.　　New context – Bulgaria

The first contribution is the investigation of knowledge processes in Bulgaria, a post-communist transition economy which recently joined the EU. There has been much research conducted in the US, the UK and Western Europe. Little is known about knowledge processes in Bulgaria which is currently trying to become a knowledge economy (European Commission, 2009). In an attempt to explore and explain these processes a new model, Organisational Knowledge Sharing and Interactions Model, was designed. The model developed and tested in this study provides a robust starting point for rethinking practices and interactions within Bulgarian organisations in order to enhance and nurture knowledge processes. In this way, Bulgarian firms can adjust to the dynamically changing business environment and be more innovative and competitive in the newly opened EU market.

9.3.2.　　New concept/construct – Knowledge Interactions

The second major contribution lies in the introduction of the new concept/construct - Knowledge Interactions. Knowledge Interactions emerged as a concept in this thesis based on the practice perspective of knowledge. This new concept helped overcome the purely taxonomic view of knowledge and provided a new direction for research. Within the Bulgarian context the concept of knowledge interactions appeared very prominent as knowledge processes were described as more ad-hoc, informal where people demonstrated things in practice, improvised and performed tasks collectively. These findings helped enhance the new knowledge interactions concept and it was refined and redefined as

collective interactions based on spontaneity, intuition and showing each other how things are done in practice.

Additionally, in relation to the knowledge sharing and knowledge interaction processes, two factors, underexplored in the literature, also appeared to be very prominent in the Bulgarian context, namely power relations and transactive memory systems. By adopting a mixed methods approach this study was able to provide both depth and breadth of the phenomena studied. Through utilising semi-structured interviews the factors affecting the knowledge processes within Bulgarian organisations were identified. The results of the semi-structured interviews demonstrated the existence of strong epistemic power relations within Bulgarian organisations. The strict control and domination that exist, give the legitimate right of the powerful to use the powerless as a means to an end (Kärreman, 2010; Galinsky et al., 2006; Gruenfeld et al., 2008). Within Bulgarian organisations strong power relations and control were observed as obstacles to knowledge processes, even though management considers power differentials and control as absolutely necessary. However, the aspect of power relations and their effect on both knowledge sharing and knowledge interactions is an underexplored area within the existing literature as majority of studies consider power as 'unproblematic' and it has not received much consideration in empirical studies (Gordon and Grant, 2004; Blackler, 2011). Furthermore, this study demonstrated that the effect of power relations on the knowledge processes depends on the nature of these processes.

Transactive memory systems appeared as one of the main factors enhancing knowledge processes within Bulgarian organisations. The awareness of who knows what and who within the organisation appeared to be the main prerequisite for knowledge processes to take place. While the concept of transactive memory systems is not new, the majority of the research is focused on the positive effect TMS has on team performance. Researchers are urged to explore the effect of TMS on knowledge processes as it is suggested that TMS leads to better performance because it enhances knowledge sharing processes (Choi et al., 2010). However, how TMS affects knowledge processes has not been given much consideration within the literature with some notable exceptions (e.g. Choi et al., 2010).

9.3.3.   New theoretical research model - Organisational Knowledge Sharing and Interactions Model

The third major contribution attained in this study is the design of the new model, Organisational Knowledge Sharing and Interactions Model. The new model was developed to test the relationships between the identified factors as well as their effect on knowledge sharing and knowledge interactions. As anticipated at the start of this research, no existing model was suitable to represent the specificity and the complexity of the knowledge processes in the new Bulgarian context. The research model was developed based on the qualitative findings, the activity system framework and the critical realism's notion of causation.

The use of activity theory to investigate the knowledge sharing and knowledge interaction processes helped to demonstrate that the community, in this case the organisation, is characterised by the social relationships between people in terms of trust and informal networks. Additionally, strong power differentials were evident as part of the division of labour within the community. The social and power relationships governed the organisational rules or the nature of the working environment, who has access to what information, and opportunity to take initiatives and risks. Additionally, people's activities aimed at engaging in knowledge processes are mediated by transactive memory systems. TMS is used as a tool to locate the necessary expertise and build an awareness of who knows what and who in the organisation.

Additionally, activity theory was enhanced by blending it with the critical realism's notion of causation. This notion suggests that the results of people's activities, i.e. knowledge sharing and knowledge interactions, are enabled or obstructed by deeper organisational factors divided into structures and mechanisms. To some extent, it was demonstrated that within Bulgarian organisations the deeply embedded structures represented the context, i.e. the community (trusting relationships and existing informal networks) and the division of labour (strong power relations). The effect of these deep structures was suggested to be mediated by the mechanisms of existing rules (organisational culture/climate) and tools (transactive memory systems). In this way a layered organisational activity system is built to explain the processes of knowledge sharing and knowledge interactions.

The research model developed in this study is the first model aiming to explore and explain knowledge interactions and to bring a further distinction between the two knowledge processes: knowledge sharing and knowledge interactions. The model helps to provide deeper understanding of the occurrences of the two knowledge processes and how they are affected by the wider organisational factors. Based on the Organisational Knowledge Sharing and Interactions Model sixteen non-mediation and sixteen mediation hypotheses were suggested. The hypotheses were tested through a large-scale questionnaire among Bulgarian organisations. A new measurement instrument was developed where four constructs were adapted based on previous empirical studies (Organisational Culture/Climate, Transactive Memory Systems, Knowledge Sharing and Trust where trust was divided into Trust in Peers and Trust in Management) and three were newly developed constructs (Informal Networks, Power Relations and Knowledge Interactions). The newly developed model allows for separate investigation of the two knowledge processes and draws a picture of the heterogeneity of the knowledge processes and the different effects the organisational factors have on these processes.

9.3.4. Mixed Methods approach

The fourth contribution attained in this research is found in the application of mixed methods. Firstly, the application of a mixed methods research approach allowed for the portrayal of a rounded picture of knowledge processes within Bulgarian organisations both in term of depth and breath. The qualitative interviews gave rise to the new concept of knowledge interactions and two new factors emerged – power relations and transactive memory systems. In the quantitative stage the effects of the identified factors on the two knowledge processes were tested, which helped to further differentiate between knowledge sharing and knowledge interactions. Secondly, the number of studies adopting mixed methods approach is significantly underrepresented in the current organisational studies, management and information systems literature. In this way this study adds to the debates in the community by demonstrating a successful use and execution of mixed methods approach and thus strengthening the viability and robustness of mixed methods. Thirdly, a mixed methods approach was applied in light of activity theory and critical realism. While in general neither activity theory nor critical realism are methods-bound, they have been predominantly used as part of qualitative studies. In this study they were successfully used as part of both the

qualitative study as well as the quantitative study. In this way both activity theory and critical realism are enhanced methodologically.

9.3.5.   Findings derived from testing the model

The fifth contribution lies in the actual findings as a result of testing the model. Firstly, the reliability and the validity of the new model were confirmed, followed by testing the hypotheses based on 229 fully completed questionnaires. In statistical terms the model was demonstrated to be robust as the reliability and validity of the measurement model was confirmed and on average 70% of the variability in the dependent variables is explained by the model. Secondly, PLS analysis was conducted in order to identify the path coefficients between the variables and test the hypotheses. PLS analysis was considered the most appropriate as it is suitable to test complex exploratory models, it accommodates both formative and reflective measures and does not require normally distributed data (Ringle et al., 2012; Gefen et al., 2011; Hair Jr et al., 2014). The results showed some interesting findings contributing to the current body of knowledge. The results demonstrated that the two knowledge processes are affected by the same factors differently. Knowledge interactions are strongly affected by informal networks and transactive memory systems, while knowledge sharing is affected by transactive memory systems, organisational culture/climate and power relations.

Strong power relations were demonstrated to have a significant negative effect on knowledge sharing but no effect on knowledge interactions. Knowledge sharing processes are mainly dictated by the hierarchy where people share explicit and tacit knowledge and engage in less informal, spontaneous interactions based on improvisation. This finding supports the conceptualisation of knowledge sharing as a formal, linear process. Contrariwise, informal networks have a strong positive effect on knowledge interactions and no effect on knowledge sharing. Knowledge interactions heavily rely on informal networks. Interactions in informal settings result in collective action where people show each other how things are done in practice, improvise and follow their intuition and voice their opinions unobstructed by managerial control.

Transactive memory systems have a very strong positive effect on both knowledge sharing and knowledge interactions. TMS is one of the most important ingredients for knowledge processes to take place within Bulgarian organisations because such processes start with locating the right people who can help with the execution of a particular task. As such it is considered essential to know other people, to know who does what, who knows what and whom to ask when help is required. Important antecedent factors leading to TMS development are informal networks and trust in peers. As a mediator between the deeper factors of trust and informal networks TMS subsequently enhances knowledge interactions. The mediating effect of TMS is greater on knowledge interactions since informal networks were not found to affect knowledge sharing and as such, TMS was not found to be a mediator between informal networks and knowledge sharing. TMS development is not directly affected by strong power relations and as such does not play a mediating role between power and the knowledge processes.

Organisational culture/climate has a positive effect on knowledge sharing and less strong but still positive effect on knowledge interactions. Organisational culture/climate is affected and moulded by the deeper factors of trust and power relations. As a mediator between the deeper factors of trust and power, and the knowledge processes organisational culture/climate could be seen as a tool of power. The negative effect of power on organisational culture/climate in turn may affect the knowledge processes negatively. Similarly, the lack of trust would result in less affiliation, fairness and innovativeness and would affect the knowledge processes negatively. Informal networks do not affect directly organisational culture/climate and as such, organisational culture/climate is not a mediator between informal networks and the knowledge processes.

In the light of the major findings the newly developed model is revised here to account for the interaction between the deeply embedded structures – power relations, informal networks and trust. These three factors coexist and are deeply rooted within Bulgarian organisations and are in constant tension. Additionally, the findings showed that power relations and informal networks are the main differentiators between the processes of knowledge sharing and knowledge interactions. Thus, in order to deepen the understanding of the relationships between power relations, informal networks and trust, five additional associations were explored. These are: the effect of power relations on 1) informal networks, 2) trust in peers, 3) trust in management, and the effect of informal networks on 4) trust in

peers and 5) trust in management. The extended Organisational Knowledge Sharing and Interactions Model is presented in Figure 9.2. The extended model helps to further the discussions and to create opportunities to expand current debates in the academic literature.
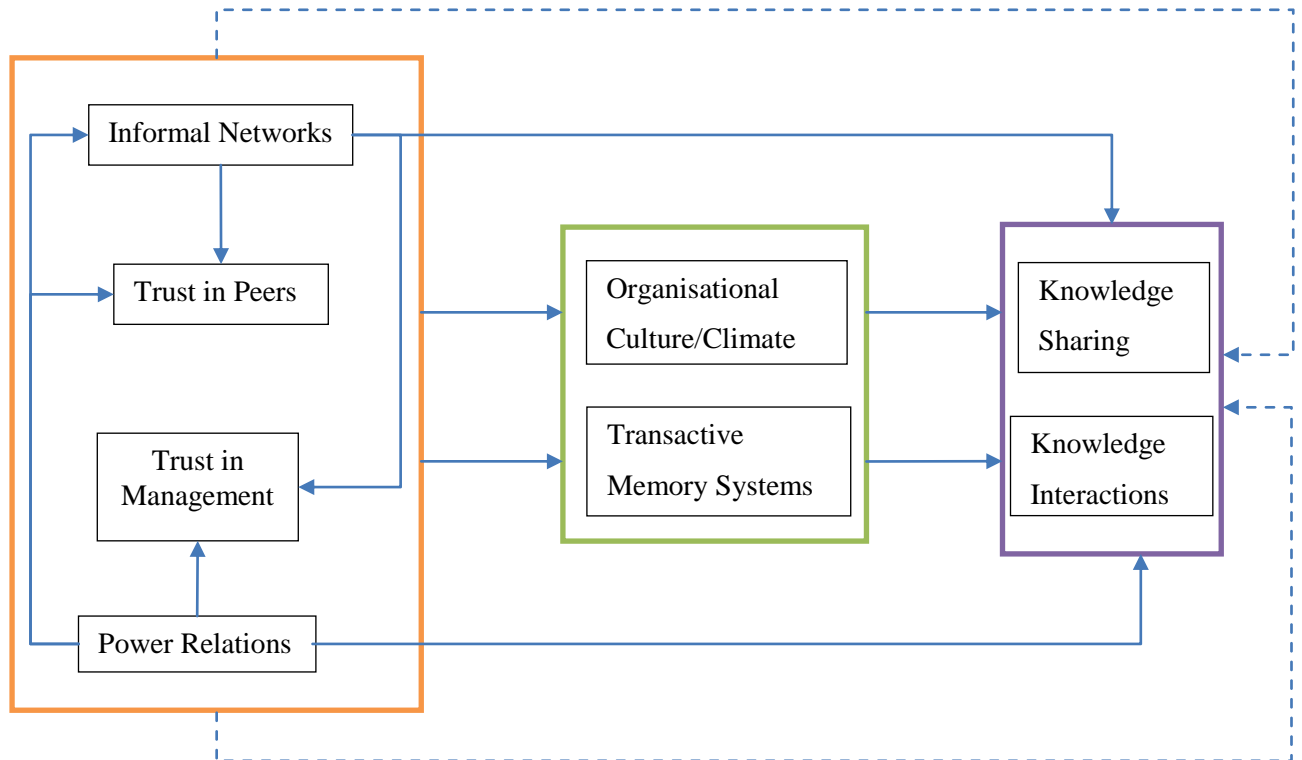
Figure 9.2: Extended Organisational Knowledge Sharing and Interactions Model

9.4 Practical Contributions and Recommendations

Reflecting on the study conducted in this research and its consecutive findings a number of practical contributions are outlined along with recommendations for enhancing knowledge processes in Bulgarian organisations.

Recognise the importance of knowledge as well as the complexity of the knowledge processes within organisations

This study provides deeper understanding of the different knowledge processes within Bulgarian organisations which can enrich decision making. It is important for managers to recognise that knowledge is multifaceted and that knowledge processes need to be nurtured in order for organisations to be competitive and innovative. As a result of differentiating between knowledge sharing and knowledge interactions, the findings demonstrated that by

focusing on promoting the factors enhancing knowledge sharing, knowledge interactions may be obstructed. In practical terms for Bulgarian organisations this means that if knowledge sharing following the hierarchy is promoted and the informal networks are suppressed knowledge interactions may be seriously obstructed. What needs to be realised by the management is that real work is done in informal settings. Managers may find it more useful if multi-layer knowledge strategy is put in place where people are encouraged to share and use existing knowledge by providing greater access to the companies' databases but also to interact and collectively solve problems by encouraging informal gatherings and interactions.

Loosen power and control

Within Bulgarian organisations strong hierarchical power differentials exist. This study demonstrated that power relations have negative effects not only on the knowledge processes but also on the working environment. A mentality of making the boss happy appears still to be present within Bulgarian organisations which is further reinforced by the great divide between the hierarchical levels. In order to overcome this mentality, it would be necessary for management to be less dominant, more delegating and to provide more freedom to people at operational levels as "employees will be reluctant to share knowledge if management is unwilling to share power and authority" (Davison et al., 2013, p. 92). Thus it is of vital importance for management to encourage people to take initiatives and risks, to experiment, and not to be afraid to voice their opinions. Trust between the different hierarchical levels should be increased through an open and transparent communication where people are not afraid to criticise upper management levels and where managers are open to criticism stemming from lower hierarchical levels. The role of management should not only be to give orders, monitor and control, but to lead by example, coach, mentor, interact and 'be part of the people' as opposed to considering the lower hierarchical levels as 'unequal'. It is recognised that management should be less about subordinating and more about leading by example and creating followership (Amar et al., 2012). While management is still responsible for the performance of the organisations, and thus control may still be necessary, it should be highlighted that a new kind of control is required in a way that creativity is not impeded, people's interactions are facilitated rather than obstructed and a reasonable level of tolerance for deviation and acceptance of others' freedom is considered (Amar et al., 2012).

Such change needs to be instigated from the top management levels where managers may need to recognise that both internal and external support may be required. A useful analogy

can be made with tennis, where even the greatest tennis players have coaches and supporting team who help them and guide them. Managers in Bulgarian organisations could consider management training and development and external support in the form of consultancy interventions where needed.

Enhance informal networks

Informal networks were uncovered to be the main factor enhancing knowledge interactions within Bulgarian organisations. As such these formations need to be encouraged and nurtured by the management. Such recommendation is further evident from the literature where it is stressed that "to build a sharing culture, enhance the networks that already exist. Enable them with tools, resources and legitimization" (McDermott and O'Dell, 2001, p. 85). Managers should provide more opportunities for people to meet and interact informally, for example managers could encourage more common breaks and lunches. Empirical research highlights that common coffee breaks, lunches, breakfasts, and meetings around the water fountain cultivate knowledge sharing due to the fostering of personal proximity and informality (Lilleoere and Hansen, 2011; Corti and Storto, 2000; Brown and Duguid, 1991). Importantly the ideas generated through such informal networks should not be dismissed by the upper levels but should be considered and incorporated as far as possible. Furthermore, informal networks need to be nurtured as they appeared to be great platforms for developing a mental map of dispersed expertise within the organisation, i.e. transactive memory systems.

Enhance transactive memory systems development

Ttansactive memory systems, or otherwise knowing who knows what and who within the organisation, were shown to have the strongest effect on both knowledge processes. Management needs to stimulate the development of transactive memory systems as opposed to becoming the central point of reference where people are only supposed to consult their line managers. People need to be encouraged to expand their network and develop a map of who knows what and who in the organisation by conducting joint training, using interactive technological tools, organising social events and encouraging informal gatherings and networks. While the positive effect of informal networks on transactive memory systems development was evident from the results, the use of interactive Web 2.0 technologies appeared to be banned in the majority of Bulgarian organisations. However, it is evident from the literature that such technologies are very valuable in reaching out to the wider network,

finding out who knows what and locating the necessary expertise (Oshri et al., 2008; Choi et al., 2010; Davison et al., 2013; Majchrzak et al., 2013). Therefore, as opposed to banning such technologies, Bulgarian organisations should explore the benefits such interactive tools can offer and their use should be strongly encouraged. Additionally, formal joint training is considered beneficial for transactive memory systems development (Lewis et al., 2005; Jarvenpaa and Majchrzak, 2008). Management should consider providing more opportunities for training and career development to their workforce. Moreover, companies need to compensate for the poor educational system in Bulgaria and invest in their intellectual capital.

9.5 Limitations and Further Research

Along with the theoretical and practical contributions afforded through this research, its limitations are also recognised. Most of the limitations are also seen as opportunities for further research which are presented in this section.

Power relations

Power relations were only explored from an epistemic perspective. From that perspective, strong power relations did not affect knowledge interactions directly. Also they did not affect transactive memory systems directly. Such relationships and insights in the area are new and would benefit from further research to additionally explain why such phenomena is observed and whether these are reoccurring events as opposed to context-specific experiences. Future research could also explore power and its existence within organisations in different shapes and forms (Clegg and Haugaard, 2009). As suggested by Bunderson and Reagans (2011) socialised use of power could be further included as a moderator of epistemic power relations. In general further research should be more concerned with the power/knowledge dynamics investigating diverse forms of power as well as different notions of knowledge.

Transactive memory systems

Although this study explored some important antecedent factors for TMS development, TMS was represented as a static construct. TMS development is a dynamic process which evolves over time and as a result of continuous interactions (Choi et al., 2010; Kanawattanachai and Yoo, 2007). Subsequent research may investigate the change in TMS as

a result of continuous interactions and evolving teams and practices. It could be expected that the process of TMS formation is iterative and the more people engage in knowledge processes the more the TMS will be developed.

Additionally, with the development of higher levels of TMS it could be expected that higher levels of trust will also develop. Thus a two-way relationship is observed. A similar point could be made for the relationship between trust and organisational culture. For example, in this study it was posited and confirmed that trust affects organisational culture/climate. However, the opposite could also be contended and there are studies which demonstrate that organisational culture affects trust (Al-Alawi et al., 2007; van den Hooff and Huysman, 2009). In a subsequent study, a two-way interaction between the different factors could be explored in more detail.

Informal Networks

In this study informal networks are assumed to have a positive effect on knowledge processes. However, informal networks may also be viewed as destructive formations aiming to promote opportunistic behaviours and self-interests and create conflicts within the organisations (Willem et al., 2006; Willem and Buelens, 2009; Willem and Scarbrough, 2006). The negative aspects of such informal formations could be further explored. Additionally, informal networks did not affect knowledge sharing and organisational culture/climate directly. Such findings could benefit from further research in the area so that such phenomena are further clarified.

Sampling

In relation to the qualitative stage of the research a limitation could be found in the number of interviews and the low number of respondents per company, mainly one per company. While the sample consists of participants occupying different positions within organisations, the participants were also from different firms. This was due to the difficulties of gaining access in Bulgarian organisations. As data collection and gaining access proved challenging in the Bulgarian context, the main sampling technique used for the quantitative study was snowball sampling. Thus the representativeness of the sample could be questionable as well as the generalisability of the results.

Additionally, the sample was not restricted to a specific industry either in the qualitative, or in the quantitative study. The predominant industries, which this research targeted as dynamic and more innovative industries, are IT and Software and Management Consulting. However, other industries were not excluded which may have diluted the sample. While the analysis did not show difference between the different industries in relation to knowledge sharing and knowledge interactions, the implications and recommendations of the research may be more applicable to the more innovative IT and Software and Management Consulting industries.

Methodology

Since this study adopted interviewing and cross-sectional survey methods for data collection, it may not have captured the development of knowing and the dynamism of the situated practices within organisations. In order to study people's interactions and constructing knowledge in practice methods such as observations and ethnography would be more appropriate to be adopted (Marabelli and Newell, 2012). Additionally, in order to investigate any change in how people share and interact in Bulgarian organisations with time a longitudinal study should be conducted.

Enhancement of the knowledge interactions construct

The construct of knowledge interactions as a dynamic process based on spontaneity, intuition and collective action could be further applied and tested in other studies, settings and contexts.

Knowledge interactions could be further investigated in light of the nature of the problem – routine or novel problem, as well as in light of the outcome. In particular the relationship between knowledge interactions and creativity, innovation, knowledge customisation and learning could be further explored. Additionally, these aspects could be incorporated within the construct of knowledge interactions.

9.6 Conclusion

The global economy has experienced some turbulent changes in the past few years. In response to this economic crisis, knowledge is even more strongly recognised as the main

driver for competitive advantage and innovation. But while it is well-documented that Bulgaria is lagging behind in terms of innovation, important knowledge processes have still not been explored in the Bulgarian context. This research has gone some way to explore knowledge processes within Bulgarian organisations and to reinforce the need to invest in intellectual capital and nurture knowledge interactions.

Along the way this research tackled issues such as what knowledge is, what knowledge sharing is, what factors affect knowledge sharing processes and in particular in the Bulgarian context. The Organisational Knowledge Sharing and Interactions Model which was developed and tested in this study provides a good starting point for Bulgarian organisations to rethink their processes in order to increase their competitive advantage and innovation.

This conclusion draws to a close an exciting research cycle which sets the beginning of further exciting research endeavours guided by my greater understanding of the process and sound research skills developed.

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APPENDIX A

Уважаеми/а Г-н/Г-жа,

Нуждаем се от Вашата помощ. В момента провеждаме проучване, с цел изследване на начините, по които българските компании споделят и разпространяват знание в рамките на организацията и извън нея. Вашето име бе избрано на случаен принцип от списък на български организации. Бихте ли могли да отделите 30 минути в подходящо за Вас време за провеждане на интервю по телефона? В прикачения файл сме представили на Вашето внимание план на интервюто, включващ списък с въпросите, които бихме желали да Ви зададем. Декларираме анонимност на интервюираните и конфиденциалност на информацията.

Вашето участие в това проучване ще подобри значително качеството на нашето изследване. Ако проявявате интерес в края на проучването бихме могли да Ви предоставим резюме обобщаващо анализираните резултати.

Надяваме се да участвате в това проучване.

С Уважение,
Бойка Симеонова
Dr Ashok Jashapara

Dear Mr/Mrs,

We need your help. We are conducting a study exploring ways in which Bulgarian companies share knowledge within and across firms. Your name was chosen randomly from a listing of Bulgarian organisations. We would like to conduct a telephone interview with you at a time of your choosing and wonder whether you could spare 30 minutes of your time for our research. We have attached an Interview Schedule with a list of questions that we would like to ask you. All interviews will be treated anonymously and confidentially.

Your participation in this study will significantly improve the quality of our research. If you are interested, we could send you an Executive Summary of the findings at the end of the study.

We do hope that you will take part in this research.

Yours Sincerely,
Boyka Simeonova
Dr Ashok Jashapara

Споделяне на знание сред българските организации

План на интервюто

1. Какъв вид информация, знания и умения са най-ценни за Вас?
2. Как търсите нова информация в рамките на организацията и извън нея? Какви ресурси използвате в рамките на организацията?
3. Какво Ви насърчава да споделяте знание или Ви възпрепятства да го правите?
4. Какво мотивира Вас и другите да споделяте знание?
5. Как бихте описали нивата на доверие във Вашата организация?
6. Как споделяте опит във Вашата организация?
7. Кои части от Вашата организация считате за отлични в споделянето на знания? Какво според Вас е специалното в тези части от организацията?
8. Какви видове технологии за споделяне на информация използвате във фирмата?
9. Как бихте описали културата в организацията? По какъв начин тя влияе на споделянето на знание сред хората?
10. Как бихте описали формалните и неформалните мрежи във Вашата организация? Какво влияние оказват те на споделянето на знания?

Knowledge Sharing among Bulgarian Firms

Interview Schedule

1. What types of information, knowledge or skills are most valuable to you?
2. How do you search for new information within and outside your organisation? What sources do you use within the organisation?
3. What encourages you to or inhibits you from sharing your knowledge?
4. What motivates you and others to share knowledge?
5. How would you describe levels of trust in your organisation?
6. How do you share experiences in your organisation?
7. What parts of your organisation do you consider excellent in knowledge sharing? What do you think is special about these parts of the organisation?
8. What types of technologies do you use to share information in your company?
9. How would you describe the culture of your organisation? In what way does it affect the way people share knowledge?
10. How would you describe formal and informal networks in your organisation? What impact do they have on knowledge sharing?

APPENDIX B

School of Management
Royal Holloway, University of London
Egham, Surrey, TW20 0EX, UK
www.rhul.ac.uk

T +44 (0)1784 276213
F +44 (0)1784 276100

Royal Holloway
University of London

Уважаеми/а Г-н/Г-жа,

ПОКАНА: Споделяне на знание сред организации в България

Нуждаем се от Вашата помощ. В момента провеждаме проучване за споделяне на знание сред организации в България. Знанието се счита за главен източник на конкурентно предимство на организациите. Целта на проучването е да се идентифицират и изследват практиките и процесите за споделяне на знание. Резултатите от изследването ще разкрият как знанието се споделя и използва в организациите в България.

Вашата организация бе избрана на случаен принцип от списък на български организации. Успехът на проучването зависи от Вашето участие, което е напълно доброволно. Попълването на въпросника отнема 15-20 минути. Декларираме анонимност и конфиденциалност на информацията.

Въпросникът е разработен в два варианта, на български и на английски. Моля попълнете един от двата варианта по Ваш избор, като натиснете линковете предоставени по-долу:

Българска Версия: http://www.zoomerang.com/Survey/WEB22FP5KDM6J9

Английска Версия: http://www.zoomerang.com/Survey/WEB22FP5KGM6L4

Предварително благодарим за отделеното време. Вашето участие в това проучване ще подобри значително качеството на нашето изследване. Ако проявявате интерес, в края на проучването бихме могли да Ви предоставим резюме с обобщение на анализираните резултати. И накрая, ако имате някакви коментари и препоръки относно проучването, моля свободно / непременно да ги споделите с нас.

С Уважение,
Бойка Симеонова,
Dr Ashok Jashapara

Dear Mr/Ms,

INVITATION: Knowledge Sharing in organisations in Bulgaria

We need your help. We are conducting a survey on Knowledge Exchange Practices. Knowledge is seen as the main resource for companies' competitive advantage. This survey aims to identify the practices and processes in your organisation that have an effect on how knowledge flows within the organisation. The findings of this study will help us to better understand how knowledge is shared and used within organisations in Bulgaria. Even though we would fully welcome your support, participation in our survey is entirely voluntary.

You have been identified as part of a random sample of organisations from throughout Bulgaria. The success of our survey depends on your participation. This survey will take around 15-20 minutes to complete. Please rest assured that your responses will be held in the strictest of confidence and used anonymously in our analysis. The survey is designed both in English and Bulgarian. Please feel free to select which one you prefer by clicking on the links below:

English Version: http://www.zoomerang.com/Survey/WEB22FP5KGM6L4

Bulgarian Version: http://www.zoomerang.com/Survey/WEB22FP5KDM6J9

Thank you in advance for your time! Your participation is crucial to the accuracy of our conclusions. If you are interested, we could send you an Executive Summary of the findings at the end of the study. Finally, if you have any thoughts or suggestions in any of the areas addressed by this survey, please let us know. Best wishes!

Yours sincerely,
Boyka Simeonova,
Dr Ashok Jashapara

Boyka Simeonova BSc (Hons) MSc MSc
PhD Student
Email: Boyka.Simeonova.2010@rhul.ac.uk

Royal Holloway
University of London

School of Management
Royal Holloway, University of London
Egham, Surrey TW20 0EX

Knowledge Sharing Survey

Affiliation. In our organisation:

1. People keep close ties with each other.
2. People consider other members' standpoint highly.
3. People have a strong feeling of 'one team'.
4. People cooperate well with each other.

Taking initiative. Our organisation:

1. Encourages suggesting ideas for new opportunities.
2. Puts much value on taking risks even if that turns out to be a failure.
3. Encourages finding new methods to perform a task.

Fairness. In our organisation:

1. We can trust our boss's evaluation to be good.
2. Objectives which are given to us are reasonable.
3. Our boss does not show favouritism to anyone.

Trust in management. In our organisation:

1. Management at our firm is sincere in its attempts to meet the employees' point of view.
2. We feel quite confident that the firm will always try to treat us fairly.
3. Our management would be quite prepared to gain advantage by deceiving the employees. (reverse coded)

Trust in peers. In our organisation:

1. If we got into difficulties at work we know our colleagues would try and help us out.
2. We can trust the people we work with to lend us a hand if we need it.
3. Most of our colleagues can be relied upon to do as they say they will do.

Specialized knowledge. In our organisation:

1. People have specialized knowledge of some aspects of our task.
2. People are comfortable accepting procedural suggestions from other people.
3. People trust that other people's knowledge is credible.
4. People are confident of relying on the information that other people bring to a discussion.
5. People know each other and have the ability to work together in a well-coordinated fashion.
6. People have the capability to respond to tasks-related problems smoothly and efficiently.

Sharing knowledge. In our organisation:

1. People share business proposals and reports with each other.
2. People share business manuals, models, and methodologies with each other.
3. People share each other's success and failure stories.
4. People share business knowledge gained from news, magazines, and journals
5. People share know-how from work experiences with each other.
6. People share each other's know-where and know-whom.
7. People share expertise obtained from education and training.

Knowing in practice. In our organisation:

1. Often we react spontaneously and we know intuitively how to do certain tasks.
2. Often the best way to help others is to show them how the task is accomplished in practice.
3. Our knowledge is deeply rooted in our daily practices.
4. Through everyday practices people increase their competences and capabilities.
5. Our know-how is embedded in the activities of the group/community.

Relationships. In our organisation:

1. Management is very dominant. (reverse coded)
2. People feel oppressed. (reverse coded)
3. People are not afraid to voice their opinion.
4. People make their own decisions without fear of management criticism.
5. People are not easily exploited by others.

Informal networks within the organisation. In our organisation:

1. We tend to coordinate our activities informally.
2. We consult each other privately rather than using formal mechanisms.
3. We contact our friends in the organisation whenever we need information.
4. We use our personal networks to get things done.
5. We tend to meet informally (coffee breaks, lunches, cigarette breaks, etc.) and generate new and clever ideas.

How would you assess your daily use of the following tools for sharing knowledge?

1. Blogs
2. Forums
3. General social networking sites (eg. Facebook, Google +, etc.)
4. Professional social networking sites (eg. LinkedIn, Talent me, Xing, etc.)
5. Micro-blogging sites (eg. Twitter, etc.)
6. Video conferencing (eg. Skype, etc.)

What industry/sector does your organisation operate in?

What is the number of employees working in your organisation?

1. <10
2. 10-49
3. 50-249
4. >250

What position do you hold in your organisation?

Споделяне на знание

Чувство за принадлежност. В нашата организация:

1. Хората поддържат близки връзки помежду си.
2. Хората ценят високо гледните точки на другите.
3. Хората имат силно усещане, че са част от един екип.
4. Хората си сътрудничат добре помежду си.

Инициативност. В нашата организация:

1. се насърчава предлагането на идеи за нови възможности.
2. се цени високо поемането на рискове дори и те да се окажат неуспешни.
3. се насърчава откриването на нови методи за изпълнение на задачите.

Справедливост. В нашата организация:

1. можем да се доверим, че оценката на нашите мениджъри е добра
2. Целите, които ни се поставят, са в рамките на разумното.
3. Мениджърите ни не показват лично пристрастие към никого.

Доверие към ръководството. В нашата организация:

1. Мениджърите са искрени в опитите си да приемат мненията на хората.
2. Ние сме уверени, че организацията винаги ще се опитва да се отнася справедливо към нас.
3. Ръководството е готово да заблуждава хората и да се възползва от тях.

Доверие към колегите. В нашата организация:

1. Ако имаме трудности в работата, знаем, че нашите колеги биха ни помогнали.
2. Ние имаме доверие в нашите колеги, че при нужда биха ни помогнали.
3. Може да се разчита, че повечето колеги правят това, което казват.

Специализирани познания. В нашата организация:

1. Хората имат специализирани познания в някои области на поставената задача.
2. Хората се чувстват комфортно да приемат предложения от други колеги.
3. Хората могат да разчитат на знанията на колегите си.
4. Хората вярват на информацията предоставена от другите.
5. Хората се координират добре в работата си.
6. Хората имат способност да реагират спокойно и ефикасно в проблемни ситуации.

Споделяне на знание. В нашата организация:

1. Хората споделят помежду си бизнес предложения и доклади.
2. Хората споделят помежду си бизнес ръководства, модели и методологии.

3. Хората споделят помежду си своите успехи и неуспехи.

4. Хората споделят помежду си бизнес знание придобито от новини, списания.

5. Хората споделят помежду си 'ноу-хау' придобито от личен опит.

6. Хората споделят помежду си къде и от кого могат да намерят информация.

7. Хората споделят знания и умения придобити чрез образование и обучения.

Знаейки на практика. В нашата организация:

1. Често реагираме спонтанно и знаем интуитивно как да изпълним дадена задача.

2. Често най-добрият начин да помогнем на другите е като им покажем как се правят нещата на практика.

3. Нашето знание е дълбоко вкоренено в ежедневната ни практика.

4. Чрез ежедневната си работа хората повишават компетентността и способностите си в дадена област.

5. Нашето 'ноу-хоу' е вградено в дейностите на групата/общността.

Взаимоотношения. В нашата организация:

1. Ръководството е силно доминиращо.

2. Хората се чувстват подтискани.

3. Хората не се страхуват да изкажат мнението си

4. Хората взимат решения самостоятелно без да се страхуват, че ще бъдат критикувани от ръководството.

5. Хората не са лесно манипулируеми от другите.

Общуване. В нашата организация:

1. имаме склонност да координираме действията си неформално.

2. се консултираме по-скоро лично отколкото следвайки формални механизми.

3. се свързваме с приятели в организацията когато ни трябва някаква информация.

4. използваме личните си връзки за да свършим дадена работа.

5. имаме сколонност да се срещаме неофициално (на кафе, обяд, цигара) където се генерират нови и хитри идеи.

Как бихте оценили ежедневната употреба на следните средства при споделяне на знание?

1. Блогове

2. Форуми

3. Социални мрежи (Facebook, Google +)

4. Професионални социални мрежи (LinkedIn, Talent me, Xing)

5. Микро блогове (Twitter)

6. Видео конференция (Skype)

Към кой сектор спада Вашата организация? (отворен въпрос)

Колко души работят в организацията Ви?

1. < 10
2. 10 – 49
3. 50 – 249
4. > 250

На каква позиция сте в организацията? (отворен въпрос)

APPENDIX C

Reliability and Validity – Pilot study

1. Knowledge Sharing

Reliability Statistics

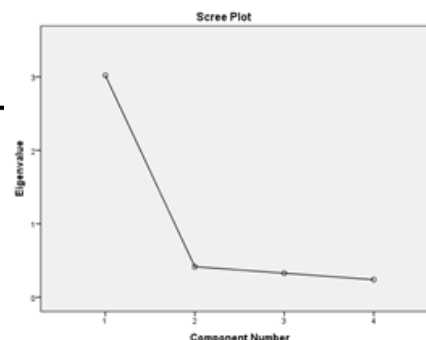| Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.938	.938	7

Factor Analysis

One component extracted

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.114	73.053	73.053	5.114	73.053	73.053
2	.639	9.135	82.188			
3	.472	6.748	88.936			
4	.296	4.230	93.166			
5	.217	3.104	96.270			
6	.146	2.082	98.352			
7	.115	1.648	100.000			

Extraction Method: Principal Component Analysis.
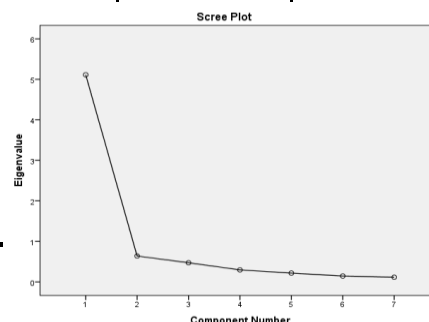
2. Organisational culture – three subgroups: affiliation, taking initiative, fairness

   Affiliation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items

	.891	.892	4

Factor Analysis

One component extracted

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.020	75.511	75.511	3.020	75.511	75.511
2	.415	10.367	85.878			
3	.326	8.157	94.035			
4	.239	5.965	100.000			

Extraction Method: Principal Component Analysis.

Taking Initiative

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.761	.753	3

Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.037	67.911	67.911	2.037	67.911	67.911
2	.775	25.848	93.759			
3	.187	6.241	100.000			

Extraction Method: Principal Component Analysis.
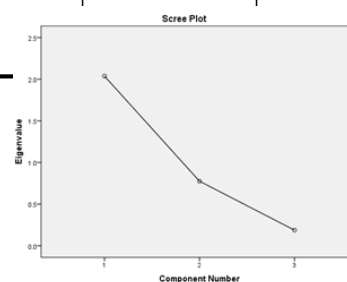
Fairness

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.897	.898	3

Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.492	83.080	83.080	2.492	83.080	83.080
2	.312	10.396	93.476			
3	.196	6.524	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot
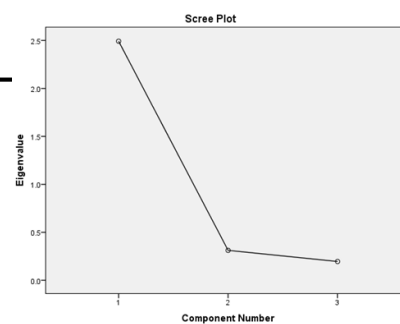
3. Trust in Management

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.837	.835	3

Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.268	75.615	75.615	2.268	75.615	75.615
2	.574	19.131	94.746			
3	.158	5.254	100.000			

Extraction Method: Principal Component Analysis.
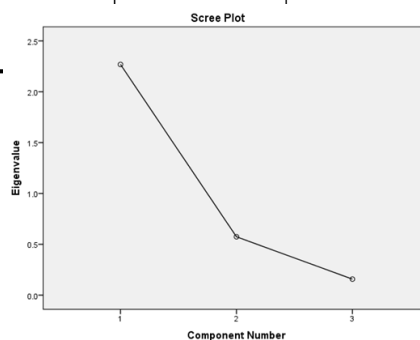
4. Trust in Peers

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.930	.931	3

Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.641	88.021	88.021	2.641	88.021	88.021
2	.289	9.638	97.659			
3	.070	2.341	100.000			

Extraction Method: Principal Component Analysis.
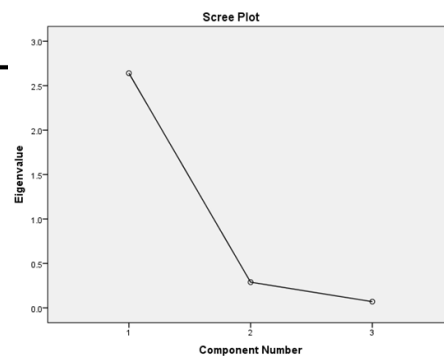
5. Transactive Memory Systems

Reliability Statistics

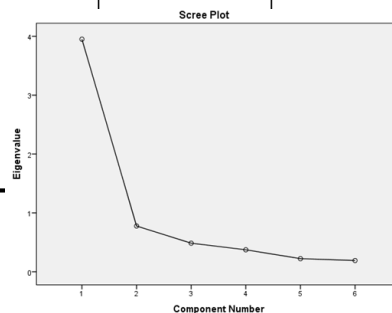| Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.890	.895	6

Factor Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.950	65.833	65.833	3.950	65.833	65.833
2	.777	12.953	78.786			
3	.486	8.092	86.878			
4	.373	6.220	93.098			
5	.223	3.718	96.816			
6	.191	3.184	100.000			

Extraction Method: Principal Component Analysis.

6. Knowing in Practice

Reliability: Delete KIP2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.693	.711	7

Factor Analysis without KIP2
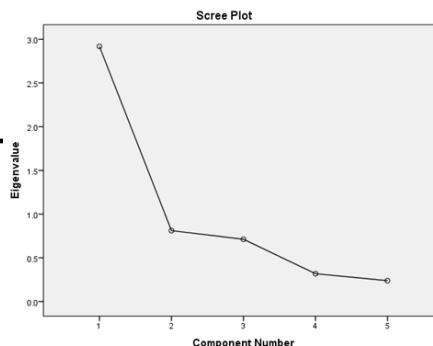
Resulted in 3 factors: delete KIP8

Resulted in two factors: Delete KIP5

One factor

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.613	52.267	52.267	2.613	52.267	52.267
2	.967	19.337	71.605			
3	.758	15.169	86.773			
4	.440	8.807	95.580			
5	.221	4.420	100.000			

Extraction Method: Principal Component Analysis.
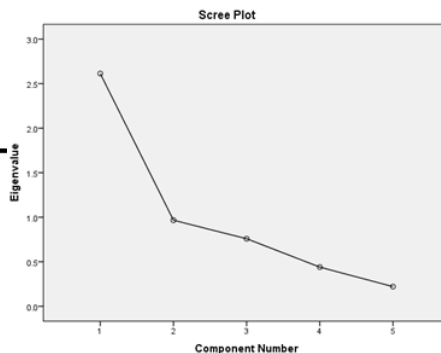
Reliability after deleting KIP8 and KIP5

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.760	.756	5

7. Power Relations

Reliability: Delete PR8

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.745	.743	7

Factor Analysis without PR8

Resulted in two factors: delete PR3

Still Resulted in two factors: delete PR4

One factor

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.919	58.377	58.377	2.919	58.377	58.377
2	.811	16.226	74.604			
3	.712	14.249	88.853			
4	.319	6.373	95.226			
5	.239	4.774	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot

Reliability after deleting PR3 and PR4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.820	.817	5

8. Informal Networks

Reliability: 0.730

Factor Analysis : Resulted in three factors: delete INFN6; Resulted in two factors: delete INFN8; Resulted in two factors: delete INFN7

One factor

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.497	49.948	49.948	2.497	49.948	49.948
2	.884	17.676	67.625			
3	.690	13.809	81.433			
4	.593	11.860	93.293			
5	.335	6.707	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot
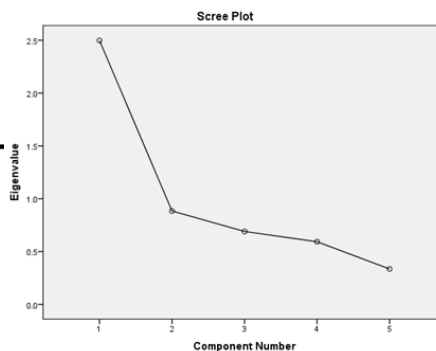
Reliability after deleting INFN6, INFN8 and INFN7

Reliability Statistics

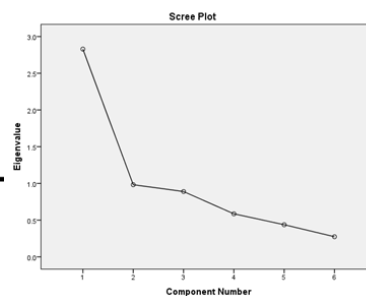| Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.746	.740	5

9. Web 2.0

Factor Analysis: Resulted in three factors: Delete Web1. Resulted in two factors: delete WEB2

One factor

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.829	47.156	47.156	2.829	47.156	47.156
2	.982	16.373	63.529			
3	.890	14.829	78.358			
4	.586	9.768	88.127			
5	.438	7.298	95.424			
6	.275	4.576	100.000			

Extraction Method: Principal Component Analysis.

Reliability after deleting WEB1 and WEB2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.768	.772	6

APPENDIX D

Descriptive Statistics – Main Study Survey Results

Affiliation

Descriptives

		Statistic	Std. Error
AFF	Mean	19.6900	.34750
	95% Confidence Interval for Mean Lower Bound	19.0052	
	Upper Bound	20.3747	
	5% Trimmed Mean	19.8831	
	Median	21.0000	
	Variance	27.653	
	Std. Deviation	5.25865	
	Minimum	4.00	
	Maximum	28.00	
	Range	24.00	
	Interquartile Range	7.50	
	Skewness	-.604	.161
	Kurtosis	-.058	.320

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AFF	.117	229	.000	.959	229	.000

a. Lilliefors Significance Correction
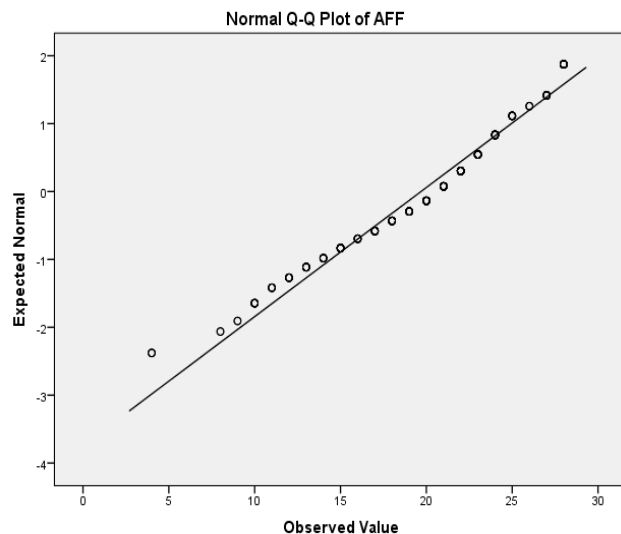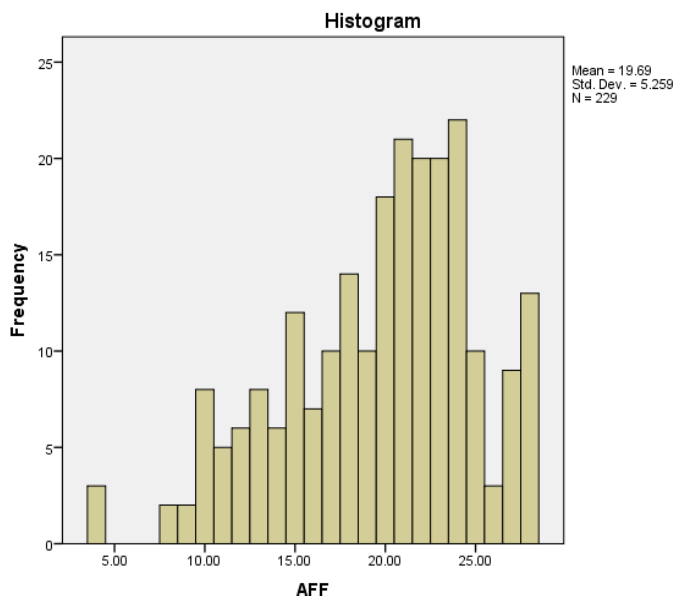
Innovativeness and Fairness

Descriptives

		Statistic	Std. Error
INN	Mean	14.2489	.30700
	95% Confidence Interval for Mean Lower Bound	13.6440	
	Upper Bound	14.8538	
	5% Trimmed Mean	14.4723	
	Median	15.0000	
	Variance	21.583	
	Std. Deviation	4.64570	
	Minimum	3.00	
	Maximum	21.00	
	Range	18.00	
	Interquartile Range	7.00	
	Skewness	-.694	.161
	Kurtosis	-.465	.320
FRN	Mean	13.9913	.31180
	95% Confidence Interval for Mean Lower Bound	13.3769	
	Upper Bound	14.6056	
	5% Trimmed Mean	14.1693	
	Median	15.0000	
	Variance	22.263	
	Std. Deviation	4.71838	
	Minimum	3.00	
	Maximum	21.00	
	Range	18.00	
	Interquartile Range	7.00	
	Skewness	-.591	.161
	Kurtosis	-.556	.320

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INN	.145	229	.000	.928	229	.000
FRN	.139	229	.000	.941	229	.000

a. Lilliefors Significance Correction
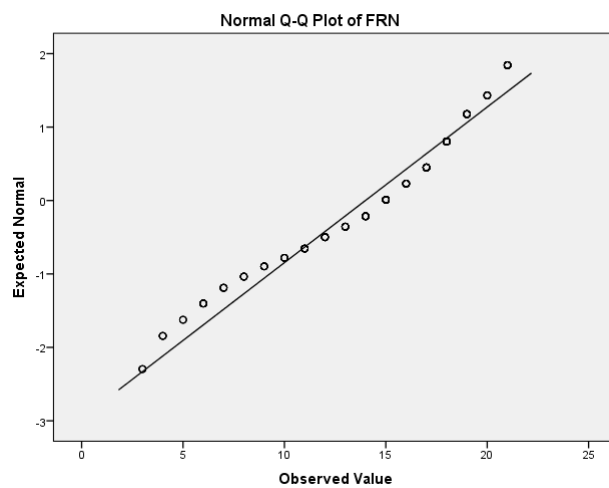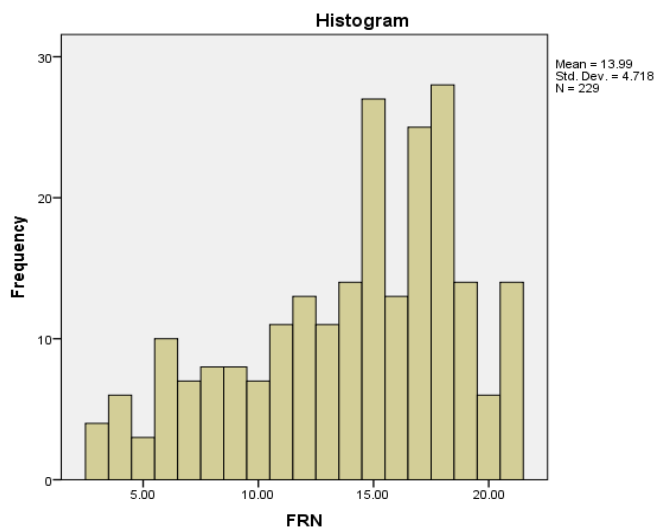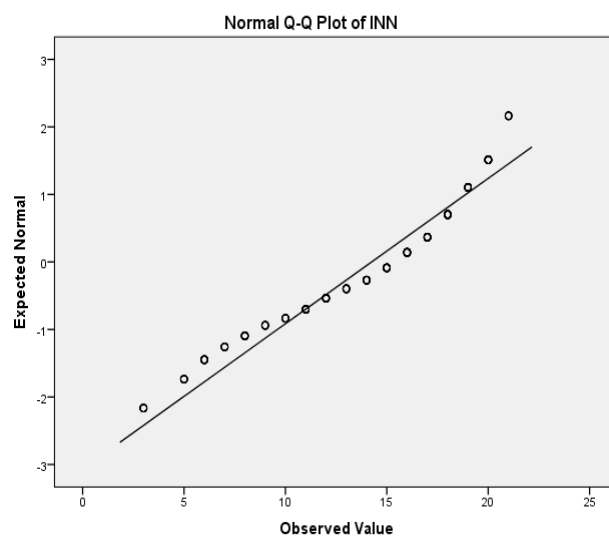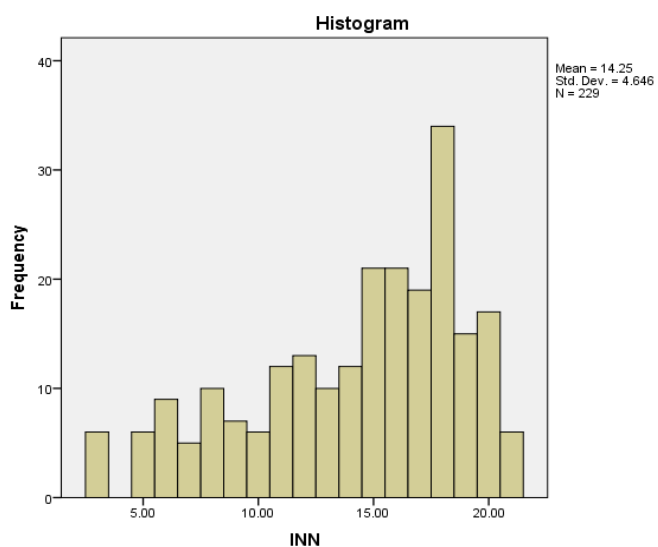
Trust in peers and Trust in management

Descriptives

			Statistic	Std. Error
TIP	Mean		16.34	.254
	95% Confidence Interval for Mean	Lower Bound	15.84	
		Upper Bound	16.84	
	5% Trimmed Mean		16.68	
	Median		17.00	
	Variance		14.752	
	Std. Deviation		3.841	
	Minimum		3	
	Maximum		21	
	Range		18	
	Interquartile Range		4	
	Skewness		-1.239	.161
	Kurtosis		1.617	.320
TIM	Mean		9.5371	.21586
	95% Confidence Interval for Mean	Lower Bound	9.1118	
		Upper Bound	9.9625	
	5% Trimmed Mean		9.6863	
	Median		10.0000	
	Variance		10.671	
	Std. Deviation		3.26661	
	Minimum		2.00	
	Maximum		14.00	
	Range		12.00	
	Interquartile Range		5.00	
	Skewness		-.558	.161
	Kurtosis		-.619	.320

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TIP	.158	229	.000	.893	229	.000
TIM	.140	229	.000	.936	229	.000

a. Lilliefors Significance Correction
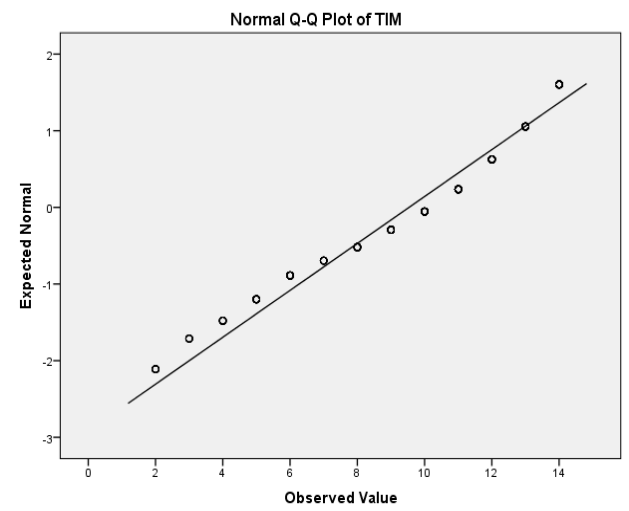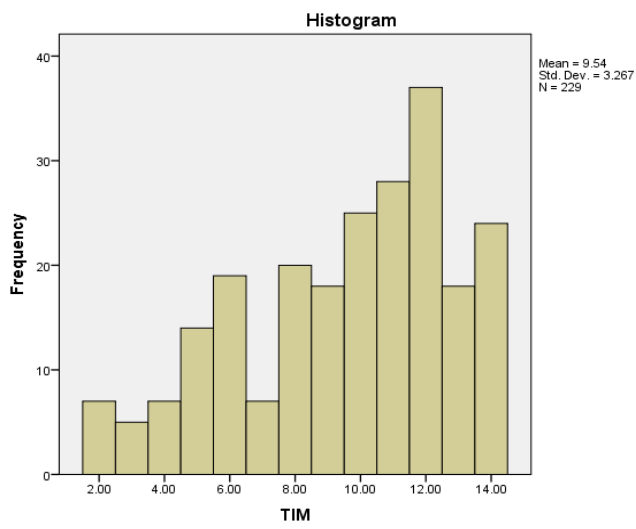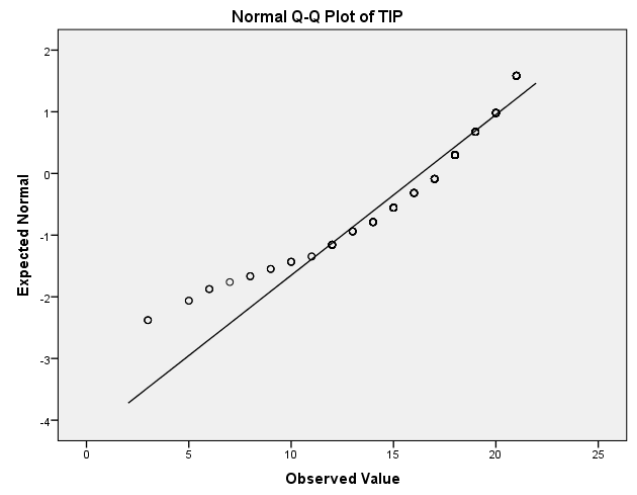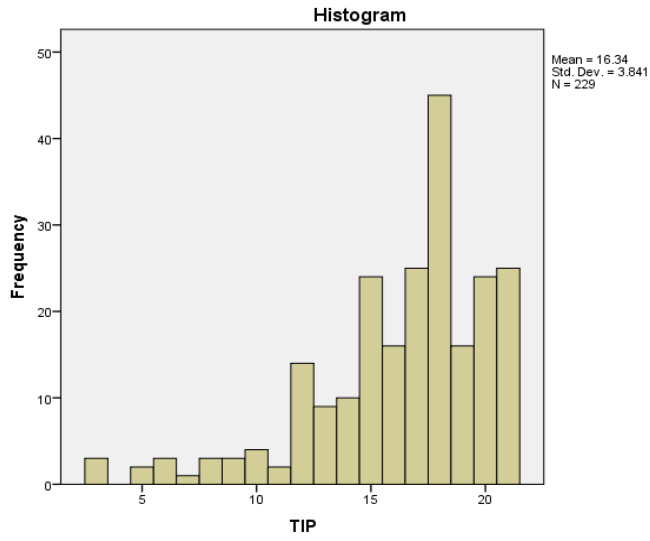
TMS, Informal Networks, Power Relations

Descriptives

		Statistic	Std. Error
TMS	Mean	30.72	.464
	95% Confidence Interval for Mean — Lower Bound	29.81	
	Upper Bound	31.64	
	5% Trimmed Mean	31.17	
	Median	32.00	
	Variance	49.279	
	Std. Deviation	7.020	
	Minimum	6	
	Maximum	42	
	Range	36	
	Interquartile Range	9	
	Skewness	-1.008	.161
	Kurtosis	.776	.320
INFN	Mean	25.93	.401
	95% Confidence Interval for Mean — Lower Bound	25.14	
	Upper Bound	26.72	
	5% Trimmed Mean	26.34	
	Median	26.00	
	Variance	36.832	
	Std. Deviation	6.069	
	Minimum	5	
	Maximum	35	
	Range	30	
	Interquartile Range	8	
	Skewness	-.993	.161
	Kurtosis	1.510	.320
PR	Mean	13.8603	.30294
	95% Confidence Interval for Mean — Lower Bound	13.2633	
	Upper Bound	14.4572	
	5% Trimmed Mean	14.0551	
	Median	15.0000	
	Variance	21.015	
	Std. Deviation	4.58426	
	Minimum	3.00	
	Maximum	21.00	
	Range	18.00	
	Interquartile Range	7.00	
	Skewness	-.569	.161
	Kurtosis	-.450	.320

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TMS	.136	229	.000	.927	229	.000
INFN	.107	229	.000	.936	229	.000
PR	.118	229	.000	.951	229	.000

a. Lilliefors Significance Correction
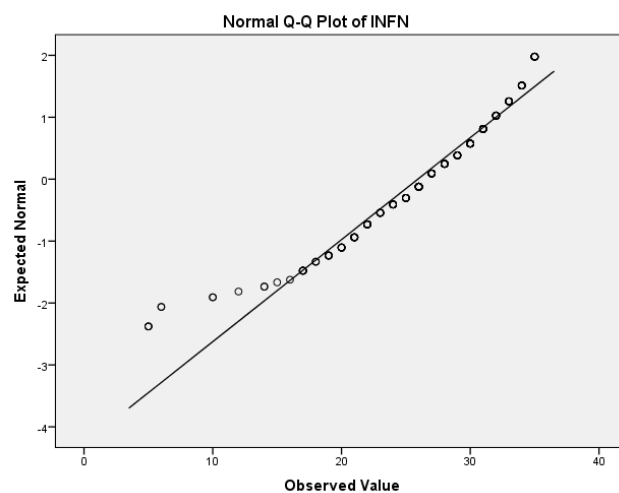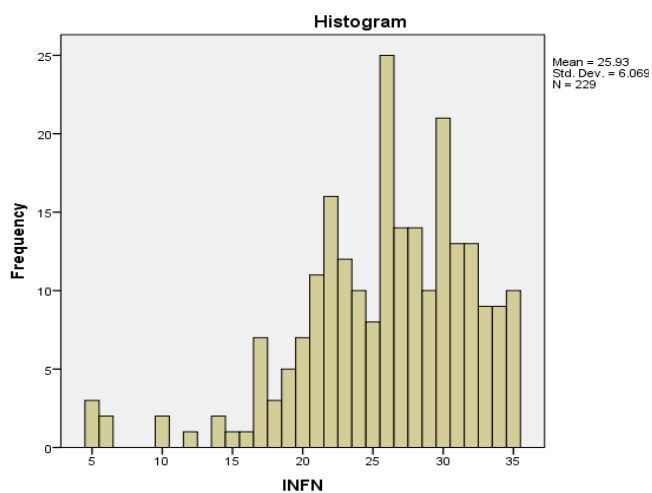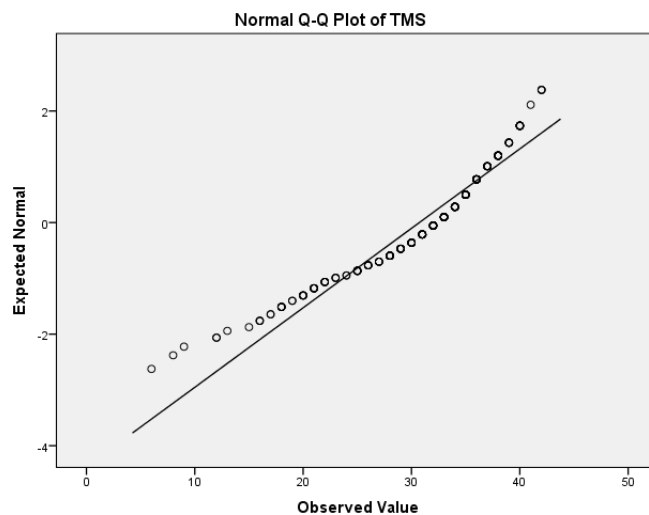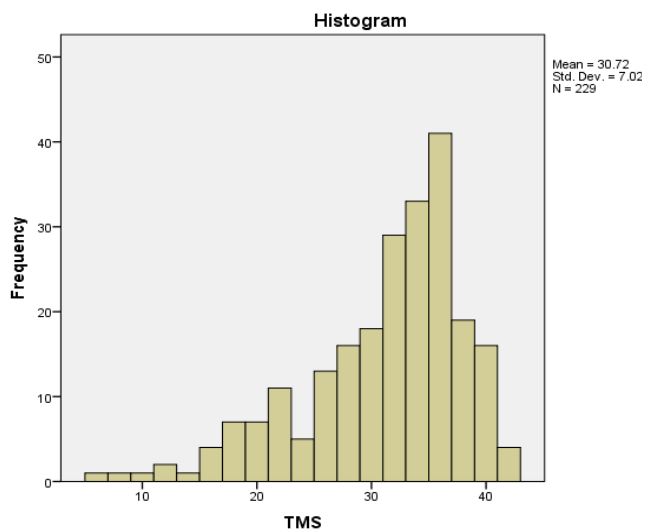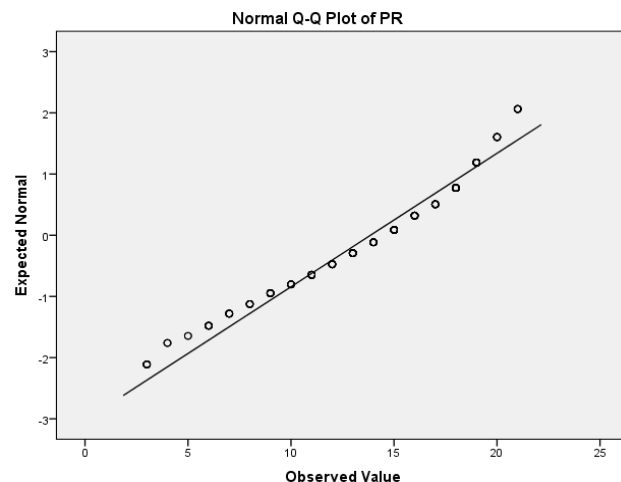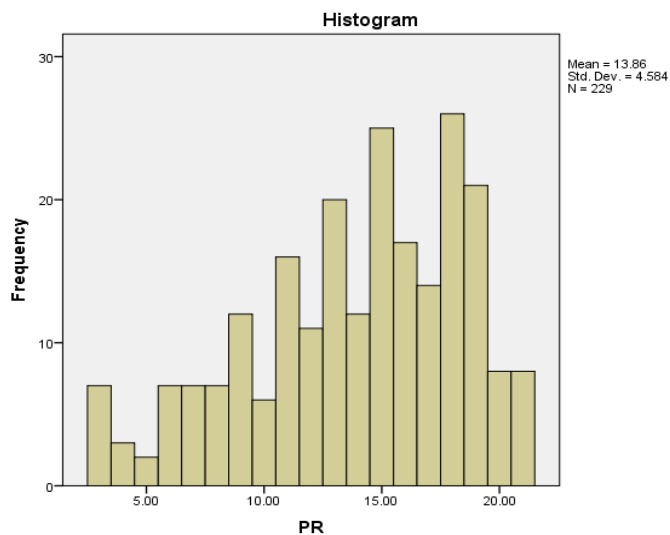
Knowledge Sharing and Knowledge Interactions

Descriptives

		Statistic	Std. Error
KS	Mean	34.52	.652
	95% Confidence Interval for Mean Lower Bound	33.23	
	Upper Bound	35.80	
	5% Trimmed Mean	35.07	
	Median	37.00	
	Variance	97.479	
	Std. Deviation	9.873	
	Minimum	7	
	Maximum	49	
	Range	42	
	Interquartile Range	13	
	Skewness	-.902	.161
	Kurtosis	.158	.320
KI	Mean	26.17	.401
	95% Confidence Interval for Mean Lower Bound	25.38	
	Upper Bound	26.96	
	5% Trimmed Mean	26.62	
	Median	28.00	
	Variance	36.765	
	Std. Deviation	6.063	
	Minimum	5	
	Maximum	35	
	Range	30	
	Interquartile Range	7	
	Skewness	-1.138	.161
	Kurtosis	1.392	.320

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
KS	.144	229	.000	.925	229	.000
KI	.135	229	.000	.918	229	.000

a. Lilliefors Significance Correction