

COACHES' KNOWLEDGE AND KNOWLEDGE MANAGEMENT ENABLERS

- A case study on team sports

Master's Thesis
Katarina Naumanen
Aalto University School of Business
Information and Service Management
Fall 2020

Author Katarina Naumanen

Title of thesis Coaches' Knowledge and Knowledge Management Enablers: A case study based on team sports

Degree Master of Science in Economics and Business Administration

Degree program Information and Service Management

Thesis advisor Riitta Hekkala

Year of approval 2020**Number of pages** 86**Language** English

Knowledge is building a competitive edge in today's market, since it is almost impossible for competitors to copy. For that reason, knowledge management (KM) has increased in popularity as a managerial perspective aimed at increasing understanding of how knowledge should be managed as an organizational resource. The increased interest in knowledge as a managerial resource emerged in the interdisciplinary field that aims to combine multiple research fields.

However, in recent years sports management has also recognized knowledge to be a key asset, since sports markets are evolving, and the amount of data and information is increasing rapidly. Knowledge management in the sports context is still a relatively new research topic. To date, research has focused on the technical aspects of developing suitable KM systems for the sports environment. Moreover, research has focused on the managerial perspective. This study focuses on understanding knowledge and knowledge processes from the coaches' perspective before presenting a holistic view on KM. Furthermore, this research aims to increase understanding of how coaches construct and perceive their knowledge in order to frame what are the main enablers of KM in their player development work in team sports. For that reason, a qualitative case study was chosen as the research methodology.

This study frames how coaches' knowledge is constructed, as well as how the key enablers of sports KM can be framed. Coaches' experiences, beliefs and attitudes are extremely valuable and important in making reactive decisions in coaching, which has an effect on knowledge creation, sharing and utilization. The study emphasizes that understanding the human and social aspects of individual knowledge perception and processes is beneficial for identifying KM enablers. To conclude, the qualitative study method gives a valuable insight on how the human factors are critical for successful KM.

Keywords: Knowledge management, knowledge, knowledge process, sports management, tacit knowledge, KM systems

Tekijä Katarina Naumanen

Työn nimi Case: Tieto valmentajille ja tiedolla johtamisen mahdollistajat pelaaja kehitystyössä joukkueurheilussa

Tutkinto Kauppatieteiden Maisteri

Koulutusohjelma Tieto- ja palvelujohtaminen

Työn ohjaaja Riitta Hekkala

Hyväksymisvuosi 2020**Sivumäärä** 86**Kieli** Englanti

Tieto on noussut nykypäivän arvokkaaksi resurssiksi. Tietoa aineettomana resurssina on mahdotonta kopioida, minkä vuoksi se vahvistaa omaa asemaa suhteessa kilpailijoihin. Tiedon merkityksen kasvaessa, kiinnostus tiedolla johtamiseen on yleistynyt. Monitieteellisenä alana tiedolla johtaminen pyrkii selittämään, kuinka tietoa voidaan hyödyntää organisatorisena resurssina.

Tätä kautta tiedolla johtaminen on yleistynyt myös urheilujohtamisen parissa. Kun informaation ja datan määrä on kasvanut räjähdysmäisesti, urheilujohtajat ovat tunnistaneet tarpeen tiedon määrän hallinnoimiselle. Kuitenkin tiedolla johtamisen tieteellinen tutkimus on vielä hyvin rajoittunutta. Tähän saakka tutkimus on keskittynyt tiedolla johtamisen teknisten ratkaisujen, ja informaatioteknologian kehittämiseen tai painottanut urheilujohtamisen näkökulmaa. Tämän vuoksi, tämä tutkimus pyrkii ymmärtämään kokonaisvaltaisemmin tiedolla johtamista joukkueurheilu maailmassa valmentajien työn näkökulmasta. Tässä tutkimuksessa keskitytään ymmärtämään, mitä tieto on valmentajille ja kuinka se vaikuttaa tiedolla johtamisen mahdollistajiin kyseisessä ympäristössä, joka tukee tiedolla johtamisen onnistumista. Tutkimus toteutettiin case – tutkimuksena joukkueurheilussa.

Valmentajien asenteet, näkemykset, havainnointi ja kokemukset vaikuttavat heidän päätöksen tekoonsa pelaajakehitystyössä. Lisäksi heidän kokemuksensa omasta tiedostaan ja sen merkityksestä vaikuttavat heidän osallistumiseensa tiedon jakamiseen, hyödyntämiseen ja luomiseen, jotka ovat kriittisiä tiedolla johtamisen onnistumiselle. Tutkimus painottaa, että tiedolla johtaminen on vahvasti sidoksissa sosiaalisiin ja humanisiin tekijöihin, joiden tunnistaminen ja ymmärtäminen vaatii inhimillistä tutkimusotetta. Viimeiseksi tämä tutkimus osoittaa, että laadullinen tutkimus antaa merkittävää syvempää ymmärrystä, kuinka valmentajien kokemus omasta tiedosta on yhteydessä tiedolla johtamisen mahdollistajiin.

Avainsanat tiedolla johtaminen, tieto, tietoprosessit, urheilujohtaminen, hiljainen tieto,

Acknowledgements

First of all, I would like to thank you who made this project possible in the first place. Thank you for finding mutual benefits for conducting this research. Thank you for being just an amazing and wise supervisor during the ups and downs. You gave me clear goals that supported my project. Then, this project would not have succeeded without the interest and participation of all the employees and managers of the case organization. I really appreciate your time and effort.

Next, I would like to thank my supervisor, Riitta Hekkala. Your help was extremely important. The effort and passion you gave to my thesis project was incredible. Without your supervision, the end result would be very different. Your expertise in conducting research was highly valuable. Your feedback and insights gave me the opportunity to improve my thesis and pushed me to work harder for better results. Thank you for being both a professional researcher and a friendly person. I really enjoyed working on this project with you.

Thirdly, thank you for the assistance provided by my lovely sister: without you this thesis would not have been completed. Your ideas and advice were always valuable. They helped me move forward with the process even when I was almost getting stuck. Finally, to my lovely dog, thanks for being you and always supporting me with this project, even though you got bored many times. Even during the hard times, you gave me positive energy and inspired me to complete this thesis.

Table of contents

Acknowledgements	iii
1 Introduction.....	1
1.1 Background and motivations.....	1
1.2 Research objectives and questions.....	3
1.3 Research scope	4
1.4. Structure of the thesis	4
2 Literature review.....	6
2.1 Background to data, information and knowledge.....	6
2.1.1 Data as a concept	7
2.1.2 Information as a concept	8
2.1.3 Knowledge as a concept.....	9
2.2 Knowledge as a process.....	13
2.2.1 Categorization of knowledge processes	13
2.2.2 Knowledge creation	14
2.2.3 Knowledge sharing	14
2.2.4 Knowledge utilization.....	15
2.3 Knowledge management.....	16
2.3.1 Different perspectives on knowledge management	16
2.3.2 Comprehensive knowledge management model.....	18
2.3.3 Critical success factors for knowledge management	18
2.4 Knowledge management in sports.....	22
2.4.1 Knowledge in sports organizations.....	22
2.4.2 Sport knowledge management.....	23
3 Methodology.....	25
3.1 Background of the methodology.....	25
3.2 Data collection and analysis.....	26
3.3 Introduction of the case company.....	28
4 Findings.....	30
4.1 Coaches' knowledge.....	30
4.1.1 Understanding the players' and the team's performance	30
4.1.2 The role of data for coaches' knowledge	33
4.1.3 Coaching principles as guidelines.....	35
4.1.4 Summary	37
4.2 Knowledge processes and player development work.....	37
4.2.1 Analyzing videos	37
4.2.2 Analyzing physical statistics.....	39
4.2.3 Intuitive decisions.....	41
4.2.4 Organization, sharing and storing of work	42
4.2.5 Summary	44
4.3 Data and KM systems in player development work.....	44
4.3.1 Nature of data: consistent, comparable and reliable	44
4.3.2 Individual planning	47
4.3.3 Videos from games and practices	49
4.3.4 Physical performance	51
4.3.5 Gathering scientific research and data.....	52
4.3.6 Summary	53
4.4 The role of management in player development work.....	53
4.4.1 Data, information and knowledge among management	54
4.4.2 A knowledge culture in a split organization.....	55
4.4.3 Setting goals and targets.....	57

4.4.4	Summary	58
5	Discussion	59
5.1	Theoretical implications.....	59
5.1.1	Defining coaches' knowledge.....	59
5.1.2	Knowledge processes in coaching	62
5.1.3	Knowledge management in player development	64
5.1.4	Summarizing the theoretical implications	67
5.2	The managerial and practical implications	68
5.3	Methodological implications	69
5.4	Limitations of the research	69
5.5	Suggestions for further research.....	70
6	Conclusion	71
	References	72
	Appendix A: Themes and interview questions.....	77

List of tables

Table 1: Overview of data collection.....	27
---	----

List of figures

Figure 1: Thesis structure	5
Figure 2: Five methods for processing data into information (Davenport & Prusak, 1998). 8	
Figure 3: SECI model (Nonaka & Takeuchi, 1995).	11
Figure 4: Knowledge management enablers (Razi et al., 2012). Originally, Alavi & Leidner (2001).	21
Figure 5: Three types of knowledge in sports organizations (Rosca, 2014).	22
Figure 6: Sports knowledge production (Schumaker et al., 2010).	23
Figure 7: Framework for coaches' knowledge	62
Figure 8: Knowledge in player development work	64
Figure 9: KM enablers in sports, revised from Razi et al., 2012.....	65

1 Introduction

This thesis discusses how knowledge management can enhance performance in sports organizations. First, the thesis will approach the topic by understanding the key elements of knowledge management (KM): knowledge and knowledge processes. In addition, the main enablers of knowledge management are discussed to increase understanding of the organizational factors that affect KM. Second, the thesis investigates how the knowledge perspective and processes influence knowledge management in team sports. In order to understand the underlying issues of knowledge management in team sports, the research is conducted as a qualitative case study. Third, the findings from the empirical case study are combined with the current literature to contribute to current research on knowledge management.

1.1 Background and motivations

After knowledge was recognized as a valuable asset, organizations' interest in managing it emerged (Austin et al., 2008; Lee & Choi, 2003). The approach has been groundbreaking, since knowledge as a resource is impossible to copy by any competitors, which makes it one of the most core assets any organization can own (Nonaka & Takeuchi, 1995; Nonaka et al., 2008; Lev, 2001). Sousa and Rocha (2019) concluded that the growing interest in knowledge and the willingness to effectively manage it created the so-called knowledge management systems that led to the emergence of this interdisciplinary research field. Knowledge management is a holistic approach, which makes it possible to manage people, systems and effects in any organization within the rapidly changing business world (Kianto et al., 2016), and achieve better business results over time (Austin et al., 2008; Lee & Choi, 2003).

In knowledge-based firms, the core value is created from intangible assets (Lev, 2001). The management faces various challenges: On the one hand, KM means managing human capital assets, such as the knowledge, motivations, skills and attitudes of employees and how these can be utilized to enhance the organization's performance (Kianto et al., 2016). On the other hand, the increased amount of available data and information has impacted knowledge creation and other knowledge processes (Ebrary et al., 2008). Technological development has enabled processing and analyzing vast amounts of data and information more efficiently to get support for decision-making (Ebrary et al., 2008). By recognizing, identifying and improving the factors of these two key enablers (technological

and social), it is possible to guide any organization towards better business performance through KM (Heisig, 2009; Razi et al., 2012; Alavi & Leidner, 2001).

Knowledge management has been researched in multiple different industries. However, the sports field has still remained untouched. Overall, researching organizational issues in the context of team sports is not a novel concept. To date, multiple research studies have recognized that there are several benefits for business organizations to getting new perspectives on business management (Wolfe et al., 2005; Erhardt et al., 2014; Kim & Andrew, 2007). However, since sports markets have transformed to business-like markets, the need for researching organizational issues also in the sports context has evolved (Dorin et al., 2016). In addition, the utilization of available data has changed the way sports organizations operate (Espitia-Escuer & Garcia-Cebrián, 2006). Researching changes in sports organizations requires analysis of sports organizations as a whole, not just the management role (Wolfe et al., 2005).

Sports organizations' interest in knowledge has increased significantly; the importance of the knowledge, its creation and sharing, have been recognized by sports organizations, since the only way to keep up with the competition is to learn faster and use the current knowledge more efficiently (Mitrevski & Aceski, 2015). Thus, sports organizations have identified that the faster and better they can manage what they know, the better the results are (Mitrevski & Aceski, 2015). In practice, this means managing how coaching work can be managed so that coaches' knowledge creation, sharing and utilization are as efficient as possible (Rosca, 2014).

In the past, sports organizations have relied only on human expertise (Schumacher et al., 2010). In practice, this meant coaches have worked independently and tried to guide athletes to better performance as best they can. In coaching, the utilization of KM systems is relatively new, especially in Finland. This explains the challenges sports management is currently facing: the perception of knowledge and how it is created differ between coaches and management (Rosca, 2014). In order to be successful in sports KM, one first has to understand what knowledge is and how it is processed by employees, that is, coaches. Then it is possible to manage knowledge as an organizational asset (Kianto et al., 2016).

The current study, conducted for sport organizations' management, is limited to the operations of research management (Espitia-Escuer & Garcia-Cebrián, 2006). Moreover, the KM research conducted among team sports organizations is focused on the technical aspects of KM, in order to understand how to effectively collect data and analyze it (Schumacher et al., 2010). Understanding and developing suitable KM systems for enhancing sports

organizations' performance is, of course, critical. However, holistically understanding the key enablers of KM increases the chances of succeeding at the organizational level (Heisig, 2009; Alavi & Leidner, 2001).

To date, there is limited research available on how coaches' knowledge affects KM and its enablers in team sports, even though it is recognized that the different kinds of knowledge bases and their utilization are critical for the performance of a sports organization (Rosca, 2014; Heisig, 2009). Moreover, it has been recognized that employees' intention to participate in KM activities and processes has a direct impact on the business effects of KM (Razi et al., 2012; Alavi & Leidner, 2001). For that reason, this study aims to contribute to how KM could be enhanced in the team sports context by increasing understanding of how coaches see knowledge and what the key enablers are affecting their initiatives and participation in KM processes. Finally, this research provides a new view on how understanding employees' knowledge may be beneficial for framing the enablers of KM in a specific context.

1.2 Research objectives and questions

This research study aims to explain what the main enablers of knowledge management in the team sports context are. Moreover, the research attempts to gain a holistic understanding of how KM principles are currently visible and utilized in player development work in football. As previous research combining sports and KM is limited, this research looks to expand the KM principles in this new context. This study has three main objectives: First of all, this study aims to understand how coaches' knowledge and knowledge processes are constructed in player development. Second, this research aims to recognize and understand the critical enablers of KM to support player development work. Third, the study aims to increase understanding of how the elements of employees' (coaches') knowledge and knowledge processes are important for KM enablers.

The research study comprises a qualitative case study in order to understand the phenomena holistically. By conducting the qualitative case study, it is possible to examine the KM principles and effects in a real-life context. Since we have a limited understanding on KM in team sports, the case study is a good starting point for the research field. The aim of the qualitative study is to understand how KM affects sports organizations' employees, that is, coaches. Finally, the qualitative method makes it possible to understand employees' perception of their knowledge and knowledge processes. As the study focuses on how that affects KM, a qualitative case study is more beneficial.

The research study is conducted in collaboration with a football club, called Company A. Since the market in Finland is small and the researcher is willing to respect Company A's anonymity, only limited information about case Company A is offered.

The following research questions have been formulated for this research study:

1. What is knowledge for coaches and how are knowledge processes visible in player development work?
2. What are the main enablers of KM in the team sports context to enhance player development work?

1.3 Research scope

Because KM is novel research topic in the sports context, a qualitative case study was chosen as methodology. This provides an excellent opportunity to understand the phenomena by interpreting a single case. However, the results obtained may not be as generalizable as when the method had been quantitative or used a multi-case research method.

There is some inconsistency in the KM literature. For that reason, the descriptive style provides an opportunity to understand how KM principles operate in team sports. Thus, the aim of this research is not to provide statistical results. Instead, this research aims to provide a more holistic view of the issues of knowledge management in the team sports context. This view may also provide new and beneficial insights into how KM could be applied in the business context as well.

Finally, the research scope is mainly limited to expanding understanding of KM in coaches' work and player development work. For that reason, other parts of the sports organization's knowledge are not the focus of the research. For example, the research study does not define or include players' knowledge or knowledge processes. Moreover, the managerial aspect is analyzed only in terms of how it affects coaches' player development work. Discussing and researching individual managers' knowledge and knowledge processes also lies outside the scope of this research.

1.4. Structure of the thesis

This thesis is divided into four parts, as illustrated in Figure 1 below. The first part is the literature review, providing an overview of the core elements of KM. The literature review starts by defining the core concepts and then discusses the knowledge processes and KM more holistically. The second part of the thesis presents the methodology used in the

research. The third part is the empirical study, in which the findings from the interviews are discussed. The fourth part consists of a discussion of how the research contributes to current research from a theoretical perspective, as well as of the main implications for sports management. Lastly, the conclusion summarizes the study.

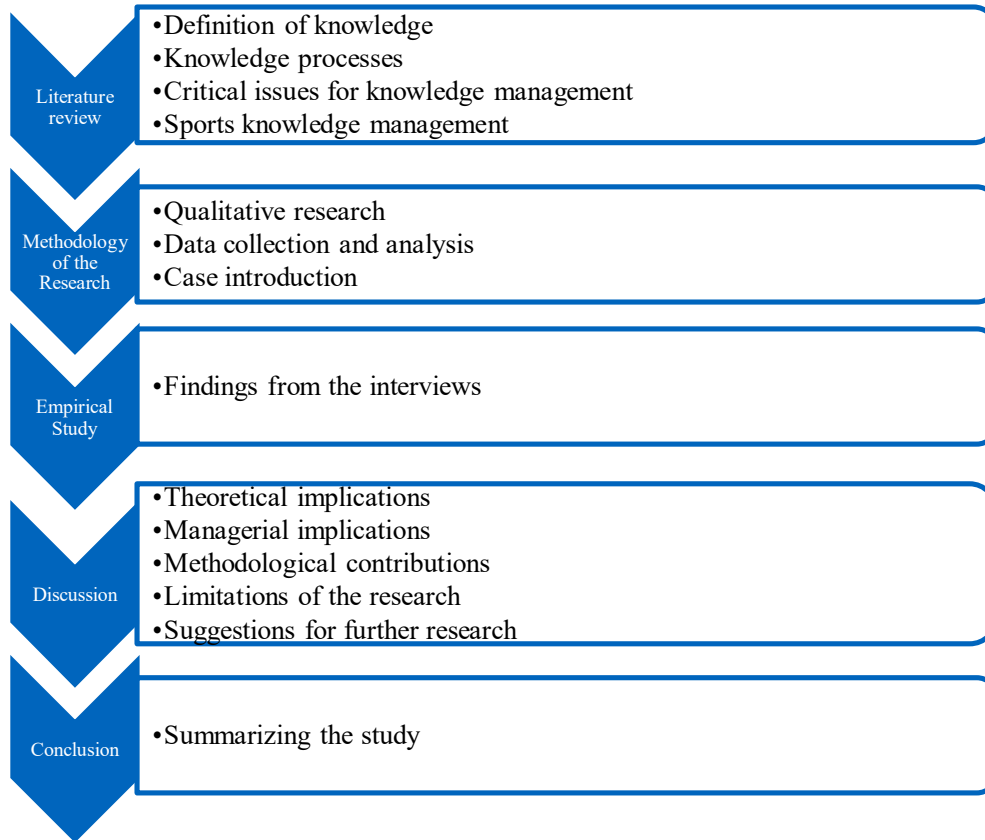


Figure 1: Thesis structure

2 Literature review

Since the 1990s, knowledge as a valuable asset has increasingly attracted interest in various industries and fields. The importance of knowledge has increased, as it is regarded as one of the key resources to establish a competitive edge in today's global markets (Nonaka & Takeuchi, 1995; Nonaka et al., 2008; Lev, 2001). Furthermore, as the importance and understanding of knowledge has increased, knowledge management as a strategic perspective has expanded (Nonaka & Takeuchi, 1995; Ebrary et al., 2008). In order to achieve a strong position in the markets, firms must recognize the knowledge they have (Gold et al., 2003). Moreover, knowledge is nearly impossible to copy by competitors, which is why knowledge management is regarded as a competitive way of leading businesses (Alavi & Leidner, 2001). The common objective of KM is to identify principles that help understand how to strategically manage knowledge in order to build a competitive edge in the marketplace (Austin et al., 2008; Lee & Choi, 2003; Davenport et al., 1998.).

The literature review discusses the current literature available in the field of KM. This chapter is divided into four parts: The first part aims to clarify the main concepts of the research, data, information and knowledge that are the main principles of KM. The second part focuses on knowledge processes, referring to KM activities that affect knowledge creation, acquisition, sharing and utilization. The third part discusses the critical success factors and main issues of KM. The last part briefly looks at what kind of research is conducted regarding KM in the sports field.

2.1 Background to data, information and knowledge

The literature often distinguishes among data, information and knowledge (Nonaka & Takeuchi, 1995; Davenport, 1997; Tiwana, 2000; Tuomi, 2000; Gold et al., 2003). Data and information can be regarded as the predecessors of knowledge (Tiwana, 2000; Davenport, 1998). Alavi and Leidner (2001) have highlighted that, without knowledge, data or information is useless. For this reason, the following section discusses data as a concept. That is followed by discussing how information can be defined and built by adding meaning to data (Davenport & Prusak, 1998). Finally, the multiple definitions of knowledge as a concept are discussed.

Davenport (1997) has emphasized that the separation of these three concepts is not straightforward in practice. Still, understanding the three concepts gives a firm an

understanding of whether the data and technology it uses has a real value or not (Tiwana, 2000). Even though these concepts are discussed separately in the following sections, it is very important to remember that they are closely linked to each other in the daily activities of organizations.

2.1.1 Data as a concept

Data can be defined as “observations of states of the world” (Davenport, 1997, p. 9). Tiwana (2000) has defined data as “particular and objective facts about an event or simply the structured record of a transaction” (p. 53). Tuomi (2000) has stated that data are usually seen as simple facts that can be structured in order to transform them into information.

Data provide a description of what has happened; data do not include judgement or call for actions (Davenport & Prusak, 1997). When defining “data,” efficiency comes into the discussion. Our judgement of how to manage or process data is mainly based on quantitative calculations that describe the capability to do something (Tiwana, 2000). In practice, this can refer to calculating the number of transactions performed or timing a task. It has been explained that we combine data with our own understanding, meanings and interpretations; through the enrichment of data, we create constantly refined data (Tuomi, 2000).

However, the definition of data is not straightforward and simple; data are not only raw material for information (Tiwana, 2000; Tuomi, 2000). Tuomi (2000) has explained that data are also built from information “by putting information into a predefined data structure that completely define[s] its meaning” (p. 108). Thus a process of reversed hierarchy occurs, for example, when creating a database. We can create a structured model in order to explain the data in an information system. The information system actually creates the representation and interpretation of the data set to build more valuable insights. As a result, the information system leads to new data and information that we can interpret again (Tuomi, 2000).

To conclude, even though data can be defined as the description of events or transactions (Tiwana, 2000), it has to be noted that data cannot be interpreted without knowledge or information (Tuomi, 2000). Moreover, collecting vast amounts of data is not connected with better insights and information (Davenport & Prusak, 1997). Instead, it can even make the sense-making process of data impossible (Tiwana, 2000). Ideally, data are provided by information systems to provide possibilities for further utilization (Tuomi, 2000). Davenport and Prusak (1997) highlighted that data should not be stored without considering how it will be transformed into value-added information. Briefly put, data

themselves are not valuable if they are not easily accessible and editable at the exact time they are needed (Davenport & Prusak, 1997; Tiwana, 2000; Tuomi, 2000).

2.1.2 Information as a concept

Information can be simply defined as “data endowed with relevance and purpose” (Davenport, 1997, p. 9). Tiwana (2000) has emphasized that information is based on the word “inform.” This verb refers to an action in which the recipient is changing or shaping the content received. In order to qualify data as information, a subjective judgement of the data by the recipient is required (Tiwana, 2000). Davenport and Prusak (1998) identified five processes how data can be converted into information: condensation, contextualization, categorization, calculation and correction. Figure 2 illustrates the five methods of data conversion.

First, it illustrates how data may be contextualized. This refers to cognitive processing, in which the recipient can identify why the data were collected. Correction means being able to remove errors from the interpreted data. By condensing data, the data is in more concise form, which supports understanding the most important content. Calculation has the same aim as condensation, by utilizing analytical or statistical methods; the data can be transformed into information by using mathematical or statistical tools to transform it to a more concise form. Categorization describes the process by which either the units of analysis or the key components are recognized (Davenport & Prusak, 1998).

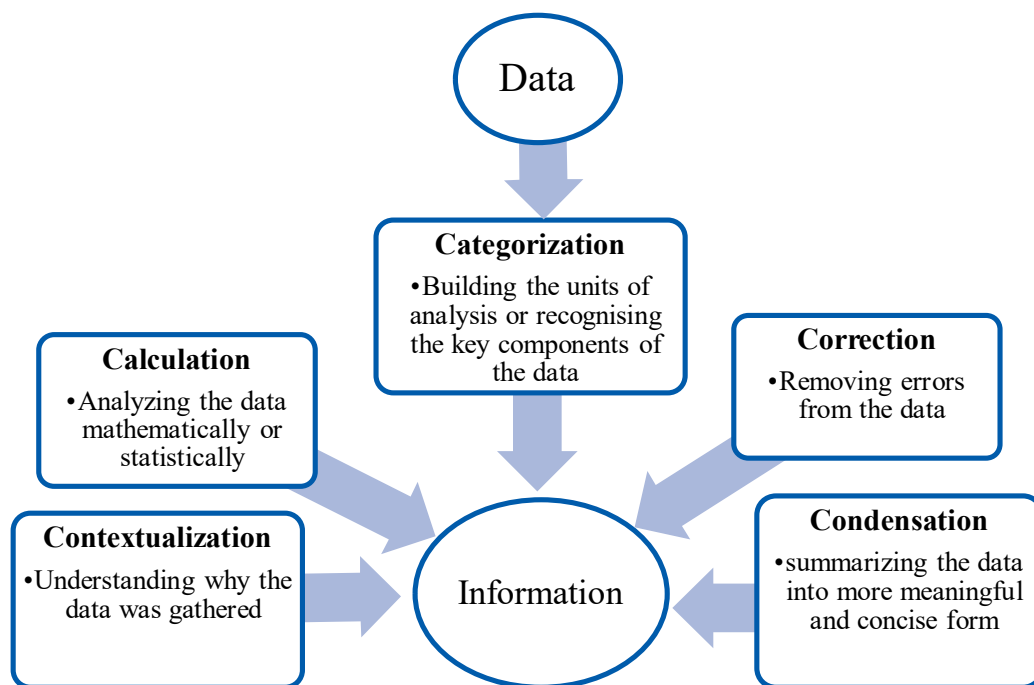


Figure 2: Five methods for processing data into information (Davenport & Prusak, 1998).

To summarize, information is built by reprocessing the available data. This process is highly dependent on the situational and personal variables (Tiwana, 2000). Data which may be valuable for one person, may be useless for another (Davenport & Prusak, 1998). For this reason, data increase their value when they are shared: the amount of information added to data increases (Tiwana, 2000). This is why it is critical that transparent data should flow through the whole organization: it increases the possibility for every employee to construct information that is relevant to them (Tiwana, 2000).

2.1.3 Knowledge as a concept

Knowledge as a concept is even more complex than data and information. In the literature, there are multiple different views and perspectives on knowledge, which leads to multiple definitions of knowledge. Understanding the differences among these different perspectives and definitions is relevant for understanding and discussing the multiple aspects of knowledge management. Nonaka and Takeuchi (1995) were the pioneers of researching organizational knowledge among Japanese companies and demonstrated the significance of knowledge for innovation creation. First, this section discusses the concepts of tacit and explicit knowledge based on their early research. Second, the literature review will be expanded to look more holistically at the different perspectives on and definitions of knowledge.

In their research on knowledge in the organizational context, Nonaka and Takeuchi (1995) discussed the two traditional dimensions of knowledge: tacit and explicit. This distinction is still one of the most commonly used in the literature. Actually, the term “tacit knowledge” was originally defined by Michael Polanyi in the 1960s. Polanyi’s (1962) ideology of “we know more than we can tell” was groundbreaking and opened up the research of knowledge for a new era.

The tacit dimension refers to a combination of the cognitive and technical elements of knowledge (Nonaka & Takeuchi, 1995). An individual’s mental models, just like points of view and beliefs, are the cognitive elements of tacit knowledge (Alavi & Leidner, 2001), while the technical elements refer to concrete and practical skills applied in some specific context (Alavi & Leidner, 2001). In practice, technical elements include knowhow and ability, for example, how to use Excel or how to structure an essay. Kianto et al. (2016) have emphasized that the nature of human intelligence is tacit. One’s knowledge always has some individual aspect that is impossible to articulate but will affect one’s actions and decisions.

In contrast to tacit knowledge, Nonaka and Takeuchi (1995) defined the explicit dimension of knowledge as knowledge that can be easily articulated and communicated. Explicit knowledge is easily codified and copied through language, videos, images or any form of communication. In practice, explicit information can be, for example, a manual on how to use a system or a guideline on how to perform an action. Kianto et al. (2016) also defined tacit knowledge that is transformed into, for example, text form to be explicit. The ideology is based on the aim to save and share tacit knowledge by transforming it into an explicit form.

Besides the tacit-explicit knowledge distinction, Nonaka and Takeuchi (1995) separated the individual and social dimensions of knowledge. Basically, individual knowledge is created by one person individually and social knowledge is co-created by a group of people. Both of these aspects have been further researched in multiple different contexts. From the point of view of organizational learning, it seems to be even more relevant to focus on the social aspect of knowledge creation (Rutten, 2004), since co-created knowledge will bring the most value for an organization (Nonaka & Takeuchi, 1995).

Social knowledge has been researched at organizational (Nonaka & Takeuchi, 1995; Rutten, 2004), local (Lahtinen, 2013) and global (Pirkkalainen & Pawlowski, 2013) levels. Organizations' social knowledge is not only internally created. Instead, social knowledge is co-created with the surrounding environment (Rutten, 2004; Lahtinen, 2013; Pirkkalainen & Pawlowski, 2013). However, Crane (2015) has questioned what social organizational knowledge is, since knowledge is always owned by individuals. Lesley (2015) has introduced a simplified and popular separation of different knowledge views: separation into organizational and personal knowledge, as well as seeing knowledge as either the object or the result of social interaction. For organizations this is relevant, since organizations which are able to manage this knowledge transformation effectively will have the most competitive edge in the markets (Nonaka & Takeuchi, 1995; Lahtinen, 2013; Pirkkalainen & Pawlowski, 2013).

Nonaka and Takeuchi (1995) created the so-called SECI model – socialization, externalization, combination and internalization – which summarizes their distinction of knowledge into tacit and explicit knowledge. It describes how knowledge can be transferred, generated or reformed within any organization. Socialization is the process by which new tacit knowledge is developed through shared personal experience (Sian & Kelkir, 2013), and is closely connected to the social co-creation of knowledge. Externalization refers to coding tacit knowledge into an explicit form (Nonaka & Takeuchi, 1995). This can refer to

practicalities, such as writing a description of work or taking advantage of a tool that records discussion. Combination means combining existing explicit knowledge into new explicit knowledge pools (Sian & Kelkir, 2013). This may refer to the process of enriching a document with updated information. Lastly, the process of internalization is defined as processing the explicit knowledge into tacit knowledge (Nonaka & Takeuchi, 1995). This is an iterative step. Through independent internalization, one can start a new cycle of knowledge creation by socialization, externalization and combination. Figure 3 below illustrates the SECI model developed by Nonaka and Takeuchi (1995).

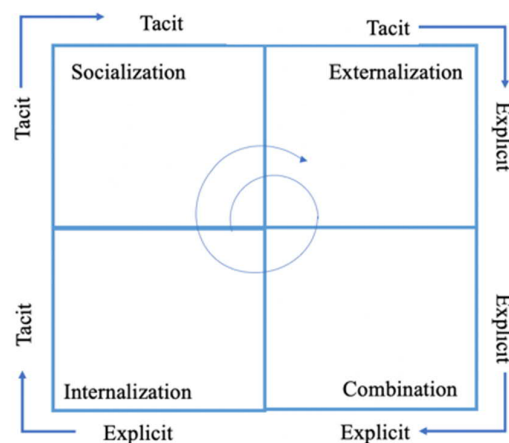


Figure 3: SECI model (Nonaka & Takeuchi, 1995).

Alavi and Leidner (2001) have argued that this separation into tacit-explicit knowledge and individual-social knowledge does not provide a comprehensive understanding of knowledge. It includes certain assumptions, such as that tacit knowledge is typically seen as more valuable than explicit knowledge (Alavi & Leidner, 2001). Instead, Alavi and Leidner (2001) have suggested that the discussion should acknowledge the mutual dependence of these different states. Explicit knowledge cannot be created without some level of tacit knowledge.

Furthermore, Alavi and Leidner (2001) have tried to collect all the different perspectives on knowledge in the literature. They described six different perspectives that affect the way knowledge management is performed in any organization. The first and most traditional perspective is separating data, information and knowledge from each other. Second, knowledge can be regarded as a “state of mind”: knowledge is one’s own understanding gained through different experiences and learning. Third, knowledge can be defined as an object. If knowledge is regarded as an object, it can be stored and manipulated.

The fourth perspective sees knowledge as a process, constituting simultaneously knowing and acting, to apply one's own expertise. The fifth perspective expands the perspective of regarding knowledge only as an object. Instead, knowledge is defined as a "condition of access to information" (Alavi & Leidner, 2001, p. 110). Knowledge must be organized to enable constantly accessing and retrieving information. The sixth perspective defines knowledge as the capability to influence future events. More precisely, knowledge is not a specific capability to perform certain actions, but is the ability related to effective and useful decision-making (Alavi & Leidner, 2001).

According to Alavi and Leidner (2001), one of the most popular perspectives in IT literature is to separate data, information and knowledge. In other words, knowledge is different from information and information is not equal to data (Davenport & Prusak, 1998). According to this separation, knowledge is defined as "valuable information from the human mind" (Davenport, 1997, p. 9). Thus, knowledge includes reflection, synthesis and context that is hard to structure and difficult to copy by machines or technology overall (Davenport, 1997).

Based on the separation of knowledge, data and information, Davenport and Prusak (1998) defined knowledge as "a fluid of mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information (p.5)." It originates and is applied in the minds of those who have the knowledge. In organizations, it often becomes "embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms" (Davenport & Prusak, 1998, p. 5). This definition was later used in many different contexts by multiple research studies (Tiwana, 2000; Alavi & Leidner, 2001; Tuomi, 2000).

To summarize, all these different perspectives on knowledge are not different definitions of knowledge (Heisig, 2009). We can conclude that the current literature represents multiple perspectives on knowledge, which are just tools to set a starting point on what knowledge means in the context in which it is discussed. In general, knowledge can be regarded as an individual's personal asset (Nonaka & Takeuchi, 1995), as well as socially created value that is always connected to a specific context (Grant, 1996). Knowledge is created when one's own information is combined with the knowledge obtained from others. Kowta and Chitale (2012) highlighted the following two characteristics of knowledge:

1. "Knowledge is highly contextualized information enriched with individual interpretation and expertise" (p. 309).

2. “Knowledge is highly person specific and gained through experience, reasoning, intuition and learning” (p. 309).

To conclude, there are multiple options for how knowledge can be interpreted in terms of KM (Alavi & Leiner, 2001; Heisig, 2009; Lesley, 2015). When discussing KM in any context, a particular view of knowledge has to be taken. This view depends on the management’s priorities and the context in which the knowledge management is applied.

2.2 Knowledge as a process

The distinction of knowledge dimensions provides several benefits for analyzing knowledge processes in organizations. Knowledge processes, in other words knowledge management activities, can be regarded as a structured way of coordinating knowledge effectively (Gold et al., 2001; Heisig, 2009). As stated previously, knowledge can be interpreted at different levels, such as the individual, organizational, local or global level. Consequently, knowledge processes can also be discussed at different levels, so that the literature on knowledge processes is multidimensional. This section first discusses the different categories of and perspectives on knowledge processes and then each knowledge process is discussed separately.

2.2.1 Categorization of knowledge processes

In their early studies, Nonaka and Takeuchi (1995) identified four knowledge processes: creation, storage/retrieval, transfer and application. Their research convinced them that these four knowledge processes are critical for successful knowledge management. Similarly, Tiwana (2000) identified three knowledge management processes: knowledge sharing, creation and utilization. These processes take place simultaneously in organizations. Interestingly, some researchers refer to knowledge cycles (Tiwana, 2000), while others see a more horizontal process flow (Nonaka & Takeuchi, 1995; Ebrary et al., 2008). In the end, this distinction does not make a significant difference, since it is agreed that knowledge processes vary a great deal, depending on the organizational structure and hierarchy (Gold et al., 2001).

Nonaka and Takeuchi (1995) expanded the understanding of the knowledge creation process as something that happens for one person to include the whole organization. This perspective was groundbreaking, since it enabled discussion of learning in the organizational context. Today, organizational knowledge creation is regarded as one of the main resources to establish a competitive business (Ebrary et al., 2008). However, the discussion needs to go

beyond the creation of knowledge in the organization (Nonaka & Takeuchi, 1995; Alavi & Leidner, 2001; Grant, 1996). Grant (1996) has emphasized that the discussion of organizational knowledge should focus on the application of knowledge. Without applying knowledge in practice, it will not have an impact on the operation of a firm. For that reason, knowledge management processes are regarded as a tool to achieve practical gains from information system (IS) technologies and human resources (Austin, 2008; Davenport et al., 1998).

Heisig (2009) studied 160 different frameworks used in the knowledge management field. He concluded that there was still no common understanding of the concept of knowledge processes. However, he was able to categorize the most frequently used knowledge management activities into four types: share, create, store and utilize knowledge. Al Emran et al. (2018) performed the same kind of review in an attempt to identify the most studied knowledge processes related to the IS field. Their research indicated that knowledge sharing is the most frequently studied topic among the knowledge processes, followed by knowledge acquisition, application, storage, protection and creation. Studies confirm that the identified knowledge processes are relevant for the implementation and maintenance of knowledge management (Heisig, 2009; Al Emran et al., 2018).

2.2.2 Knowledge creation

First, we can define knowledge creation as the process by which knowledge is constructed (Ruten, 2004; Heisig, 2009). Gold et al. (2001) defined knowledge acquisition as business processes which are able to generate new knowledge and utilize existing knowledge. Usually this process of knowledge creation is dependent on the social context (Nonaka & Takeuchi, 1995; Tiwana, 2000). Rutten (2004) emphasized that a network is an important tool for knowledge creation to take place. Laakkonen (2013) has argued that too often knowledge creation is only seen inside an organization; however, individuals are always connected to multiple networks at the same time. This means that valuable knowledge creation is taking place both inside and outside of organizations.

2.2.3 Knowledge sharing

Research by Al Emran et al. (2018) indicated that knowledge sharing is critical for successful KM. Knowledge sharing can be defined as “business processes that distribute knowledge among all individuals participating in process activities” (Lee et al., 2007, p. 682). Moreover, the studies found a connection between knowledge sharing and the utilization of IS systems, which partly explains their significance for KM (Al Emran et al., 2018).

Lee et al. (2007) concluded that knowledge sharing can help employees to understand business processes and problems to generate new solutions faster. It enhances developing current processes and practices. In addition, knowledge sharing strengthens the utilization of employees' skills by involving everyone in the current project or problem solving (Lee et al., 2007).

Tiwana (2000) also underlined the importance of creating a culture which facilitates knowledge sharing. The key is to get individuals to share the knowledge they have, instead of keeping it to themselves. Hence, the management needs to critically evaluate whether there are technical or cultural barriers to knowledge sharing. The impact of suitable IS tools for transparent and smooth knowledge sharing was highlighted (Tiwana, 2000; Laakkonen, 2013). In practice, this means tools such as video conferencing, mind map tools and cloud services (Laakkonen, 2013).

2.2.4 Knowledge utilization

Knowledge application can be defined as business processes that enable individuals, groups or firms to access knowledge easily (Lee et al., 2007). Al Emran et al. (2018) emphasized that knowledge application also refers to processes where knowledge is efficiently reused by using retrieval and storing techniques. Tiwana (2000) used the term "knowledge utilization" for the same processes that are meant by knowledge application.

Dalkir (2011) separated individual and organizational knowledge application in terms of KM. First, Dalkir (2011) emphasized that at the individual level we have to be concerned about the customization of information retrieval and knowledge processes. The better an environment is customized to the individual, the better knowledge can be applied in the work situation. At the group or organizational level, Dalkir (2011) emphasized the need for knowledge management systems (KMS) to facilitate knowledge application. Moreover, KMS are tools that enable groups to achieve the goals they are committed to.

Knowledge management systems are systems that support information flow and functions such as archiving, finding, accessing, creating, combining, modifying and tracking (Dalkir, 2011). When discussing knowledge processes, the significance of technology is becomes important. Information system technologies can contribute to knowledge management activities by creating a supportive environment to increase transparency and the flow of knowledge in an organization (Alavi & Leidner, 2001; Choi & Lee, 2003; Gold et al., 2001). Furthermore, technology plays a crucial role by enabling the coding of tacit knowledge to become explicit (Nonaka & Takeuchi, 1995), through a process in which the

available knowledge is stored, recorded and transformed by using IT procedures and systems (Choi & Lee, 2003; Gold et al., 2001; Cohen & Olsen, 2014). Hence, both IT and KM systems play an important role in all the knowledge processes we discussed.

2.3 Knowledge management

Naturally, the different perspectives on knowledge lead to different perspectives on KM. Knowledge management is a multidisciplinary research field in which the scope of current literature is wide. There are various definitions of the concept of KM, as well as various ways in which it is applied in practice; KM also has various aims (Earl, 2001).

This section first discusses the multiple perspectives on KM, after which a holistic view on KM is presented. Then the crucial factors for successful KM are discussed and, finally, the significance of the surrounding environment for KM implementation is presented.

2.3.1 Different perspectives on knowledge management

Alavi and Leidner (2001) summarized the different actions that should be performed in KM, depending on the perspective on knowledge that is adopted: in the traditional data-information-knowledge perspective, individuals find relevant data and “change” it into information. The state-of-mind perspective regards KM as a tool to enhance one’s own learning and understanding through information. In the object perspective, knowledge management focuses on “building and managing knowledge stocks” (p. 110). The process of creating, sharing and distributing of knowledge should be the main focus in the process perspective. If knowledge is defined as condition of access to information, the organizations should aim to enhance accessing and retrieving information. Lastly, knowledge as capability is based on a more strategic management perspective. Here knowledge should be seen as a tool to build a company’s core competence and a competitive strategic edge.

Similar to the categorization by Alavi and Leidner, Earl (2001) distinguished seven different types of KM “to help managers identify alternative knowledge management initiatives or solutions, understand what is required to make them work, and make sense of and improve the effectiveness of any existing, inherited, or early knowledge management projects” (p. 232). Earl (2001) did not suggest implications resulting from the practice. However, he did offer a clear categorization of the seven different types of knowledge management. This categorization includes three clusters: technocratic, economic and behavioral knowledge management. Technocratic knowledge management refers to

organizations in which the base of knowledge creation is the utilization of information or management technologies. Economic knowledge management emphasizes the significance of generating revenue streams through the utilization of knowledge. Lastly, behavioral knowledge management is more focused on motivating managers and management to strengthen knowledge sharing and creation. In other words, behavioral KM refers to seeing knowledge as a resource that individuals own (Earl, 2001).

It has been proposed that there are three different approaches to analyzing KM in organizations (Borowiecki & Siuta-Tokarska, 2013). The first, the most traditional, is Nonaka and Takeuchi's approach, which focuses on the division of knowledge. Second, Leonard-Barton's (1995) approach focuses on key competences and skills. Third, Davenport and Prusak (1998) advocated the process approach, where KM creates, codifies and transfers knowledge. Based on a critical review of 50 different KM perspectives, Crane (2015) emphasized that the main difference between approaches is whether knowledge is interpreted as a personal or social asset.

Borowiecki and Siuta-Tokarska (2013) highlighted that there are different types of "knowledge companies" which affect KM. First, we discuss companies in which knowledge is a core value. If the company does not take care of developing the knowledge base, the company will lose its market share and competitive edge. Second, we describe companies that are one step ahead from the previous type. They already have the core knowledge, but they understand the value of innovative knowledge that will build value in the business world of tomorrow. This difference is crucial for understanding why knowledge is something that is available elsewhere or should be imported. For this reason, KM will help a company recognize and effectively organize how productive the company is now and in the future.

Overall, it can be concluded that KM is more than processing data into information or managing IS systems (Austin et al., 2008). Tiwana (2000) has defined KM simply as managing knowledge in an organization. The key is to build business value from organized and structured knowledge processes (Tiwana, 2000). Knowledge management means building a sharing environment in which knowledge can be shared, distributed and developed through the use of different systems and technologies (Gold et al., 2001; Austin et al., 2008). Instead of focusing on data or information utilization, the ultimate goal is to manage the process of creating, sharing and transforming knowledge within the organization (Nonaka & Takeuchi, 1998).

2.3.2 Comprehensive knowledge management model

Based on their research, Lee and Choi (2003) attempted to build a comprehensive model of the recognized success builders of KM: enablers, processes and organizational performance. Basically, enablers refer to the organizational infrastructure used to effectively perform knowledge processes, in other words, to help store, create, share and use knowledge. As already stated, processes are all the actions taken in order to manage knowledge effectively (Gold et al., 2001). Business performance can be defined as the degree to which business goals are met and can refer to financial metrics or organizational learning (Simonin, 1997).

To summarize Lee and Choi's findings, knowledge creation and processes cannot be managed perfectly. Thus, the management has to be able to recognize which enablers are crucial for knowledge creation. Austin et al. (2008) argued that organizations should define and recognize the most vital processes that support the utilization of KM systems. In practice, this means testing, trying and finding ways in which KM systems feel comfortable and beneficial for employees.

Cohen and Olsen (2014) confirmed that KM capabilities and their effectiveness vary, depending on the surrounding organizational circumstances. In practice, this could mean that, for service-oriented business models, investing in IT systems over human resources may lead to worse business performance (Cohen & Olsen, 2014). However, their findings disagreed with Lee and Choi's (2003) results, which concluded that the implementation of strategies for managing both tacit and explicit knowledge at the same time cannot be beneficial for a firm's performance. Cohen and Olsen (2014) argued that this is possible if the focus is on enhancing the customer service or offering. In this case, the firm has to identify crucial IT systems and structures that enhance knowledge utilization in the specific context. Overall, KM is highly dependent on contextual factors that define how knowledge and KM is perceived and interpreted.

2.3.3 Critical success factors for knowledge management

Heisig (2009) divided the critical success factors of KM into four groups: human-oriented factors, organization-oriented factors, technology-oriented factors and management process-oriented factors. Subsequently, Inkinen (2016) used the same framework and studied knowledge management practices and their effect on organizational performance. Heisig (2009) emphasized human-oriented factors as one of the four categories crucial for the success of knowledge management. Besides human-oriented factors, he identified technology and organization as major challenges. However, the current literature does not present proof of the direct impact of organizational activities on business performance

(Inkinen, 2016). Instead of focusing on the decentralization of power or decision-making, Inkinen (2016) argued that “establishing expert units that have well-defined goals and responsibilities” (p. 242) will be more beneficial. The last challenge Heisig (2016) identified was overall process management, referring to goal setting, strategy and measurements. This refers to the planning of an implementation strategy for KM. Successful KM requires goals and targets for both employees and management that are regularly tracked and measured.

With regard to human oriented-factors, Inkinen (2016) found that human resource management (HRM) practices can indirectly enhance a firm’s performance by strengthening the knowledge processes and employees’ ability to take advantage of their own knowledge. This can be achieved by supporting employees’ commitment to organizational activities, as well as increasing the way IT systems support knowledge management (Inkinen, 2016). In addition to HRM practices, Inkinen (2016) identified leadership as a main success factor among human-oriented factors. Lee et al. (2008) emphasized that support structures such as knowledge management strategies and goals are vital for successful leadership. Overall, motivating, inspiring and participating leadership enhances knowledge management activities by supporting knowledge transformation and sharing (Inkinen, 2016).

Inkinen (2016) concluded that technology-oriented factors are also significant for successful KM. These include, for example, IT support systems that enhance knowledge sharing, creation and transformation (Lee et al., 2003; Davenport & Prusak, 1998). Lee et al. (2012) concluded that suitable IT systems, combined with good HRM practices, enhance organizational learning and build an agile culture. Furthermore, IT systems and their utilization were found to have a positive impact on a firm’s innovativeness, similar to HRM practices (Inkinen, 2016). It was also found that IT support was one of the key assets responsible for a competitive edge in the market, leading to growth and increasing profitability (Inkinen, 2016).

Third, management process-oriented factors are related to activities such as strategic planning, implementation, and recognizing and updating activities that involve knowledge building (Inkinen, 2016). Lee et al. (2008) emphasized that strategic KM activities also enhance the non-financial performance of an organization. Strategic KM activities especially support organizational learning and growth by developing and strengthening internal business processes and customer orientation (Lee et al., 2008). Furthermore, strategic KM tools comprise an underlying factor rendering knowledge as an intellectual asset important for a firm (Grant, 1996). This, of course, leads to an important mindset that the firm can follow in all its actions and operations.

2.3.4 An enabling environment for knowledge management

Reich et al. (2012) identified an “enabling environment” as one of the key aspects for successful KM. This refers to two dimensions, namely technological and social factors. The same categorization was also used by Alavi and Leidner (2001). As stated previously, knowledge is constantly transferred and shared among individuals working in the same organization. Thus, knowledge transfer happens between individuals. That raises one of the major challenges KM aims to solve, namely how to facilitate and improve knowledge transfer within an organization (Alavi & Leidner, 2001). Of course, this perspective assumes that knowledge is a valuable resource possessed by individuals.

Briefly, one of the greatest challenges of knowledge management is to make one person’s knowledge available and meaningful to others (Alavi & Leidner, 2001). This transfer challenge applies at the group and organizational levels as well. Heisig (2014) argued that KM research mostly focused on the application of IS systems. However, research indicates that there should be more focus on clarifying the economic, social and human factors of the implementation of new technologies. For this reason, Heisig (2014) argued that more emphasis should be placed on researching the human and social factors of knowledge management. Davenport (1998) argued that the strategic value gained through knowledge management is strongly related to the characteristics of the organizational culture.

As stated previously, knowledge is created through the social learning process. Alavi et al. (2005) emphasized that the impact of the organizational culture is a key success factor for successful knowledge management, both in terms of implementation and maintenance. Based on their case study, which involved a global high-tech giant, Alavi et al. (2005) concluded that an organization’s values affect how knowledge management tools are utilized in daily practices. Similarly, Gilmour (2003) agreed that the key factors of KM are individuals, their values, and attitudes towards the systems being used. When these values differ from each other, the individuals use the knowledge management tools differently (Alavi et al., 2005).

Gilmour (2003) emphasized corporate culture as a tool to enable information flow within any organization, as people have a natural tendency to keep their information secret. If the culture does not support sharing knowledge, information will not flow, even though the supporting systems may be as suitable as possible. For example, Alavi et al. (2005) proved that when employees feel strongly connected to their colleagues, their responsiveness

and use of KM communication tools were remarkably higher compared to those who did not have a feeling of connection.

A culture that enhances successful KM can be achieved by effective leadership (Taylor, 2013; Inkinen, 2016; Heisig, 2014). Taylor (2013) emphasized that a knowledge-sharing culture can be developed, maintained and managed by implementing shared leadership principles. Shared leadership can be defined as horizontally distributed management, in which every team member is willing to lead the team to perform well (Taylor, 2013). This style of leadership is called modern by Inkinen (2016), who identified it as one of the key success factors of KM. Inkinen (2016) highlighted that modern leadership styles strengthen employees' feelings of a trust-based and knowledge-friendly culture, at the same time leading the knowledge base to match the strategic goals.

Overall, the surrounding organizational culture has a huge impact on successful KM. Figure 4 illustrates KM enablers which affect individuals' intentions to be involved in KM and knowledge processes. The management should focus on building an environment in which the organizational values strengthen the use of KM tools. In this regard, the management has a huge role to build leadership that supports the creation of a sharing culture. To create a knowledge-friendly culture, employees should feel connected to the organization and its strategic goals.

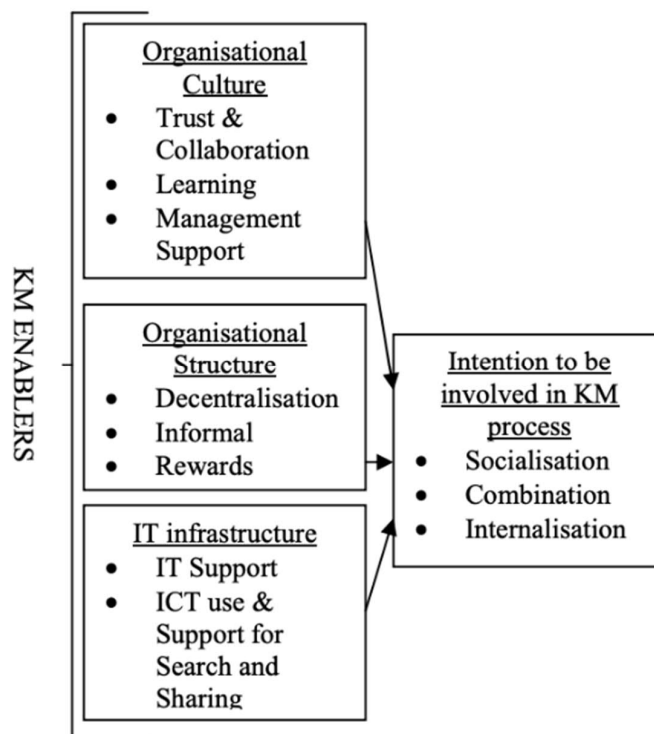


Figure 4: Knowledge management enablers (Razi et al., 2012). Originally, Alavi & Leidner (2001).

2.4 Knowledge management in sports

The roots of KM in sports dates back to the 1980s, when statistical analysis became part of the major sports in the US, baseball and basketball (Schumaker et al., 2010). Subsequently, this knowledge exposition happened in the sports context generally. The amount of data and information has grown significantly since then (Mitrewski & Aceski, 2015). However, to date there are relatively few studies that have investigated KM in the sports context. First, this section discusses knowledge in sports organizations and how this creates the need for sports KM. Second, the limited available sports KM literature is briefly introduced.

2.4.1 Knowledge in sports organizations

Rosca (2014) has suggested a model to strengthen strategic decision-making in sports organizations. Figure 5 presents three knowledge types, according to Rosca, required to effectively manage a sports organization. The first two are the traditional knowledge types. Game knowledge refers to knowledge that enables players to play the game and is owned by the players. This consists of motor and physical skills, as well as technical and tactical skills required by players. Basically, it refers to understanding the game. By comparison, coaching knowledge refers to game understanding and the knowledge of coaches, including how to guide the team during a game or training for better performance. Combining these two knowledge bases enables actual performance and playing. However, Rosca (2014) also emphasized a third type of knowledge, which is as important as the other two to effectively operate a sports organization. Expert knowledge refers to business knowledge and includes marketing knowledge, finance and accounting knowledge, and human resources management. According to Rosca (2014), expert knowledge supports sports organizations, for example, to build a stronger brand, to use resources more effectively, to reduce costs and to find new revenue streams.

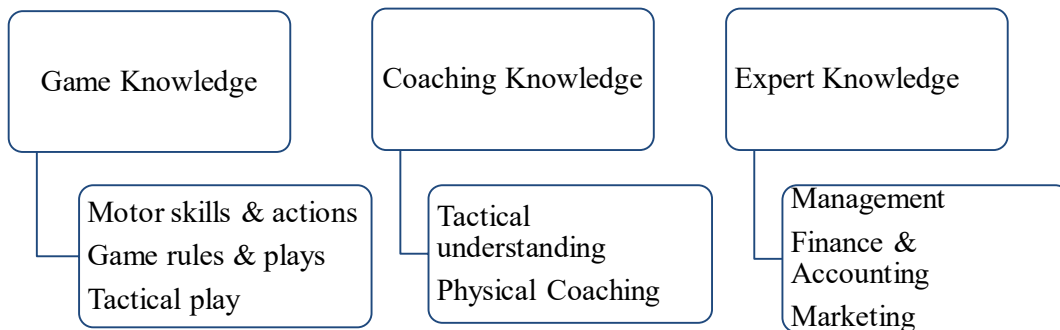


Figure 5: Three types of knowledge in sports organizations (Rosca, 2014).

While Rosca (2014) categorized the different types of knowledge, Schumaker et al. (2010) developed a framework for sports knowledge production. Figure 6 illustrates this framework which can transform sports data into meaningful knowledge through three processes: expert examination, statistical analysis and machine learning. Put simply, expert examination describes the process by which sports professionals make decisions based on the available data and their experience. Second, statistical analysis refers to the processes of data mining and modelling to achieve better predictions and support decision-making. As stated previously, statistics have been part of sports for a long time, but now more sophisticated IS systems can, for example, reveal interesting patterns in players' behaviors or teams' strengths and weaknesses. Third, machine learning can learn patterns from the data and reveal knowledge that was previously not obvious. For example, the hidden trends of some players' actions may be revealed by machine learning, something that was not previously recognized by coaches or scouts.

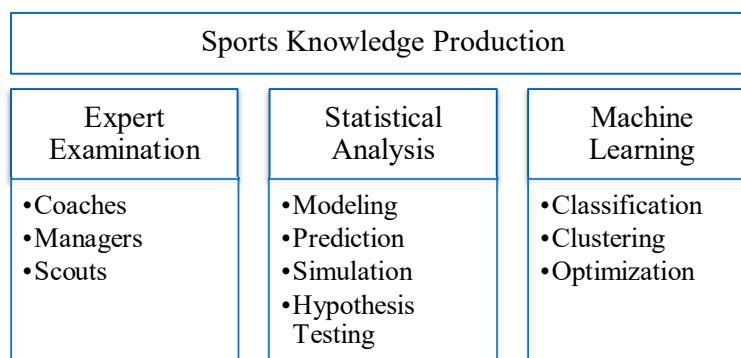


Figure 6: Sports Knowledge Production (Schumaker et al., 2010).

2.4.2 Sport knowledge management

Research on sports KM has focused on recognizing and building relevant KM systems to enhance knowledge creation, transformation and sharing. For example, Espitia-Escurer and Garcia-Cebrián (2006) investigated Spanish first-division soccer teams' performance and built a system for comparing the actual results and the results a club should have achieved. This resulted in building a system that enables management to more efficiently allocate their resources and recognize critical factors of not using the resources as efficiently as possible. In another example, Edhardt and Martin-Rios (2016) investigated two kinds of sports teams to illustrate how differences in organizational structures and KM systems affected

knowledge creation, transformation and sharing. Overall, research on sports KM is limited to investigating KM systems and how to innovate these in the sports environment.

With regard to the sports KM environment, Rosca (2010) has argued that performing well in a highly pressurized environment requires creating a KM environment in which the full knowledge capacity of a sports organization is utilized. Moreover, Rosca (2014) has argued that sports organizations could achieve a competitive edge by combining the different types of knowledge more efficiently. Rosca (2014) has underlined that, as a sports organization's knowledge base consists of coaching and game knowledge, the integration of expert knowledge in this context is key to developing a competitive edge against other organizations. In other words, several types of knowledge can enable sports organizations to find new ways to make the work of coaches and management more efficient (Rosca, 2010).

3 Methodology

The aim of this research study is to identify the critical factors for KM in a sports context. This chapter describes the case study. However, since the sports industry in Finland is limited, the project is vulnerable to identification if too many details of Company A are disclosed. For this reason, the case study is described in a way that ensures the anonymity of the company and its representatives. First, the case methodology is discussed. Second, the data collection and analysis processes are described. Third, the case company is introduced.

3.1 Background of the methodology

Until the end of the 1980s, research based on qualitative information systems (IS) was not systematic and not as highly valued as research based on quantitative IS. Then various researchers challenged the limitations of IS studies. However, Cecek-Kezmanovic et al. (2020) argued that opening IS research to social processes and underlying issues would benefit the application of information technology in an organizational context.

Qualitative business studies are relevant for finding underlying issues when there is a need to understand and explain the bigger picture (Eriksson & Kovalainen, 2008). Eriksson and Kovalainen (2008) specified two different scenarios in which qualitative business studies are the most valuable: First, when the topic is relatively new and unknown, a qualitative study gives a holistic understanding of the topic before moving to more specific quantitative studies. Second, if the quantitative study has failed to deliver relevant results, a qualitative study can provide an understanding of all kinds of topics. As KM is not a research field in the sports management context yet, the qualitative methodology provides a good start to understand the research topic and issues that are crucial for successful KM in the sports context. Moreover, the qualitative method provides an opportunity to understand how coaches interpret their knowledge.

As Lee (1989) has emphasized, IS case study methods are not the most valuable for establishing new theoretical frameworks. However, qualitative IS study methods can be an efficient tool to extend the existing theoretical framework and the literature. For that reason, a qualitative research methodology was chosen, since the main objective of this research study is to extend the KM literature, not to build a new theoretical framework.

Silverman (2013) has identified the factors affecting the choice of a qualitative methodology for conducting research. Basically, the research method depends on the research objective and what is regarded as valuable information and interesting. In this

research study, the main aim is to understand the key enablers of KM in the sports context. According to Silverman (2013), qualitative research facilitates investigating research phenomena in a natural setting that may reveal important aspects regarding why and how participants act and work in a specific way.

There are multiple available methods for qualitative research in IS studies, such as the case study, ethnographic, grounded theory, the focus group or action research (Eriksson & Kovalainen, 2008). Also, how these methods are categorized varies somewhat (Cecek-Kexmanovic, 2020). When the aim is to study information systems in organizations, and not just the technical issues they raise, a case study is a way of understanding various phenomena within a real-life context (Lee, 1989). Therefore, due to the aim of this research, a case study provides a great opportunity to understand the research phenomena more holistically within a real-life context.

Defining what a case study is, Eriksson and Kovalainen (2008) distinguished intensive and extensive case studies. An intensive case study refers to a study in which a unique and individual case is studied from the inside with the aim of understanding it thoroughly, while an extensive case study aims for more generalizable results by interpreting several individuals in a specific context. The authors stated that an extensive case study may be used if there is no available research on a specific topic in a specific sector. While KM has been studied and interpreted in various business sectors, sports management and the sports industry have to date not been investigated. An extensive case study provides an opportunity to interpret phenomena in a new context and the issues that are vital for successful KM in the sports context.

3.2 Data collection and analysis

Having decided on a qualitative methodology, namely a case study, the data gathering style was considered. Interviews are one way to gain a holistic understanding of the research topic in a natural setting (Lee, 1989). To gain a holistic overview of the research topic, interviews were chosen as the data gathering method.

The data were collected by interviewing 18 employees of the organization. Of the 18 interviewees, three were from the administrative level, while the rest were either coaches or managers for certain age groups. The interviewees were approached via the administration; the ultimate goal was to include coaches with different roles and for different age groups. The aim was to have as diverse a group of interviewees as possible. The interviewees were informed and invited to the interviews by email. Table 1 lists the interviewees: their names

have been changed in order to protect their anonymity. Since the organization is very male dominated, only two of the interviewees are women. In order to protect their anonymity, all the interviewees' names were changed to Finnish male names.

Table 1: Overview of data collection

Role	No. Interviews	Names
Coach U5–U11, boys/girls	4	Simon, Peter, Miles, Luke
Coach Youth/Adults	7	Henry, Math, Nick, Mark, John, Mike, James
Coach Manager	3	Arthur, Luis, Keith
Administrative Role	3	Troy, Harry, David
Coach Education	1	Jerry

The interviews were open-ended and semi-structured. Semi-structured interviews are usually used for collecting similar information about a topic by planning specific themes that are discussed in an informal style (Lapan & Riemer, 2011). However, the interviews move forward freely, ensuring that everything has been covered when the interviews are finished. The interview themes and support questions can be found in the Appendix. Not all the questions were asked in every interview. It was decided to use themes and semi-structured interviews as an interview methodology in order to obtain the underlying attitudes and motivations of employees. All the interviews were recorded and fully transcribed. The interviews were conducted either in Finnish or English, depending on the interviewee's native language.

The data analysis was based on the theoretical framework represented in the literature review. The literature on KM is basically divided into three clusters: defining data, information and knowledge; knowledge processes; and enablers for successful KM. Lapan and Riemer (2011) have defined coding as a process by which qualitative research data are coded into themes and topics. This theoretical ideology was applied to analyze the data collected by the interviews. The semi-structured interviews were structured into themes that also supported analyzing the data.

As mentioned previously, it is important to note that the context of this research study is new and has not been studied before. For this reason, the theoretical framework could not be too strict, in order to understand KM in coaching neutrally and holistically. Otherwise, the main aim of the qualitative study, to explain and increase understanding about the

research phenomena, would not have been achieved. A too formal and strict research setup could have reduced the quality and contribution of the qualitative study (Eriksson & Kovalainen, 2008; Lee, 1989).

3.3 Introduction of the case company

The project of implementing KM began about five years ago at Company A. During these five years, Company A has grown and the number of full-time employees has increased constantly. This of course enables the management to lead better and to guide the organization in the right direction.

Regarding the organizational structure, Company A consists of two organizations. The junior and adult teams are separated into two different organizations, each with their own managements. Currently, the aim is to enhance collaboration between the two organizations to find more synergies.

In the past, Company A has operated many sports clubs in Finland: The coaches' knowledge and competence have guided player development and coaching to achieve the best results. In practice, this means that coaches have been responsible for planning and executing the mission quite independently. However, as financial resources have been increasing, the managerial side has been strengthened at the same time, and the number of full-time coaches has increased. This has enabled the recruitment of shift coaches, who can concentrate on players' development and coaching, while managerial staff take care of issues such as marketing and financial duties.

Knowledge management in sports organizations is a combination of cultural and technological change. First, the management has to have an understanding of what they are trying to change to actually improve the current processes. Second, they recognize that implementing KM principles in coaching and player development is even more challenging than doing implementing it in their own job duties, which are more related to "traditional business." For that reason, they recognize the need for a project that investigates in-depth how knowledge operates in coaches' work and how that may frame KM implementation.

One of the key issues the management is struggling with is how knowledge is shared and saved. Coaches are employees and they are free to leave and change clubs as they choose. As the organization relies on the coaches' knowledge, it faces a high risk of huge information losses if someone leaves. Thus, the management is interested in how they can enhance transparency and sharing throughout the organization. Naturally, a great deal of

coaches' knowledge will inevitably disappear, but the training history and player information should be documented and transformed into knowledge in written form.

Second, the management recognizes that KM is not a familiar way of working for the employees as it is for them. For years, coaching has been based on coaches' decisions and perceptions. Now, statistical tools are aiding coaches' decision-making. Looking at the bigger picture, it seems that coaches are easily confused by all the available information. So, it is vital for management to understand how the employees are experiencing KM, since there are question marks about their experience with knowledge and how it is built by using data and information as supports.

All this transformation may sound normal for any employee working in a business company. However, sports clubs have been working on a voluntary basis for a long time. Organizational development has been lagging behind. Now, the goal is to create a professional working culture, in which the employees are committed to following the objectives and working methods of the organization. The management of Company A understands that applying KM principles to practices requires listening to and understanding their employees, the coaches. During this starting phase of the process, Company A wants to understand the possible problems and obstacles, as well as the possibilities they may face when changing their organizational system. In addition, they are eager to find factors that will support KM utilization and implementation in the future.

4 Findings

This chapter discusses the analysis conducted, based on the interviews. The analysis was divided into four parts: the first part clarifies how coaches construct knowledge. The second part discusses how knowledge affects coaches' work. The third part discusses KM tools, data and KM systems, more specifically, how data and KM systems are used and affect the player development work. Finally, the organizational and managerial aspects are analyzed.

4.1 Coaches' knowledge

This section discusses the findings from the interviews that explain the coaches' perceptions of their knowledge. The analysis is divided into three parts: first, coaches' experience and understanding are crucial for their ability to be a coach. Second, their work is partly based on the available data and information that form a crucial part of their knowledge. Third, one part of the knowledge is clearly more structured and easier to explain and document.

4.1.1 Understanding the players' and the team's performance

Coaching aims to develop the players and the team. This requires an understanding of the actions of individual players and the team. The most important information bank for coaches is seeing the players' and the team's performance during games and practices, as well as watching it on video afterwards. Coaches evaluate the players' and the team's field performance to see whether they have been succeeding in their coaching to develop players.

“There is all the time happening a lot, so what I can see from the games and practices is relevant information for me as a coach. Every training and game are kind of a test for me.”
(Simon, U5–U11)

The coaches look for specific actions by individual players or a group of players that tell them whether they are succeeding or not. The actions they are looking for are based on their own understanding of the game. In other words, they seem to conduct a cause-effect analysis where certain actions performed by the players are connected with certain qualities of the players. Based on that, the coaches aim to create exercises that support training specific technical or tactical behaviors. Then, they try to evaluate and modify what they see, to help players perform better and solve the problems they are facing on the field more successfully. This evaluation process is not a specific process. Instead, it is hard to articulate and explain, but it seems to be at the heart of coaching.

“I have a certain goal for the training session. In that session I want to see it happen in practice. If it does not, I have to react and then give advice for players or change something in the exercise. As a coach, I just have to identify when the player is succeeding.” (Nick, Coach youth/adults)

The coaches mentioned that it is important to identify certain signs in the players' behavior that can indicate problems. For example, a tired player is frustrated during training and cannot perform well. All this seems to be a natural way of understanding players for every coach. They do not analyze only football actions, but also actions off the field that indicate possible problems that can affect performance. However, the coaches cannot explain any specific rules they are following. It is more about being able to identify small signs in the context that lead them to take action.

Partly, the coaches need to build their knowledge with insufficient resources. Especially with children and youths, the overall load varies a great deal from player to player. Some players compete in multiple sports that affect their recovery time. Also, big life changes affect players' mental state significantly and should be taken into account in practice planning. Due to the fact that coaches are responsible for a larger number of players on the children's teams, it is harder to discuss issues with the players individually to get information.

“Big changes in life, such as deaths, changing school, divorce situations, are the information I need. Otherwise, the player education project fails. I could pay attention to which events the children participate in and what is the role there. For example, the player may have little injuries or signs that there is a lot going on in life at home. I could adapt the plan so that the player could rest one event. Right now, I cannot take care of this as well as I hope.” (Peter, Coach U5–U11)

Currently, getting information about players' real mental and life situations is based on the coach's ability to be interested and ask questions. One of the key factors that affect getting information about the players' wellbeing is coaches' ability to build trusting relationships with the players. Then, the players are willing to share their life problems on and off the pitch. This requires communications skills and perception in order to interpret correctly the signals that may be visible in players' actions or discussions if everything is not alright.

“I feel that many players are trusting. That is a good starting point. It has been good.”
(Henry, Coach Youth/Adult)

“The mental state is really important. They are quite honest with me; it won’t happen if I do not have such trust to build on.” (Mathey, Coach Youth/Adult)

Most coaches also recognized that there is a need for a professional to support players’ growth in becoming an athlete. They feel that it is partly outside of their area of expertise to try to support players becoming mentally stronger. Some coaches may feel it is not important to listen to players’ personal problems or they may not be comfortable doing so. This information may also affect the coach’s judgement of the player’s performance. However, if a coach does not have the ability to read the situation or to have a discussion with a player, the underlying issue behind the poor performance will not be understood. This, of course, will affect the player’s development in the future.

“Now, they are telling me how they are feeling. However, it should be deeper, and it should not come from me. Some professionals they could talk to. If they are having a bad day at training, the coaches do not understand they have other stuff. Many coaches just ignore that, since they do not really know what is going on in their life.” (Mathey, Coach Youth/Adult)

Overall, it can be said that a coach’s experiences play a remarkable role in their knowledge. They do value their reactive way of working. They note or feel that this is the right way to work, but they are not able to clearly describe how their knowledge on or off the field affects their decisions.

“It is very hard to explain my decision as coach in detail. Yes, there are some guidelines which I have learned from the coaching education. But it is not that I’ve learned 100 situations and then I just do it on the field. The situation is never the same and still I kind of know what to do.” (Luke, Coach Youth/Adult)

4.1.2 The role of data for coaches' knowledge

Video material from games and trainings provides the possibility again to go through how the team and the players performed. It also provides the possibility to take more time to consider what should be trained and how, since during the game or practices everything happens very fast. It also offers more time for analysis, since the videos can be watched again and again. Basically, the evaluation process is very similar to the evaluation on the field. The coaches watch and analyze the actions and draw their conclusions from that. It is their subjective judgement of the performance that establishes an understanding of the game or the training.

“We film games, and sometimes the practices as well. That gives me an opportunity to go through again more deeply how the players and the team performed. On the field, everything is more reactive.” (James, Coach Youth/Adult)

The coaches realize that it is relevant and important to obtain data and information about the players' physical status and capabilities to be able to understand their physical capabilities. These data are gathered by physical tests, such as heart rates and GPS monitoring. The tests are performed either by Company A or by a third party. The older a player gets, the more they are tested. Heart rate monitoring is regarded as valuable data to understand the impact of training on the players' physical capabilities. However, consistent heart rate monitoring is only possible for the men's top team. Overall, these data provide knowledge about the players' or team's physical performance. There is fewer subjective feelings associated with the physical evaluation, since interpreting the numbers is more straightforward compared to the players' performance on the field.

“The test results are, of course, one data source. If I could decide, we would also use heart rate monitoring to get more specific information about how high the individual player's overall training load is and how they are recovering inside the training. As well, I could see how much they are running in different speed zones and so on.” (James, Coach Youth/Adult)

“I use the physical test results to see in which stages the players are developing.” (Mark, Coach Youth/Adult)

The data indicate the players' maximum physical capabilities, whether the players are at a good level and where they are developing most. These are basically numbers that coaches track themselves. For some teams, the data are stored by a third party. This third party also provides information about what kinds of physical skills can be trained at the specific stage of the growth curve. The data are an enabler of knowledge. Without the data, coaches would guess how to develop players' physical performance.

“The test result is important in terms of giving information what we are good at and what needs to be improved. Also, when the players are filling their load after trainings, it is easier to plan what level trainings I can plan for the next day. As well, there is information about what physical trainings should be done at that stage of the growth curve. Then I can do individual planning better.” (Simon, Coach U5–U11)

The coaches are looking for opportunities to get information about players' overall condition, since the physical data cannot describe the whole truth. Understanding the players' experience and feelings of their current status allows coaches to plan the training schedule better and do individual adjustments. The overall condition is valuable information, despite the player's age. In addition, this supports coaches' own evaluation of what they have seen on and off the field.

“This season we have been putting emphasis on the holistic view of wellbeing. The holistic wellbeing is super important. These may be very small things that have a huge effect for player development. In terms of wellbeing, every player has their own challenges. For some it is eating and others more economical, then there are these issues at school, somebody has just entered high school and for some players parents are telling them what to do.” (Henry, Coach Youth/Adult)

Wellbeing questionnaires is one way for coaches to build knowledge of the players' overall condition. This system gives valuable information and data for coaches. They get some statistics of the overall mental and physical condition of players. The key is that players are providing this information themselves, and it is a subjective estimation of their current wellbeing and experienced condition.

“We have the benchmark to get players’ own evaluation of the training load and daily wellbeing. It is a good way to get an estimation of the recovery status of the players from themselves.” (James, Coach Youth/Adult)

4.1.3 Coaching principles as guidelines

Besides getting data and information from the players, coaches search actively for information to increase their competence as coaches. This is mainly done in discussion with other coaches, mainly in their own clubs. Half of the coaches mentioned that they regularly have discussions with other clubs’ or other sports’ coaches to increase their understanding and competence. In addition, the internet, social media, club visits abroad, scientific publications, coach education and the Football Association of Finland were mentioned as sources of information. This information is vital for coaches to get to know the best practices.

“Well, other coaches are important information sources too. I also read quite a lot of literature. I search for relevant news and educate myself as a coach. Or I mean the courses led by the Football Association of Finland, such as econo and everything else. I have a pretty big support network in the sports field, outside of football. So, I also collaborate with other sports.” (Simon, Coach U5–U11)

“Social media, especially Twitter is nowadays a very important platform for coaching discussions. If I was not taking advantage out of it, I would be stupid.” (Luke, Coach U5–U11)

To clarify, Company A’s own database was not a key information or data source for any of the coaches. Only the person responsible for uploading and updating the information to the database was checking it regularly. Currently, Company A’s database of coaching principles contains a great deal of information. For that reason, it is difficult to apply in practice. The coaches also feel that a specific protocol cannot be followed, as coaching is depended on the situational factors. It is clear that the amount of information given for coaches is too much to use it as a tool for player education. This result in a situation where the coaches are executing coaching as they see fit. Many of them do not actively use Company A’s information at all or use it only as a guideline for their coaching, since it is experienced as difficult to approach.

“I do not see any of the information is actually to be used, to be honest.” (Mathey, Coach Youth/Adult)

“The coaching is not understood. When I ask from the coaches working with the children what they think about it, they have not even heard about it. They may not have the base understanding of the theories of growth and learning which makes it impossible to understand the coach-line information in practice.” (Peter, Coach U5–U11)

The full-time coaches also mentioned the coaches who are doing the job part-time, which is one of the biggest challenges the club has to solve. First of all, most of these coaches are not fully motivated regarding their coaching role. In practice, this means they show up for training and leave afterwards. Even though great training plans are developed by the full-time coaches, half of it disappears, as there is no knowledge or willingness to commit to the role of coach.

One of the key issues is the education of the part-time coaches in order to increase their understanding of the game. Also, there has to be a better way of building communication between the full-time and part-time coaches. Right now, the information given is not in a form the part-time coaches would be able to understand and apply in the field. The coaches that are not working full time do not value the same data and information sources in their coaching planning as the full-time coaches, such as training plans.

“Basically, if I have made the training plan with specific exercises, the part-time coaches may not understand anything of it. Or the goals I have set for the training overall. I used to do very detailed plans, but I noticed it was a waste of time due to them not being able to read the plan, so I quit it.” (Peter, Coach U5–U11)

“If we are having this much ‘daddy coaches’ we have to put more effort into educating them and encourage them to participate in the education courses we are organizing. Maybe, we have to fix the scheduling of the courses to get them there or something else ... There are a couple who are very motivated. It is the most important thing. That you are committed to this. Then you are willing to learn. Then we have the possibility to even give the information and make sure they understand it.” (Simon, Coach U5–U11)

4.1.4 Summary

To conclude, coaches' knowledge includes a great deal of understanding and evaluating players' or the team's performance on the field. This is based on their experiences and understanding of football, which is extremely difficult to discuss simply and explain. Many actions taken by the coaches is extremely hard for them to verbalize and justify. They basically have this understanding based on their previous experience that supports their knowledge and performing well in that specific situation.

However, there is this strong reliance on data and information obtained from either playing, physical or mental activities of the players. This is something they cannot underestimate, since it gives great insights and richness to their knowledge. The key is that the data increase their understanding of the players' actions and wellbeing. It increases their ability to interpret underlying issues that may affect development.

Finally, there is clearly a part of knowledge that is easier to verbalize and document. Coaches look for outside sources to find relevant information that they can utilize in their work. This refers to knowledge that is not based on their own understanding and experience, but instead is part of very well-defined protocols and principles. Partly, it seems that these kinds of coaching principles are hard to verbalize in a form that would add value for coaches, since the coaches do value the situational and contextual factors on the field that require a reactive approach from them.

4.2 Knowledge processes and player development work

Knowledge management is very strict about knowledge processes. This section discusses how coaches create, use and share knowledge in their work to facilitate KM processes. First, it is discussing how video analysis is used as a tool to build knowledge and support coaching. Second, physical results affect how knowledge is created and utilized. Third, coaches rely a great deal on intuitive decision-making in their player development work. Lastly, knowledge organization, sharing and storing of coaches' work is discussed.

4.2.1 Analyzing videos

Every coach used video analysis in some form as a tool to guide their player development work and to get an understanding of how the team and players are performing. Filming practices is possible only for the older teams due to the available resources. Also, with the children and youth, not every match is filmed. As stated previously, the video provides an opportunity to look multiple times at how the players performed. That enables interpreting

new details of the players' actions. This knowledge creation enhances coaches' understanding of the game and their subjective analysis of certain actions.

The coaches use the videos differently to analyze their coaching. Some look more at the performance of the whole team, whereas others look only at individual players. This is also tied to the age of the team. With regard to children and youth, for the coaches it is most important to understand and create knowledge about individual players, but when players get older, the team performance and its analysis are more relevant. Depending on the coach, clips are made either about individual players or the whole team. Others may take pictures and share these with the players. Some add their own visualizations to help players to understand the clips.

"I watch the filmed games or practices. Those are YouTube videos that I watch. I write a word file about what is happening and then I take a screenshot. The screenshot I show and share with the players. We also have a trial video processing app that I can use to make clips and share them right away with the players after the games." (Peter, Coach U5–U11)

"Mostly I do clips of the games. To videos we are adding some visual highlights and marks." (James, Coach Youth/Adult)

The videos provide the possibility to analyze the technical and tactical aspects of the game. This is of course crucial in order to build an own understanding and knowledge, to develop at a new level as a coach. Most of the coaches are spending hours watching matches or practices and doing shorter clips for individual players and the team. There is huge variation in coaches' technical ability to use videos as a support tool for coaching. For some, it is one of the key methods to gain understanding of their players' technical and tactical skills, while for others, it is a support tool that is used to get a holistic understanding of how the team is playing. Other words, their technological skills are connected with the coaches' knowledge creation.

"I use the video to analyze the actions of the players on the field. I think there is a huge difference in the IT skills among the coaches and in the level we are able to use the videos as a tool for coaching. Everybody cannot understand what the advantage is of getting it from there. Everyone cannot even make clips or so on." (Miles, Coach U5–U11)

“I look at the game videos as well. What does our team’s playing look like? Maybe how some players are fitting into the playing system. Should something be changed, for example playing positions ...” (Mark, Coach Youth/Adult)

Video also acts as a feedback system for coaches to ponder whether their decisions have been correct. Some coaches have specific goals for a session or game. Afterwards, they use the video analysis to assess whether they have achieved the goals or not. So video is not just a tool that is used to evaluate the players’ development. It is also used to build coaches’ own coaching knowledge to a new level: to see which kind of practice has a certain effect on players’ performance and actions on the field.

“For example, I try to use the video to get information on whether I succeeded in building an effective session. I always have these themes that we are focusing on weekly or monthly. For example, I get a theme from the head coach she wants to work on. Then I add the tactical part into training and try to build the session based on that. Then I see from the videos whether I have succeeded in building the right session to really target developing these themes.” (Mathey, Coach Youth/Adult)

4.2.2 Analyzing physical statistics

One source for analyzing players’ physical capabilities is testing. The most common issue with physical testing is the question of how the data are useful for coaches in player development. Some are not that familiar with the metrics, and the data are too fragmented to give a holistic view of the individual’s or the team’s physical capability. The coaches lack the knowledge on how the test data can or should guide, for example, their training planning. This was a bigger issue with regard to the younger players.

“The test results are not really used. It is nice to have these tests and see how they are developing. But we have to have a certain plan how to develop a plan between the tests. It is not enough to do it for a couple of players. There is a huge difference in the attention given to players.” (Mathey, Coach Youth/Adult)

Basically, the physical test results and information provide coaches with an understanding of the strengths and weaknesses of the players and the team. This works as guidelines for

the training targets in the future. The tests are compared to previous results and teams. This increases the understanding of the current status and gives an opportunity to have indicators of the future of the players. The coaches are able to utilize the test results as they utilize their knowledge about physical development and training. This is gained through their own coaching education.

Again, there are differences among the IT skills of the coaches. Thus, the analysis of the test results is done more in-depth by some coaches than by others. For that reason, not every coach is able to create as much knowledge from the same data sets, since their IT skills are not sufficient. However, there is the possibility to get an analysis that is good enough. That does not require IT skills, just the ability to read and understand the test results.

“I see that understanding the test results is easy. I get them as finalized and can directly compare, for example, the five best players of the team to the others. I also do different kinds of visualizations to get a mathematical interpretation of the metrics, developed similarly between the players. In the long-term analyzing, I use the test results of previous age groups. It gives a better indication which direction we are heading, even some cause-result facts.”
(Miles, Coach U5–U11)

There is a clear division between how coaches are able to utilize the available data: coaches working with children have less time to do their work as well as they would like to. Coaches working with youth are not that fully booked. Lastly, the coaches working with adults have the most spread duties, which enables more in-depth analysis of their own work and its development. This naturally affects the ways work duties are done. If there is no time for data utilization, the coaching relies more on assumptions and beliefs.

“Currently, I have enough time. All the time, I have to ponder what is the value of the work I have done. Maybe not much has been achieved. And then I do something that is bringing more value. I have been mostly responsible for my work by myself, as the responsibility has been big. And that is a good thing. Definitely, it has grown and developed me to critically look and structure my work.” (Henry, Coach Youth/Adult)

“I have so much work. I am not even sure if [management] they understand how much I’m working. There are so many duties [planning trainings, watching clips, giving feedback for players] that increase my workload so much that I get stressed. I would really need more

support. I am a person that likes to do everything perfectly, and in this situation, I have too many things to take care of by myself.” (Simon, Coach U5–U11)

4.2.3 Intuitive decisions

Lastly, the coaches emphasize that the video analyzing or data overall cannot be the whole truth. Even though some specific metrics are built and followed, these metrics are just tools that guide players in the right direction. The game cannot be played so that the team gets good statistics from the video analysis or the players get good physical results. For that reason, the coaches value decision-making that is based on their ability to understand the situation. This matches the first part of this analysis: part of the coach’s knowledge is extremely hard to explain. It is more like understanding and reacting.

“Good indicators have pros and cons. But the final result cannot be that we are only looking at whether we are passing this specific amount. We have to look, think and understand the game.” (John, Coach, Youth/Adult)

Analyzing videos or physical capabilities is more based on understanding numbers or building metrics that indicate performance. However, many of the decisions coaches are making is based on their ability to recognize the relevant information from the game overall. More specifically, knowledge is understanding players’ actions, their movements, decisions, and how these affect the team’s performance. Without football-specific knowledge, understanding the game and the team’s performance is impossible, which means teaching the game is impossible. This process is more intuitive and internal. Utilizing this part of own knowledge is kind of an autonomous process.

“In the first place, the coaches should understand the game in order to be able to teach it to the players.” (Mark, Coach Youth/Adult)

As said previously, intuitive decision-making has a significant role in coaches’ player development work. Experience is visible as the ability to recognize specific details from the game and players’ actions that help coaches make decisions faster, as well as collect the available information as an understandable summary of the situation. The more experienced coaches have a better ability to utilize their knowledge or they have a larger knowledge base. At some level, they are better at reaching conclusions and combining many information sources.

“Every information source, training, benchmarks and games are important. I use all of them. The same thing may be visible in all of them. In the end, it is the whole. Somehow, also the intuition. When there are enough signs visible, then we have to be brave and say something to the player. And there has to be enough evidence and strong understanding that my point is relevant for the player.” (Henry, Coach Youth/Adult)

Also, the coaches trust their instinct and eyes in decision-making. Even though they have a great deal of data available, the feelings and perceptions of the game and players are important for coaching. They do value their knowledge and decision-making and are not afraid of taking decisions or actions if the situation requires it. Besides, they do their work very independently, they do not rely on someone’s support to coach players forward. They trust their own vision and knowledge and are not afraid to apply it in practice.

“However, my own eyes are the most used tool that I use. I see on the field what I am supposed to do.” (Mark, Coach Youth/Adult)

Learning to recognize and understand their own decisions depends on their own perception of the game. In order to learn to make different kinds of decisions, it is vital to learn to perceive the game from different perspectives. This may also strengthen the ability to make intuitive decisions during the game and practices. In order to coach, even with less experience, coaches have to find new ways to interpret players’ actions. This supports their knowledge creation processes.

“There are multiple things we can watch in performance. We cannot watch only the ball and what happens with it. If we look at different things, we get different information. And this process should be led and tracked. We have to trust and give opportunities for every coach to try to recognize what should be improved. This is especially the case with the coaches who do not have so many years of experience. That is how they start to recognize what they know.” (Jerry, Coach Education)

4.2.4 Organization, sharing and storing of work

Analyzing coaches’ way of doing their work, they use knowledge in a systematic way. Even though coaches have multiple ways of executing their work, they all have some individual

plan and protocol they are following. This is based on their knowledge of how coaching will bring the best results. Coaches are very detailed, describing how they construct their daily, weekly, monthly and yearly plans. However, this does not mean a written document. It is more a protocol for working that is very natural and typical for all of them. Of course, there are also written training plans, but these do not include actual guidelines on how to do something; they are more about guiding what should be trained and when.

“The way how systematically we are planning our coaching has gone forward at the individual level. This is based on the fact that coaches understand what they are doing, and they are capable of doing that with a long-term mindset.” (Jerry, Coach Education)

“For me, planning is all in all. I have the training rhythm and games planned so that the schedule is supporting the development of the players. There has to be progress in what we are doing. I am aiming to see that what we are training becomes visible in the games.” (Luke, Coach U5–U11)

Working independently is connected with knowledge creation and sharing. As said previously, the coaches execute their work as they see fit. Everyone is saving the work in their own personal hardware. Storing knowledge is mostly happening via training plans, game videos and test results. The actual coaching work, what has been done and how the players have improved are not saved anywhere. Every coach has their own databank and hardware they use. If someone is interested, the information is then shared with others. However, there is no systematic transparency currently in the coaches' work.

There has been an attempt to construct a system in which coaches can save their work, for example exercises to create a library from which any coach could get inspiration when planning trainings. Unfortunately, this system is not regularly used by the coaches yet. Interestingly, the coaches are experiencing that if everything is shared by everyone, it will cause information chaos. They do not believe that all their work should be shared and transparent.

For the more inexperienced coaches, knowledge sharing would be a key element for learning. Enhancing communication and daily chats among coaches from different levels would enhance knowledge sharing and the learning of the younger coaches. The coaches underline that many of their best ideas come from socially co-created discussions with colleagues. So, actually, they do note that they value social knowledge creation, even though

in practice their work is very independent when analyzed. For that reason, coaches emphasize their chats with colleagues as important for both their own development and players' development. New ideas will enrich their coaching and of course support player development.

“If everyone is sharing everything everywhere, it will be a huge chaos. I think it is enough that the basics are there available, it is everyone's own decision how to utilize it.” (John, Coach Youth/Adult)

“There is nothing happening like document sharing. We have these teams, for example, which enables it, but it is not used. I do not know why. I think a lot of information will disappear, since it is not saved or shared for others.” (Arthur, Coach Manager)

4.2.5 Summary

To conclude, the coaches work in two different ways: first, they utilize the data and information available. This is used especially when analyzing video material or the physical capabilities of the players. Second, the coaches rely on their intuitive and experiential decision-making. This is visible as they make fast decisions on the field during games and practices. In addition, this becomes visible in their ability to work systematically, planning their work and their player development plans.

Overall, there is a great deal of data and information available for coaches. The critical point seems to be how to recognize the crucial data and information that can really support the coaching work. Interestingly, they still value the knowledge socially co-created with other colleagues. However, sharing their work or storing it in public clouds is not part of their way of working, even though others' ideas are highly valued.

4.3 Data and KM systems in player development work

This section discusses the findings from the interviews related to data qualities and KM systems. The discussion starts with the nature of the data, followed by what is currently supporting knowledge creation and what should be improved in data collection. Lastly, the overall KM systems and IT environment are summarized.

4.3.1 Nature of data: consistent, comparable and reliable

At the moment, coaches are able to define the important data sources but not the most important data metrics that would bring the most value to their work. However, the nature

of data collection should be consistent and comparable. This supports the development process and its evaluation. The comparison seems to make the data richer and actually gives some guidelines for the work of coaches. If they see that their age group is lagging behind the previous one, they can try to identify differences in training. This will provide valuable information on what is an effective way of coaching players.

“Like I explained, we do have all those data sources available [physical tests, videos, wellbeing questionnaires, coaching principles]. The key is how we can systematically develop players from year to year? We need a holistic path for them. And this needs systematic data collection to enable comparison and evaluation of development.” (Luke, Coach U5–U11)

The coaches do see that the metrics should be developed together in order to collectively develop similar skills in the players, as well as aim to play football with the same principles as a team. This gives the framework for the data collection. Football as a game can be played in multiple ways. The coaches struggle to see clear goals that would support targeting the right skills in player development work. It should be clearly defined what the skills are that each age group of players should be taught. The better the targets are defined, the easier it is for coaches to focus on certain qualities. This helps the planning process as well. This would give the coaches a more systematic way of working collaboratively. Naturally, this also determined what kind of data should be collected. Coaches agree that more justified data collection would support data utilization. Currently, analyzing what should be trained is based mostly on coaches’ evaluation of what are the most important skills they should be targeting.

Furthermore, coaches are not able to define themselves what these targets should be. Somehow, they cannot find clear indicators that would be good enough to be used. To some extent, it sounds as if coaches are looking for perfect metrics and are not having the knowledge to build these, or they cannot use their own knowledge to identify targets that would be useful.

“There is no pattern in the trainings, no pattern to what we are teaching.” (Mathey, Coach Youth/Adult)

“How does the player's path go from a little child to a player of a league team? Now we are not having a clear plan of what is taught and when. We should determine all the sub-areas and be sure the base is good enough before moving forward with the coaching process. Otherwise, there will be problems in the players' path towards the top.” (Simon, Coach U5–U11)

“What are the physical, technical and tactical skills that we are following for each age groups? What should the coach teach the players?” (Miles, Coach U5–U11)

“It all starts with having a shared and common understanding of our players' path from the little child to the top team. We have to have some target things we are teaching at every stage of the game. Then we can start talking about having unified working methods, in which data and information utilization and sharing is one part.” (Miles, Coach U5–U11)

“We have to determine what is the reason behind the data utilization in coaching: to guide players to make better decisions. And we should share the understanding, what are the decisions we prefer these club players to take? Then we are on the right track. But data itself is not valuable if we don't understand how to utilize it in player development.” (Mark, Coach Youth/Adult)

In order to be able to compare the collected data, coaches note that the environment in which testing is conducted should always be the same. Some of the coaches did not see this as a problem. Instead, they just did a comparison among tests that were done in the same location.

“I see the test result as very simple and reliable when the tests are performed in the same place. Of course, if the tests are done in different test stations, then the results are not comparable. There is no such thing as absolute information, overall.” (Arthur, Coach Manager)

Also, it was raised that sometimes the data and information collected on the players' wellbeing are not reliable for coaches to be utilized. The players may underestimate their tiredness or practice loads while completing the data in order to get more playing time. Children's answers may be affected by the parents' support. Naturally, the coaches are willing to utilize the data, even though there may have been problems. However, also the

attitude towards data collection and utilization is a bit suboptimal for some coaches. They do not utilize it, since they do not trust its value, or they feel that it is unimportant.

“If it is used correctly, it is an awesome tool [wellbeing questionnaires]. A couple times in the beginning, I checked it, and everything looked OK, except the training. The players were tired. The system did not show it. Then we asked and the players said they were tired. The questionnaires were not filled in correctly. So, we have to sell this for the players as well. It is good for them. And we can’t blindly look at the results we get from there.” (Mark, Coach Youth/Adult)

“The reliability of the information we get is relative. It is completely reliable if the player marks the feeling after training by himself. However, the possible parents’ support and questions have a huge effect on the results. Also, when it is completed increases the inaccuracy.” (Peter, Coach U5–U11)

4.3.2 Individual planning

From the interviews it can be concluded that the information and data collected should support planning more individual development plans for the players. From the data and information gathered, the coaches should be able to build knowledge, so that both the coach and the player understand the development process and its steps. As said previously, this data collection should be consistent and systematic, in order to build data banks for individual players, so that new coaches also get an understanding of what kind of players they are getting in the team. This requires measuring both physical and mental capabilities, as well as technical and tactical capabilities on the field. Overall, the systems used should support transparency between the coach and players, as well as between coaches and other staff. Currently, the information flow is slow and a bit challenging.

“If we had more resources – every player and body is different – and we could do everything more individually. Some things can be done the same way for everyone, but for some players it just does not work. If we had some database, then I could see the history of the player and then we could continue the more individual planning easier. For example, if some players cannot do the same amount of jumps due to the growth stage, then we would prevent stupid injuries that slow down the player’s development. Besides, collecting that information would

give me the possibility to learn what kind of players are stepping into my team.” (Mike, Coach Youth/Adult)

The older the player gets; the more effort should be put into measuring also the player's tactical capabilities from perspective of the whole team. Even though the significance of the matches' and season's results increases as the player is moved to work with older teams, it does not reduce the need for individual planning. The team's performance is seen as the sum of its players' capabilities. The development of individuals builds the team's performance and development as well. The difference is that it seems to be irrelevant to collect too much data of the team's playing when they are children. To conclude, it is probably not needed to have exactly the same information shared throughout the player's development path. However, the coaches in the later development phases do value the “historical information.” That gives them information on what has been done and when.

“As I am working with the younger players, the focus is on the individual players. If the players develop, it will show up in the team's performance as well. Looking at the result in the long-term perspective is one thing, but in the short term I have to focus on the development of individual players. It may not be the result, but the playing overall that is showing the results.” (Miles, Coach U5–U11)

“Basically, the focus is on the team and the result we get on the weekends. That is it. Of course, we have to develop our playing, and that is the way of developing individual players' forward path too. But the further we get, the more we should shift the focus from individuals to teaching team's tactics. The basic individual skills have to be taught in an early phase.” (Nick, Coach Youth/Adult)

As mentioned previously, the wellbeing data were an important source of information and were connected with the ability to build individual plans. Of course, this kind of information should come from the players as naturally as possible. Understanding their personalities is crucial for both the coaches and the players themselves. Getting more in-depth data and understanding that would really improve the player development process.

In addition, this is connected to understanding how to give feedback to players individually. The coaches emphasized that it would be valuable to get information on how to take care of the players differently as individuals to get the best results. This acknowledges

that it is hard to have certain guidelines or automated systems for that. However, the systems could enable better feedback differently. For example, more fluent capability to share clips or individual training plans would value a player's development process.

“In the future, it would be valuable to get analysis of the players' personalities. What kind of analysis and feedback should I give the players? For example, some expert of mental coaching could advise me to give the feedback or player discussions in the right way. Also, maybe we could enhance the process of giving feedback, like having different channels for it.” (Nick, Coach Youth/Adult)

4.3.3 Videos from games and practices

The coaches emphasized that game or practice videos constitute the best quality data source. In other words, these information sources are seen as the greatest opportunity to build knowledge as a coach to make the right decisions. However, everybody agreed on the problem of getting quality data from the actions of individual players or the team. This was a problem even though the team was analyzed by a system, such as Instatt. Football is a subjective game and highly dependent on the context, which leads to numbers always being a simplified representation of the actual playing. There are no specific guidelines on how to win a game. It is naturally dependent on a huge number of variables.

Coaches have tried to look for different tools, but they have not found better than what is currently being used. They do understand that it is their responsibility to gain an understanding of the numbers. However, they underline that a more customizable system for the team's specific needs would be more beneficial. Currently, the report is massive and gives a great deal of information. It would be more beneficial if some parts are customized to better measure the organization's own playing targets. Now, the metrics automatically come from the service provider.

“The game itself and filming is full of information. I can see whether my coaching has had an effect on players' development. If it has, why it is so or why not. It is not simple. There are always difficulties defining the cause-effect relationship. And in the end, playing football is always subjective. Some say this is good and others say it is not.” (James, Coach Youth/Adult)

Not related to systems, but rather to data collection, one missing part was getting video materials from the trainings. If only games are filmed and analyzed, it is only one part of the player's development process that is analyzed.

“We should use more video material from the trainings as well. We will get more specific practices. If only the games are filmed, we cannot analyze some specific technical or tactical parts and their development.” (Luke, Coach U5–U11)

Right now, analyses are mainly done manually. The process of analyzing games and practice films is time-consuming and takes many hours of work by the coaches. The coaches do see that some of information collection could be automated or collected externally. By this they mean that some of the statistics could give beneficial insights to understand how the players or team has performed. It could help to categorize the game events into themes and offer metrics for certain variables decided beforehand. Currently, only the men's top team gets an automatic analysis of the games regularly. Others get the analysis a couple of times per season.

“It takes hours to analyze a game. It is time-consuming to get numbers out of the performance manually. For example, passing numbers, ball position numbers and winning 1v1 battles. This part would be beneficial to automate by Instatt, for example.” (James, Coach Youth/Adult)

However, the coaches underline that even though there would be extra resources for analyzing, they would still watch the games themselves also, because the system cannot estimate the contextual factors, such as an opponent's effect on players' actions. Besides, doing the analysis by oneself ensures getting all the relevant information out of the videos.

“However, this work is partly also a subjective opinion of the coaching team and coaches, at least when we are looking at some more tactical aspects of the game, such as successful openings or attacks.” (James, Coach Youth/Adult)

“As long as I am doing the analysis, I get all the information I want.” (Luke, Coach U5–U11)

4.3.4 Physical performance

Everybody agreed on the difficulty of building football-specific metrics to measure physical capacities. For the field players, the current tests give better indications of their physical capabilities as players than for goalkeepers. The coaches are willing to get physical data from the trainings and games, to get an image of the players' recovery and physical performance.

Also, currently information related to players' physical development is mostly sourced abroad. In many cases, the available resources in terms of systems and test environments are at a different level compared to Finland. The research data from Finland are from individual sports that are different from the football environment. This creates challenges because the tests are not as highly specified as possible.

"We need more [football-] specific metrics. These current tests give indicators for the field player at some level. However, we need also more specific metrics for goalies. This requires understanding the goalie's actions in the field step by step to target measuring these pieces." (Luke, U5–U11)

"If I could decide, we would also use heart rate monitoring to get more specific information about how high the individual player's overall load is, and how they are recovering inside the training, or how much they run during the trainings or games at high speeds." (James, Coach Youth/Adult)

However, the coaches felt the current physical tests are good enough at the moment. Instead, they talked more about the form in which the data are offered to them. The data are now basically numbers. The coaches do not really need the exact numbers; they need something to which they can compare the results, to see whether the players have developed or not. They would need more data that support finding insights to really understand the numbers. Also, they see that this process could be automated, since their IT skills are not sufficient to do the analysis. Also, they see that mastering data analysis is not a core knowledge that would be valuable for coaches to spend time on.

"The better visualization would bring benefits in long-term evaluation especially. We could better compare age group development at certain stages. Maybe we could even find reasons why the development has gone in that direction." (Miles, Coach U5–U11)

4.3.5 Gathering scientific research and data

The coaches working with children and youth underlined that they would need more scientifically proven facts about human stages of growth. This referred to the development of motor skills and how to teach these. This knowledge is something they would like to strengthen in the future. Every coach highlighted the importance of motor skills for player development. Currently, they get some parts of this information with the physical test results from the third party. Supporting this kind of analysis would enhance player development. In other words, the results would not be only numbers, but the system could also give directions on what to train with a player in the future.

“With the youngest age groups, the main focus should be on how to develop the motor skills. We should find ways to target these.” (Luis, Coach Manager)

The coaches working with children and youth emphasized that more effort should be put on understanding modern styles of teaching skills. This meant actual coaching work and its methods. In the opinion of the coaches, the methods used now varied a great deal among the club’s coaches, even though there is some kind of guideline about the teaching methodology used by the club. However, that information is not understood and internalized properly. Also, the coaches working with children and youth constantly raised this, but the coaches working with the older players did not even use the word “method.” Learning modern teaching skills is not related to any IT skills or data collection. It is closely connected to coaching education and research articles.

“We should understand and internalize the modern methods of teaching skills. In this country, we do not have a holistic view of that, yet. Literacy is still relatively new.” (Peter, Coach U5–U11)

Understanding scientific language was also recognized as a challenge, in order to build knowledge from the available information. Some of the coaches even asked for translation support. Moreover, the coaches emphasized that there is not enough research done in the team sport context in Finland. They have to look for research abroad, but sometimes that information does not apply to the Finnish context. And, as said, more research is done in individual sports. Thus, sometimes the available information is irrelevant. To date the

actions taken to find partners for conducting research on team sports has failed. Lack of scientifically proven information is frustrating for some coaches.

“We are relying on others’ scientific publications. To understand these, I have tried to ask for translation support. But those services are expensive. The hardest thing is to really understand the scientific articles. The terminology is extremely difficult to understand. And going further, what those articles mean for our daily coaching is demanding.” (Arthur, Coach Manager)

4.3.6 Summary

Currently, there is a great deal of information available. However, the coaches are struggling to analyze and recognize the most important metrics. Most of all, the coaches are looking to ensure data quality, that data collection is consistent from time to time, and that the data collected are comparable and reliable. In practice, this meant that the video material, tests and player data should be collected systematically in the same way, to build individual data banks for players. This would mean that the data collected is actually beneficial and can be used in player development work.

The coaches overall lack external or system support to analyze the data they receive, since data analysis is time-consuming and requires specific IT skills. However, since football as a game is very subjective, it has to be remembered that analysis cannot be automated for the whole process of player development. The coach has to give input to the analysis in terms of the contextual factors and adding their own understanding.

Finally, there are three takeaways from the analysis. First, the data collection should be more consistent and comparable to enable coaches to identify changes in the development process. Second, KM systems should be very simple and enhance the information flow on individual players between coaches, as well as between coaches and players. Third, there are problems finding football-specific metrics and analysis systems for physical and game data.

4.4 The role of management in player development work

In the implementation of KM, management’s role cannot be underestimated. Since the content of work of management and coaches is significantly different, the interviews from managers give great insight into important factors that may affect KM. First, it is discussed how data, information and knowledge are bound together differently among management. Second, the culture of the organization is raised as one of the key issues affecting KM when an organization actually consists of two separate organizations. Third, the organization’s

goals and targets are not shared or clear. This has a direct impact on how KM is applied in practice.

4.4.1 Data, information and knowledge among management

Management sees data and information as a natural part of their job. Since their job duties are more managerial and financial, they also recognize that it is easier to find facts and numbers on which to base their decisions than it is for coaches. For that reason, they are looking for facts in order to justify their decisions.

“I am aiming to use data in everything I am doing in order to get out of the feeling. We have to base our decisions on facts if we are a top club. And we should be able to justify why we are doing something.” (David, Management)

“For me it is a natural way of working. I look for the facts, so the decision-making is easier. I do my work so that everyone can look at it and have access to it if they need it.” (Troy, Management)

The managers also highly respect the knowledge of the coaches. They are trying to understand how KM principles could support coaching. The key is to find the data and information which support coaching work best. They are not willing to make decisions on behalf of the coaches. Instead, they believe that the best end result will be obtained by including coaches in the decision-making and get them to identify new ways of working.

However, they do see the job of a coach as similar to the leadership role of their own jobs. For that reason, it requires social and communication skills to create and a team environment in which the collaboration level is high. Furthermore, it requires human interactions; not everything in coaching work can be automated and based on available data.

“We are trying to find to ways how to support the humanism side of the coaching work. And that is something we want to support. We do recognize that everything cannot be based on facts. If that was the case, there would be robots coaching.” (Harry, Management)

From the perspective of management, currently the issue is the amount of data and information available. There is too much to analyze, and no one can define what is crucial. In addition, the managers are concerned about how much time the data and information

analysis is taking among coaches' daily work. For them as leaders, it is difficult to guide coaches towards identifying the vital information or data, since they do not have the coaching knowledge of football.

“There is plenty of information available. We have not identified what is relevant data or information. Besides, now the data analyzing is done mostly manually. We are doing a lot of work that some code could take care of. That is wasting time.” (Harry, Management)

“We do have a lot of information available. It is like a huge bank vault [the company's current cloud]. We have to open up the content better, more understandable materials and reduce the amount of information. Simply, I assume everyone is missing simplified goals, performance measurements and the basic model trainings for each age group.” (David, Management)

4.4.2 A knowledge culture in a split organization

The management sees that currently they are struggling to create a culture in which the data and information would be at the heart of operations. For example, they describe that their work is more visible for others. However, coaches' work is more individualistic. Since the management cannot be football coaches due to their lack of football-specific knowledge, they are willing to give the responsibility to develop the operations to the coaches. For that reason, they believe that changing the culture to more a professional working environment will have the biggest impact on how the coaches are doing their work, for example, how much they share and which systems they are using.

Mostly, managers hope that they can support creating a professional working culture, in which the employees understand that the organization has certain expectations of them. For example, the coaches would understand that using some systems is beneficial for them and for the organization as a whole, and that data and analytics are going to be part of everything, and that this transformation is natural and meant to support their coaching work. However, the coaches hope for similar change. They are working independently and are hoping for a more shared culture in which the values are visible in everyday life.

“I am working for this club. And I hope the coaches would think this way as well. This is connected to how the work is documented and shared. Is the coach here for the club or is the club here for the coach?” (Harry, Manager)

“I see this culture is a bit individualistic. I do understand that partly, since every coach has the history and background and we have to respect that. They are not used to work like this. And there is also some shared culture among the full-time employees that is recognizable. We should try to strengthen that, share more and learn together.” (Troy, Manager)

“The organizational culture should be shared. Our values should be unified and clarify how the values are visible in our everyday actions. Also determining how these values are part of coaching at different age groups could help build a better culture.” (James, Coach Youth/Adult)

Actually, both the management and coaches did talk about a professional working environment that is visible in everyday actions. Both agreed, also, that management has a huge impact on determining factors such as the organizational structure and work roles. In addition, the coaches and managers underlined the need for emphasizing teamwork in which everyone is responsible for their own area of expertise. Overall, currently, the organization is split in two, and everybody is hoping to create more synergies between the two different sides: juniors and adults. The management’s recognition of the need for better collaboration is noted. However, a good information flow between these organizations requires the active participation of every coach.

“We also have to have knowledge about how to lead the team. Hopefully, in the future this ideology that the role of the head coach is a bit different would be the normal way of working. Everybody in the team is an expert of their own area. This whole is led by the head coach. Coaching is becoming more and more complex. It is impossible to be taken care of by one person. The head coach role should be more to verify the tied collaboration between the whole team.” (Nick, Coach Youth/Adult)

“At least, we have to aim for a work culture in which we are not doing this independently, but instead together. We should forget the traditional head coach thinking, other titles and so on. More collaborations, team perspective and working in groups.” (Miles, Coach U5–U11)

“I hope we can see how real teamwork can be beneficial for our work results. Also, by doing more together, we can find synergies and be more productive.” (Troy, Manager)

4.4.3 Setting goals and targets

For coaches it would be important to crystalize why the club exists and what the ultimate goal of the KM process is. This would perhaps support coaches allocating time to different duties. The coaches recognize the missing indicators and their monitoring. There are no standards for them to critically estimate their work, apart from the actual results they achieve by the matches or the season. Some track the number of players that are getting into higher-level teams, national teams or go to play abroad. However, everyone agrees that this should not be the only valid metric to measure whether a coach is succeeding, especially on the children and youth side. In the end, coaches recognize that measuring and tracking their work effect is extremely difficult and is more based on feelings than actual facts.

“The club has to understand why they exist. When we have defined why we are doing this, we create a profile ourselves and then it is easier to answer that question. After that, it is easier to think about the whole player development process. If we are a high-level football club, it means we are not offering football for everyone. Then we have more resources to put elsewhere.” (Miles, Coach U5–U11)

“The player development will be better if the standard for coaches is set higher as well. If the coaches don’t meet the target, it has consequences. If we are expecting good performance from the players, we have to set the same standards for the coaches.” (Peter, U5–U11)

The management does agree with the coaches. They are missing goals and targets that would guide them as an organization in the right direction. They do see that KM is crucial for building goals and targets for Company A. Also, it would enable them better to track how employees are succeeding in their player development work. These measurements are important, as they can be a tool to support recognizing what to focus on, for both management and coaches.

“If we are doing this based on facts, we have a better chance to measure our performance and follow the development. Also, I see that building the KM culture will crystalize what we are looking to track and measure. This can give our coaching and operations better guidelines.” (Troy, Manager)

4.4.4 Summary

Overall, the management interprets the data and information differently than the coaches. They see the data and information as an integral part of their work, whereas the coaches see it more as an add-on. However, currently the overall issue is not the missing data or information. Management emphasizes that coaches cannot find the most relevant information for their work. For that reason, everything is collected.

Second, the management is constantly bringing up the culture. The organizational culture seems to be too individualistic for implementing KM quickly. The coaches are used to working in their own way, and now the management is hoping to create a unified, professional working culture.

Finally, implementing goals and targets could improve implementing KM in practice. This could happen both at the strategic and operational levels. By clearly defining goals, it will be easier to achieve these together.

5 Discussion

This chapter discusses the theoretical, managerial, practical and methodological implications of the research. First, the theoretical contributions are discussed, followed by the practical and managerial implications. Then the methodological implications are presented. Lastly, suggestions for further research are proposed.

5.1 Theoretical implications

The aim of this research study was to determine the main enablers of KM in the sports context, especially in player development work. Since the research field is new in KM research, the goal was to increase understanding of coaches' knowledge and knowledge processes. Understanding how coaches' knowledge is constructed and utilized facilitated a holistic discussion of KM in player development work.

The theoretical implications are presented at three different levels: firstly, the study defined and framed coaches' knowledge as a concept. Second, the knowledge processes were discussed to analyze their key strengths and weaknesses in coaches' player development. Third, coaches' and management's perspectives were combined to present a holistic overview of KM in the team sports context. Lastly, the theoretical implications will be summarized at a more general level.

5.1.1 Defining coaches' knowledge

Nonaka and Takeuchi (1995) introduced the tacit and explicit dimensions of knowledge. These two dimensions of knowledge form the basis of coaches' knowledge. At the same time, data and information are also important elements of knowledge. These three elements – data, tacit and explicit knowledge – create the ability to understand the game and coaching. Rosca (2014) categorized three knowledge categories in sports KM: the game, coaching and expert knowledge. This research focused on understanding coaching knowledge. Based on the research conducted, a coach's knowledge can be divided between game and coaching knowledge. In this study, the concept of game knowledge is the same as in Rosca's model, but it refers to coaches' understanding of football as a game that enables analyzing players' and a team's performance, not to players' understanding of the game. Coaching knowledge refers to coaching principles, educational and managerial knowhow that are needed in player development work.

Most of the time, coaching seems to rely on tacit knowledge, since analyzing the game is always subjective and requires contextual analysis of each situation. This analysis

requires the cognitive element of tacit knowledge; analyzing the game situation requires mental models that are complex. Furthermore, the technical element of tacit knowledge is also utilized in coaches' work. This refers to the practical knowledge of being able to perform certain patterns of actions in a specific situation. In practice, we are discussing coaches' knowhow to devise a coherent development plan for a player or building a good football session with effective exercises. Coaches are actively looking for guidelines on how to improve their coaching principles. This all is information that is possible to easily articulate and code in written form.

Overall, the tacit element of knowledge is constantly affecting the way coaches interpret the actions of players on and off the field. At the same time, coaches are dependent on their explicit knowledge to have certain protocols for managing different coaching duties successfully. Separating coaches' knowledge into tacit and explicit dimensions describes how coaches' knowledge is a mix of tacit knowledge, which is hard to share or verbalize, and explicit knowledge, which is easier to transfer and share.

Nonaka and Takeuchi (1995) introduced the SECI model to illustrate how tacit and explicit knowledge are in a constant flow within organizations. The model is useful for understanding coaches' knowledge flow, since coaches constantly reshape their knowledge through discussions with their colleagues or looking for new coaching principles. Reforming their knowledge affects how coaches, for example, analyze players' actions during games and what kinds of actions they value highly. Thus, discussions with other coaches and players are valued highly, because socialization is the process by which new tacit knowledge is co-created and is at the heart of coaches' knowledge creation. However, coaches may use their tacit knowledge in the field to analyze players. They react to players' actions and learn afterwards what elicited their reaction. Their knowledge is enriched by this learning. Thus, the recreation of knowledge does not require the flow between tacit and explicit knowledge. Sometimes, coaches' knowledge is enhanced by their own experiences that strengthen their tacit knowledge.

At the beginning it was mentioned that data is a crucial factor in coaches' knowledge. The usual definition of knowledge distinguishes among data, information and knowledge. Information is data enriched with meaning (Davenport, 1997). Furthermore, knowledge is enriched information with individual experience and expertise (Kowta & Chitale, 2012). Davenport and Prusak (1998) defined five processes by which data can be processed into information: categorization, condensation, contextualization, calculation and correction. Coaches process data into information, since they are looking for data summaries that would

give better insights (=condensation). Coaches are also good at categorizing the available data into physical, game and mental data. Furthermore, they recognize that collecting data from multiple sources is relevant. However, understanding why data are gathered and for which purpose (=contextualization) is clearly recognized as a weakness at the moment. Distinguishing among data, information and knowledge provides some understanding of coaches' knowledge. However, data and information are not at the heart of coaching work, as the knowledge is strongly based on the tacit dimension. For that reason, this definition of knowledge may not be the best to describe coaches' knowledge.

Tuomi (2000) has suggested a reverse interpretation flow for data, information and knowledge. Sometimes, the useful data and information cannot be created if there are no sufficient knowledge resources. Since coaches actively try to develop data collection and information creation, coaches' current knowledge is also reversely affecting data and information collection. Furthermore, building a suitable KM system depends on coaches' knowledge to interpret what kind of data should be targeted and how it should be presented. To build a framework of KM for player development work, we can summarize the reverse view of data, information and knowledge.

Finally, as analyzed, coaches rely a great deal on their intuitive decision-making and own experience (=tacit dimension of knowledge). Alavi and Leidner (2001) explained that knowledge can be a "state of mind," in which one's own understanding and experience is at the heart of the knowledge. This accurately describes coaches' experience of their own knowledge, since coaches value their own analysis and understanding of the game very highly. The study confirms that knowledge can be mostly one's own interpretation of a situation.

Figure 7 below summarizes how coaches' knowledge is constructed from three dimensions: tacit and explicit knowledge, supported by data. The arrows in the figure go in both directions, since the knowledge is rebuilt and reformed constantly by new experiences and information. Rosca (2014) has suggested that it would be beneficial to identify three different knowledge bases. However, expert knowledge was not raised by the coaches, so for that reason it is dropped from the model that describes coaches' knowledge.

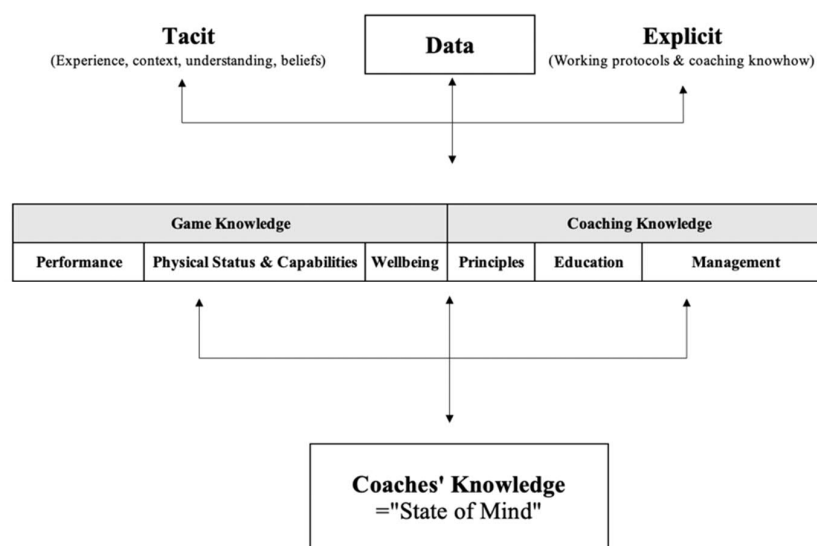


Figure 7: Framework for coaches' knowledge

5.1.2 Knowledge processes in coaching

Managing knowledge processes, so-called KM activities, is crucial for effective KM (Nonaka & Takeuchi, 1995; Tiwana, 2000). Because it is impossible to perfectly manage all the KM processes, it is crucial to recognize the key enablers of each of the processes (Lee & Choi, 2001). As discussed, in the literature there are different categories of knowledge processes, depending on the context in which KM is researched. Tiwana (2000) identified three KM processes: knowledge sharing, creation and utilization, while Nonaka and Takeuchi (1995) identified one more category, namely storage.

The findings indicate that in player development work knowledge sharing, creation and utilization are the key knowledge processes. Storing knowledge is not as strongly associated with the coaching job. Coaches do save their work in some form to their own hardware, but this storage refers to storing information or data for themselves. The process itself does not aim to store knowledge that is valuable for the whole organization. The knowledge process should support KM activities at the organizational level (Tiwana, 2000). Thus, the storage of knowledge is not recognized as a key process for KM at the organizational level.

The literature highlights that knowledge creation is a social process (Nonaka & Takeuchi, 1995; Tiwana, 2000). Coaches' knowledge creation is strongly based on social interaction with one another. Moreover, according to the literature, networking is one of the key enablers of effective knowledge creation inside and outside of the organization (Rutten,

2004; Laakkonen, 2013). Coaches' strong network inside and outside of the organization is one of the most important factors for their knowledge creation. Informal face-to-face discussions with colleagues or other stakeholders are common. This has both pros and cons. It leads to knowledge flowing well inside the own team and among close colleagues, but the knowledge is not shared throughout the organization. In addition, it supports knowledge creation and learning for an individual coach who has a strong network outside of the organization. However, younger coaches who do not have a strong coaching team around them may not develop as coaches as fast as others due to the limitations of their network.

Knowledge utilization enables individuals and groups to access knowledge, as well as to reuse and retrieve knowledge (Al Emran et al., 2018; Lee et al., 2007). The utilization of knowledge mostly becomes visibly through the understanding of game performance and the organization of a coach's own work. Coaches search for information in terms of when and how players succeed and what could be improved. This requires utilizing the knowledge base presented earlier. Coaches are very conscious of how they execute their work, for instance, how a training session or an annual training plan is built. Coaches are also able to devise a development plan based on physical test results. Lastly, coaches evaluate players' actions all the time. They are good at working independently and intuitively and making proactive decisions on the field. This requires tacit knowledge and the capability to utilize it.

The first key challenge for coaches' knowledge processes is recognizing the relevant data and information from the information overload and how to utilize the data and information in actual player development work. They cannot grasp the insights from the vast amount of the information that is available. Data collection should be more consistent, comparable and of a better quality to support knowledge processes. In the literature, it is recognized the KM systems is one of the main enablers for knowledge utilization and knowledge sharing (Laakkonen, 2013; Al Emran et al., 2018; Dalkir, 2011). Especially the need for specialized KM systems highlights sharing tacit knowledge (Tiwana, 2000). However, the unqualified data and information overload hinder coaches' knowledge creation. Thus, the insufficient KM systems currently affect coaches' knowledge processes significantly.

The second key challenge is the unclear organizational goals and targets. For knowledge utilization to be effective, goals should always be clearly defined (Dalkir, 2011). Coaches are missing clearly defined targets for both their own performance and players'

performance. However, they are unable to define these goals together with management, since measuring football performance is complex and multidimensional.

Lastly, in the literature culture is emphasized as a key enabler for effective KM processes, especially sharing (Laakkonen, 2013; Al Emran et al., 2018; Dalkir, 2011). Even though the context is team sports, the current organizational culture is more individualistic than collective, which does not support working in a manner that supports knowledge sharing. The coaches' ideology is that their work is mainly meaningful for themselves. Instead of recognizing that transparency and sharing would add value for others, they believe that sharing everything would create even worse information overload. The culture is driving individual coaches to work hard and develop themselves, but they are holding on to their own working methods and ideologies.

Figure 8 summarizes the key enablers and challenges in coaches' knowledge processes. The strengths are connected by the efficient use of their own tacit knowledge, while the key challenges are a mix of technical and cultural issues.

Knowledge in Player Development Work			
Knowledge process	Creation	Sharing	Utilization
Key Strengths	Perception of performance Socially with colleagues Video analysing Lot of data available	Face-to-Face communication with colleagues Among the own team is efficient	Physical data is guiding physical development Aiming for holistic wellbeing Understanding player's/teams' actions Intuitive & proactive decision making Organization of work
Key Challenges	Recognising the relevant data & information Consistent data collection and quality	Culture Insufficient IS tools and hardwares Information overload	The data utilization in the players' development work Unclear goals & tracking

Figure 8: Knowledge in player development work

5.1.3 Knowledge management in player development

There are multiple presentations of KM enablers in the literature. One of the categorizations identifies two different groups: technological and social enablers (Reich et al., 2012; Alavi & Leidner, 2001).

The key components of social enablers (=culture, organizational structure and IT infrastructure) strongly affect KM processes in the sports context. As discussed, culture supports knowledge creation and sharing (Gilmour, 2003). For coaches, KM is a new way of working. They are not used to using KM systems as a support for their jobs. Besides, they are used to working independently and see this as best. Thus, KM is not yet an integrated part of the culture that significantly affects initiatives and possibilities to participate in KM

processes. Razi et al. (2012) have identified IT infrastructure and organizational structure as key enablers of KM. Both of these are key enablers of the KM process in the sports context as well.

Figure 9 below summarizes KM enablers in sports KM from the perspective of player development work. The model is revised from the model by Razi et al. (2012), which is based on the categorization by Alavi and Leidner (2001). The original model does not include industry-specific factors. However, the findings indicate that there are multiple industry- and context-specific factors which affect the KM process. To fit the framework better to sports KM, three different blocks were added to Alavi and Leidner’s model: people, leadership and contextual factors. In addition, IT infrastructure was changed to KM systems, which better describes the actual systems that support knowledge creation. In this categorization, the organizational structure and contextual factors are constructors of industry enablers. These factors are typical in the specific industry to which KM was applied. If the industry has typical organizational structures, elements or contextual factors that are significant for decision-making, these factors are related here.

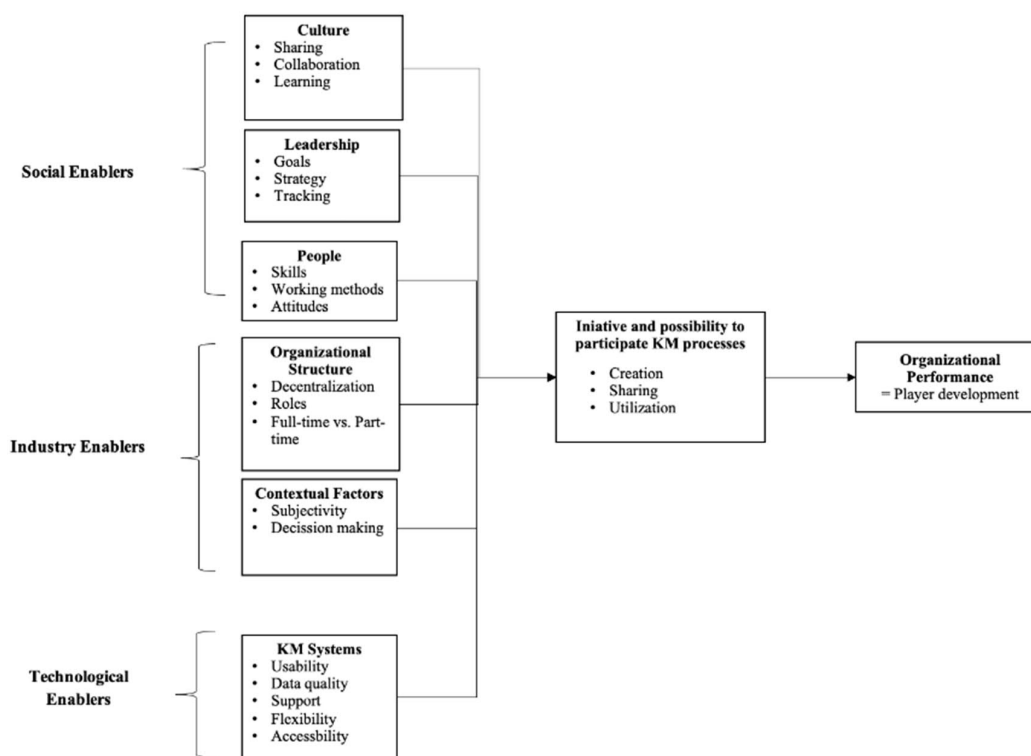


Figure 9: KM enablers in sports, revised from Razi et al., 2012

First, one of the social enablers is people, which includes skills, working methods and attitudes. People's skills set the base for how advanced they are at utilizing KM systems. Coaches lack some level of technical skills to get better insights from the data and information. Coaches' working methods are based on their working experience. Knowledge management requires changing these working methods to use different methods and tools. For this reason, the initiative to participate in KM processes is also tied to people's attitudes. Human-oriented factors are recognized as one of the key issues in successful KM (Heisig, 2009).

Second, leadership is another social enabler and includes setting the strategy, goals and tracking for KM. Defining the goals and targets for KM, as well as measuring and tracking coaches' work are crucial for successful KM (Heisig, 2009). Coaches trust the management's decisions. However, coaches need more support and guidance from management on how to develop their work. The decentralization of power leaves many opportunities for coaches but also gives them more possibilities not to participate in KM processes. Overall, the leadership role is crucial for tracking KM and supporting a culture in which coaches are willing to participate in KM processes.

Third, in the framework, there are industry enablers which include contextual factors and organizational structure. For KM to be successful, the decentralization of power is a critical factor (Heisig, 2009). However, in the sports context the decentralization level is very high, which makes the KM environment demanding to control. Coaches organize their work independently without clear control from outside. Partly, the increased power of coaches is due to the multiple responsibilities of their job roles. Moreover, the division into full-time and part-time employees creates an organizational challenge. Decentralization is a challenge for KM if coaches are not familiar with KM ideologies; employees should understand KM as an integral part of their work and decentralization should support participation in KM activities.

Contextual factors refer to issues that are specific for a certain kind of organization. Sports performance, more specifically football performance, is not as straightforward as business performance. The optimal result of the player development process cannot simply be defined as winning a game or winning a situation. There is always a context that determines whether the performance is categorized as a success or not. Moreover, time on the field is building the core for player development work. Succeeding as a coach during practices or games requires intuitive decision-making and utilization of tacit knowledge. The style of decision-making in sports is special and affects KM processes. Knowledge

management systems, at least at the moment, cannot help with real-time decision-making on the field. The KM systems work as a feedback and evaluation system that enables analysis after training and games. For this reason, the KM environment is significantly different from the traditional business environment in which KM can be better utilized on a real-time basis.

5.1.4 Summarizing the theoretical implications

The current literature recognizes the main enablers of KM, in which knowledge and knowledge processes are, most of the time, researched in separate studies. However, this study aimed first to understand knowledge and knowledge processes, and then to frame a holistic view on KM in the specific context.

The tacit and explicit elements of knowledge are identified as important by multiple research studies in the KM field (Nonaka & Takeuchi, 1995; Alavi & Leidner, 2001). However, it has not been revealed how these are related to KM. This research study provides understanding of the tacit element of knowledge that strongly affects individuals' initiatives and participation in KM processes within organizations. We have to understand how one's knowledge is built in order to frame the holistic view for a specific organization in a specific context. Moreover, this study focused on critical human factors of knowledge for KM. Individual employees' attitudes, perceptions and decision-making in a specific situation play a significant role in KM.

For that reason, the study contributes to the current literature by emphasizing the importance of cultural and social factors in KM within organizations that rely on the tacit dimension of knowledge. The study highlights that the perception of one's own knowledge is tied to the surrounding culture and contextual factors. Moreover, understanding how employees construct and experience knowledge enriches our understanding of the surrounding culture, which brings a new perspective to KM. Team sports as a case environment may overemphasize the role of situational and reactive decision-making that is highly affected by one's own understanding, beliefs and feelings. However, this kind of decision-making is increasingly seen in today's businesses, as low hierarchy enables employees to take more responsibility. Moreover, real-time decision-making is, inevitably, part of everyone's job at some level.

In addition, understanding how a decentralized and self-driven culture may also be a challenge for KM is a remarkable notion which the study contributes to the current KM literature. As coaches are very conscious and self-guided in their work, it pushes them to work hard and develop further as coaches. This self-driven culture is not tied to data and

information utilization, which challenges the principles of KM. To date, the KM literature has emphasized decentralization of work as an enabler for KM. However, this study confirms that decentralization may also be an obstacle for an organization, if the employees do not feel that it is beneficial to participate in the KM processes.

To conclude, the study provides a new understanding of how the perception of knowledge is linked to knowledge processes and KM. By gaining this understanding, we can gain a deeper understanding of what could be the main enablers for KM in team sport context.

5.2 The managerial and practical implications

The managerial implications are closely connected with the theoretical implications. This case study opened up possibilities for management to see the critical success factors of KM.

This case study has emphasized multiple critical issues for KM implementation in sports management which management should take into account. First of all, the study confirms that KM in sports organization has multiple different enablers. At the moment, the organizational culture is a crucial part of how effective and successful KM systems and KM culture are. In addition to creating a strong IT infrastructure, the management needs to support a knowledge culture which also values sharing and transparency throughout the organization. Knowledge management requires investments to build and support an organizational structure that reduces organizational silos. This may require building new positions that enable better collaboration within the whole organization.

Second, data collection, utilization and sharing are partly difficult due to insufficient and suitable KM systems. Since the markets do not offer finalized products that would be easy to utilize and customize for coaches' needs, the management is challenged to support coaches in finding new solutions. Furthermore, due to coaches' limited technological skills, they require management's support to build and customize supporting KM systems for player development work. From a managerial point of view, the empirical part justifies that currently data and information are not at the heart of the coaching job. However, the study also provides insights into coaches' knowledge and increases understanding of how it is constructed. Combining these two factors, management can better justify why data utilization is difficult for coaches. In other words, this case study provides great understanding of coaches' job for management from the KM perspective. This is valuable for leading organizations in the right direction.

Third, the study confirms that the KM has a challenging task in trying to combine human factors and organizational performance. For management it would be valuable to create an environment and systems that support the sharing of tacit knowledge. However, sharing and storing tacit knowledge is a highly sensitive area in terms of individual privacy and ethical questions. For example, in this context player information is private and can include sensitive topics. For that reason, if the tacit knowledge plays a significant role in an organization's performance, management has to balance privacy and publicity. Moreover, the environment has to be a safe place to share even sensitive information within the organization. Thus, creating a strong and reliable culture is crucial for KM.

Overall, this study offers a comprehensive framework in which management can build their KM plan for the future. It highlights what are the most critical factors for employees applying KM principles. This is, of course, vital information for management. Without getting the whole organization and its employees on the same page, it is impossible for any organization to perform well.

5.3 Methodological implications

The theoretical and managerial contributions discussed in this study confirm that a qualitative methodology enabled researching KM issues in-depth. Knowledge management combines both social and technological issues. It cannot be analyzed and researched only as a rational phenomenon in which we discuss the technological aspects of KM. The study confirms that human issues are as critical for successful KM as technological issues.

Because the interviews were conducted face-to-face, the collected data became more relevant and richer than if the study had been conducted using quantitative methods. The KM research study confirms that the qualitative study method gives beneficial insights for understanding how knowledge and knowledge processes are experienced by humans themselves. Moreover, the case study indicates that managing knowledge requires understanding the surrounding environment and culture from the perspective of those working on it. This understanding was gained through listening, which requires a qualitative methodology.

5.4 Limitations of the research

Every study has its limitations. This study was based on a single case method. Of course, more holistic and generalized results would have been achieved by increasing the number of

case organizations. In addition, this case study was conducted in one country that is relatively small, so generalizing the results to another country may be questionable.

Moreover, a qualitative case study also has its limitations. These results cannot be generalized statistically. However, the aim of this study was to understand KM in a new context rather than find generalizations, and therefore it was reasonable to use a qualitative method. The group of interviewees was heterogeneous, so it represents well the diverse group of coaches that is typical in this context.

When analyzing qualitative data, researchers' interpretations are more likely to affect the results than when doing quantitative research. In this research, it was attempted to reduce the extent of researcher's bias by using open-ended interviews, in which the interviewees led the questions. All the questions were posed as neutrally as possible. Of course, the honesty of the interviewees also affects the reliability of the research.

5.5 Suggestions for further research

This research study was just the start for researching knowledge management in the sports context, especially from the perspective of coaches. Now that a holistic understanding and the key issues have been defined, further research could target these variables in greater depth and more independently.

For example, more emphasis could be placed on clarifying how coaches are dividing their time among different tasks. This would give crucial information for management in order to see how much coaches are actually using the hours off the football field. This would also increase understanding of how time-consuming the current IS systems are.

To understand the underlying issues on a personal level, more in-depth analysis and research should be conducted. This could clarify the reasons why it is difficult to create a unified and holistic culture in which KM plays a significant role.

In addition, this case study did not critically analyze the outcome of KM. That being said, further research could study how KM can create business value in this context. This would require building some kind of metrics that can measure the impact of KM in the sports management context.

Finally, the study confirms that understanding employees' perspectives on knowledge and knowledge processes is linked to KM enablers. This connection could be further researched in a different context.

6 Conclusion

Knowledge management has emerged as a popular topic due to knowledge being key to building a competitive edge in today's markets (Austin et al., 2008; Lee & Choi, 2003). As sports has become a competitive market, in which knowledge is contributing to a competitive edge, KM has been recognized as a beneficial managerial style in sports (Dorin et al., 2016; Espitia-Escuer & Garcia-Cebrián, 2006). However, current research on sports KM is very limited. For that reason, this study aimed to provide understanding of the critical enablers of KM in the team sports context. To achieve that, the study investigated how coaches' knowledge construction and knowledge processes are visible in their work.

The study was conducted as a qualitative case study for a football club in Finland. The qualitative case method enabled increasing understanding of coaches' perspectives on knowledge and knowledge processes. The empirical part consists of 18 semi-structured interviews that were collected from the employees of the case company during autumn 2020. The main group of interviewees were coaches (14/18).

The findings of the research emphasize that coaches' knowledge construction and perceptions are strongly connected to their own judgement, thoughts and understanding of the player development process. Furthermore, the tacit dimension of knowledge is extremely valuable for coaches, in order to make reactive decision on the football field. Moreover, their utilization of available data and information is strengthened by their knowledge and supports decision-making. However, the utilization of data and information is inconsistent, due to both technological and social factors. All the findings were summarized to frame KM enablers in player development work in team sports.

The study recognizes that employees' perspectives on their knowledge affect their participation in KM activities. Furthermore, understanding coaches' knowledge processes provides a beneficial perspective for understanding the enablers of KM, both at individual and organizational levels. The study highlights that KM enablers are connected with the contextual factors that affect the style of decision-making and working. Specifically, the study underlines that understanding the human and social aspects of individual knowledge perception and processes is beneficial for identifying KM enablers in a specific context. Finally, the study emphasizes the qualitative method as providing several beneficial issues for understanding how KM can be applied in a new context.

References

- Alavi, M. & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual and Research Issues. *MIS Quarterly*, 25(1), pp. 107-136. <https://doi.org/10.2307/3250961>
- Al-Emran, M., Mezhuyev, V., Kamaludin, A. & Shaalan, K. (2018). The impact of knowledge management processes on information systems: A systematic review. *International Journal of Information Management*, 43, pp. 173-187. <https://doi.org/10.1016/j.ijinfomgt.2018.08.001>
- Austin, M. J., Ciaassen, J., Vu, C. M. & Mizrahi, P. (2008). Knowledge Management: Implications for Human Service Organizations. *Journal of Evidence-Based Social Work*, 5(1-2), pp. 361. https://doi.org/10.1300/J394v05n01_13
- Cecez-Kecmanovic, D., Davison, R., Fernandez, W., Finnegan, P., Pan, S. & Sarker, S. (2020). Advancing Qualitative IS Research Methodologies: Expanding Horizons and Seeking New Paths. *Journal of the Association for Information Systems*, 21(1), pp. 246-263. <https://doi.org/10.17705/1jais.00599>
- Cohen, J. & Olsen, K. (2015). Knowledge management capabilities and firm performance: A test of universalistic, contingency and complementarity perspectives. *Expert Systems with Applications*, 42(3), pp. 1178-1188. <https://doi.org/10.1016/j.eswa.2014.09.002>
- Crane, L. (2015). *Knowledge and Discourse Matters*. (1st edition). Wiley.
- Dalkir, K. (2011). *Knowledge Management in Theory and Practice*. Jordan Hill: Taylor & Francis Group.
- Davenport, T. H. & Prusak, L. (1997). *Information ecology: Mastering the information and knowledge environment*. New York: Oxford University Press.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organization manage what they know*. Boston: Harvard Business School Press.
- Earl, M. (2001). Knowledge Management Strategies: Toward a Taxonomy. *Journal of Management Information Systems*, 18(1), pp. 215-233. <https://doi.org/10.1080/07421222.2001.11045670>
- Erhardt, N. & Martin-Rios, C. (2016). Knowledge Management Systems in Sports: The Role of Organisational Structure, Tacit and Explicit Knowledge. *Journal of Information & Knowledge Management*, 15(2), <https://doi.org/10.1142/S0219649216500234>

- Ebrary, I., Becerra-Fernandez, I. & Leidner, D. E. (2008). *Knowledge management: An evolutionary view*. Armonk, N.Y.: M.E. Sharpe, Inc.
- Espitia-Escuer, M. & García-Cebrián, L. I. (2006). Performance in sports teams. *Management Decision*, 44(8), pp. 1020-1030. <https://doi.org/10.1108/00251740610690595>
- Gold, A. H., Malhotra, A. & Segars, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. *Journal of Management Information Systems*, 18(1), pp. 185-214. <https://doi.org/10.1080/07421222.2001.11045669>
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), pp. 109-122. <https://doi.org/10.1002/smj.4250171110>
- Heisig, P. (2009). Harmonisation of knowledge management - comparing 160 KM frameworks around the globe. *Journal of Knowledge Management*, 13(4), 4-31. <http://dx.doi.org/10.1108/13673270910971798>
- Inkinen, H. (2016). Review of empirical research on knowledge management practices and firm performance. *Journal of Knowledge Management*, 20(2), pp. 230-257. <https://doi.org/10.1108/JKM-09-2015-0336>
- Kianto, A., Vanhala, M. & Heilmann, P. (2016). The impact of knowledge management on job satisfaction. *Journal of Knowledge Management*, 20(4), pp. 621-636. <https://doi.org/10.1108/JKM-10-2015-0398>
- Kim, S. & Andrew, D. (2007). Understanding sport organizations: The application of organization theory (2nd edition). *Journal Of Sport Management*, 21(3), pp. 455-457. <https://doi.org/10.1123/jsm.21.3.455>
- Lahtinen, J. (2013). Local social knowledge management: A case study of social learning and knowledge sharing across organizational boundaries. *Journal of Information Science*, 39(5), pp. 661-675. <https://doi.org/10.1177/0165551513481431>
- Lapan, S., Quartaroli, M. & Riemer, F. (2011). *Qualitative Research: An Introduction to Methods and Designs*. Jossey-Bass.
- Lee, A. (1989). A Scientific Methodology for MIS Case Studies. *MIS Quarterly*, 13(1), p. 33. <https://doi.org/10.2307/248698>
- Lee, C., Lee, G. & Lin, H. (2007). The role of organizational capabilities in successful ebusiness implementation. *Business Process Management Journal*, 13(5), pp. 677-693. <https://doi.org/10.1108/14637150710823156>

- Lee, H., Choi, B. & . (2003). Knowledge Management Enablers, Processes, and Organizational Performance: An Integrative View and Empirical Examination. *Journal of Management Information Systems*, 20(1), pp. 179-228. <https://doi.org/10.1080/07421222.2003.11045756>
- Lee, S., Gon Kim, B. & Kim, H. (2012). An integrated view of knowledge management for performance. *Journal of Knowledge Management*, 16(2), pp. 183-203. <https://doi.org/10.1108/13673271211218807>
- Lee, C.L., Ho, C.T. & Chiu, Y.L. (2008). The impact of knowledge management enablers on non-financial performance in small and medium enterprises. *International Journal of Technology Management*, 43(1/2/3). <https://doi.org/10.1504/IJTM.2008.019419>
- Lev, B. (2001). *Intangibles: Management, measurement, and reporting*. Washington, D.C.: Brookings Institution Press.
- Lin, H. & Lee, G. (2005). Impact of organizational learning and knowledge management factors on e-business adoption. *Management Decision*, 43(2), pp. 171-188. <https://doi.org/10.1108/00251740510581902>
- Mitrevski, V., & Aceski, A. (2015). Creation and Transfer of Knowledge Management in Sport Institutions and organizations. *Indian Journal of Commerce and Management Studies*, 6(1), 70-75. Retrieved from <https://search.proquest.com/docview/1645882028?accountid=27468>
- Nonaka, I. & Takeuchi, H. (1995). *The knowledge-creating company*. New York: Oxford University Press.
- Nonaka, I., Toyama, R. & Hirata, T. (2008). *Managing flow: A process theory of the knowledge-based firm*. Basingstoke: Palgrave Macmillan.
- Pirkkalainen, H. & Pawlowski, J. M. (2013). Global social knowledge management- Understanding barriers for global workers utilizing social software. *Computers in Human Behavior*, 30. <https://doi.org/10.1016/j.chb.2013.07.041>
- Polanyi, M. (1962). *Personal knowledge: Towards a post-critical philosophy* (Corr. ed.). Chicago: University of Chicago Press.
- Razi, M. J. M., Karim, N. S. A. & Mohamed, N. (2012). Knowledge Management Enablers and Knowledge Management Implementation. *International Conference on Advanced Computer Science Applications and Technologies*, pp. 228-233. <https://doi.org/10.1109/ACSAT.2012.58>.

- Rosca, V. (2010). The rugby coach and his three roles in the management of a team. *Management & Marketing*, 5(4), pp. 135-147. Retrieved from <https://search.proquest.com/docview/822740625?accountid=27468>
- Rosca, V. (2014). A Model for Eliciting Expert Knowledge into Sports-Specific Knowledge Management Systems. *Revista de Management Comparat International*, 15(1), pp. 57-68. Retrieved from <https://search.proquest.com/docview/1545871737?accountid=27468>
- Rutten, R. (2004). Inter-firm knowledge creation: A re-appreciation of embeddedness from a relational perspective. *European planning studies*, 12(5), pp. 659-673. <https://doi.org/10.1080/0965431042000220002>
- Ryszard Borowiecki, Barbara Siuta-Tokarska.(2013). Challenges and Problems of Knowledge Management in Enterprises in Poland. *China-USA Business Review*, 12(2). <https://doi.org/10.17265/1537-1514/2013.02.006>
- Schumaker, R., Solieman, O. & Chen, H. (2010). Sports knowledge management and data mining. *Annual Review of Information Science and Technology*, 44(1), pp. 115-157. <https://doi.org/10.1002/aris.2010.1440440110>
- Serenko, A. & Bontis, N. (2016). Understanding counterproductive knowledge behavior: Antecedents and consequences of intra-organizational knowledge hiding. *Journal of Knowledge Management*, 20(6), pp. 1199-1224. <https://doi.org/10.1108/JKM-05-2016-0203>
- Sian Lee, C. & Kelkar, R. S. (2013). ICT and knowledge management: Perspectives from the SECI model. *The Electronic Library*, 31(2), pp. 226-243. <https://doi.org/10.1108/02640471311312401>
- Simonin, B. The importance of collaborative know-how: An empirical test of the learning organization. *Academy of Management Journal*, 40, 5 (1997), 509–533. <https://doi.org/10.2307/256930>
- Sita Nirmala Kumaraswamy, K. & Chitale, C. (2012). Collaborative knowledge sharing strategy to enhance organizational learning. *Journal of Management Development*, 31(3), pp. 308-322. <https://doi.org/10.1108/02621711211208934>
- Skyrme, D. J. (1999). *Knowledge networking creating the collaborative enterprise*. Oxford: Butterworth-Heinemann.
- Sousa, M. & Rocha, Á. (2019). *Strategic Knowledge Management in the Digital Age*: JBR

- Special Issue Editorial. *Journal of Business Research*, 94, pp. 223-226.
<https://doi.org/10.1016/j.jbusres.2018.10.016>
- Tiwana, A. (1999). *Knowledge Management Toolkit, The* (1st edition.). Prentice Hall.
- Tuomi, I. (2000). Data Is More than Knowledge: Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory. *Journal of management information systems*, 16(3), pp. 103-117.
<https://doi.org/10.1080/07421222.1999.11518258>
- Wolfe, R. A., Weick, K. E., Usher, J. M., Terborg, J. R., Poppo, L., Murrell, A. J., Jourdan, J. S. (2005). Sport and Organizational Studies: Exploring Synergy. *Journal of management inquiry*, 14(2), pp. 182-210.
<https://doi.org/10.1177/1056492605275245>
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd edition). Thousand Oaks (CA): Sage Publications.

Appendix A: Themes and interview questions

1. Basic information
 - Age
 - Position
 - Years of coaching
 - Education
2. Work
 - Describe your work
 - What kind of systems do you use as a support?
 - What kind of tasks includes to your work?
 - How do you spread your time for the different tasks?
 - How would you describe success in your work?
 - What is critical for succeeding in your work?
 - Have the new systems affected your working?
 - Who are you working with?
3. Data, Information, Knowledge in Player Development
 - What kind of information do you use in player development?
 - What is critical information you need for player development?
 - What kind of data do you utilize in the player development?
 - Where do you search for the information/data?
 - Where do you save your work?
 - What kind of information would you gather for player development?
 - How would you enhance the process of player development?
 - How would you describe the quality of available data/information?
 - How would you describe your knowledge?
 - Is the data reliable?
4. Communication
 - Describe how you communicate in the club?
 - Which communication channels do you use?
 - What is critical for successful communication inside the club?
5. Wellbeing
 - Describe your current state at work?
 - What is critical for your work well being?