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**Practices for Business Intelligence Development -  
Identifying the Knowledge Management  
Leveraging During the Strategic Tool Creation  
Process**

Action Research in Hitachi Energy

School of Management  
Master's thesis in Strategic  
Business Development

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**ABSTRACT**

**Aim:** This study aims to elaborate on knowledge management practice utilization during the designing and implementation of strategic tools for business intelligence, primarily focusing on different organizational levels.

**Theory:** The study covers two research streams: knowledge management and strategy-as-practice. The synthesis of these forms the framework of the study, which is used to observe the participation of different organizational levels in the strategic tool creation process and the information and knowledge received from individual practitioners.

**Methodology:** The empirical part of this study consists of a case study for Hitachi Energy through action research. The data was gathered through process observations and structured and unstructured interviews with practitioners from different organizational levels. Finally, the data analysis is carried out as thematic analysis, which focuses on describing implicit and explicit interpretations.

**Findings and contribution:** The strategy tool design and implementation process usually involve practitioners from different organizational levels with different backgrounds that will bring a unique set of information and knowledge. As a result, it is essential to identify the practitioners who positively contribute to the desired outcome. The findings of the study emphasize the importance of senior and middle management in terms of knowledge input and identify the lower management and operational level as assistive strategy practitioners. The knowledge input of these practitioners can be enhanced by creating agile draft versions during various project stages. The draft versions allow the parties involved to get a better overall view of the project and improve the quality and accuracy of the feedback provided, development suggestions, and other relevant observations. In addition to these findings, significant findings for the strategic tool developer were keeping the big picture in mind and understanding the essential knowledge-related characteristics of different organizational levels.

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**KEYWORDS:** knowledge management, strategy-as-practice, business intelligence

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## 1 INTRODUCTION

The business environment has become hyper-competitive and turbulent, driving organizations to a situation where they need to monitor market trends and developments and, in addition, utilize the company's knowledge assets as well as possible (Ahlstrom, 2019; Ihrig & MacMillan, 2015; Kunc, 2019). This increase in competitiveness and turbulence has been propelled by digitalization and globalization in the form of, e.g., the development of international trade, the growing opportunities for consumers in terms of products, the more unrestricted movement of goods, the spread of digital information technology in both every day and business life (Chamorro-Premuzic, 2021; Levitt, 1983; Subramaniam, 2021; van Alstyne & Parker, 2021). Based on these trends and developments, organizations' businesses and focus must be reinvented, and strategic decision-making adjusted (Ahlstrom, 2019). Strategic decision-making requires knowledge, which is often formed from an organization's internal or external markets in the form of data and information (Ahlstrom, 2019). Therefore, the integration of knowledge within an organization can be identified as a critical source of competitive advantage (Neeley & Leonardi, 2018).

Therefore, companies are increasingly dependent on employees' information, knowledge, expertise, and competencies from different organizational levels (Darkow, 2015). As a result, companies are increasingly trying to implement their internal activities and processes to promote and capture this knowledge and expertise among their employees (Neeley & Leonardi, 2018). In this context, it is relevant to explore the in-depth knowledge and its emergence and look at constant changes in the company's internal work culture and external markets. To explore the in-depth knowledge and its emergence, knowledge management has been explored using a strategy-as-practice approach (Marin et al., 2016). This approach makes it possible to look at consistent changes in day-to-day practice and practitioners' praxis to more accurately identify where knowledge comes from and how the organizational outcomes are formed (Marin et al., 2016). This approach is also supported by the argument that all knowledge exists within the fields of practice (Schatzki et al., 2001).

As the need for knowledge management leveraging has grown, there has been an arising need to provide a complementary perspective on traditional strategy thinking, strategy-as-practice, which, as its name implies, focuses on practice: how strategy is performed (Whittington, 1996). It has been argued that through individual actions and interactions within a practice, its knowledge can be studied most effectively (Schatzki et al., 2001). Strategy-as-practice focuses on concrete micro-actions instead of abstract macro analysis (Peppard et al., 2014). The strategy has been studied academically and, in terms of organizations, typically at the macro-level, which has left the strategizing processes, people, and measures in the shadows. Thus, people and the knowledge generated by them through practice should be at the heart of research in addition to /instead of individual minds and actions or social structures, systems, and discourses that have been focused within the conventional strategy (Peppard et al., 2014; Schatzki et al., 2001). As a result, a strategy-as-practice approach has emerged to provide strategy-related answers, such as how it is done, who does it, and what they used to do it, shifting the focus from the core competency of the firm to the practical level of competence of the strategy practitioners (Jarzabkowski, 2005; Whittington, 1996).

Knowledge management approaches the understanding of information and knowledge mainly in the same way as strategy-as-practice (Brown & Duguid, 2000). It assumes that knowledge can be best captured by exploring how people get things done (Brown & Duguid, 2000). Thus, in addition to explicit knowledge, the identification of tacit knowledge is also perceived as significant. In addition, knowledge management recognizes that an organization is competing in an unpredictable environment (Brown & Duguid, 2000). As a result, business intelligence, identified as a subset of knowledge management and its various tools, has become increasingly important (Herschel & Jones, 2005). Like knowledge management, business intelligence also supports learning, decision-making, and understanding; however, business intelligence concentrates on explicit knowledge, while knowledge management focuses on explicit and tacit knowledge (Herschel & Jones, 2005).

Although business intelligence concentrates on explicit knowledge, designing and implementing strategy tools involves many strategy practitioners at different organizational levels, and the strategy-as-practice style tacit know-how they provide. For knowledge management, the design phase of business intelligence tools in particular is an effective way to capture information and knowledge from practitioners. The interviews, observations, and other findings during the design and implementation allow capturing and transforming the challengingly identifiable tacit knowledge into an explicit form. This approach also helps to address the challenge where, for practitioners, there is a gap in what they think they are doing compared to what they are doing during the process (Brown & Duguid, 2000). Practices are full of tacit improvisation, which is challenging for practitioners to articulate and point out in an explicit form (Brown & Duguid, 2000). Therefore, examining the design and implementation of business intelligence tools from a strategy-as-practice viewpoint allows one to identify the actual practices with tacit improvisation, get them captured effectively, and transform them into an explicit form where it is better retained and utilized in the organization.

The recognition that organizations operate in unpredictable, rapidly evolving, and changing environments, has created a demand for business intelligence tools that focus on predictive analytics to develop models that predict future or otherwise unknown events (Nyce, 2007). The different forecast models are widely used predictive models, characterized by creating information and knowledge for an organization by predicting outcomes of, e.g., sales, demand, supply, and consumer behavior (Parthasarathy, n.d.). The information generated from these modelings allows strategic decision-making to be based on fact-based knowledge rather than gut feelings. At the heart of successful organizations are knowledge and the internal ability to implement it as part of everyday processes (Emerald Group, 2005). The processes involved in creating, identifying, capturing, organizing, and storing knowledge are discussed under knowledge management (Gartner, n.d.; IBM Cloud Education, 2020). Knowledge management objectives ensure that an organization operates intelligently to secure its profitability and operational success and recognize the best possible value from its knowledge assets (Wiig, 1997).



## 1.1 Motivation for the study

The strategy development process has long been addressed with a conventional strategy approach focused primarily on strategy formation from a top-down perspective. Research has mainly focused on top management employees (Darkow, 2015). Therefore, a less minor observation has been conducted concerning the literature on how middle management, lower management, and operational levels are involved in the strategy development process (Darkow, 2015). Hence, there is an absence of empirical evidence that has been published regarding how individual companies approach the strategy development process and which organizational levels are included in the process apart from the top management (Darkow, 2015). However, in addition to top management, other organizational levels have been recognized as significant strategy practitioners and knowledge contributors (Tien, 2019). Therefore, it is essential from a strategy-as-practice viewpoint to identify strategy practitioners who are significant strategic influencers and knowledge contributors in interpreting change and implementing the strategy through practice (Marin et al., 2016).

A significant part of knowledge is formed by sharing tacit and implicit knowledge in organizations, so it is critical to analyze how it is distributed and applied to organizational processes (Marin et al., 2016). Although companies recognize the need for knowledge sharing among employees, little is known about enabling and utilizing such sharing (Neeley & Leonardi, 2018). Knowledge management has become an increasingly essential factor as the value of companies is increasingly made up of employee know-how, based on which companies seek to find answers to the question of how strategy development is worth being established so that the company can leverage the full potential of employee expertise into organizational processes (Darkow, 2015). Especially when comparing explicit information, practices and praxis around tacit-to-tacit sharing are difficult to identify and control in firms (Marin et al., 2016). These practices refer to the routine activities that employees at the different organizational levels do when they are strategizing and praxis (Marin et al., 2016). On the other hand, it refers to concrete, unfolding activities as they take place (Marin et al., 2016). Therefore, identifying the

process of designing and implementing business intelligence tools is an efficient way to capture both explicit and tacit knowledge. Analyzing this process provides a compelling perspective to understand things sequentially (this happened, then that happened), causally (this happened because that happened), and thus to understand the overall picture of actions and the causes and effects of those actions (Brown & Duguid, 2000).

## **1.2 Problem statement**

Based on these identified issues related to organizational knowledge management and utilization and the importance of the different organizational levels in strategy formation, the study of this paper has been implemented in the form of action research, which identifies the knowledge management leveraging during the design and implementation of a strategic tool for business intelligence in a multinational company. A recorded framework will be created and presented, describing how knowledge management practices could be utilized when designing and implementing strategic tools for business intelligence. In addition, the framework aims to support the process of identifying how employees from different organizational levels could contribute during the creation process. The need for the case organization, in turn, is based on the fact that they do not currently have a recorded framework for knowledge management capturing and leveraging related to these kinds of processes.

## **1.3 Research questions and objectives**

Based on the identified need for a more in-depth review of the literature connecting knowledge management and strategy-as-practice, to further explore strategy practitioners at different organizational levels, as well as the role of business intelligence tools for knowledge management, the research questions are formed as follows:

- RQ 1: *How could knowledge management practices be utilized when designing and implementing strategy tools for business intelligence?*

- RQ2: *How could employees from different organizational levels contribute during the creation process?*

The following objectives for the study were formed to address the identified issues and to answer the research questions:

1. To understand the explicit, tacit, and implicit knowledge involved within different organizational levels
2. To understand how business intelligence tool design and implementation can utilize the organizational knowledge management practices

By finding answers to the mentioned research questions and the listed objectives, this thesis contributes empirically to the literature and practically by supporting the case organization.



**Figure 1. Thesis outline.**

## 1.4 Thesis structure

The thesis presents the two research streams: knowledge management and strategy-as-practice. The knowledge management research stream covers its importance to organizations, different knowledge types, knowledge management as a process, relation to business intelligence which is treated as a subset of knowledge management in this thesis, and critical business intelligence topics. Strategy-as-practice, in turn, covers its objectives, characteristics, approach, and key elements; practitioners, practices, and praxis.

Research streams are synthesized by studying knowledge management leveraging while creating new strategic tools for business intelligence. This process is examined in more detail with a strategy-as-practice focus aimed to identify different organizational level contributions during the process. Finally, the section presents the framework for studying knowledge management utilization with the strategy-as-practice perspective during the strategic tool creation process.

The literature review is followed by presenting the methodology of the research. This section covers the theoretical and practical demand for the case study and presents the case company. The section includes the data collection process and presents the selected data analysis method. The methodology section concludes with a critical analysis of research validity, reliability, and ethical factors.

Next, the case study findings are presented by dividing the strategic tool creation process into three stages: the initial, production, and finishing, which are then analyzed separately. After the individual stages, the general findings related to all the presented stages are introduced. Finally, the final section contains general conclusions related to the topic, identified theoretical and managerial implications, suggested future research, and thesis-related limitations.

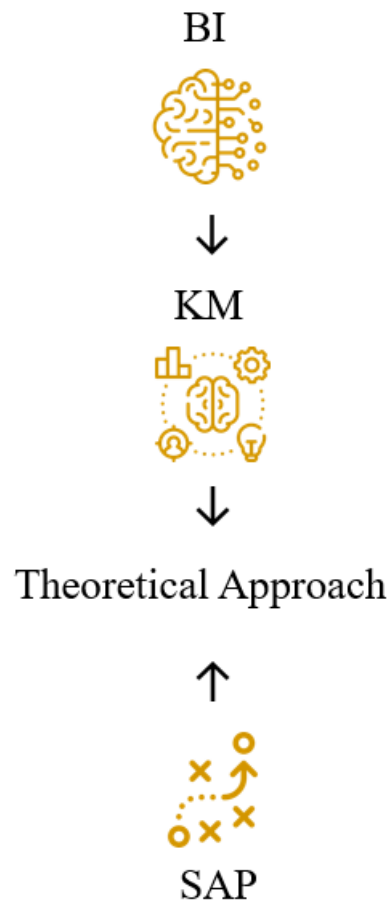
## 2 LITERATURE REVIEW

The literary review consists of two research streams designed to cover the research agenda by providing an overview of relevant literature and establishing a premise for the thesis.

In the first research stream, in this section, knowledge management is discussed by which the subset of business intelligence positions (Herschel & Jones, 2005). This placement can be justified by the fact that knowledge management encompasses explicit knowledge (documented information), tacit knowledge (understood information), and implicit knowledge (applied information) (Herschel & Jones, 2005). However, business intelligence is focusing on explicit knowledge (Herschel & Jones, 2005). Both concepts deal with understanding, decision-making, and learning. However, knowledge management affects the essence of business intelligence, and not the other way around (Herschel & Jones, 2005).

This study needs to understand the value of knowledge management for organizations, the types of knowledge, and the knowledge management process. The literary review also comprehensively covers business intelligence in knowledge management, as it can be identified as an essential part of the research. In this respect, the chapter describes, among other things, the intelligence landscape, the formation of information and its hierarchy, business intelligence as a process, and predictive analytics and modeling.

The second research stream is strategy-as-practice, which, as the name implies, delves into practice by breaking down strategy-as-practice with Whittington's (2006) approach into strategy practitioners, strategy practices, and strategy praxis then identified in more detail. Figure 2 illustrates the formation of a theoretical approach from selected research streams.



**Figure 2. Formation of the theoretical approach.**

## **2.1 The importance of knowledge management for organizations**

Organizations constantly seek new ways to advance their performance and results (Wiig, 1997). In a globally competitive world, it is essential to capture, manage, and utilize knowledge (Alavi & Leidner, 2001). At the heart of successful organizations are knowledge and the internal ability to implement it as part of everyday processes (Alavi & Leidner, 2001). The successes and failures gained through experience have motivated managers to understand better the underlying complex mechanisms, such as knowledge, that drive business efficiency (Wiig, 1997). Knowledge has become a critical driving force for organizations, making organizations more knowledge-intensive, resulting in a more systematic treatment of knowledge in the same way as other tangible resources (Yew

Wong, 2005). Hall (1993) also points out the same, suggesting that knowledge is both a tangible and intangible resource.

Knowledge management does not give the organization direct answers to a problem, but it facilitates learning answers (Call, 2005). Knowledge management objectives ensure that an organization operates intelligently to maintain its viability and financial success and realize the best possible value from its knowledge assets (Wiig, 1997). Based on this, knowledge is based on people who own, develop, and act in addition to technologies. Thus, knowledge management has been described as the only long-term and sustainable source of competitive advantage (Gold et al., 2001).

Knowledge management is a relatively new discipline, born between the 1970s and 1980s when management academics and practitioners made publications that focused on utilizing information and knowledge as valuable organizational resources (Sullivan, 2012). This pattern can also be identified by searching for “Knowledge Management” with an exact search in Elsevier’s ‘Scopus abstract and citation database, including article titles, abstracts, and keywords as search criteria. The first related search results can be found as early as the 1960s, but a significant increase in search results occurred between the mid-1980s and the 1990s.

For practitioners, knowledge management started to arise within the management consulting community when the use of the internet arose (Koenig, 2018). This community quickly realized that the Internet made information widely accessible and geographically distributed regardless of location (Koenig, 2018). They also saw the commercial potential it brought; their expertise and techniques, and tools had become a new product that could be offered primarily to large organizations whose internal processes were still complex and fragmented (Koenig, 2018). The timing in this regard was favorable for management consulting firms, as organizations' interest in intellectual capital peaked in the 1980s, as information and knowledge were identified as essential assets for the organizations (Koenig, 2018). As a result, the principles and techniques associated with

knowledge management quickly spread to organizations, professional associations, and disciplines (Koenig, 2018).

IBM has defined knowledge management as the “... process of identifying, organizing, storing and disseminating information within an organization” (IBM Cloud Education, 2020). Similarly, Gartner describes knowledge management as a process “... that formalizes the management and use of an enterprise’s intellectual assets. KM promotes a collaborative and integrative approach to creating, capturing, organizing, accessing, and using information assets, including the tacit, uncaptured knowledge of people” (Gartner, n.d.).

### **2.1.1 The relationship between knowledge management and business intelligence**

As this study deals with knowledge management and business intelligence, it is essential to understand their relationship. Consequently, this section describes the positioning between the two and the distinguishing factors.

Knowledge management and business intelligence are closely associated, even considered genuinely similar. A study found that almost two-thirds of consultants did not recognize the difference between these two (Herschel & Jones, 2005). As a result, many academics and practitioners describe the relationship between these by organizing knowledge management under business intelligence (Cook & Cook, 2000; Haimila, 2001; McKnight, 2002). However, against this approach, the paper of Herschel & Jones (2005) interprets that business intelligence should be interpreted as a subset of knowledge management. It is also conceptually straightforward to understand how knowledge can be interpreted as an internal part of business intelligence and thus also as part of decision-making (Herschel & Jones, 2005). However, the two are most significantly distinguished by their focus on knowledge types. Both concepts support understanding, learning, and decision-making; however, business intelligence concentrates on explicit knowledge, while knowledge management focuses on explicit and tacit knowledge (Herschel & Jones, 2005).

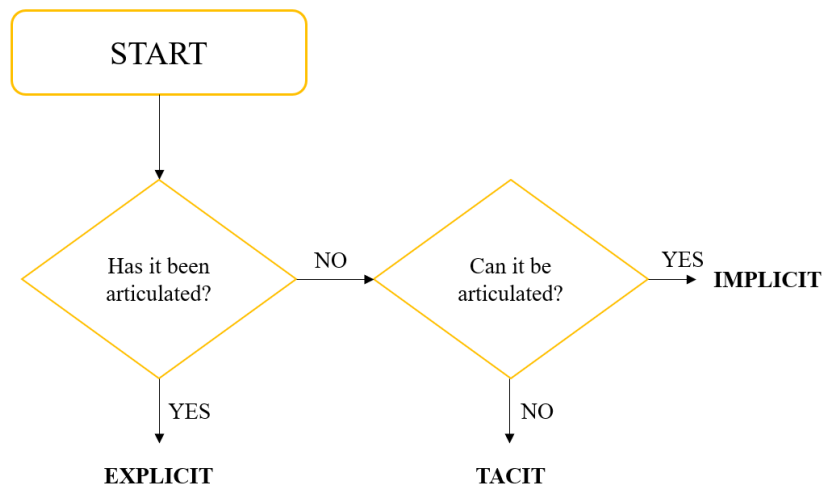


### **2.1.2 Differences between the types of knowledge**

This study will analyze the knowledge management practice utilization from the perspective of strategy-as-practice elements, focusing on where knowledge is divided into three main types: tacit, implicit, and explicit. As a result, this section describes these types of knowledge separately and introduces a method (Figure 3) that can roughly identify these types.

Knowledge can be divided into three main types - tacit knowledge (understood information), implicit (applied information) knowledge, and explicit knowledge (documented knowledge). Tacit knowledge can be identified as the knowledge that is challenging to obtain from being taught or from books; this is based on the fact that it is formed through experience, practice, context, or value, for example, and it is intuitively understood (Cambridge Dictionary, n.d.; IBM Cloud Education, 2020). For example, tacit knowledge can be innovative, leadership skills, body language, or humor. Implicit knowledge is mainly like tacit knowledge. Still, it differs in nature, in a way where it is easier to teach from one person to another and moves with the person, for example, when moving from one job to another. Examples of implicit knowledge include knowing how to ride a bicycle, fly an airplane, or use some work-related application.

On the other hand, explicit knowledge differs from tacit and implicit knowledge in a way that can be easily documented and shared. If tacit and implicit are unstructured information, then explicit is structured. Examples include books, reports, and guides. These types of knowledge are often visualized as an iceberg, where explicit knowledge is the proportion on the water's surface, and tacit and implicit knowledge is on the invisible part below the water's surface. The model (Figure 3) created by Nickols (2000) also clearly observes the difference between these types of knowledge.



**Figure 3. Explicit, implicit, and tacit knowledge model (Adapted from Nickols, 2000).**

### 2.1.3 Describing knowledge management as a process

With knowledge management at the heart of this thesis, it is essential to understand knowledge management as a process. The process describes the journey from creating knowledge to its utilization. Understanding this process thus helps to better identify the utilization of knowledge management during the strategic tool designing and implementation. This section describes the academic and the more commercial approach to this process and the steps involved.

Knowledge management is often described as a process (Gartner, n.d.; IBM Cloud Education, 2020). Although there are several different approaches to the process, in general, the only difference is in the terms used and the number of steps roughly more academic approaches dismantle the process into several parts, while more commercial approaches condense it into the narrowest possible one (Gartner, n.d.; IBM Cloud Education, 2020; King, 2009; Wibowo, 2017). When presenting the process (Figure 4), references are taken from both approaches, describing it clearly. This process starts with creating knowledge and ends with its exploitation.

King's (2009) approach divides the process into seven parts involving: knowledge creation, acquisition, refinement, storage, transfer, sharing, and utilization. In turn, Wibowo's

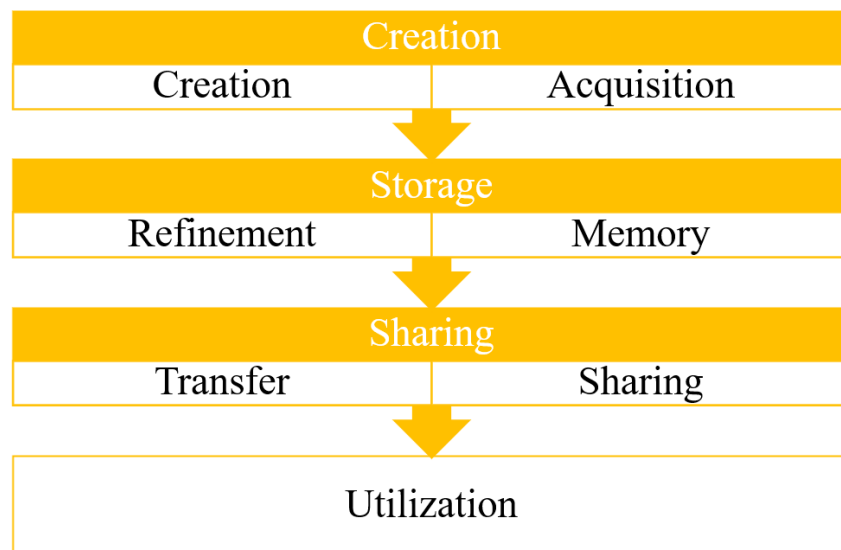
(2017) description of the process includes five steps describing knowledge creation, capturing and storing, organizing and transforming, deploying, and applying. As can be identified, the structure of both processes is very similar, the most significant differences being mainly in the distribution of steps. Although individuals, regardless of organizational level (e.g., executive, managerial, operational), are all involved in these processes, knowledge management focuses a lot on managers and how they can achieve the desired knowledge management goals, motivate individuals to participate in this process and create an overall atmosphere that facilitates knowledge management success (King, 2009).

IBM divides this process into three main stages: knowledge creation, storage, and sharing (IBM Cloud Education, 2020). Knowledge creation involves identifying and developing any existing or new knowledge that is to be circulated throughout the organization (IBM Cloud Education, 2020). King's (2009) process model divides this phase into knowledge creation, which consists roughly of the organization's internal tacit and explicit knowledge, and knowledge acquisition, which, in turn, consists mainly of the organization's external explicit knowledge.

Knowledge storage is the natural next step after knowledge creation, where knowledge is transferred to an organization's memory, usually into an information technology system, seeking to maximize its impact and future usability (IBM Cloud Education, 2020; King, 2009). King's (2009) model describes this same by dividing it into two steps: knowledge refinement as well as knowledge storage, where refinement describes the process by which knowledge is selected, filtered, refined, and optimized for storage. Again, it can be seen that the academic approach is entirely in line with the commercial approach but has taken the process to a deeper level.

IBM describes knowledge sharing as the last stage that includes processes for sharing knowledge across the organization (IBM Cloud Education, 2020). King's (2009) model divides this phase into knowledge transfer, sharing, and utilization. Similarly, knowledge

is transferred or shared to have the greatest possible organizational impact. These terms are very similar; however, the transfer can be seen as a more determined transmission of knowledge and sharing as a less formal and targeted sharing of knowledge (King, 2009). Knowledge transfer or sharing is followed by the utilization of knowledge, where it can be implemented in, for example, the organization's internal policies and systems (King, 2009).



**Figure 4. Comparison of IBM's three-step approach (orange) with King's (2009) seven-step approach (white) to the knowledge management process (IBM Cloud Education, 2020; King, 2009).**

#### **2.1.4 Reasons why the demand for business intelligence is growing**

As the study examines the design and implementation of the strategic tool for business intelligence, it is crucial to understand business intelligence as part of knowledge management, its main features, information hierarchy, and predictive analytics. Predictive analytics has been highlighted because the strategic tool discussed in the study is done in predictive analytics and, more specifically, predictive modeling. Understanding the form of the strategic tool will also contribute to an improved understanding of the whole and hence the utilization of knowledge management as part of this process.

Business intelligence can be interpreted as a broad set of technologies that collect, store, and analyze data to provide enterprise users with the knowledge for better business decision-making (Vercellis, 2009). The term includes extensive knowledge of all external and internal aspects affecting the business, such as competitors, customers, stakeholders, economic environment, and internal operations, supporting optimal decisions (Herschel & Jones, 2005; Vercellis, 2009). Kohtamäki et al. (2017, p.40) define business intelligence as: "A process that transforms internal and external data into knowledge and communicates it to the business user via a set of applications."

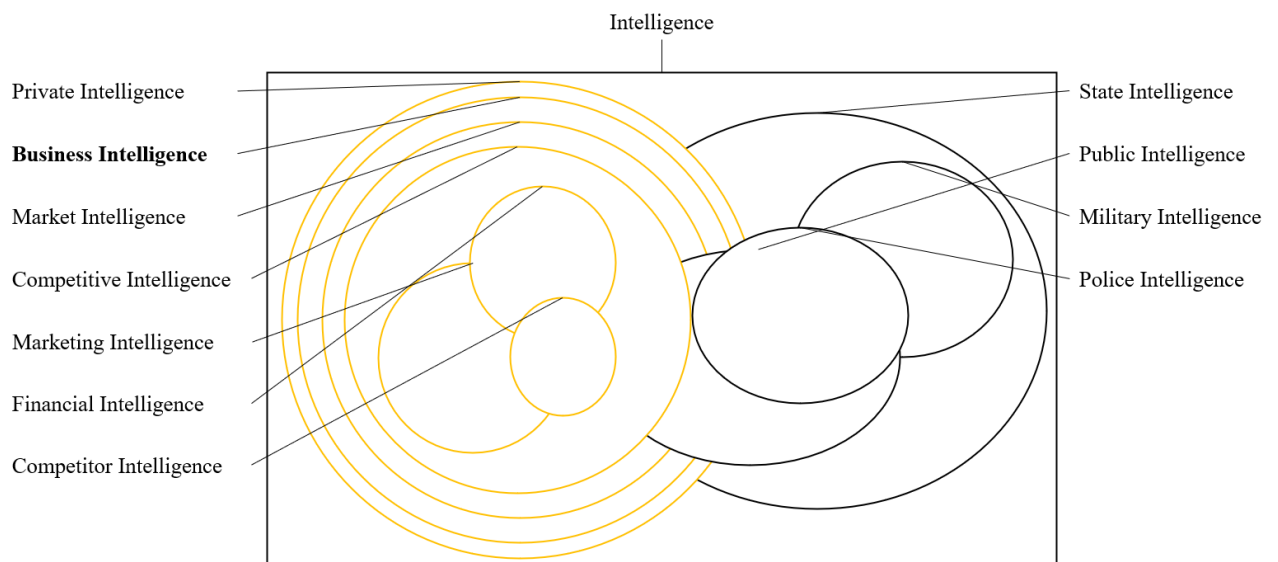
The demand for business intelligence has grown even more significant due to the digital transformation as organizations are becoming more data-centric and the markets more dynamic (Suša Vugec et al., 2020; Tavera Romero et al., 2021). The concept incorporates analytics, big data, and artificial intelligence, which are at the center of the digital revolution in both the private and public sectors making business operations smarter and more profitable (Suša Vugec et al., 2020). Given these, the processes and technologies utilized by business intelligence enable, among other things, organizations to provide quicker responses to these dynamic markets (Tavera Romero et al., 2021).

The primary purpose of business intelligence is to provide positive value for the organization by supporting decision-making (Işık et al., 2013). Roughly, business intelligence supports the decision-making process by improving the quality of the information used, enabling rapid reactions to change in the business environment, and identifying future market potential (Fink et al., 2017). This value is created through several different organizational benefits, as a result of which the success of business intelligence must also be interpreted from the perspective of the expected benefits for each organization (Işık et al., 2013). The crucial benefits of business intelligence for the organization are better profitability, reduced costs, improved efficiency, reduced risks of possible bottlenecks, and deeper customer understanding (Işık et al., 2013).

### 2.1.4.1 Business Intelligence as part of the intelligence landscape

As the Intelligence landscape is vast and multifaceted, it is essential to understand the position of business intelligence as part of this. This makes it easier to identify what business intelligence entails.

Following Jenster et al. (2009), the intelligence landscape can be roughly separated into two significant areas of study: private intelligence and state intelligence (see Figure 5). As its name implies, private intelligence includes the private sector and progresses layer by layer, starting with business intelligence, followed by market intelligence, which includes competitive intelligence and can be divided into competitor intelligence, marketing intelligence, and financial intelligence. Regarding state intelligence, public intelligence plays a significant role and includes, for example, police intelligence, another area of state intelligence is military intelligence. However, it must be emphasized that intelligence studies vary significantly between countries, and the content of both private intelligence and state intelligence contains many overlaps and primarily operate on the same principles.



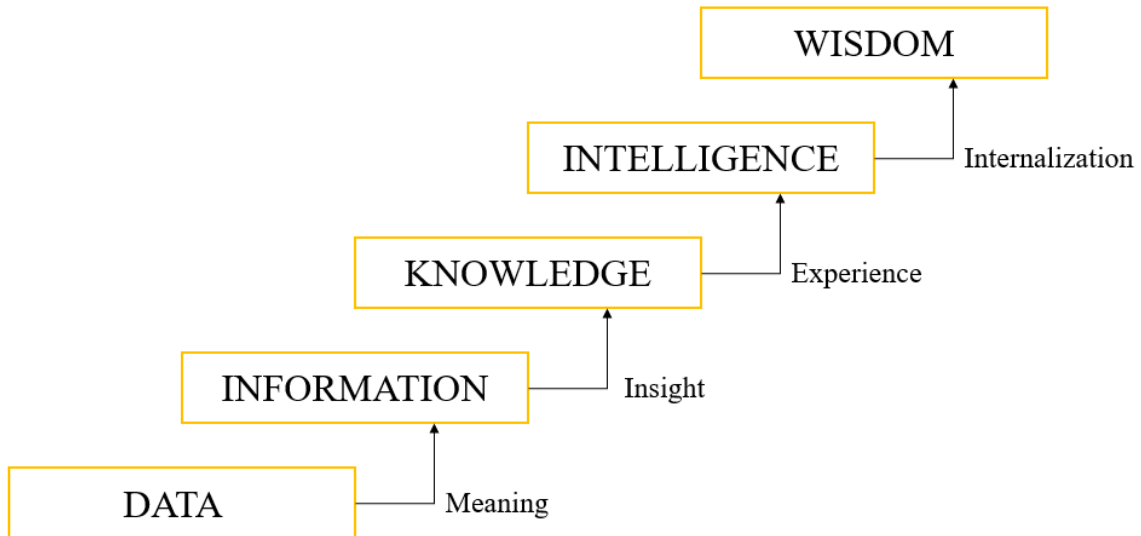
**Figure 5. Intelligence landscape (Adapted from Jenster et al., 2009).**

#### **2.1.4.2 From data to wisdom, the information hierarchy structure**

As this study primarily works with data, information, and knowledge, it is essential to understand how they are hierarchically intertwined. In addition to this, intelligence and wisdom are also presented as part of this hierarchy. This allows practitioners' information and knowledge input to be identified when researching the strategic tool creation process.

The core of the whole business intelligence can culminate in the relationship between data, information, and knowledge. From the business intelligence perspective, one can claim that data, information, and knowledge belong to a consecutive order, where data acts as a raw material for information and information in turn as a raw material for knowledge (Zins, 2007). However, the explanation of these terms is not entirely unambiguous, as based on the field of research, definitions vary slightly, and for this reason, this thesis focuses on the general approach of business administration and information science. United Nations Economic Commission for Europe (n.d.) defines data as: "...a representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by human beings or by automatic means". Information can be considered data processed into a meaningful and understandable form for the recipient (Gordon B. Davis, 1985). Knowledge can be viewed as general understanding and awareness gathered from accumulated information, tempered by experience, enabling new contexts to be envisaged (Zins, 2007).

In addition to these three building blocks, knowledge can be further refined. Vuori (2006) has subdivided knowledge into intelligence as well as wisdom. Intelligence is formed from knowledge based on personal experiences, while wisdom is refined from intelligence through internalization (Vuori, 2006). Intelligence and wisdom systematically relate to data, information, and knowledge, forming a hierarchical continuum (see Figure 6).



**Figure 6. A hierarchical entity formed by data, information, knowledge, intelligence, and wisdom (Adapted from Vuori, 2006).**

#### 2.1.4.3 Describing business intelligence as a process

In general, business intelligence is utilized in different ways based on the needs of individual organizations. However, regardless of this, business intelligence proceeds very much following the same steps as a process. Hannula & Pirttimäki (2003) observe that several different versions of this process have been developed, but they all follow the same elements; however, the steps in the process may be quantitatively different due to different emphases. These generic steps include identifying the need for information, how and where it is collected, how the collected data is organized and stored, how the data is transformed into visually understandable information, and how the information can be utilized as knowledge to reinforce the decision-making process of organizations (Li et al., 2008).

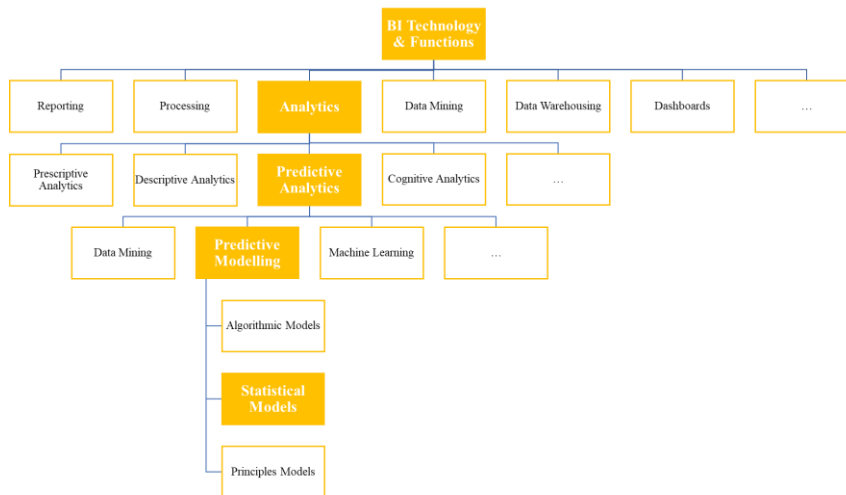
Microsoft (2021) presents this process by dividing it into four steps that together make up the process that roughly forms the journey from raw data into easy-to-digest insights for use by organizations. Due to the simplicity of this approach, it serves well to demonstrate the steps in the process. The first step involves collecting data from several sources, such as internal company data and external market data. In the second step, Microsoft



describes the uncovering of trends and inconsistencies. This step can be considered data analysis; several other models use the data processing step before this step (Hannula & Pirttimäki, 2003). In the third step, the data is visualized, and the identified findings are presented in charts, graphs, histograms, or other visual forms. The fourth step describes the utilization of the knowledge formed from data visualization for the actions of decision-makers. However, it should be noted that the business intelligence process is intended to support the decision-making process, giving decision-makers a clearer overall picture and understanding and not providing direct answers related to the decisions.

#### 2.1.4.4 Predictive analytics as a strategic organizational resource

Business Intelligence is a vast entity in terms of the technologies it covers and its functions. For this reason, the focus must also be maintained on areas relevant to research (Figure 7). As a result, in terms of business intelligence functions, the theoretical framework focuses on analytics, specifically predictive analytics and its predictive modeling technique. This limitation is because the action research in this study focuses on developing a predictive modeling tool and monitoring this process.



**Figure 7. A rough graph showing the technology and functions of BI, highlighting the focus of this study.**

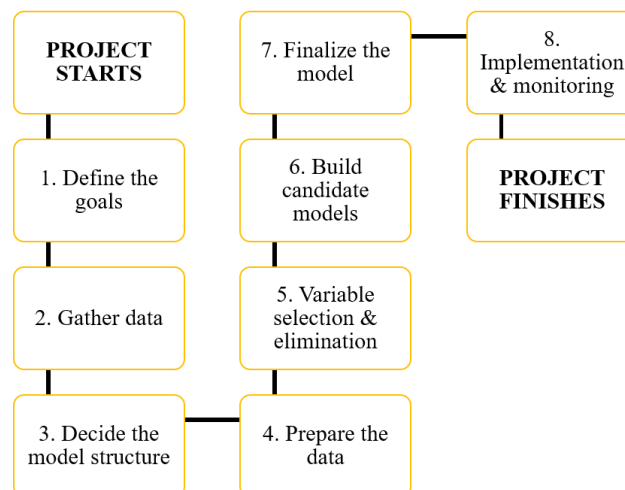
The concept of analytics is also broad; at its simplest, analytics can be reporting, while at its most advanced, it can be machine learning and artificial intelligence. Oxford (n.d.) defines analytics as "A careful and complete analysis of data using a model, usually performed by a computer; information resulting from this analysis". Institute for Operations Research and the Management Sciences (n.d.) defines analytics as "... the scientific process of transforming data into insights for the purpose of making better decisions". Analytics is always an action-driven approach. There is always a decision to be made when we look at doing analytics." The role of analytics is to help find answers to business questions, detect connections, predict results, and automate decision-making. This versatile field of computer science is utilized to find relevant data models and search for new information through mathematics, statistics, predictive modeling, and machine learning techniques.

Data storage and its processing speed set limits on analytics, but today's technology overrides these limitations, opening up the path for processing large amounts of data and thus creating analytics (SAS Institute Inc., n.d.). Today, most organizations see analytics as a strategic resource central to many operational roles and skills (SAS Institute Inc., n.d.). Business intelligence-supported analytics can be identified as necessary assets for organizations to cope with the rapidly changing environment (Choi et al., 2017).

Predictive analytics is characterized by its core to uncovering data-related patterns and identifying relationships in data (Gandomi & Haider, 2015). As the name implies, predictive analytics predicts future outcomes using various techniques and tools based on historical and current data (Gandomi & Haider, 2015). From the academic perspective, predictive analytics is located in the data science subset and, in terms of its needs in research, it can be divided into statistics, optimization, forecasting discrete event simulation, applied probability, data mining, and analytical mathematical modeling (Waller & Fawcett, 2013).

It is significant to note that although predictive analytics is associated with many quantitative approaches, it differs from them in its nature, so it stands as distinct from each (Waller & Fawcett, 2013). As an example, statistics is quantitative, while predictive analytics is quantitative and qualitative (Waller & Fawcett, 2013). On the other hand, forecasting focuses on predicting the future, while predictive analytics can identify what would have occurred in the past under various conditions (Waller & Fawcett, 2013). Compared to these quantitative disciplines, predictive analytics has a different emphasis.

Predictive modeling is a statistical technique under predictive analytics that uses statistics to predict outcomes (Geisser, 1993). The model can, at its simplest, be dissembled into pieces and defined as a representation of something that aims to help us understand what is currently going on, how things interact with each other, and to predict what may happen in a situation where variables develop positively or negatively (Wu & Coggeshall, 2012). In general, models can be physical objects, such as a model of an airplane, which is typically a smaller as well as a simpler version of a real object, and algorithm-based models, such as statistical models, which are typically built on a set of rules, equations, and adjustable parameters (Wu & Coggeshall, 2012). The generic statistical modeling process is presented below (Figure 8).



**Figure 8. Straightforward generic statistical modeling process (Adapted from Wu and Coggeshall, 2012).**

## **2.2 Practicality and micro-perspective as part of strategy exploration through strategy-as-practice**

The strategy-as-practice approach has arisen from the need to provide a second perspective on traditional strategy thinking, in a way that, as its name implies, focuses on practice, that is, how strategy is performed (Whittington, 1996). Strategy research has typically remained at the macro level of firms and markets simultaneously, reducing the associated human-induced variables (Jarzabkowski et al., 2007). As a result, to understand how a strategy arises and is formed on a practical level, it is required to shift the focus of research also in the direction of the actions and interactions of the strategy practitioners (Jarzabkowski et al., 2007).

Based on these identified issues, in more detail, strategy-as-practice examines strategizing, strategy-making, strategy work, and strategic management, with the micro perspective focus of the strategy implementers (Golsorkhi et al., 2010). However, strategy-as-practice focuses not only on the micro-level but has also started to evolve into a more holistic stance, taking into account the macro-level, for example, when examining practitioners and their practices (Fenton & Langley, 2011). This approach allows strategy research to focus on strategy in terms of how it is done, who does it, and what they use to do it, shifting the focus from the core competency of the firm to the practical level of competence of the strategy practitioners (Jarzabkowski, 2005; Whittington, 1996).

### **2.2.1 The actual complexity of strategy making**

As an approach, strategy-as-practice offers relevance for strategy practitioners and theorists. Examining strategy practically enables individuals in strategic roles or those seeking similar tasks to understand better how the strategy is put into practice (Jarzabkowski, 2005). In this regard, Jarratt and Stiles (2010) have also shown a critical view that the traditional tools and models presented in strategy research may oversimplify the complex reality of actual actions of strategy making. Jarzabkowski (2005) also supports this critique by pointing out that much of the strategy theory is built around large-scale

research, narrowing the actual complexity of strategy making. As a result, the strategy-as-practice approach provides a more concrete perspective on strategy practitioners from a context that focuses on understanding how they engage with methodologies and tools to develop a strategy (Jarratt & Stiles, 2010).

The academic approach answers the problem, which has formed from the gap between the relevant theory and its actual practice (Jarzabkowski, 2005). Therefore, this means that the academic approach has alienated from the strategy at the practical level and thus partly focused on exploring issues that might not have been identified as concrete issues at the practical level.

### 2.2.2 The critical elements of strategy-as-practice

As this study will examine the utilization of knowledge management practices both by type of knowledge and through key strategy-as-practice elements, it is vital to identify these elements separately. Therefore, this section introduces key elements, describes their nature and relations, and provides concrete examples.

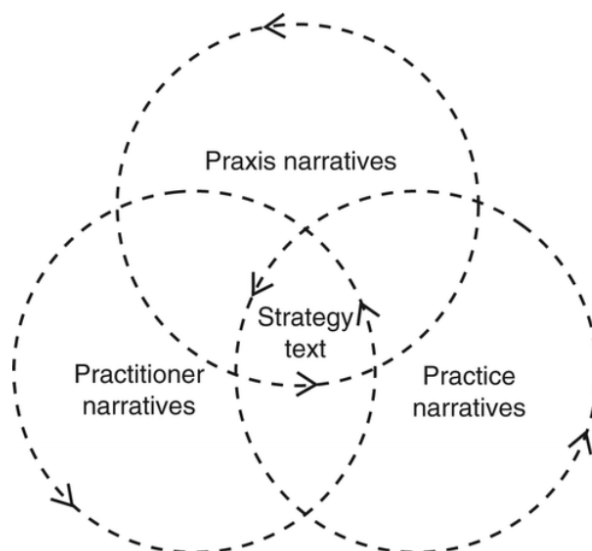
Whittington (2006) divided strategy-as-practice into strategy praxis, practices, and practitioners (Figure 9).



**Figure 9. The praxis, practitioners, and practices framework (Whittington, 2006).**

Strategy practitioners include a wide range of strategy practitioners who interact with or otherwise influence strategies, such as consultants, analysts, and managers. Strategy praxis refers to what strategy practitioners do in their day-to-day work when dealing with strategy or aspects of it; these can contain a wide variety of interactions such as meetings and conversations (Fenton & Langley, 2011; Whittington, 2006). On the other hand, strategy practices focus on thinking, doing, and using things from routines, procedures, and techniques (Fenton & Langley, 2011).

In addition to the framework (Figure 10) and its three categories, praxis, practices, and practitioners, Fenton and Langley (2011) identify another category that Whittington's (2006) approach could not fully capture. The identified category is strategy text, reflecting textual artifacts such as strategy plans as part of strategic activities (Fenton & Langley, 2011). Vaara et al. (2010) also found that few studies have examined and reviewed strategic texts and their characteristics in more detail. Given the significant importance of strategic documents in organizations and their impact on strategizing and decision-making, the strategy texts have identified precise needs as part of the strategy-as-practice elements and suggested frameworks (Fenton & Langley, 2011; Vaara et al., 2010).



**Figure 10. Fenton & Langley's (2011) four-factor approach on strategy-as-practice (Fenton & Langley, 2011).**

At a general level, traditional strategy research is interested in answering what strategic decisions are taken and examining the consequences for company performance (Chia & MacKay, 2007). For their part, Pettigrew (1985) and Johnson (1987) set out to find an answer to how a particular strategy emerges and thus set in motion a new paradigm that focused on the strategy process. On the other hand, Whittington's (1996) approach focused on a similar strategy-as-practice approach, which differed from the strategy process approach in terms of the nature of its approach and focus. However, due to the similarity between strategy-as-practice and strategy process, Chia and MacKay (2007) emphasized a more apparent distinction regarding what practice is concerning processes and individual activities and observing whether strategy-as-practice works entirely as its unique perspective or to extend the strategy process view.

### **2.2.3 Identifying the organization's employees as strategy practitioners**

Since this study deals with strategy actors at different levels of the organization hierarchy, it is essential to understand how they contribute to strategy. In addition to senior management, strategy-as-practice identifies middle management, lower management, and the operational level as part of the organization's strategy practitioners.

In the strategy-as-practice approach, it is essential to internalize a strategist, i.e., a practitioner. Related literature dominates the concepts of strategy formation as a top-down process, so their focus is on top managers and their decision-making process (Jarzabkowski et al., 2007). However, the practice perspective shows that this top-down approach does not identify the broader group of actors as potential strategists (Jarzabkowski et al., 2007). Strategy-as-practice studies have shown that middle management, lower management, and operational level employees can be significant strategic actors (Jarzabkowski et al., 2007). While their job descriptions and actions may not be directly related to strategy, they, directly and indirectly, impact the organization's strategic direction (Jarzabkowski et al., 2007).

These groups of middle managers and lower-level operational employees can be significant contributors based on their understanding through, for example, process experience (Bingham & Eisenhardt, 2011). This is also supported by the argument that good plans are made and implemented under good leaders at all levels (Cohen, 2004). Mintzberg (1987) describes this situation by representing that although the guidelines for the strategy come with a top-down approach, salespeople based on their process experience, usually proceed on their own, modifying their approach and products to suit the customers. By this, they are convincing the production to produce such a product. In this way, they are pursuing their strategies, although they follow the top-down strategic guidelines in the bigger picture. As a result, it is essential to identify these actors as strategists (Jarzabkowski et al., 2007).

#### **2.2.4 Strategy practices and praxis in response to questions about what and how strategy is made**

Reflecting on the Whittington (2006) approach, after identifying the strategist, one must next understand what and how the strategists are doing strategy; that is, one must examine the perspectives of praxis and practices. This approach is also supported by Jarzabkowski et al. (2007), according to which the question of what strategists do is bound on how researchers determine how a strategist is defined.

The creation and implementation of the strategy have, over time, changed in nature based on external needs, such as digitalization, globalization, and the rapidly changing world in general. The unpredictable market environment is incompatible with what has historically been one of the most significant tasks of strategists, namely, leading the direction of the annual strategic planning process (Birshan et al., 2014). In terms of their work, strategists have responded to this by increasing their roles' scope and complexity (Birshan et al., 2014). Significant tasks for strategists beyond strategic planning include reallocating organizational resources, detecting and building critical strategic capacities, identifying business development opportunities, detecting external insights directly related to the organization, and indirect long-term market trends (Birshan et al., 2014).



However, strategic tasks are not limited to these; the strategy is carried out directly and indirectly on many levels, through many different positions, as highlighted earlier (Cohen, 2004; Jarzabkowski et al., 2007; Mintzberg, 1987).

Strategists and what they do are also shaped by emphasizing their role, individual strengths, and the organization's needs. The research provided by Birshan et al. (2014) surveyed around 350 senior strategists standing for 25 different industries from all the regions, and the analysis yielded five clusters based on the strategist's strengths (Figure 11). These identified clusters, from which strategic roles were formed, consisted of three categories: generating insight, enabling and enacting strategic decisions, and possessing particular value levers (Birshan et al., 2014). The observed roles consisted of the architect, the mobilizer, the visionary, the surveyor, and the fund manager, based on the strategist's signature strengths of various categories (Birshan et al., 2014). Although this research focuses on a top-down approach, it reflects the diversity of strategists' roles and different strategic focuses.



**Figure 11. Identified strategist roles, by category (Birshan et al., 2014).**

## 2.3 Synthesis

This section combines the research streams, knowledge management, and strategy-as-practice presented in the literature review. To this end, this section makes the synthesis of studying knowledge management leveraging while creating new strategic tools for business intelligence purposes. This creation process is examined in more detail with a strategy-as-practice focus designed to identify various levels of organization contribution during the creation process. Most importantly, as a consequence, this chapter introduces the framework that will be used to explore the research gap between strategy-as-practice and knowledge management.

Therefore, the framework needs to observe that one of the critical features of the strategic tool creation process is including knowledge and expertise from many different organizational levels (Darkow, 2015). The integration of knowledge within an organization can be identified as a critical source of competitive advantage (Neeley & Leonardi, 2018). Companies are increasingly dependent on employees' knowledge, expertise, and competencies from different organizational levels (Darkow, 2015). As a result, companies are increasingly trying to implement their internal activities and processes to promote this knowledge and expertise among their employees (Neeley & Leonardi, 2018). To explore the in-depth knowledge and its emergence, knowledge management has been explored using a strategy-as-practice approach (Marin et al., 2016). This approach makes it possible to look at continual changes in daily practice and the praxis of practitioners to more accurately identify where knowledge comes from and how the organizational outcomes are formed (Marin et al., 2016).

The approach of this study and the associated identification of knowledge from several different organization levels can be seen as very relevant. This is based on the fact that there is a deficiency in empirical evidence published regarding how individual companies approach the strategy development process and which organizational levels are included in the process apart from the top management (Darkow, 2015). As a result, integrating knowledge management with strategy-as-practice enables strategy practitioners'

knowledge input to be identified and analyzed with the necessary accuracy at various organizational levels. This means that the conventional strategy approach has mainly focused on strategy formation with a top-down approach and thus identified, for the most part, only top management (Darkow, 2015). However, research related to strategy development has found the importance of practitioners from multiple organizational levels in contributing to strategy formation (Darkow, 2015). The focus can be identified to shift toward more modularized and decentralized decision-making (Darkow, 2015). To date, however, concerning literature, relatively little observation has been conducted on how in addition to top management, other levels of the organization are involved in the strategy development process (Darkow, 2015). Based on this, it is essential from a strategy-as-practice perspective to identify strategy practitioners who are significant strategic influencers in interpreting change and implementing the strategy through practice (Marin et al., 2016).

In organizations, a significant part of knowledge is formed by sharing tacit and implicit knowledge, so it is important to analyze how this knowledge is distributed and implemented into organizational processes (Marin et al., 2016). Although companies recognize the need for knowledge sharing among employees, more could be identified on how to enable and utilize such sharing (Neeley & Leonardi, 2018). Knowledge management has become an increasingly important factor as the value of companies is increasingly made up of employee know-how, based on which companies seek to find answers to the question of how strategy development is worth being established so that the company can leverage the full potential of employee expertise into organizational processes (Darkow, 2015). Especially when comparing explicit information, practices and praxis around tacit-to-tacit sharing are difficult to identify and control in firms (Marin et al., 2016). These practices refer to the routine activities that employees at different levels of the organization do when they are strategizing and praxis, on the other hand, refers to concrete, unfolding activities as they take place (Marin et al., 2016). Based on the challenge of tacit-to-tacit sharing, strategy-as-practice benefits from the knowledge management

approach, where knowledge can be divided into different knowledge types, which can be studied separately.

Practitioner-led research allows for a more advanced understanding of the strategy development process in practice (Darkow, 2015). For this reason, it is important for strategy-as-practice and knowledge management that the research occurs in the form of action research, where the researcher is a member of the company and not an external researcher. A strategy-as-practice perspective, compared to conventional strategy can identify that there is a difference between what individuals think and what individuals do (Marin et al., 2016).

Based on these identified synergies, synthesizing these two research streams allows us to identify how explicit, tacit, and implicit knowledge are divided between practitioners of different organizational levels. In addition to this, practitioners and praxis can also be analyzed in terms of knowledge types. Consequently, for the framework (Table 1), it is necessary to rethink the strategy development process and to identify with a strategy-as-practice approach how knowledge management leveraging takes place as part of the strategic tool creation process. Thus, each level of the organization must be identified and, in terms of information and knowledge, explicit and tacit must be detected separately.

Based on this, practitioners, practices, and praxis have been placed on the second axis of the strategy-as-practice side of the framework. Moreover, in turn, the other axis of knowledge management is formed with the focus on tacit and implicit, and explicit knowledge. This approach to the framework makes it possible to identify individual strategy actors, regardless of organizational level, and to identify whether their knowledge input documented explicit knowledge or more challenging to access tacit and implicit knowledge. Therefore, the framework allows identifying especially the organizational tacit-to-tacit knowledge which is challenging to capture in explicit form. Similarly, in terms of practices, it is possible to examine whether the tools, methods, processes, and

routines used in different stages of the process are in the form of documented explicit knowledge or tacit undocumented information related to the company's processes, routines, and methods. For praxis, on the other hand, the focus is on the activities that take place as part of creating the strategy.

**Table 1. Research framework.**

Stage	TACIT / IMPLICIT KNOWLEDGE	EXPLICIT KNOWLEDGE
<b>PRACTITIONERS</b> Strategy actors involved (Who?)		
<b>PRACTICES</b> Tools, methods, processes, routines employed (What?)		
<b>PRAXIS</b> Findings about praxis, the flow of activity in which strategy is accomplished (How?)		

### **3 METHODOLOGY**

This section presents the methodology of the thesis. Additionally, the need for a case study is discussed, and the case organization is introduced. After this, the data collection and analysis section are presented. Finally, the reliability and validity factors of the thesis are presented.

#### **3.1 Research methodology and method**

This study aims to study how knowledge management practices could be utilized during designing and implementing strategic tools for business intelligence. A significant focus in this regard is the contribution of various organizational levels in the form of different types of knowledge. Therefore, this research examines the strategic tool creation process in action research and provides the case organization with a framework that synthesizes knowledge management and strategy-as-practice as an outcome. The action research approach allows data to be collected while creating the strategic tool through interviews and observations. The project focusing on where one wants to know how to do things better through practice aligns with the nature of action research. (Raine & Aarnos, 2018). Therefore, the research is conducted as a qualitative action research case study.

Action research “is an orientation to knowledge creation that arises in a context of practice and requires researchers to work with practitioners” (Bradbury-Huang, 2010, p.93). The simultaneity of research and practice characterizes the action research approach; therefore, action research combines practice and theory (Puusa et al., 2020). However, practicality does not remove the requirement for action research to systematically use scientific methods (Puusa et al., 2020). In terms of practice, action research involves observing the process from which new things are learned, and insights are made, which in turn leads to changes in the process that took place in practical life and thus feeds into the accumulation of theoretical understanding connected to the problem (Puusa et al., 2020).

It has not been possible to define an unambiguous definition for action research (Puusa et al., 2020). This is because it is applied in many disciplines and in literature from different schools of thought, differing in terms of methods, objectives, and background assumptions, among other things (Puusa et al., 2020). In addition to these, schools of thought are also classified based on their focus, such as various social movements or research into working life (Puusa et al., 2020). However, all approaches have in common their way of acting, based on action, study, reflection, and making the necessary changes based on these steps (Puusa et al., 2020). However, action research is not research about the practice itself but research within an activity for its development, i.e., it can be described more as research within the practice for practice (Raine & Aarnos, 2018). In addition to these approaches, regardless of discipline or school of thought, there is an idea that actors and researchers participate together throughout the research process (Puusa et al., 2020). Thus, the aim is to connect action and theory (Puusa et al., 2020).

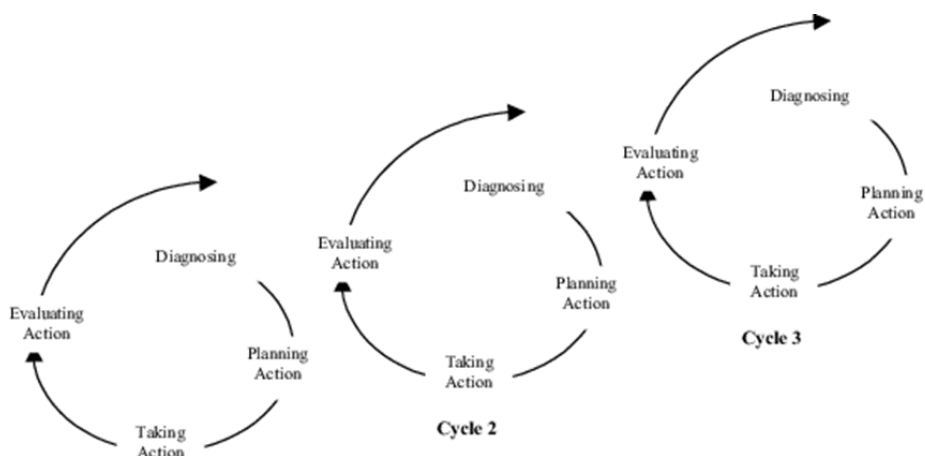
The originator of the action research is considered to be the German psychologist, social psychologist, and philosopher of science Kurt Lewin (Adelman, 1993). In the late 1930s, Kurt Lewin together with his students arranged experimental tests in nearby businesses to demonstrate productivity gains through democratic participation rather than autocratic coercion (Adelman, 1993). Thus, a strong link between the successful development of the organization and intangible capital themes such as workplace climate, trust, better organizational processes, and internal change began to emerge (Puusa et al., 2020). Through this, the construction of knowledge began to occur through human activities and the social interactions between actors. Organizations benefit from the growing self-understanding of their processes, and concrete change actions are developed and put into practice (Puusa et al., 2020).

There has been a critical view of action research as to whether it meets the necessary scientific criteria based on universities taking an overly narrow view of knowledge (Puusa et al., 2020). Therefore, it can be interpreted that action research meets the criteria of science if it includes a research element (Puusa et al., 2020). Thus, an essential part of

action research is collecting and analyzing data using well-established scientific approaches (Puusa et al., 2020). For this reason, it is essential in action research to maintain a balance between action development and research (Puusa et al., 2020).

An example of this is a situation where the development of activities takes too much focus, resulting in which research interests may be left out (Puusa et al., 2020). Conversely, in the same situation, where the research focus takes too much focus, the practical part of the process itself may be left out. Kurt Lewin's phrase illustrates the connection between theory and practice in action research "Nothing is as practical as a good theory" (Raine & Aarnos, 2018).

Reflective thinking can be considered one of the critical factors in action research (Raine & Aarnos, 2018). Reflection aims to get a person to look at their approach to the issue, their way of thinking, and their experiences (Raine & Aarnos, 2018). Reflection aims to understand new approaches to processes and thus develop activities (Raine & Aarnos, 2018). Therefore, in practice, the focus is on broadening one's mindset and thus finding alternative approaches to processes. Action research is often described as a self-reflective cycle in which action, analysis, reflection, and redesign follow one another (Raine & Aarnos, 2018). Naturally, action research involves several of these cycles, which are interconnected to form a spiral (Figure 12).



**Figure 12. Spiral of action research cycles (Nunes & McPherson, 2002).**



The primary data for the research is collected through observations. Observations are an inherent way to gather data in an action research approach because research questions and objectives are based on what the people in the organization do due to their role and know-how in the organization (Sanders et al., 2007). The observations in this study are participant observations, a qualitative observation in which the researcher himself participates in the process and thus acts as part of a team and organization (Sanders et al., 2007). At a general level, participant observation aims to explore the whole 'what is going on', and such a deep understanding requires the researcher to participate and be part of the team (Sanders et al., 2007). According to Gill and Johnson (2002), depending on the study, the role of the participant-observer can be divided into four different roles:

- complete participant
- complete observer
- observer as participant
- participant as an observer (Gill & Johnson, 2002)

I acted as a participant and an observer for this study, meaning that I revealed my purpose as a researcher, I made it clear to the interviewees that it was a fieldwork relationship (Sanders et al., 2007). Because my motive and goals are clear to the interviewees, as an interviewer, I can ask questions to improve my understanding, so interviewees can also interpret the process and the interview with analytical reflection on the processes they have been involved in (Sanders et al., 2007).

The interviews were primarily conducted in an unstructured interview style. Unstructured interviews are suitable for case studies as they allow for a comprehensive study of the subject and gaining extensive insights from key people (Williamson, 2002). This is also because often, in an action research case study where something new is created, the researcher cannot predict how the interviewees will react to the prototype or draft and, therefore, the unstructured interview offers a flexible approach (Williamson, 2018).

Semi-structured interviews were also conducted at certain stages of the case. These interviews consist of standard questions but, at the same time allow the interviewer to go deeper if the respondent gets an interesting insight into a particular question (Williamson, 2002). Semi-structured interviews can be associated closer with unstructured, in-depth interviews than structured, standardized interviews (Williamson, 2002). Some researchers do not distinguish between these unstructured and semi-structured interviews but refer to both as 'qualitative interviewing' (Williamson, 2018).

### **3.2 Case selection process**

The case organization, Hitachi Energy, is a subsidiary of Hitachi and has its product portfolio divided into business units for Grid Automation, Grid Integration, High Voltage Products, and Transformers. Hitachi Energy is headquartered in Zurich, Switzerland, and employs approximately 36,000 people. Hitachi Energy was formed in 2020 when Hitachi acquired 80.1% of ABB's Power Grids business. During the early phases of the acquisition, the company was renamed ABB Hitachi Power Grids but later changed its name to Hitachi Energy.

The thesis's project focuses on Hitachi Energy's Grid Automation unit, consisting of three business lines: Automation and Communication, Grid Edge Solutions, and Enterprise Software Solutions. The project focuses on the Automation and Communication portfolio, the most significant functions of which are protection and control, mission-critical communication, and automation and communication service. Automation and communication solutions aim to digitalize power and automation networks to enhance safety, improve operational efficiency, and serve our customers throughout the entire lifecycle.

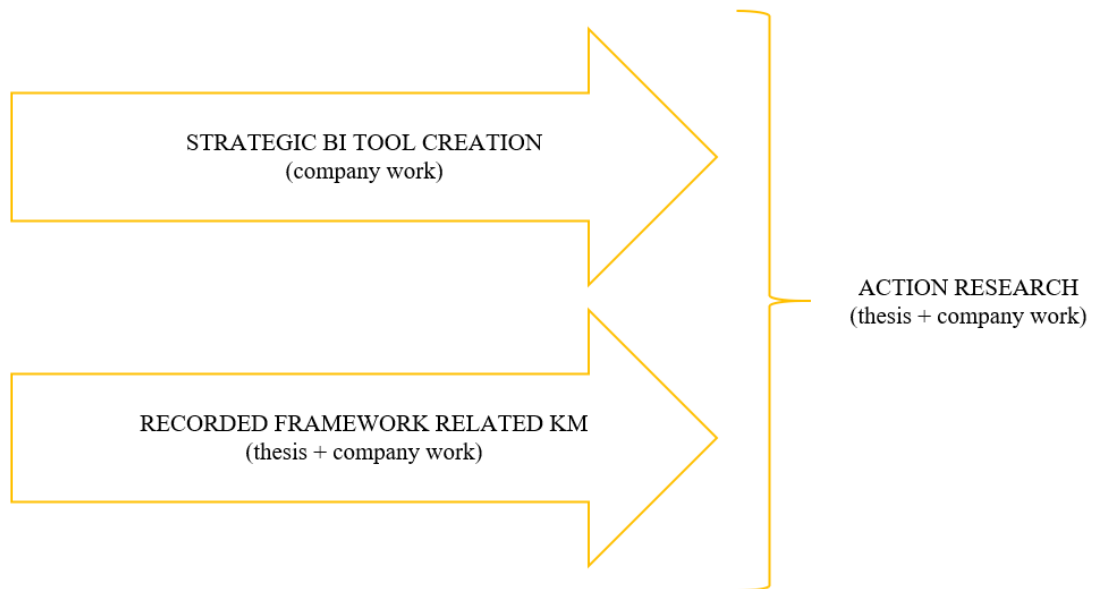
The thesis project from Hitachi Energy focuses primarily on the need to streamline further the internal processes of the Grid Automation business unit. Several business units have developed their predictive modeling approaches, based on which, e.g., potential market sizes, market attractiveness, and forecasting have been analyzed. The modeling tools in the Grid Automation unit are also used to help with several different processes.

The Grid Automation unit identifies the need to develop deeper bottom-up predictive modeling (referred to as a strategic tool in this study) for the Automation and Communication product portfolio within the Rail segment in the European region. Well-implemented bottom-up predictive modeling enables, e.g., a more precise definition of market potential and, in this respect, a more streamlined decision-making process for business development.

Another defined need is to create a recorded framework to act as a rough framework for creating new strategic tools focusing on the knowledge management aspect. Hitachi Energy identifies that it is important to get an overall view of who should be involved in certain stages of the strategic tool design and implementation process based on their assumed knowledge when doing similar projects. This will help optimize similar projects and the internal human resources utilized. At a practical level, this means that the strategic tool developer can proceed through stages that have been identified to be effective and include individuals from certain organizational levels who are presumed to have the relevant know-how required. Thus, for example, meetings with people who are not expected to add value in terms of relevant knowledge to the project based on their organizational position can be pruned, and, accordingly, people who are believed to add value to the project can be included based on the current state of the project. Based on this, Figure 13 presents how the thesis project was defined as creating a strategy tool in the identified unit, recording this process in the recorded framework, and analyzing the whole process in action research.

The case has been chosen because Hitachi Energy was embarking on a process to define knowledge management practices and ways to leverage employees' knowledge to create a more streamlined business intelligence process. The outcome of this research provides Hitachi Energy with a framework that includes observations on the possible utilization of knowledge management practices during the business intelligence design and implementation processes. This approach makes it possible to obtain a sufficiently clear and comprehensive knowledge management perspective, as a result of which the

framework formed can be fulfilled. In addition to this, the action research-style approach to the case also allows for a sufficiently comprehensive analysis of employees at different levels of the organization.



**Figure 13. The division between the thesis and company work.**

### 3.3 Data collection and analysis

The research data were collected primarily through semi-structured and unstructured interviews (second appendix of the paper) with employees of the organization and process observation. Most of the interviewees worked in the senior management, middle management, and lower management; however, individuals from the operational level were also involved in the interview. In terms of their market focus, the interviewees consisted of three groups, the organization's employees with a Finnish market focus, a British market focus, and a global market focus. The interviews were conducted between October 2021 and March 2022. The calls were scheduled between 8.00 and 18.00 Finnish time. The interviews were conducted in the morning, during the day, and in the evening for two reasons: firstly, most of the interviewees worked at either the top management or middle management, which made them urgent during the day, and secondly,

although most of the interviewees are in Europe, there were still individual interviewees that were from different continents, and thus operated in a different time zone. In general, non-Europeans were professionals in similar data-based modeling or product level experts and thus were significant addition in providing modeling-related insights.

All interviews were conducted through the business communication platform Teams. This was because it was an internal business communication platform used within the organization. Interviews ranged in length from 30 to 90 minutes. The length of the interview was based on the person being interviewed, the content of the interview, the stage of modeling at the time, and the person's presumed need for the modeling and current stage. In terms of structure, the interviews followed mainly the same formula, in which the interviewee was presented with a description of what the research was about and what the modeling was aimed at from an organizational point of view. Next, the interviewee was introduced to the current state of the project, and the current draft version of the modeling was presented. This phase was followed by tailored modeling-related questions designed for the interviewee, based on the interviewee's position in the organization and the knowledge expected of him or her. The last stage of the interview was always almost similar in structure; the interviewees were asked whom they would recommend for the next or certain modeling stages, based on which new or previous interviewees were included in the project. The interview listing that can be found in the appendices describes the interviewees in terms of their role, organizational level, project stage, date, and interview duration.

In addition to the organized interviews and process observations, the research data consisted of the organization's internal documents and tools, such as other similar data-based modeling tools. Corresponding internal modeling tools in an organization usually contain information about the modeling as a whole and how the modeling has been done. This information can be, for example, the part contained in the modeling, which tells about the versions of the modeling and what has been included in it at any stage. In addition to this, individual Teams sessions were also held with the modelers to review

the modeling they had done and how they had approached the process. This provided significant insight into the organization's practices and similar projects. The purpose of the external market research was to outline how the consulting companies and other authors have approached the determination of market sizes with a top-down approach. In this respect, the role of external documents was thus to provide a second perspective to the process.

For the observations, the data collection consisted of primary and secondary observations. Primary observations are those from which the researcher would note what happened or was said in a particular situation (Sanders et al., 2007). Often, direct observations require recording to record the findings as they are. Secondary observations, in turn, are based on statements made by the observer based on what happened or what the interviewee said (Sanders et al., 2007).

The data analysis is carried out as thematic analysis, a qualitative data analysis method. The thematic analysis describes implicit and explicit interpretations, identified as themes (Guest et al., 2012). The thematic analysis is well suited for data analysis, as there are many data to be processed due to the number of interviews and several data sources.

The analysis is approached so that the different stages of the process are treated separately and as a whole. Based on the observations and interviews made during the process, the aim is to identify reoccurring items, themes, or patterns. Groups are formed from these identified issues. As part of the interviews, the aim is to go through these groups /themes with the interviewee and get more information and findings.

### **3.4 Reliability, validity, and ethics**

In general, qualitative research methods are often well-tailored based on the purpose of the research, which means that the reliability of the research must be assessed with the necessary accuracy. The science practice requires high-quality research and reliable

research results based on it. As a result, this section deals with three interrelated concepts: the research's reliability, credibility, and ethics.

Credibility refers to how the study audience, such as student colleagues, interviewees, and the scientific community, accepts the study's results as valid and trusts that the research material has been properly collected and analyzed (Puusa et al., 2020). Reliability means the ability of a researcher to select and use reasonable and appropriate approaches and methods to answer research questions and conduct research (Puusa et al., 2020). Ethics means that the researcher has adhered to ethical principles throughout the research (Puusa et al., 2020).

Research in the field of management can be carried out so that the researcher oneself may be involved in the events. Especially in this action research approach, the researcher's reflexivity concerning his or her research process is a central factor in how the reliability of the research develops during the research. As a result, a critical reflection on the process and its various components have been kept in mind throughout the study.

Validity and reliability are key concepts in assessing the reliability of the study. Validity in qualitative research concerns, for example, the integrity of a phenomenon defined as the object of research (Puusa et al., 2020). In this respect, this study focuses on an identified phenomenon and research questions that have been regularly re-examined to keep them in mind. In the same way, study results and the analysis of the results have been carried out in a way that respects and focuses on the nature of the defined phenomenon. The study's validity has also been considered by utilizing several different data sources: related research streams, interviews, observations, internal documents, and tools. A more holistic approach with multiple data sources reduces the risk associated with validity.

Reliability, in turn, is enhanced by the parallel result produced by two or more measurements (Puusa et al., 2020). In this respect, reliability can be improved by the number of

interviewees and interviews, which allows for a broader understanding of the subject. Therefore, the strength of reliability has been considered in this study by interviewing several individuals who operate at the same organizational level and in the same or similar position. In many cases, these individuals have also been interviewed many times at various stages of the process.

Qualitative research evaluation often uses the idea of transferability, i.e., whether similar research results could be obtained in another research environment and whether the same topic could be re-examined there (Puusa et al., 2020). As a result, the research questions and the resulting framework have been implemented in a form that can be implemented in another research environment. In addition to transferability, one factor influencing reliability is transparency, i.e., how the researcher can present their reasoning pathways when analyzing and interpreting the results (Puusa et al., 2020). The study results have been described as comprehensively as possible, and citations from the interviews have supported the observed findings.

A particular pursuit of truthfulness guides all research; it concerns the reliability of the research process, research results, and ethical research issues (Puusa et al., 2020). In other words, the researcher must consider research ethics at all stages of the research process. For example, one important research ethical principle for this study is that the results of the study do not serve the interests of any group or offend any group within the organization. The study serves a more prominent interest group, meaning several different organizational levels, and the study has ensured that it does not offend or contribute to any person, group, organizational level, or other entity.

The reliability of a qualitative study manifests itself differently at different stages. It transparently incorporates the researcher's expertise, which influences reasoning chains and helps to highlight new matters that could be relevant to the research. In this regard, the quality of qualitative research is influenced by the researcher's ability to construct a suitable research design and to select suitable participants for the research and



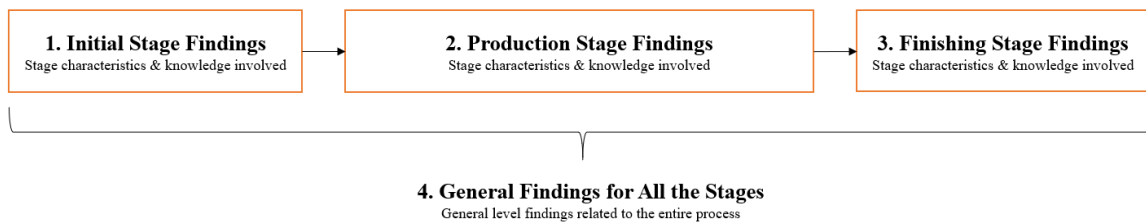
interviews, who should be able to respond to the research questions (Puusa et al., 2020). The individuals involved and interviewed have been selected with the necessary precision and the questions have been designed to fit their profiles. This has also been ensured by the fact that additional questions have been created for the interviews if it turns out that the interviewee cannot answer the question presented to him or her. In the cases of this style, the interview can be smoothly taken to a more generic level or to a different topic area to which the interviewee can respond.

One factor influencing the quality of the study can be identified as the researcher's initial understanding of the topic (Puusa et al., 2020). If there is too little understanding, there is a risk that the researcher will steer the research in the wrong direction. For this study, the researcher has worked in the presented case organization, which is why he understands its structure and operating models. This was also positively influenced by the academic competence developed through the studies, which allows the researcher to examine the phenomenon under consideration comprehensively. These can have a positive effect on, for example, the construction and conduct of interviews, which improves the reliability of the study. However, in this context, the researcher's ability to critically reflect on his or her foreground is essential. Therefore, the focus remains on things that might otherwise seem self-evident to the researcher but could provide significant information to the audience.

When the researcher carefully examines the target phenomenon of the research and takes many aspects into account throughout the research process, the coherence and reliability of the research improve (Puusa et al., 2020). This has been supported by diverse perspectives and sources of findings such as observations during the process, interviews conducted, the number and diversity of the interviewees, and internal and external documents and studies.

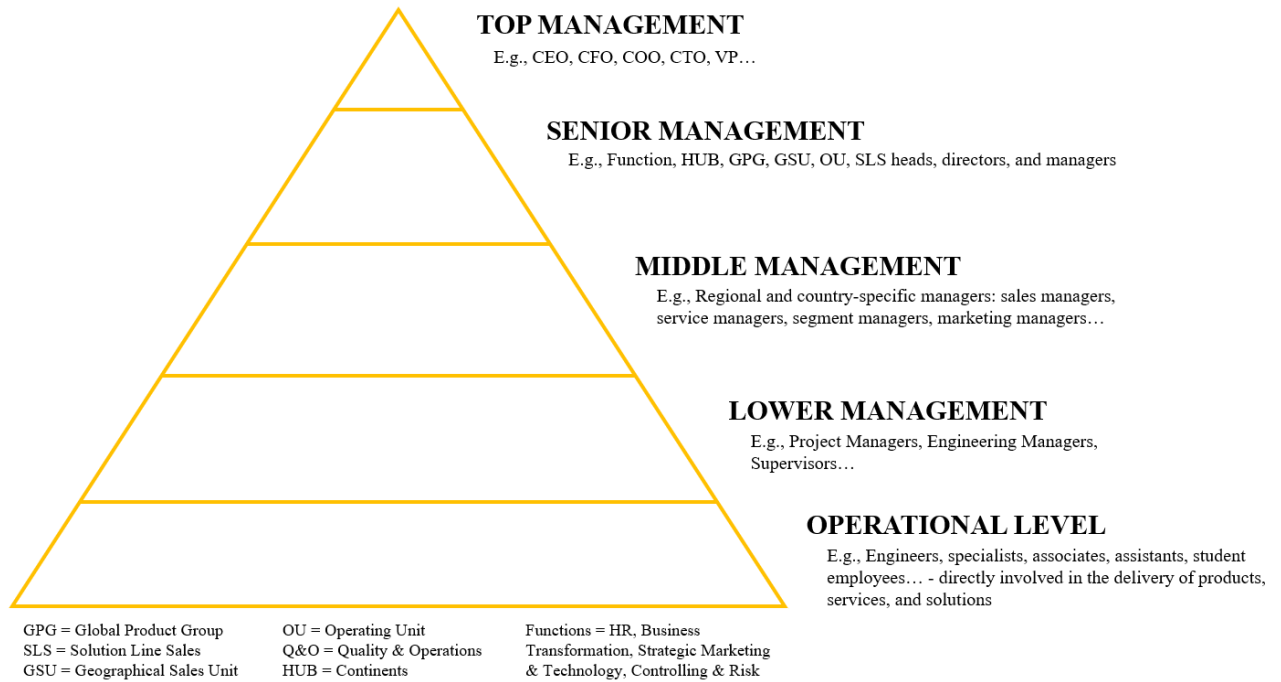
## 4 FINDINGS

This section presents the case study's findings in three stages: initial, production, and finishing stages (Figure 14). Dividing the findings into different stages is essential since the different stages of a project are different in nature, involve employees at different organizational levels, and consists of different types of information and knowledge. Stages are structured to describe the characteristics of the stages with the required depth, which creates the groundings to better present the knowledge involved within these stages. In addition to these stages, the general findings suitable for all the mentioned stages are presented at the end of the section.



**Figure 14. Approach to present the findings.**

Hitachi Energy is divided into five organizational levels: top management, senior management, middle management, lower management, and operational level. This definition is based directly on the internal documents of Hitachi Energy, which describe the organization's hierarchy (Figure 15). In this hierarchical pyramid, the management levels are divided into four parts. In many cases, however, management levels are divided into: top management, middle management, and lower management. Due to the size and complex structure of the Hitachi Energy, senior management has also been added to the pyramid between top management and middle management.



**Figure 15. Hitachi Energy hierarchy levels.**

## 4.1 Initial stage

The initial stage (Table 3) can be identified as the most significant factor influencing the outcome of the entire modeling project. The handrails could figuratively perceive it on the side of the road that keeps the car on the road and the right track. Similarly, a poor initial stage causes modeling to go the wrong way, leading to a situation where the finished modeling does not meet the expectations and intended purpose. For this reason, the initial stage must be conducted carefully, so that both the modeling developer and the case organization agree on the desired outcome.

**Table 2. Framework for the initial stage.**

Initial Stage	TACIT / IMPLICIT KNOWLEDGE	EXPLICIT KNOWLEDGE
<b>PRACTITIONERS</b> Strategy actors involved (Who?)	<b>Senior Management:</b> <ul style="list-style-type: none"> <li>- GSU Manager</li> <li>- HUB Senior Managers</li> </ul> <b>Operational-level:</b> <ul style="list-style-type: none"> <li>- Other thesis workers (with similar projects)</li> </ul>	<b>Senior Management:</b> <ul style="list-style-type: none"> <li>- GSU Managers</li> <li>- GPG Managers</li> <li>- HUB Senior Managers</li> <li>- Department Heads</li> </ul> <b>Middle Management:</b> <ul style="list-style-type: none"> <li>- Market Intelligence Manager</li> </ul>
<b>PRACTICES</b> Tools, methods, processes, routines employed (What?)	<ul style="list-style-type: none"> <li>- Organizational project related observations related to processes, routines, and methods</li> <li>- Insights about previous modellings from the student worker perspective</li> </ul>	<ul style="list-style-type: none"> <li>- External market studies</li> <li>- External databases</li> <li>- Internal market studies</li> <li>- Previous modellings</li> <li>- Other internal documents</li> </ul>
<b>PRAXIS</b> Findings about praxis, the flow of activity in which strategy is accomplished (How?)	<ul style="list-style-type: none"> <li>- Individual views of project flow; initiation, execution, reflection, coordination, and collaboration during modelling project</li> </ul>	<ul style="list-style-type: none"> <li>- An experience-based perception of the nature of the project, e.g., starting early and adjusting on the way, and paying attention to planning</li> </ul>

In the initial stage, most naturally, modeling developer is dealing with the party who commissioned the modeling. This entity can be, for example, a person, a group of several people, or an entire business unit. Alternatively, the author deals with a person who received a modeling assignment from a higher organizational level. However, generally at this stage, senior management and middle management employees are involved, depending on the modeling and its intended use. These parties understand the intended use of the modeling and the internal and external resources that may be used to create the groundings of the modeling. It can also be assumed that these individuals have been involved in similar modeling projects in the past, either in a self-acting role or in connection with previous commissions.

“From the point of view of the project as a whole, the planning phase [Initial phase] is very important, which can be approached well through the saying of well-planned is half done. However, it is important to understand that project design can often be very project-specific and complex. For example, projects of this kind [strategic tool creation] by an inexperienced author naturally include a lot of trial-and-error style approaches. It is worth considering the planning phase as a multi-stage part of the project, which can also be returned to as needed in the later

stages of the project. This enables the utilization of the knowledge gained during the other phases of the project as part of the design and thus contributes to a better overall project outcome.” – GSU Manager & BU Country Lead

As it can be identified from the quote, one way to enhance knowledge management utilization is by observing the initial phase as a multi-stage part of the project, which can also be returned to later. Thus, the necessary information and know-how for the design stage can be supplemented and changed as the project progresses. This allows for a more agile transition from the initial stage to the production stage, but not at the expense of planning. This also allows for a more holistic utilization of knowledge that aims for a better overall project outcome. A comment on the trial-and-error style approach is also worth noting.

In many cases, this approach allows for faster strategic tool drafting, which enhances the knowledge input of the interviewee. This is because the interviewee has something to comment on, and, therefore his or her knowledge can be immediately utilized. Compared to a situation where the interviewee has nothing to comment on, and his or her knowledge is focused purely on the interviewer’s ability to ask relevant questions.

During the initial stage, the goals and purpose of the modeling must be carefully identified. Goals and purpose also indicate how many resources one should use for modeling, for example, the number of hours worked, the people involved, and the financial costs. For example, if the goal is to do rough modeling concerning case X and modeling is needed in the short term, it can be assumed that the modeling and the work used for it need not be too detailed. Similarly, if modeling, for example, becomes part of an organization’s normal internal processes, it can be assumed that modeling should be qualitatively much more detailed. If the goals and purpose set for the modeling are not completely clear to the author, the author should use the following questions:

- What will the modeling be done for?

- Will modeling be used for an individual purpose or, for example, as part of an organization's normal processes?
- What are we trying to achieve with the modeling?
- What is the outcome we are trying to aim for?
- Under what situations will the model be used, and for what purposes?

These questions prepare the strategic tool developer in terms of the kind of information and knowledge he or she should seek for. Based on this, it becomes clearer which practitioners are worth pursuing, which practices are relevant to the project, and through the practitioners, the preferred activity to accomplish the project, praxis, can be clarified.

”Concerning new projects, my goal is to always map the starting points of the project as comprehensively as possible. If, after this, I still have any doubts about the project, I will contact the relevant party with the necessary knowledge. In general, however, I can say that there is usually enough data and information to start the project, and the quality of it is good enough for the project. However, there will always be some questions about the project; that’s normal. It is part of the nature of the project manager's job. This process could be compared to building a house. If the foundation of the house is poor, usually the whole result will be poor as well.”  
– Engineering Manager

From the above statement, the findings of an experienced engineering manager regarding new projects can be observed. The interviewee clearly emphasizes the importance of the initial stage in building a proper foundation for the project. In the initial stage, the foundation may be built from, for example, the determination of the required knowledge based on the people required for the project are identified. In addition to this, the foundation may also include expanding the project manager's expertise and know-how. However, in a company the size of Hitachi Energy, it is not worth trying to achieve all the knowledge oneself, but in turn, connecting with people who have assumed information and knowledge based on their organizational positions. The interviewee also stressed that new issues always arise for new projects; they can be identified as part of project work. What seems to matter is how these newly arising issues are approached. In this

regard, also as part of the initial stage, it must be understood that the client may not fully know how to approach the project:

“It is quite common that in new projects, during the initial stage of the project, the client may not yet accurately know the necessary project needs. Therefore, our task is to map out what the issue is, based on which the necessary people, knowledge, and information will begin to be outlined. In the early stages, project mapping is often based on old pre-existing know-how and information that has been generated from previous similar projects.” - Sales Director Rail and Wind

Another interviewee also raised the same point that in complex projects in general, customers understand that possible variables are included in the course of the project. In these cases, the change management process is usually followed:

“When defining a project, a change management process is agreed with the customer, this includes matters related to handling the change in the project. This defined change management process includes additional work for the project as well as parts that may not be needed for the completed project. It should be noted, however, that for complex projects, customers generally understand that there will be changes to the big picture of the project. In this respect, the initial configurations often change as the project progresses.” - Regional Sales Manager

After goals and purposes, the focus begins to shift from general situation mapping to modeling itself and its content. The modeling content is mainly determined by the depth expected from it. The depth here refers to how detailed the modeling should be approached and to how truthful the modeling results should be. The depth of modeling can be assumed to be based on the purpose of the modeling. It is essential to outline what depth is required of the measured individual factors. In this connection, the senior manager points out that as the initial stage progresses, the required depth for projects will also begin to become more apparent:

“As the initial stage progresses, the client can have an external consultant or their technical expert who has made more detailed specifications regarding the requirements for the project. If at this stage, it is found that the project contains requirements that we [Hitachi Energy] have not implemented [in the past], then it is clear that a great deal of investment in knowledge will be focused on exploring this area.

It is therefore natural that there is less focus in areas that we already know how to implement and how the costs involved can be determined.” - Sales Director Rail and Wind

As an example, if the goal of modeling is to determine how many passenger planes there are in the world, whether the result should be aimed at the accuracy of thousands, hundreds, or tens. In this regard, it is good to outline how much work is estimated in terms of modeling if the result is pursued with tens of precision. Next, in this regard, it is worth analyzing and making a rough mapping of how much the added workload brings relative value to the result. If the workload increases significantly, but the result would have been sufficient with the accuracy of hundreds of passenger planes, it can be identified that the organizational resources are wasted in terms of workload.

Regarding the content of modeling, it is also important to determine whether the strategy tool is approached with a top-down or bottom-up approach. The contrast between these two approaches should not be underestimated. This affects much of the required knowledge, roughly described as a top-down approach allowing a strategic tool to be made based on more explicit information and a bottom-up project requiring more tacit and implicit knowledge. The top-down approach starts with a big picture broken down into smaller pieces. For the case modeling, this big picture could have been information on the size of the overall European market for the segment being analyzed. Next, this overall market would have been broken down into smaller segments, for example by country, after which the product portfolio would have been subdivided and so on. This is just a rough example. However, as its name implies, the bottom-up approach approaches modeling from the opposite direction. Initially, the individual base elements are determined with high accuracy, after which they begin to form larger entities, which eventually end up forming a top-level system. Case modeling was approached with a bottom-up approach.



#### **4.1.1 Knowledge involved**

As it is high-profile modeling for the European region, senior management and middle management were involved in the initial stage. These parties provided much explicit knowledge, such as external and internal market studies, previous modeling, and other related internal documents, that helped the modeling developer get the necessary base for the knowledge project. Senior management, in particular, plays a significant role as they have access to the internal documents of the organization as well as information on who is worth pursuing in certain areas. They have experience-based knowledge of similar projects for tacit and implicit knowledge, manifested as information on recommended routines, and ways to approach the project. This information cannot be found documented internally anywhere; it can be accumulated as a rule by participating in similar projects.

In addition to senior and middle management, this phase included other previous thesis workers from the operational level who were able to give an overview of how the project should be approached. On their behalf, tacit and implicit knowledge are emphasized. They usually have no explicit knowledge and information regarding the project processes and methods used. Also, their modeling and other used documents might only be in their possession or individual units. As a result, their awareness within the organization is low and can be challenging to access internally.

#### **4.2 Production stage**

The production stage (Table 4) is the modeling phase, where the initial stage purposes and goals mapping are followed by the actual work of developing the strategic tool. In terms of resources, the production stage requires the most time and resources of the organization's employees, as most of the necessary interviews take place during it. The production stage involves contacting the recommended practitioners based on the initial stage mapping. The recommended contacts, in turn, recommend forward other necessary people related to separate project situations, and thus the necessary contacts for

the production stage begin to form. In terms of the practitioners' organizational levels, it can be identified that the share of senior management is decreasing during this stage, and the number of employees in the middle and lower management levels is increasing compared to the initial stage.

**Table 3. Framework for the production stage.**

<b>Production Stage</b>	<b>TACIT / IMPLICIT KNOWLEDGE</b>	<b>EXPLICIT KNOWLEDGE</b>
<b>PRACTITIONERS</b> Strategy actors involved (Who?)	<b>Middle Management:</b> <ul style="list-style-type: none"> <li>- Market &amp; Sales Managers</li> <li>- Service Manager</li> </ul> <b>Lower Management:</b> <ul style="list-style-type: none"> <li>- Project Managers</li> <li>- Engineering Managers</li> </ul>	<b>Senior Management:</b> <ul style="list-style-type: none"> <li>- Segment Directors</li> <li>- Department Heads</li> </ul> <b>Middle Management:</b> <ul style="list-style-type: none"> <li>- Market &amp; Sales Managers</li> <li>- Service Manager</li> <li>- Marketing Manager</li> </ul>
<b>PRACTICES</b> Tools, methods, processes, routines employed (What?)	<ul style="list-style-type: none"> <li>- Organizational discussions</li> <li>- Practical project related experience and knowledge from the field</li> <li>- Knowledge about country-specific insights, pricing, segment, and component specific characteristics</li> </ul>	<ul style="list-style-type: none"> <li>- Internal documents related to sales, prices, practical projects, segment characteristics, components, etc.</li> <li>- Internal software's for the required product related calculations</li> </ul>
<b>PRAXIS</b> Findings about praxis, the flow of activity in which strategy is accomplished (How?)	<ul style="list-style-type: none"> <li>- Importance of creating agile draft versions in order to streamline the processes and to utilize knowledge better</li> </ul>	<ul style="list-style-type: none"> <li>- Product and segment specific insights through project experience</li> <li>- Practical information during the usage of the internal software's</li> </ul>

The change in the middle and lower management direction is because, at this stage, practicality is emphasized and demanded above commercialism. Senior management has more ability and knowledge about the overall picture, while middle and lower management perceives the information included in the bottom-up approach. In other words, the bottom-up approach to the strategic tool requires detailed lower-level knowledge that is better utilized from the organizational level whose work tasks are directed related to it. However, to maintain the project's purpose and objectives, it is worth holding regular meetings with senior management as the draft version of the strategic tool progresses.

In the production stage, the importance of draft versions is emphasized regarding utilizing the interviewee's knowledge. In the drafting phase, the strategic tool developer can

make reasonably arbitrary assumptions that an expert can then correct. This has been identified as more effective than the approach where the developer would not provide anything the interviewee could “grab on”. Thus, quickly making drafted versions and making assumptions at this stage improves the use of the interviewee's knowledge resources, as these rough assumptions already provide better direction and an idea of the modeling situation and where the modeler is trying to take it. The interviewee also emphasized the importance of draft versions in obtaining significant customer insights and the utilization of the organization's resources:

“The agile approach is effective and, if possible, we often prefer to start planning and implementing projects with the help of rough sketches. This approach allows receiving quick feedback from customers, based on which their needs and other project-specific insights can be mapped more accurately, and the necessary changes and corrective actions can be taken. In this way, it is also possible to prioritize the organization's resources better and achieve the desired project outcome in which the customer is also satisfied. The agile approach is therefore suitable for certain types of projects, such as possible piloting, testing, and creating something new. However, it should be noted that the agile approach may not be suitable for everything. Many of the projects require a more traditional approach, as they proceed according to a specifically defined process, that is, for example, linked to external factors.” – Market Manager

As a result, the interview becomes more efficient, especially as the interviewee internalizes the project faster and the responsibility for brainstorming, for example, is transferred to the strategic tool developer instead of the interviewee. On a general level, the interviewees also clearly appreciate that the strategy tool developer has tried in this regard and even tried to get it forward with insufficient knowledge. Thus, making quick drafts also affects the interviewee's willingness to help the developer.

Another important role in utilizing knowledge is to prepare for the interviews themselves. The strategic tool developer can prepare for the interview by getting to know the interviewee, observing what information and knowledge can be obtained from the interviewee, making preliminary drafts of the strategic tool that can be presented to the interviewee, and practicing how to present and approach different strategic tool creation

steps. It is also a good idea to prepare customized questions for each interviewee, which may serve as the interview's backbone. They also help maintain focus in areas relevant to the interview. The faster the interview reaches the relevant subject areas in terms of strategic tool creation, the more effectively the interviewee's knowledge can be utilized.

#### **4.2.1 Knowledge involved**

In the production stage, the importance middle and lower management for the sought-after knowledge is growing. The role of senior management, in turn, is changing its character to more into the role of identifying the overall project development. This means that senior management generally monitors the project's progress and provides a more general level of advice to help the project stay on track. On the other hand, middle and lower management provide more concrete information, expertise, and examples for both explicit knowledge and tacit and implicit knowledge.

“[In terms of knowledge] ... a similar project [thesis work] includes much tacit knowledge that you are only able to learn and access as the project progresses. In the role of thesis worker, the most significant thing is the ability to observe the interviewees in such detail that this tacit information can be detected, internalized, and utilized as the project progresses.” – Student Thesis Worker 1

For a similar project, the interviewed student also highlighted the importance of tacit knowledge. However, tacit knowledge is often only accessed as the project progresses compared to explicit knowledge. Capturing tacit knowledge is also clearly more challenging than explicit knowledge and requires the interviewer to pay attention to the information presented by the interviewees.

For explicit knowledge, for example, knowledge may consist of internal documents related to sales, pricing, projects, segment characteristics, and components (anything that can be seen as relevant to the project's current stage). For tacit and implicit knowledge, meanwhile, undocumented practical project-related experience and knowledge from projects they have been involved in, and market expertise related to country, pricing,

segment, and component specific characteristics can be obtained from middle and lower management.

In general, regarding the production stage and the entire strategic tool creation process, it can be analyzed that the more concrete product-specific information and know-how are required, the lower the organizational levels one must go. In a multinational organization, the size of Hitachi Energy, it is not unusual that senior and middle management have minimal direct contact with the products, services, and overall operational tasks. They often have a general understanding of a product portfolio gained through familiarity with an organization's internal documents but may not have specific product knowledge. Lower management and operational level employees may have much knowledge about products and services, but a relatively less commercial perception of the bigger picture. In summary, the different organizational levels offer different types of information and know-how; in addition to this, it is also worth paying attention to cross-organizational collaboration. Thus, knowledge can be sought from different levels of the organization and different sources on a country-by-country and unit-by-unit basis.

“I think cross-organizational collaboration can reveal different perspectives on the same topic. As a result, a topic can be better seen through. In part, trivial errors can also be cleaned up that arise due to the previously limited perspective. Employees can share different results, data sets, or approaches with each other.”

– Student Thesis Worker 2

This is also highlighted by another Hitachi Energy's thesis worker who has been involved in a similar strategic tool creation process. Versatile information and knowledge enable the creation of a more reliable overall picture. Several perspectives on the same topic enrich the outcome and bring out observations that may not have been raised before. In addition, different organizational levels, the views of different business units, and country-specific findings also create a more reliable and relevant entity. It should also be noted that this can also bring its challenges for knowledge capturing. When several perspectives must be considered, in many cases, the result of the project also starts to become more complex and does not necessarily fully serve the result sought in the initial

stage. It is therefore essential to understand that those diverse perspectives are significant, but one must also be able to keep the project's desired outcome in mind.

### **4.3 Finishing stage**

The finishing stage (Table 5) is the final step in the strategic tool creation process. In this stage, the project's outcome will be presented, discussed, and finalized with the party that ordered the tool. Based on this party's comments, observations, and proposed changes, the strategic tool will be further refined. As a result, this stage is very similar to the initial stage regarding the individuals that should be involved. However, the goal when moving to the finishing stage would be that the strategic tool would already be at a point where there will no longer be major concrete changes, but more refinements related to visuals, functions, data used, and other details. However, if major concrete changes still occur at this stage, it may indicate poor reporting with the related party during the production phase. The operational level and lower management involvement at this stage are very minimal. This is because the information and knowledge obtained from these parties are significant in the production stage but no longer at the heart of the project as the strategic tool is reviewed from a higher perspective. Operational level and lower management are mainly dealt with if the senior and middle management suggests proposals for changes that require operational level expertise.

**Table 4. Framework for the finishing stage.**

Finishing Stage	TACIT / IMPLICIT KNOWLEDGE	EXPLICIT KNOWLEDGE
<b>PRACTITIONERS</b> Strategy actors involved (Who?)	<b>Senior Management:</b> <ul style="list-style-type: none"> <li>- GSU Manager</li> <li>- HUB Senior Managers</li> </ul> <b>Middle Management:</b> <ul style="list-style-type: none"> <li>- Market Intelligence Manager</li> </ul>	<b>Senior Management:</b> <ul style="list-style-type: none"> <li>- GSU Manager</li> <li>- GPG Manager</li> <li>- HUB Senior Managers</li> <li>- Department Heads</li> </ul> <b>Middle Management:</b> <ul style="list-style-type: none"> <li>- Market Intelligence Manager</li> </ul>
<b>PRACTICES</b> Tools, methods, processes, routines employed (What?)	<ul style="list-style-type: none"> <li>- Practical strategic tool related experience and knowledge</li> <li>- Strategic tool cross-testing to ensure reliability and validity</li> <li>- High organization level observations (no operational level accuracy)</li> </ul>	<ul style="list-style-type: none"> <li>- External market studies</li> <li>- External databases</li> <li>- Internal market studies</li> <li>- Other internal documents</li> </ul>
<b>PRAXIS</b> Findings about praxis, the flow of activity in which strategy is accomplished (How?)	<ul style="list-style-type: none"> <li>- Individual views of project outcome; the significance of higher perspective observations compared to operational level observations during this stage</li> </ul>	<ul style="list-style-type: none"> <li>- The goal of external and internal documents in this stage is to improve the reliability of the strategic tool</li> </ul>

Concerning this stage, it is important to realize that for the strategic tool developer and those who have been more closely involved as part of the project, all the functions and details of the tool may be clear. However, it must be recognized that the tool and related notes must be reported and presented clearly and accurately. This is because strategic tools of this kind can be very complex and include many details. In addition to this, for example, in a situation where the author of the tool leaves the organization, tool's users should have clear information about how the strategic tool is built and how it can also be developed further. Therefore, for knowledge management, it is important to transform as much tacit knowledge as possible into the form of explicit knowledge. In addition to other notes, it also makes sense to note what this version of the tool contains and to make suggestions for how the tool can be developed in the future. It is also important to point out things that the tool may not yet consider in the current version. This will allow knowledge to remain in the organization and potentially reduce duplicate work in the future.

A critical part of the finishing stage is ensuring the reliability of the strategic tool. In the sense of knowledge management, this does not mean that the expertise of the experts interviewed is questioned. Especially in the related case style project where the tool is

made available for use in European countries, it is important to ensure that it is suitable for countries other than the target countries alone. One effective way to do this is through various country-specific cross-tests to ensure the reliability of the created tool. In this style of cross-testing, it is important to involve parties who are well acquainted with the market being tested and ensure the accuracy and functionality of the strategic tool. In addition to cross-testing, reliability can be improved through external and internal data sets, market research, and documents.

#### **4.3.1 Knowledge involved**

In the finishing stage for strategy practitioners, the focus shifts to higher-profile management, i.e., senior and middle management. For practitioners, this means that the same people are involved in this stage as in the initial stage. However, from a knowledge perspective, finishing and the initial stage are different. Compared to the initial stage, at this stage, tacit and implicit knowledge are more emphasized compared to explicit knowledge. The practical strategic tool-related experience and general higher organization level observations of the practitioners involved are important knowledge inputs. Roughly speaking, higher organizational level observations also mean that this stage goes through the strategic tool and its functionality at a more general level. There is very little to do with operational-level and lower management at this stage. Thus, the detailed knowledge typical for the operational level is no longer at the heart of the project. The operational level is mainly dealt with if there are proposals for concrete changes from senior management that require detailed operational level expertise.

However, at this stage, the reliability of the strategic tool will be improved by ensuring the details. Compared to the production stage, however, this is done mainly with middle management and mainly includes explicit knowledge in external market studies, databases, and internal market studies and documents. Senior management probably has the best access to documents of this style, but due to the nature of their role, they are often not dealing with these. Middle management, on the other hand, has more to do with this style of explicit knowledge, and therefore they are usually able to identify the



relevant sources of explicit knowledge. Therefore, presumably, also for documents related to explicit knowledge, it can be observed that the higher the strategy actor in the organizational hierarchy, the higher the profile of explicit knowledge available to them. For the case project, this often means that the documents provided by senior management improve the overview and provide direction but less frequently provide concrete help. In turn, the explicit knowledge provided by middle and lower management is often already much more concrete. Explicit documents at the operational level, on the other hand, are already very specific and therefore often require the assistance of similar staff so one can be able to internalize and understand them.

#### **4.4 General findings for all the stages**

This section covers more general findings related to the entire process, i.e., initial, production, and finishing stage. Previous stage-specific findings, in turn, described the findings related to that stage. Therefore, it is conceivable that the findings of this section could also have been incorporated into the findings of the individual stages. Similarly, these findings also focus directly on the research questions, therefore focusing on the utilization of knowledge management practices and contributions at different organizational levels during the design and implementation of the strategic tool for business intelligence.

##### **4.4.1 Finding the right people**

As the table on interviews (Appendices) indicates, the strategic tool process involves many strategy practitioners from several different levels of the organization. In addition to organizational levels, practitioners operate in very specific roles, which significantly contributes to the fact that individuals can hold very specific information and knowledge in terms of knowledge management. Another significant factor is practitioners' geographical role related to focus, usually meaning global, continent, country, or area-specific focus. The geographical focus associated with an employee's role also dramatically influences their perceived knowledge. In addition to these mentioned factors,

practitioners' knowledge is also influenced by their interests, those close to them, previous work experience, educational background, and many other factors. This means that individuals' expectations about knowledge can be made up to a certain point, especially in terms of their role and geographical focus, but other influencing factors must also be recognized. The interviewee also points to the same fact about the differences between knowledge expectations and individuals:

“In a similar project [strategic tool design and implementation], effective added value is usually generated by individuals who can perceive and evaluate larger entities. These individuals typically have extensive industry and organization-specific experience and knowledge. Thus, they are presumably able to provide a good overview of market developments as well as how organizations own product portfolio responds to it. However, it must be noted, that when an organization's portfolio includes many different and possibly complex products and solutions, there are also many different types of individuals with different responsibilities and ways to operate. As a result, not all employees have the opportunity to perceive higher-profile perspectives in the same way, even if they work at the same organizational level. Correspondingly, the less the person has experience and knowledge of the industry and the organization's operating methods, the more presumably their knowledge input will also be based on a smaller sample of the projects. As a result, the information and know-how they bring with them can, of course, have a higher margin of error.” – Market Manager

In addition to the above-mentioned knowledge-related factors, especially those related to the person and their role, other influencing factors affect the information and knowledge utilized by these practitioners. These factors include personal motives for the project, the general state of urgency associated with the work, and any pressure from another person to participate. Personal motives may include a general interest in the topic and a desire to contribute as much as possible. Another motive, in turn, may be the practitioner's benefit from the strategic tool. For example, this may mean that the interviewee sees the potential benefits of the strategic tool concerning their role. Because of this, they have a clear motive to help the project as much as possible and, in addition to this, recommend individuals whom they assume can improve the outcome of the project.

On the other hand, urgency means how busy a practitioner is in general. If they are urgent because of their role or the current work situation, it affects how much project-related know-how they bring. In extreme cases, these people cannot be reached at all, but more generally, they can be reached, but due to the urgency, they do not fully participate in the project. From the knowledge management perspective, they will not be able to reach their full potential in terms of the strategic tool development process. In turn, the pressure created by another person to participate in the project may be that the interviewee's supervisor or an individual from a higher organizational level has recommended them to develop the strategic tool. This, in part, puts pressure on the interviewee to get involved in the project and bring a lot of the knowledge expected of them into the process.

Together, these factors affect how individuals contribute their knowledge to strategic tool development. Therefore, due to knowledge management, resource-saving, and process streamlining, it is important to identify individuals contributing positively to the desired outcome. Similarly, it is also important to identify individuals who, despite their organizational position, do not significantly contribute to the desired outcome. Therefore, in projects of this style that contain a lot of different information and knowledge, it is important to find the right people and work with them effectively.

#### **4.4.2 Creating agile draft versions**

Whether it is the development of an initial plan for the project, the various stages of the strategic tool's production stage, or the development proposals for the strategic tool in the finishing stage, the importance of agile drafting for the utilization of knowledge is significant. With agile draft versions, the various steps are streamlined, but this is not at the expense of quality; on the contrary, these drafts contribute to a better project outcome. This is because when presenting the draft versions to different parties, they better understand the project's progress and how the strategic tool developer approaches different areas. Thus, the draft versions allow the parties involved to provide better

feedback, development suggestions, and other relevant observations related to the different stages of the project. The senior manager also interviewed points in the same direction:

“When clarifying new reasonably unfamiliar matters, the outline in the form of a rough draft versions will help the other employees involved get to the “heart” of the matter more effectively. This draft does not even have to be close to the final output, but even a small outline on the subject enhances the potential knowledge input of other people involved. However, it must be noted that the sketch [draft version] created must be treated critically. Since the draft is often based on a single perspective, it may be that the draft directs the whole entity on the wrong track right from the start. From the outset, therefore, one must be able to criticize this outline sufficiently constructively. This criticality often makes it possible to identify whether the subject has been approached from the right perspective, and therefore the overall approach can be optimized.” - Sales Director Rail and Wind

In addition, the drafts version reduces the risk that the developer knows exactly what he /she is aiming for the project but is not fully able to verbally explain it to those involved in a sufficiently clear and comprehensible form. At worst, this can lead to a situation where the person involved, such as an interviewee in a production stage, does not get complete clarity about what is at stake and his or her potential knowledge input is thus wasted or not captured effectively enough.

Based on this, one way to utilize knowledge management practices is to make agile draft versions. These draft versions may be wildly inaccurate in content and mostly resemble rough outlines but still allow for a better perception of the project situation from an outside perspective. As a result, a person who is not so deeply involved in the project personally can access the overall picture and goals more effectively. Thus, it is possible to obtain relevant information and knowledge from these parties better and more accurately.

#### **4.4.3 Keeping the big picture in mind**

In general, the more complex the project, the more challenging it is to remember to keep in mind the big picture and the goals set for the project. This is mainly because these

kinds of projects usually involve a lot of different parties, different roles, opinions, motives, and other factors that quickly steer the result of the project in the wrong direction. In this regard, the interviewee also raised the issue of several participants involved and also the observation that different individuals may have their own goals for projects, which can take the project in the wrong direction:

“Since our projects are rather complex and involve a lot of participants with different portfolio focuses and possible personal targets, it is essential to keep the overall picture of the project in mind at all times. Therefore, if you are leading the project, you need to be able to stay exactly in the right direction; of course, the more people are involved, the easier it is for the project to get off track, and therefore there is the risk of not being able to provide the project within agreed deadlines. Therefore, it is important to define the project at the required depth at the beginning of the project and understand the objectives of the project. And stay strictly on the agreed contracts. Of course, there will certainly be challenges along the way, but the defined plan must be adhered to unless the customer adds some changes that need to be adjusted to.” - Regional Sales Manager

In addition, the developer of the strategic tool may be under pressure regarding the opinions, ideas, and observations of those positioned at higher levels of the organization. For this reason, it is important to understand that the outcome of a project can rarely fully satisfy all parties involved. However, the project developer should listen carefully to the ideas and thoughts of the people involved to capture tacit, implicit, and explicit knowledge as effectively as possible while keeping in mind the goals set at the outset for the project outcome.

As one observation, the interviewee stressed the importance of determining too precise details might not be the most effective approach, especially at the production stage. Therefore, keeping the big picture in mind and making rough assumptions can streamline the course of the project:

“Partially referring to this particular project, I think the ability to handle the project during situations where the result is still unknown is important. Especially during the production phase of the project, it may be more effective to keep the big picture in mind and not be disturbed if all the details are not yet fully in place. Many

can easily get lost when it comes to determining the exact details during each step, which results in leaving the project stuck or not moving forward at the expected pace. Therefore, progressing with indicative values and assumptions may be sufficient during the production phase and during the later stages of the project these values can be adjusted as the project progresses.” – Market Manager

Diverse opinions and interviewees enrich and make the result more reliable; however, at the same time, this can make the project more complex than intended. As a result, it is worthwhile to return regularly to the plan and goals created in the project’s initial phase. This way, the project’s desired result remains more clearly in mind as well as the project does not get sidetracked too much. If the project goes in the wrong direction, the available resources will be used inefficiently, and the information and knowledge of the practitioners involved will not be utilized in an efficient and targeted way. In this case, almost everyone involved in the project, the developer, the project client, and the experts interviewed suffer because their resources are used inefficiently.

#### **4.4.4 Knowledge related characteristics of different organization levels**

From the point of view of the utilization of knowledge management practices, it is important to roughly outline what style of knowledge the different levels of an organization contain. In general, it can be exacerbated that the higher the practitioner is in the hierarchy, the higher the profile of tacit, implicit, and explicit knowledge they have. In addition, if they do not directly have this information or knowledge themselves, they will also have access to information and know-how of a higher profile. Correspondingly, the closer we get to the operational level, the more concrete and practical the knowledge and information of these parties are. Perceiving this overall picture helps to internalize where the necessary information is worth seeking.

In general, the lower in the hierarchy the relevant, targeted information and knowledge is located and available, the lower it is worth pursuing. This is because there is a waste of resources within the organization to seek knowledge from the higher organizational level that would also be available from the lower hierarchy level. Another reason for this is that roughly speaking, the calendars of those at higher organizational levels are usually

booked for a full range of meetings, making it more challenging to reach them and make time with them for the project. Moreover, when they have time for the related project, it is worth utilizing it as efficiently as possible, and that is why it is worth focusing on the information and know-how that is supposedly only available to them or their organizational level. It would be a waste of some time to spend this time going through things and achieving the knowledge possible to get from the lower levels of the organization.

Also, for meeting lengths, if possible, with a higher level of organization, it is good to favor shorter calls and move more directly to the project-related issues. This is because shorter calls are easier to fit into their calendars, and thus it is possible to reach these parties on a faster schedule. This is especially important if the necessary knowledge at a higher organizational level has become a bottleneck for the project. Similarly, based on the nature of the work at the operational and lower management levels, these parties often have more flexible calendars and better opportunities for interviews, even with faster notice and longer interview sessions.

## 5 CONCLUSIONS

As the business environment has become more competitive and turbulent, organizations have had to respond to this with more accurate monitoring of market trends and more efficient utilization of their knowledge assets (Ahlstrom, 2019; Ihrig & MacMillan, 2015; Kunc, 2019). The importance of knowledge management has grown further as organizations become more dependent on employees' knowledge, expertise, and competencies from different organizational levels (Darkow, 2015). Therefore, the integration of knowledge within an organization can be identified as a critical source of competitive advantage (Neeley & Leonardi, 2018).

As a result, companies are increasingly trying to implement their internal activities and processes to promote this knowledge and expertise among their employees (Neeley & Leonardi, 2018). However, it has been argued that through individual actions and interactions within a practice, the knowledge formed from it can be studied most effectively (Schatzki et al., 2001). To explore the in-depth knowledge and its emergence, organizations' knowledge management practices have started to explore different types of knowledge using a strategy-as-practice approach (Marin et al., 2016). This approach has made it possible to look at constant changes in daily practice and practitioners' praxis to more accurately identify where knowledge comes from and how the organizational outcomes are formed (Marin et al., 2016).

Based on these identified issues and the theoretical and practical demands, the main research question of the thesis was structured as follows:

- RQ1: *How could knowledge management practices be utilized when designing and implementing strategic tools for business intelligence?*

Based on the study results, it can be identified that designing and implementing a strategic tool for business intelligence is an effective way to capture explicit and tacit



knowledge from different organizational levels. In terms of knowledge management practices, it can be identified that agile draft creation enhances both the flow of the process and the knowledge input of the people involved. This is based on the observation that by presenting the draft versions to different parties involved, they get a better and faster overall view of the project's current state. Therefore, the draft versions allow these parties to provide feedback, development suggestions, and other relevant observations better.

Another significant knowledge management practice includes the identification of the right people. This means that the strategic tool design and implementation involve many strategy practitioners with different organizational levels, roles, geographical focuses, personal interests, motives, external pressures, previous work experiences, educational backgrounds, and many other factors that affect their knowledge input. Together, these factors affect how individuals contribute their knowledge to these projects. Therefore, due to knowledge management, resource-saving, and process streamlining, it is important to identify individuals contributing positively to the desired outcome. Similarly, it is also important to identify individuals who, despite their organizational position, do not significantly contribute to the desired outcome.

The third key finding includes keeping the big picture in mind. This means that strategic tool creation projects are complex and involve many different parties, roles, opinions, motives, and other factors that easily steer the project's result in the wrong direction. Diverse opinions and interviewees enrich and make the result more reliable; however, at the same time, this can make the project more complex than intended. If the project goes in the wrong direction, the available resources will be used inefficiently, and the information and knowledge of the practitioners involved will not be utilized in an efficient and targeted way. For this reason, it is important to understand that the outcome of a project can rarely fully satisfy all parties involved.

Moreover, the second assisting research question was formed as:

- RQ2: *How could employees from different organizational levels contribute during the creation process?*

Regarding the second research question, practitioners from several different levels of the organization should be involved in the strategic tool creation. Different organizational levels allow for the formation of different perspectives, information, and knowledge, which makes the project's outcome more reliable. This also allows for a better understanding of knowledge between different levels of the organization, which gives employees a more comprehensive overall picture of how the organization operates. This approach also enhances capturing an important organizational tacit-to-tacit knowledge in one centralized location (strategy tool) from which employees at different organizational levels can access it in an explicit form.

## **5.1 Theoretical implications**

As Darkow (2015) argues, in response to today's business environment and dynamics, many organizations have identified the growing importance of middle management with the relevant knowledge of market developments and organizational capabilities to utilize a foresight-based strategy development. The findings of this study also identify middle managers' comprehensive knowledge of the market and organizational capabilities. In addition, the findings perceive middle managers as significant contributors to foresight tools based on their tacit and explicit knowledge input. However, in addition to middle managers, this study also identifies the potential of lower management, especially in terms of tacit knowledge of understanding market changes and the organization's resources.

In their study, Marin et al. (2016) point out that practices and praxis around tacit-to-tacit sharing are difficult to identify and control within organizations, especially when compared to explicit information. This study finds that identifying tacit and implicit

knowledge is more challenging than explicit knowledge. This study also identifies that various business intelligence tools are an effective way to capture and transform tacit and implicit knowledge into an explicit form that is more easily utilized in an organization.

In addition, Marin et al. (2016) point out that a strategy-as-practice perspective compared to conventional strategy can identify a difference between what individuals think and what individuals do. The findings of this study show indicate similar observations. Employees in an organization, in particular, often base their knowledge and praxis expectations of other employees based on their organizational position. However, it can be identified that even the employees within the same role can perform different types of tasks; hence their daily practices and praxis can differ significantly. Based on this, the knowledge input of these employees in particular also differs significantly.

## **5.2 Managerial implications**

Based on the case study findings, three key managerial implications can be recommended. These suggestions are based on the utilization of knowledge management practices during designing and implementing strategic tools. However, it should be noted that each organization has its own unique knowledge management structure that should be considered when analyzing and implementing these implications.

The first recommendation is to understand that the knowledge input of strategy actors is based on several background factors such as educational background, interests, and motives, rather than just an organizational role. It is important to identify the right people for the project who will contribute positively to the desired outcome and work effectively with them. Similarly, it is also important to identify individuals who do not significantly contribute to the project in terms of resource utilization. In this way, their resources can be focused on other work tasks where their knowledge input can be utilized more effectively.

Second, it can be identified that creating agile draft versions can streamline the project. Draft versions allow the parties involved to provide feedback, development suggestions, and other relevant observations. Therefore, their knowledge input is more accurate and efficient. For similar projects, the creation of rough draft versions should be endorsed as part of an organization's internal practices.

Third, practitioners from several different levels of the organization should be involved in the strategic tool creation. This, of course, generally depends on the nature of the tool. Different organizational levels allow for the formation of different perspectives, information, and knowledge, which makes the project's outcome more reliable. This also allows for a better understanding of knowledge between different levels of the organization, which gives employees a more comprehensive overall picture of how the organization operates. In this respect, too, critical knowledge remains less in the hands of individual employees.

### **5.3 Limitations and suggestions for future research**

Since the thesis is based on a single case study, it should be noted that the findings should not be discussed in a more general form. Therefore, this research successfully identifies the studied phenomenon in the case's knowledge management infrastructure during the strategic tool creation process. However, if more generalizable findings had been required, the research conducted with a cross-case approach would have guaranteed even more precise reliability. However, the research questions and the resulting framework have been implemented in a form that can be implemented in another research environment. Another possibility is to study an organization of a different size in the same industry, and in this way, insights on knowledge management, especially those related to organizational levels, could be analyzed from a strategy-as-practice perspective. Cross-case studies of this style could also highlight differences between organizations' practices, taking into account that two different knowledge management infrastructures would be analyzed.

Based on the strategy-as-practice approach focusing on the concrete micro-actions of the practitioners from different organizational levels, the aligned analysis has been implemented from a micro perspective. As a result, if the knowledge management practices and the identified phenomenon were to be studied at the macro level, a conventional strategy approach could be a more suitable way of approaching the research. This approach could provide more general findings that could be more suitable in multiple organizations in the same industry and size class.

The geographical focus of this study was Europe; a similar case study could be carried out on a different continent. This could be used to analyze geographical differences in knowledge management practices. For example, comparing inter-organizational behavior for a similar study between European and Asian work cultures would be interesting. On the other hand, the differences between knowledge management practices in Europe could also be examined on a country-by-country basis.

## REFERENCES

- Adelman, C. (1993). Kurt Lewin and the Origins of Action Research. *Educational Action Research*, 1(1), 7–24. <https://doi.org/10.1080/0965079930010102>
- Ahlstrom, R. (2019, January 17). *The Role of Data in The Age of Digital Transformation*. Forbes. <https://www.forbes.com/sites/forbestechcouncil/2019/01/17/the-role-of-data-in-the-age-of-digital-transformation/?sh=4a6e342a4509>
- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25(1), 107. <https://doi.org/10.2307/3250961>
- Bingham, C. B., & Eisenhardt, K. M. (2011). Rational heuristics: the ‘simple rules’ that strategists learn from process experience. *Strategic Management Journal*, 32(13), 1437–1464. <https://doi.org/10.1002/smj.965>
- Birshan, M., Gibbs, E., & Strovink, K. (2014, November 1). *Rethinking the role of the strategist*. McKinsey Quarterly. <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/rethinking-the-role-of-the-strategist>
- Bradbury-Huang, H. (2010). What is good action research? *Action Research*, 8(1), 93–109. <https://doi.org/10.1177/1476750310362435>
- Brown, J., & Duguid, P. (2000). Balancing Act: How to Capture Knowledge Without Killing It. *Harvard Business Review*. <https://hbr.org/2000/05/balancing-act-how-to-capture-knowledge-without-killing-it>
- Call, D. (2005). Knowledge management – not rocket science. *Journal of Knowledge Management*, 9(2). <https://doi.org/10.1108/13673270510590191>

Cambridge Dictionary. (n.d.). Tacit knowledge. In *Dictionary.Cambridge.org dictionary*. Retrieved February 8, 2022, from <https://dictionary.cambridge.org/dictionary/english/tacit-knowledge>

Chamorro-Premuzic. (2021, November 23). *The Essential Components of Digital Transformation*. Harvard Business Review. <https://hbr.org/2021/11/the-essential-components-of-digital-transformation>

Chia, R., & MacKay, B. (2007). Post-processual challenges for the emerging strategy-as-practice perspective: Discovering strategy in the logic of practice. *Human Relations*, 60(1), 217–242. <https://doi.org/10.1177/0018726707075291>

Choi, T.-M., Chan, H. K., & Yue, X. (2017). Recent Development in Big Data Analytics for Business Operations and Risk Management. *IEEE Transactions on Cybernetics*, 47(1), 81–92. <https://doi.org/10.1109/TCYB.2015.2507599>

Cohen, W. (2004). *The Art of the Strategist*. AMACOM.

Cook, C., & Cook, M. (2000). The Convergence of Knowledge Management and Business Intelligence. In *Auerbach Publications*. [https://www.academia.edu/44519567/Knowledge\\_management\\_and\\_business\\_intelligence\\_the\\_importance\\_of\\_integration](https://www.academia.edu/44519567/Knowledge_management_and_business_intelligence_the_importance_of_integration)

Darkow, I.-L. (2015). The involvement of middle management in strategy development —Development and implementation of a foresight-based approach. *Technological Forecasting and Social Change*, 101, 10–24. <https://doi.org/10.1016/j.techfore.2013.12.002>

Emerald Group (Ed.). (2005). *Introduction to Knowledge Management*. Emerald Publishing Limited.

- Fenton, C., & Langley, A. (2011). Strategy as Practice and the Narrative Turn. *Organization Studies*, 32(9), 1171–1196. <https://doi.org/10.1177/0170840611410838>
- Fink, L., Yogev, N., & Even, A. (2017). Business intelligence and organizational learning: An empirical investigation of value creation processes. *Information & Management*, 54(1). <https://doi.org/10.1016/j.im.2016.03.009>
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137–144. <https://doi.org/10.1016/j.ijinfomgt.2014.10.007>
- Gartner. (n.d.). Knowledge Management (KM). In *Gartner.com dictionary*. Retrieved February 2, 2022, from <https://www.gartner.com/en/information-technology/glossary/km-knowledge-management>
- Geisser, S. (1993). *Predictive Inference: An Introduction*. CRC Press. <https://doi.org/10.1201/9780203742310>
- Gill, J., & Johnson, P. (2002). *Research Methods for Managers*. SAGE Publications.
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. *Journal of Management Information Systems*, 18(1), 185–214. <https://doi.org/10.1080/07421222.2001.11045669>
- Golsorkhi, D., Rouleau, L., Seidl, D., & Vaara, E. (2010). Introduction: what is strategy as practice? In D. Golsorkhi, L. Rouleau, D. Seidl, & E. Vaara (Eds.), *Cambridge Handbook of Strategy as Practice* (pp. 1–30). Cambridge University Press. <https://doi.org/10.1017/CBO9781139681032.001>



- Gordon B. Davis. (1985). *Management Information Systems Conceptual Foundations, Structure, And Development*. McGraw-Hill College.
- Guest, G., MacQueen, K., & Namey, E. (2012). Introduction to Applied Thematic Analysis. In *Applied Thematic Analysis* (pp. 3–20). SAGE Publications, Inc. <https://doi.org/10.4135/9781483384436.n1>
- Haimila, S. (2001, November 1). *The helping hand of BI*. KMWorld Magazine. <https://www.kmworld.com/Articles/News/KM-In-Practice/The-helping-hand-of-BI-8490.aspx>
- Hall, R. (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal*, 14(8), 607–618. <https://doi.org/10.1002/smj.4250140804>
- Hannula, M., & Pirttimäki, V. (2003). Process models of business intelligence. *Frontiers of E-Business Research*. [https://www.researchgate.net/publication/251987518\\_Process\\_models\\_of\\_business\\_intelligence](https://www.researchgate.net/publication/251987518_Process_models_of_business_intelligence)
- Herschel, R. T., & Jones, N. E. (2005). Knowledge management and business intelligence: The importance of integration. *Journal of Knowledge Management*, 9(4), 45–55. <https://doi.org/10.1108/13673270510610323>
- IBM Cloud Education. (2020, November 12). *What is knowledge management?* <https://www.ibm.com/cloud/learn/knowledge-management>
- Ihrig, M., & MacMillan, I. (2015). *Managing Your Mission-Critical Knowledge*. Intellectual Property. <https://hbr.org/2015/01/managing-your-mission-critical-knowledge>

Institute for Operations Research and the Management Sciences. (n.d.). *Best definition of analytics*.

Işık, Ö., Jones, M. C., & Sidorova, A. (2013). Business intelligence success: The roles of BI capabilities and decision environments. *Information & Management*, 50(1).  
<https://doi.org/10.1016/j.im.2012.12.001>

Jarratt, D., & Stiles, D. (2010). How are Methodologies and Tools Framing Managers' Strategizing Practice in Competitive Strategy Development? *British Journal of Management*, 21(1), 28–43. <https://doi.org/10.1111/j.1467-8551.2009.00665.x>

Jarzabkowski, P. (2005). *Strategy as Practice: An Activity-Based Approach*. SAGE Publications Ltd. <https://doi.org/10.4135/9781446215777>

Jarzabkowski, P., Balogun, J., & Seidl, D. (2007). Strategizing: The challenges of a practice perspective. *Human Relations*, 60(1), 5–27.  
<https://doi.org/10.1177/0018726707075703>

Jenster, P. v, Solberg, K., & Sjøilen, K. S. (2009). *Converging Foundations of Intelligence Analysis*. <https://triton.fi/Record/nelli07.2670000000066308>

Johnson, G. (1987). *Strategic Change and the Management Process – Corporate Strategy, Organization and Change*. Blackwell.

King, W. R. (2009). Knowledge Management and Organizational Learning. In *Annals of Information Systems* 4. Springer Science+Business Media, LLC.  
[https://doi.org/10.1007/978-1-4419-0011-1\\_1](https://doi.org/10.1007/978-1-4419-0011-1_1)

Koenig, M. E. D. (2018, January 15). *What is KM? Knowledge Management Explained*. KMWorld. [https://www.kmworld.com/About/What\\_is\\_Knowledge\\_Management](https://www.kmworld.com/About/What_is_Knowledge_Management)

Kohtamäki, M., Farmer, D., Talaoui, Y., Rodrigo, R., Koulumies, A., Huikkola, T., Laukkanen, V., Heimonen, J., Mattila, J., Kultalahti, S., Partanen, J., Mansouri Jajae, S., Cavén, O., Einola, S., Boldosova, V., Petäjä, E., Luokkanen-Rabetino, K., Rajala, A., Sillanpää, I., & Shahzad, K. (2017). *Real-time Strategy and Business Intelligence* (M. Kohtamäki, Ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-319-54846-3>

Kunc, M. (2019). *Strategic Analytics : Integrating Management Science and Strategy*. John Wiley & Sons Ltd.

Levitt, T. (1983). The Globalization of Markets. *Harvard Business Review*, 61(3), 92. <https://hbr.org/1983/05/the-globalization-of-markets>

Li, S.-T., Shue, L.-Y., & Lee, S.-F. (2008). Business intelligence approach to supporting strategy-making of ISP service management. *Expert Systems with Applications*, 35(3), 739–754. <https://doi.org/10.1016/j.eswa.2007.07.049>

Marin, A., Cordier, J., & Hameed, T. (2016). Reconciling ambiguity with interaction: implementing formal knowledge strategies in a knowledge-intensive organization. *Journal of Knowledge Management*, 20(5), 959–979. <https://doi.org/10.1108/JKM-11-2015-0438>

McKnight, W. (2002). *Ask the CRM expert*. [https://www.expertanswercenter.techtarget.com/eac/knowledgebaseAnswer/0,295199,sid63\\_gci974430,00.html](https://www.expertanswercenter.techtarget.com/eac/knowledgebaseAnswer/0,295199,sid63_gci974430,00.html)

Microsoft. (2021). *What is business intelligence?* Retrieved January 19, 2022, from <https://powerbi.microsoft.com/en-us/what-is-business-intelligence/>

Mintzberg, H. (1987, July). *Crafting Strategy*. Harvard Business Review. <https://hbr.org/1987/07/crafting-strategy>

Neeley, T. B., & Leonardi, P. M. (2018). Enacting knowledge strategy through social media: Passable trust and the paradox of nonwork interactions. *Strategic Management Journal*, 39(3), 922–946. <https://doi.org/10.1002/smj.2739>

Nickols, F. (2000). The knowledge in knowledge management. *Knowledge Management Yearbook*. [https://www.researchgate.net/publication/288901934\\_The\\_knowledge\\_in\\_knowledge\\_management](https://www.researchgate.net/publication/288901934_The_knowledge_in_knowledge_management)

Nunes, M. N., & McPherson, M. A. (2002). No lectures on-campus: can e-learning provide a better learning experience? *Proceedings of the Second IEEE International Conference on Advanced Learning Technologies (ICALT'03)*, 442–447.

Nyce, C. (2007). Predictive Analytics White Paper. In *American Institute for CPCU*. [https://www.researchgate.net/publication/267689958\\_Predictive\\_Analytics\\_White\\_Paper](https://www.researchgate.net/publication/267689958_Predictive_Analytics_White_Paper)

Oxford. (n.d.). Analytics. In *Oxfordlearnersdictionaries.com dictionary*. Retrieved January 18, 2022, from <https://www.oxfordlearnersdictionaries.com/definition/english/analytics>

Parthasarathy, S. (2022, January 1). *Top 5 Predictive Analytics Models and Algorithms*. Logi Analytics. <https://insightsoftware.com/blog/top-5-predictive-analytics-models-and-algorithms/>

Peppard, J., Galliers, R. D., & Thorogood, A. (2014). Information systems strategy as practice: Micro strategy and strategizing for IS. *The Journal of Strategic Information Systems*, 23(1), 1–10. <https://doi.org/10.1016/j.jsis.2014.01.002>

- Pettigrew, A. (1985). *The awakening giant*. Blackwell.
- Puusa, A., Juuti, P., & Aaltio, I. (2020). *Laadullisen tutkimuksen näkökulmat ja menetelmät* (2nd ed.). Gaudeamus.
- Raine, V., & Aarnos, E. (2018). *Ikkunoita tutkimusmetodeihin 1 - Metodien valinta ja aineistonkeruu* (5th ed.). PS-kustannus.
- Sanders, M. N. K., Lewis, P., & Thornhill, A. (2007). *Research methods for business students* (Vol. 4). Prentice Hall.
- SAS Institute Inc. (n.d.). *Analytiikka - Mitä se on ja miksi se on tärkeää*. Retrieved January 23, 2022, from <https://libraryguides.vu.edu.au/apa-referencing/7Webpages>
- Schatzki, T., Knorr-Cetina, K., & von Savigny, E. (2001). *The Practice Turn in Contemporary Theory*. Routledge.
- Subramaniam, M. (2021, September 21). *The 4 Tiers of Digital Transformation*. Harvard Business Review. <https://hbr.org/2021/09/the-4-tiers-of-digital-transformation>
- Sullivan, M. S. (2012). *A Study of The Relationship Between Personality Types and The Acceptance of Technical Knowledge Management Systems (Tkms)* [Doctoral dissertation, Capella University]. Education Resource Information Center. <https://eric.ed.gov/?id=ED547859>
- Suša Vugec, D., Bosilj Vukšić, V., Pejić Bach, M., Jaklič, J., & Indihar Štemberger, M. (2020). Business intelligence and organizational performance: The role of alignment with business process management. *Business Process Management Journal*, 26(6), 1709–1730. <https://doi.org/10.1108/BPMJ-08-2019-0342>

- Tavera Romero, C. A., Ortiz, J. H., Khalaf, O. I., & Prado, A. R. (2021). Business intelligence: business evolution after industry 4.0. In *Sustainability (Switzerland)* (Vol. 13, Issue 18). MDPI. <https://doi.org/10.3390/su131810026>
- Tien, N. (2019). *International Economics, Business and Management Strategy*. Academic Publications. [https://www.academia.edu/41633181/International\\_Economics\\_Business\\_and\\_Management\\_Strategy](https://www.academia.edu/41633181/International_Economics_Business_and_Management_Strategy)
- United Nations Economic Commission for Europe. (n.d.). Data. In *Unece.org dictionary*. Retrieved January 27, 2022, from <https://unece.org/trade/uncefact/unedifact/part-3-terms-and-definitions>
- Vaara, E., Sorsa, V., & Pälli, P. (2010). On the force potential of strategy texts: a critical discourse analysis of a strategic plan and its power effects in a city organization. *Organization*, 17(6), 685–702. <https://doi.org/10.1177/1350508410367326>
- Van Alstyne, M. W., & Parker, G. G. (2021, December 17). *Digital Transformation Changes How Companies Create Value*. Harvard Business Review. <https://hbr.org/2021/12/digital-transformation-changes-how-companies-create-value>
- Vercellis, C. (2009). *Business Intelligence: Data Mining and Optimization for Decision Making*. John Wiley & Sons, Ltd. <https://doi.org/10.1002/9780470753866>
- Vuori, V. (2006, November 28). Methods of Defining Business Information Needs. *Conference: Proceedings of the International Conference on Electronic Business (ICEB)*. [https://www.researchgate.net/publication/255586517\\_Methods\\_of\\_Defining\\_Business\\_Information\\_Needs](https://www.researchgate.net/publication/255586517_Methods_of_Defining_Business_Information_Needs)

- Waller, M. A., & Fawcett, S. E. (2013). Data Science, Predictive Analytics, and Big Data: A Revolution That Will Transform Supply Chain Design and Management. *Journal of Business Logistics*, 34(2), 77–84. <https://doi.org/10.1111/jbl.12010>
- Whittington, R. (1996). Strategy as practice. *Long Range Planning*, 29(5). [https://doi.org/10.1016/0024-6301\(96\)00068-4](https://doi.org/10.1016/0024-6301(96)00068-4)
- Whittington, R. (2006). Completing the Practice Turn in Strategy Research. *Organization Studies*, 27(5), 613–634. <https://doi.org/10.1177/0170840606064101>
- Wibowo, A. (2017). Knowledge Management Support for Enterprise Architecture Development. *International Journal of Knowledge Engineering*. <https://doi.org/10.18178/ijke.2017.3.1.082>
- Wiig, K. (1997). Knowledge Management: An Introduction and Perspective. *Journal of Knowledge Management*, 1(1), 6–14. <https://doi.org/10.1108/13673279710800682>
- Williamson, K. (2002). Research techniques: Questionnaires and interviews. In *Research Methods for Students, Academics and Professionals* (pp. 235–249). Elsevier. <https://doi.org/10.1016/B978-1-876938-42-0.50023-X>
- Williamson, K. (2018). Questionnaires, individual interviews and focus group interviews. In *Research Methods* (pp. 379–403). Elsevier. <https://doi.org/10.1016/B978-0-08-102220-7.00016-9>
- Wu, J., & Coggeshall, S. (2012). *Foundations of Predictive Analytics* (1st ed.). CRC Press LLC.

Yew Wong, K. (2005). Critical success factors for implementing knowledge management in small and medium enterprises. *Industrial Management & Data Systems*, 105(3), 261–279. <https://doi.org/10.1108/02635570510590101>

Zins, C. (2007). Conceptual approaches for defining data, information, and knowledge. *Journal of the American Society for Information Science and Technology*, 58(4). <https://doi.org/10.1002/asi.20508>



## APPENDICES

### Interview table 1 of 2

No	Role	Organizational level	Project Stage	Date	Length
1	Head of Market Intelligence Student Thesis Worker	Senior Management Operational level	Initial Stage	01.09.2021	60 min
2	Market Intelligence Manager	Middle Management	Initial Stage	21.10.2021	30 min
3	Head of Market Intelligence GSU Manager & Country Lead	Senior Management Senior Management	Initial Stage	28.10.2021	30 min
4	Head of Market Intelligence GSU Manager & Country Lead	Senior Management Senior Management	Initial Stage	3.11.2021	60 min
5	Head of Market Intelligence	Senior Management	Initial Stage	1.12.2021	60 min
6	Head of Market Intelligence	Senior Management	Initial Stage	2.12.2021	30 min
7	GSU Manager & Country Lead	Senior Management	Initial Stage	3.12.2021	30 min
8	Head of Market Intelligence Business Development & Industry Network Lead GPG Marketing & Sales Manager	Senior Management Senior Management Senior Management	Initial Stage	7.12.2021	30 min
9	Project Manager	Lower Management	Initial Stage	9.12.2021	45 min
10	GSU Manager & Country Lead	Senior Management	Initial Stage	16.12.2021	30 min
11	Head of Market Intelligence Global Marketing & Sales Manager	Senior Management	Initial Stage	17.12.2021	45 min
12	Sales Director Rail & Wind	Senior Management	Initial Stage	20.12.2021	30 min
13	Head of Market Intelligence	Senior Management	Initial Stage	23.12.2021	30 min
14	Project Manager	Lower Management	Production Stage	4.1.2022	60 min
15	Project Manager	Lower Management	Production Stage	5.1.2022	90 min
16	Sales Director Rail & Wind	Senior Management	Production Stage	7.1.2022	60 min
17	Head of Market Intelligence	Senior Management	Production Stage	7.1.2022	30min
18	Sales Manager	Middle Management	Production Stage	11.1.2022	60 min
19	Service Manager	Middle Management	Production Stage	13.1.2022	30 min
20	Head of Market Intelligence	Senior Management	Production Stage	18.1.2022	60 min
21	GSU Manager & Country Lead	Senior Management	Production Stage	18.1.2022	40 min
22	Engineering Manager	Lower Management	Production Stage	19.1.2022	30 min
23	Service Manager	Middle Management	Production Stage	19.1.2022	30 min
24	Sales Manager	Middle Management	Production Stage	20.1.2022	60 min
25	Sales Director Rail & Wind	Senior Management	Production Stage	21.1.2022	30 min

## Interview table 2 of 2

26	Head of Market Intelligence Head of Presales	Senior Management Senior Management	Production Stage	24.1.2022	45 min
27	Regional Sales Manager	Middle Management	Production Stage	28.1.2022	60 min
28	Student Thesis Worker	Operational Level	Production Stage	2.2.2022	30 min
29	GPG Marketing & Sales Manager Global Marketing & Sales Manager	Senior Management Senior Management	Production Stage	3.2.2022	60 min
30	Sales Manager	Middle Management	Production Stage	14.2.2022	60 min
31	Engineering Manager	Lower Management	Production Stage	14.2.2022	30 min
32	Head of Presales	Senior Management	Production Stage	14.2.2022	30 min
33	Sales Manager	Middle Management	Production Stage	18.2.2022	60 min
34	Sales Director Rail & Wind	Senior Management	Production Stage	18.2.2022	60 min
35	Business Development & Industry Network Lead	Senior Management	Production Stage	22.2.2022	60 min
36	Rail Industry Network Leader Head of Market Intelligence	Senior Management Senior Management	Finishing Stage	23.2.2022	30 min
37	Head of Market Intelligence Global Industry Marketing Manager	Senior Management Middle Management	Finishing Stage	23.2.2022	30 min
38	Business Development & Industry Network Lead Global Industry Marketing Manager	Senior Management Middle Management	Finishing Stage	28.2.2022	60 min
39	Business Development & Industry Network Lead Global Industry Marketing Manager Market Manager	Senior Management Middle Management Middle Management	Finishing Stage	8.3.2022	60 min
40	Business Development & Industry Network Lead Global Industry Marketing Manager Sales Manager Communications	Senior Management Middle Management Middle Management	Finishing Stage	10.3.2022	30 min
41	Business Development & Industry Network Lead Global Industry Marketing Manager Pre and Post Sales Support Engineer	Senior Management Middle Management Operational Level	Finishing Stage	15.3.2022	30 min
42	GPG Marketing & Sales Manager Head of Market Intelligence	Senior Management Senior Management	Finishing Stage	15.3.2022	60 min
43	Sales Manager Communications	Middle Management	Finishing Stage	22.3.2022	30 min
44	Market Intelligence Manager	Middle Management	Finishing Stage	23.4.2022	30 min
45	Rail Sector Manager Global Industry Marketing Manager	Senior Management Middle Management	Finishing Stage	24.3.2022	60 min
46	Transportation Segment Manager	Middle Management	Finishing Stage	24.3.2022	15 min
47	Market Intelligence Manager	Middle Management	Finishing Stage	25.3.2022	30 min
48	Sales Director Rail & Wind	Senior Management	Finishing Stage	25.3.2022	45 min
49	Student Thesis Worker	Operational Level	Finishing Stage	28.3.2022	30 min
50	Sales Manager	Middle Management	Finishing Stage	29.3.2022	45 min
51	Regional Sales Manager	Middle Management	Finishing Stage	30.3.2022	45 min
52	Head of Presales	Senior Management	Finishing Stage	1.4.2022	45 min

## Interview structure

Brief: As the interviews concerned different stages of the process, different areas, different people at the organizational level, this affected the structure of the interviews. However, the questionnaire structure below provides the typical progression of the interviews. This is based on the senior manager interviewed during the initial stage of the process. The painted areas concern thesis related matters.

### Interview structure – Sales Director Rail & Wind

1. Presentation of the study
  - a. academic objectives
  - b. research aim
  
2. Presentation of the strategic tool
  - a. organizational objectives
  - b. current state of the tool
  
3. Strategic tool questions
  - a. based on the interviewees organizational position and expected knowledge
  - b. the interviewee's recommendations for the following interviewees
  
4. Thesis related questions (interviewee specific)
  - a. providing background for the question 1 and 2
  - b. Question 1: If you (or your team) start a new project that is reasonably unfamiliar to you, through what way do you usually seek the necessary knowledge or a person with the necessary knowledge?
    - i. possible follow-up questions based on the answer
  - c. Question 2: How do you act in a situation where you find that a project is going in the wrong direction? (For example, someone in the project is focusing on “wrong” things) or (if the customer goes to demand something that was not originally agreed)
    - i. possible follow-up questions based on the answer