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Is Everyone On Board?

An Exploratory Study About Individual Sustainability-Oriented Knowledge in Swedish Corporate Boards of Directors

ABSTRACT

Sustainability-oriented knowledge is becoming an increasingly important factor in corporate success. However, there is a surprising lack of research about how it is incorporated into the corporation's highest decision-making body: the board of directors. The purpose of this thesis is to address this theoretical gap through an exploratory study of sustainability-oriented knowledge among Swedish corporate board members. We also aim to make a practical contribution by outlining preliminary advice to corporate decision-makers on how to enhance their board members' sustainability-oriented knowledge. To examine this, we use a combinative methodology with two separate studies: one quantitative and one qualitative. The quantitative study consists of a survey with the purpose of examining individual board members' sustainability-oriented absorptive capacity (SACAP), and how it is influenced by their personal characteristics. The qualitative study consists of in-depths interviews with the highest-ranking sustainability representatives from Swedish companies, with the purpose of examining the company's sustainability-oriented knowledge expectations and educational efforts towards their board members.

Our main conclusion is that the sustainability-oriented knowledge of individual board members is affected by both their personal characteristics and by educational efforts from their companies. This suggests that the management of board members' sustainability-oriented knowledge is a multidimensional practice that requires parallel efforts from both the individual board members themselves and their organisation. These findings are mainly consistent with previous literature, and have narrowed the theoretical gap by identifying influencers of individual board members' sustainability-oriented knowledge through utilising concepts from knowledge management and board theory. We also contribute to corporate decision-makers by pinpointing educational efforts that companies can utilise to enhance their board of director's sustainability-oriented knowledge, as well as a deeper understanding of some personal characteristics that affect individual board members' sustainability-oriented knowledge capabilities.

Keywords: sustainability-oriented knowledge, knowledge management, board of directors, individual absorptive capacity, personal characteristics, education

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Stockholm, May 15th, 2017

André Hedberg & Marcus Kullman

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1. INTRODUCTION

The incorporation of sustainability into business, both environmental and social responsibility, has undoubtedly gained momentum during the last decades. Concepts such as corporate responsibility, corporate citizenship and sustainable development have firmly taken root in the business sphere (Ricart et al., 2005; Schaltegger and Burritt, 2005; Bansal, 2005). A Google Scholar search on "sustainability and business" yields 2.370.000 results. Whereas the early corporate sustainability debate focused on whether a company should commit to social and environmental engagement (e.g., Esty & Porter, 1998; Reinhardt, 1999), research has now shifted towards showing how it is in the best economic interest for companies to embrace a sustainable mindset in their decision-making processes (e.g., Clark et al., 2015; Kramer & Porter, 2011). It can lead to benefits such as better operational performance and lower costs, higher innovative success and better risk management, which in the end create long-term value for shareholders (Clark et al., 2015).

With sustainability potentially becoming an integral part of every business decision, almost all aspects of companies have been under theoretical and practical examination (Linnenluecke & Griffiths, 2013). This ranges from, for example, minimising waste in the supply chain (e.g., Carter & Rogers, 2008) and selecting and evaluating suppliers properly (e.g., Govindan et al., 2013), to identifying and measuring key social performance drivers (e.g., Epstein & Roy, 2001). However, there is one area of the company that has managed to stay hidden, and that has not yet been subject to this type of scrupulous sustainability-oriented investigation from neither academia nor practice. This area remains surprisingly unexplored, considering that it involves the highest executive body of the company, with the sole purpose of creating value for shareholders by managing the company's future strategy, management and organisation — the board of directors (Aktiebolagslagen 8:e kap, §4; Farrar, 2008).

Since the board of directors constitutes a fundamental component of a company's performance, with organisational power highly concentrated to a few individuals, one can question how the board of directors has managed to remain outside the ethical spotlights of academic and practical sustainability debates (Bavaria, 1991; Pharoah, 2003). *Board theory* in general, given its proven connection to a company's successful governance and prosperity, has received a lot of attention from academics (Conger et al., 1998). However, a large majority of them rely on personal anecdotes and subjective opinions from former board members as their primary data source due to access challenges, thus making these results limited (e.g., Leblanc & Schwartz, 2007; Millstein & MacAvoy, 1998). To cope with these challenges, the existing research has tended to focus on the board of directors as an *entity*, exploring aspects such as board performance, board processes and board dynamics (e.g., Holland & Jackson, 1998; Conger et al., 1998). The same holistic and entity-driven perspective also characterises the few studies that have tried to integrate board theory and

sustainability, placing an even stronger emphasis on what the board of directors is doing as an entity (e.g., Ricart et al., 2005; Kiron et al., 2015; Tonello, 2010 & 2013; Pharoah, 2003).

By focusing solely on the board of directors from the entity perspective, these studies have so far failed to explore sustainability at an individual-level of analysis focused on individual board members. In fact, despite a consensus that sustainability should be an important subject for the board of directors as an entity, the actual sustainability-related board engagement remains low due to uncertainty regarding financial impact, lack of sustainability-oriented knowledge and expertise among board members and short-termism (Kiron et al., 2015). The lack of sustainability-oriented knowledge among individual board members constitutes an extra interesting barrier, considering that knowledge is emphasised as one of the primary strategic resources of a company, according the well-established knowledge-based view of the firm, and that the company's skill of attaining it is seen as a primary capability leading to competitiveness (Grant, 1996; Cohen and Levinthal, 1990).

Individual board members' sustainability-oriented knowledge is therefore a topic that should be given as much attention and evaluation as any other sustainability-related topic surrounding business (Tonello, 2010 & 2013). Consequently, this thesis investigates Swedish board members' sustainability-oriented knowledge by studying how it is influenced by: (1) the board members themselves, and (2) by their organisations.

1.1 Problem Area

Within management and institutional theory, knowledge management of individual organisational members has been proven to be highly important (Kogut & Zander, 1992; Grant, 1996; Spender, 1996). The most valuable form of knowledge, tacit knowledge, cannot be codified, and the knowledge-based view of the firm therefore emphasises that individuals are the key repositories of knowledge transfer in organisations, and thus the primary actors in knowledge management (Grant, 1996; Felin & Hesterly, 2007; Foss, 2007). Lane et al. (2006, p. 854) adequately argued that "uniqueness arises from the personal knowledge and mental models of the individuals within the firm, who scan the knowledge environment, bring the knowledge into the firm, and exploit the knowledge in products, processes, and services". Accordingly, increasing the understanding of individuals' *behaviours* and *characteristics* to explain underlying organisational-level phenomenon have been emphasised as key research areas within knowledge management studies (Lichtenthaler, 2011). However, only a few researchers have explicitly focused on sustainability-oriented knowledge (e.g., Bond et al., 2010; Johnson, 2016; Roy and Thérin, 2008), and none have specifically researched on sustainability-oriented knowledge within the board of directors. Here is therefore an academic gap to explore.

Earlier literature stresses the importance of understanding that the knowledge of individual organisational members is a function of the (1) individual's own capability to absorb knowledge, as well as (2) the knowledge-enhancing capabilities of its organisation (Grant, 1996; Bond et al., 2010; Caloghirou et al., 2004). These types of knowledge attaining capabilities that allow companies to coevolve with their changing markets and surroundings, are called *dynamic capabilities* (Eisenhardt & Martin, 2000). From these two perspectives and the knowledge-based view of the firm, the sustainability-oriented knowledge of individual board members can therefore be argued to be a fundamental strategic resource that enables companies to coevolve with their surroundings (Grant, 1996; Bond et al., 2010; Eisenhardt & Martin, 2000), and is in turn influenced by (1) the board members themselves and (2) their organisation.

Regarding the **individual board member's capability** to attain knowledge, one of the most well-established concepts within knowledge management studies the last decades is *absorptive capacity*, which is the capability to absorb and utilise external knowledge flows (Cohen & Levinthal, 1990; Hurtado-Ayala & Gonzalez-Campo, 2015). Within these studies, the role of individuals has been highlighted as fundamental; the absorptive capacity of the organisation largely depends on the absorptive capacity of its individual members and their personal characteristics and mental models (Cohen & Levinthal, 1990; Lane et al., 2006; Lichtenthaler, 2011). *Individual absorptive capacity* can be defined as "the level of effort that individuals undertake to **identify** external knowledge, **assimilate** it and **utilise** it to commercial ends" (Ter Wal et al., 2011).

Regarding the **organisation's capability** to enhance its board members' knowledge (also called the learning capability of a company), *education and training* has been proven to increase the employee's ability to identify and appreciate knowledge (Bond et al., 2010; Caloghirou et al., 2004). Lane et al. (2006) argued that an organisation's absorptive capacity is dependent upon its formal knowledge management processes, and Herman (1989) emphasised the value of giving board members additional training in order to enhance their ability to align with the board of directors current way of working. Holland & Jackson (1998) came to the same conclusion, emphasising education as an essential enhancer of individual board members' knowledge.

Given the centrality of knowledge management to business practice, we find it intriguing how the nexus between sustainability, board theory and knowledge management remains unexplored. We therefore seek to contribute to a better understanding of the theoretical intersection between these three subjects. Specifically, we aim to investigate individual board members' sustainability-oriented knowledge, including (1) their degree of sustainability-oriented absorptive capacity and how it is affected by their personal characteristics, and (2) educational efforts used by companies to enhance the sustainability-oriented knowledge of their board members.

1.2 Problem Statement

Based upon the above discussion, one overarching problem statement can be derived.

PROBLEM STATEMENT

How is the sustainability-oriented knowledge of individual board members affected by (1) the individuals themselves, and (2) by educational efforts from their companies?

To investigate this, three underlying research questions have been formulated.

Considering that absorptive capacity's three dimensions follow a natural sequence, a feasible first step is to investigate whether individual board members' sustainability-oriented absorptive capacity is equally high in all dimensions, or differs throughout the process (Cohen & Levinthal, 1990; Lane et al., 2006; Ter Wal et al., 2011). Building on Ter Wal et al. (2011) definition of individual absorptive capacity, research question 1a is formulated as:

RQ1a

Do individual board members have a generally high or low sustainability-oriented absorptive capacity, or do they rather take on specialised roles as "identifiers", "assimilators" or "utilisers"?

Considering that numerous studies about individual absorptive capacity stress the importance of personal characteristics as drivers of absorptive capacity (da Mota Pedrosa et al., 2013; Foss, 2007; Lichtenthaler, 2011; Lane et al., 2006), research question 1b is formulated as:

RQ1b

Do personal characteristics influence individual board members' absorptive capacity of external sustainability-oriented knowledge?

From the perspective of the learning capability of the company, Holland & Jackson (1998) highlighted education as one of the most important dimensions of board competency and performance. Matusik & Heeley (2005) stressed the need for a dynamic interaction between external and internal sources of knowledge. Consequently, research question 2 is formulated as:

RQ2

What type of sustainability-oriented knowledge do companies expect their individual board members to possess, and which educational efforts are used to ensure this knowledge?

1.3 Purpose and Expected Contribution

The purpose of this thesis is to explore individual board members' sustainability-oriented knowledge, including how this type of knowledge is affected by the individuals' themselves and by educational efforts from their companies. Our study contributes to previous research that stresses the importance of examining personal characteristics as influencers of knowledge, as well as research exploring education of the board of directors (Lichtenthaler, 2011; Foss, 2007; Holland & Jackson, 1998; Herman, 1989). Through the perspective of sustainability, our scope constitutes a relevant and so far, unexplored domain.

Our conclusions will have implications for both academics and practitioners interested in the subject. For researchers, the main contribution of this thesis is a better understanding of individual board members' sustainability-oriented knowledge. We strive to generate results from which future researchers can take inspiration when exploring the intersection between sustainability, board theory and knowledge management further. For practitioners, our results can hopefully provide new and concrete insights regarding how companies can enhance the sustainability-oriented knowledge in their board of directors, both by utilising effective educational approaches and by having a deeper understanding of some personal characteristics that affect individual board members' knowledge absorption.

1.4 The Studies

To answer our research questions, a combinative approach was used with two studies conducted on Swedish companies: one quantitative and one qualitative. These two studies have generated complementary data and enabled a higher validity for this thesis, which is desirable when investigating an unexplored academic topic like this. This approach is also aligned with our intention to create a theoretical foundation for future research in the nexus between sustainability, board theory and knowledge management, as our two studies together create more comprehensive results.

Study 1 uses a deductive and quantitative approach to answer RQ1a and RQ1b, consisting of an online questionnaire with a diverse sample of 81 Swedish board members. Study 2 uses an inductive and qualitative approach to answer RQ2, consisting of 10 in-depth interviews with representatives from 10 different Swedish companies. The board members and the company representatives come from various industries, company sizes and geographical regions, to avoid company and industry specific insights.

1.5 Delimitations

To enhance the quality of this thesis, we have decided to delimit ourselves, both from a theoretical and a practical perspective.

1.5.1 Theoretical Delimitations

In terms of sustainability, we use a wide and open definition, as this allows our diverse sample of respondents to interpret sustainability into the context of their own company and industry, thereby increasing the internal validity of our results. Within knowledge management, we restrict ourselves with two different perspectives of company's dynamic capabilities: (1) the knowledge capability of the **individual** through the concept of individual absorptive capacity (Ter Wal et al., 2011); and (2) the knowledge capability of the **company** through internal educational efforts (Bond et al., 2010; Caloghirou et al., 2004). For individual absorptive capacity, we only measure the effort board members put into each of the three dimensions, and do not distinguish the dimensions to identify specific activities taken in each dimension. Within board theory, our focus on individual board members results in that all entity-related areas (e.g., board performance, board effectiveness and board processes) are out of scope. Additionally, we focus solely on the sustainability-oriented knowledge barrier mentioned by Kiron et al. (2015) and Tonello (2010, 2013) and does not discuss other barriers to low sustainability board engagement.

1.5.2 Practical Delimitations

Our practical scope is on board members and companies in Sweden, and does not include non-profit or political organisations. We use a diverse sample of companies and board members in terms of industry, company size and geographical region, to enhance our external validity and reliability, thus giving a more representative picture of Swedish boards of directors. By doing so, comparative analyses between specific companies is excluded from the scope of this thesis. All respondents in both studies are included and evaluated on the condition of self-selection and self-evaluation, thereby focusing on the respondents' personal opinions and values. This thesis does therefore not consider the different companies' and board members' actual achievements within sustainability. The respondents in study 1 have also been restricted to be active board members to ensure that they are up to date with current business practices, thereby facilitating a higher internal validity and reliability of our results.

1.6 Disposition of Thesis

This thesis is structured into eight chapters, besides this introductory chapter. In the following chapter (2), we will start by outlining our theoretical framework and our hypotheses. This is followed by a chapter (3) describing our chosen approach and methodology to tackle the overarching problem statement, and a chapter (4) with a concise description of how we designed our two studies, as well as a discussion of our thesis limitations and overall validity and reliability. In the next two chapters (5 and 6), we present and analyse our results based on the data from study 1 and study 2, respectively, which is summarised in a joint context in the next chapter (7). This is followed by our conclusions (8) through discussing our theoretical framework, including implications for practice and theory. Finally, in the last chapter (9) we discuss our conclusions, as well as suggesting directions for future research.

2. THEORY

Our theoretical framework includes three components: sustainability theory; board theory; and knowledge management theory.

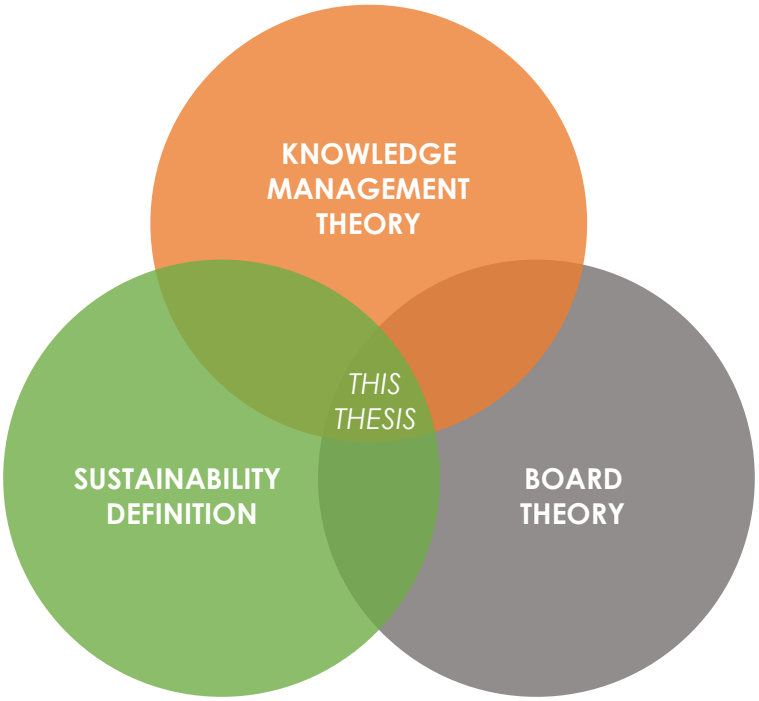

Figure 1 - Overview of theoretical components.

2.1 Sustainability Theory

2.1.1 Definition of Sustainability and Sustainable Development

The quest for a useful and concrete definition of sustainability has been on-going for many years, leading to thousands of available definitions (Kates et al., 2005). These definitions are not only numerous, but they also tend to differ in content depending on the field of research (Gatto, 1995). A common way to cope with this array of alternative definitions of sustainability is to use the related, but not substitutable, concept of **sustainable development** coined by the United Nations (Kates et al., 2005).

The original definition of sustainable development originates from 1987, when the United Nations issued the Brundtland Report, stating that sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland et al., 1987, p. 16). This definition has received a lot of praise for paving the way for the concept on the

global stage, but due to its open and general character many scholars have tried to develop a more tangible and usable definition (Kates et al., 2005). A resolution from the United Nations World Summit of Social Development in 2005 specified that sustainable development include three different components that are mutually reinforcing: *economic development*, *social development* and *environmental development*. These three components have later been known as the "three pillars of sustainable development" and this reasoning is today one of the most common ways to define sustainable development (Kates et al., 2005).

2.1.2 Sustainable Development and Business

As the discussions of sustainable development received a lot of attention in large global forums, the pressure on defining specific stakeholders in society also increased (Kates et al., 2005). The responsibility of the **business sector** was early introduced into the debate, initially from an ethical perspective, but later from a perspective of self-interest and possible gains (Elkington, 1994; Steurer et al., 2005). Many would ethically argue that companies have no choice but to take responsibility for the influence they have on their stakeholders and society in general, while others are more keen in emphasising the potential value that companies can enjoy by contributing to sustainable development (Borglund et al., 2012; Elkington, 1994; Pharoah, 2003). The combination of the two subjects — sustainability and business — is commonly referred to as Corporate Sustainability or Corporate Social Responsibility (CSR) (Van Marrewijk, 2003).

Given the diversified sample of board members and company representatives in our studies (in terms of industry, company size and geographical region), we have decided to use a definition that does not restrict us to a specific business practice or industry. This reasoning makes McWilliams & Siegel's (2001, p. 117) definition of CSR appropriate: "actions that appear to further some social good, beyond the sole interests of the firm and that which is required by law". This definition is suitable to our thesis, considering its de-emphasis on mere compliance and focus on acting beyond self-interests, inclusion of all three pillars of sustainable development (economic, social and environmental) as well as it allows our diverse respondents to interpret sustainability into their own context and situation.

Consequently, the term **sustainability-oriented knowledge** in this thesis refers to the type of knowledge that helps the board of directors take actions that appear to further some social good, beyond the sole interests of the firm and that which is required by law.

2.2 Board Theory

This section has the purpose of creating a basic understanding of how the board of directors can be defined, as well as discussing relevant research that has combined board theory and sustainability.

2.2.1 Purpose and Definition of the Board of Directors

According to the fourth paragraph of the eighth chapter in the Swedish Law of Companies (Aktiebolagslagen), the purpose of the board of directors is to be responsible for the organisation and management of the company's affairs, as well as to continuously evaluate and monitor the company's economic situation (ABL, 8 Ch, §4). A common theoretical term for this is *corporate governance,* which is widely defined as "all the mechanisms, processes and relations by which corporations are controlled and directed" (Shailer, 2004), in which the board of directors has a self-evident and central role. Within corporate governance, Conger et al. (1998) stresses the importance of (1) evaluating the board of directors, and (2) use a proper definition of the board for an adequate evaluation. When analysing the board of director's sustainability-oriented knowledge in this thesis, it is therefore important to use a suitable definition for our individual-level of analysis. We have therefore decided to interpret and define the board of directors with the help of different **attributes and roles**, as it allows us to discuss potential differences in board members' behaviours (Korac-Kakabadse et al., 2001).

2.2.1.1 Attributes and Roles of the Board

From the perspective of **attributes**, the board of directors have four different attributes: composition, characteristics, structure and processes (Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989). For our individual-level of analysis, composition and characteristics are the most relevant attributes, as the *board composition* refers to the size and the demographics of the board, and *board characteristics* refer to the individual board members' traits and capabilities influencing their performance (Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989; Maassen, 1999; Hambrick, 1987). Two examples of studies on these attributes are Letendre (2004), who concluded that board dynamics and board diversity is crucial for how board members interact with each other and what this interaction result in (i.e., board composition), and Cornforth (2001), who emphasised the importance of individual board members' experience, skills and time for board performance (i.e., board characteristics). The other two attributes, *board structure* and *board processes*, refers to how the board as an entity is organised and its decision-making process, and is therefore not as relevant for this thesis (Korac-Kakabadse et al., 2001; Maassen, 1999).

From the perspective of **roles**, the board of directors have three different roles: the service role; the control role; and the strategic role (Zahra & Pearce, 1989). The *service role* can be described as supporting the company's internal representatives with expertise, knowledge and advice that are not accessible otherwise (Zahra & Pearce, 1989). The *control role* of the board is related to monitoring and tracking the performance of the company (Zahra & Pearce, 1989; Baysinger & Zeithaml, 1986).

The *strategic role* relates to managing and directing the company's mission, goals and strategies (Zahra & Pearce, 1989). The *service* and *strategic* role of the board are relevant for us when analysing sustainability-oriented knowledge within boards, given its expertise and strategy related character.

2.2.2 Sustainability in The Boardroom

In the intersection of sustainability and board theory, a few scholars have generated findings relevant to our research questions. Ricart et al. (2005) examined how corporate governance systems within boardrooms incorporate topics related to sustainable development. Based on 18 companies from the Dow Jones Sustainability Index, the authors concluded that sustainability is integrated into the boardroom through three different dimensions: "*Who*" (demographics); "*How*" (structure and processes); and "*What*" (values) (Ricart et al., 2005). The **Who-dimension** is relevant to our thesis since it emphasises (1) the importance of individual board members' sustainability-oriented knowledge, (2) the individual board members earlier experiences, (3) attitudes related to sustainability, and (4) the sustainability training they are receiving (Ricart et al., 2005). Besides this study, most other scholars have neglected the Who-dimension, and instead focused on sustainability-aspects related to structure, processes, dynamics and performance (Benn & Dunphy, 2007; Galbreath, 2012; Money & Schepers, 2007; Tonello, 2010 & 2013; Hendry; 2005; Ledgerwood, 1997).

Connected to the Who-dimension, more recent research has shown that the *level of engagement* of the board within sustainability is considered to be important for future business prosperity (Kiron et al., 2015; Money and Schepers, 2007; Tonello, 2010 & 2013). However, from a sustainability reporting and monitoring perspective, the board's involvement remains surprisingly low (Tonello, 2010 & 2013). Kiron et al. (2015) argues that the board's sustainability engagement remains low due to barriers such as uncertainty regarding financial impact, lack of sustainability-oriented knowledge and expertise among board members and short-termism. The second barrier — lack of sustainability-oriented knowledge — is intriguing and strengthens the need for more research on sustainability-oriented knowledge management within the board of directors.

To overcome ignorance of the board regarding sustainability, solutions such as recruitment of new board members and external expertise committees have been proposed (Kiron et al., 2015; Paine, 2014; Money & Schepers, 2007; Tonello, 2010 & 2013). In a case study of Nike's usage of sustainability-related board committees, where responsibility is assigned to a limited group of the board members, it was concluded to be a successful and promising solution (Paine, 2014). However, this approach — with assignment of responsibility to certain individuals — is at the same time being questioned because individuals are argued to understand and interpret corporate sustainability in different ways, thereby requiring an integration of the subject throughout the entire organisation (Russel & Jordan, 2009; Linnenluecke et al., 2009).

2.3 Knowledge Management Theory

2.3.1 What is Knowledge Management?

The field of knowledge management originates from the resource-based theory of the firm initially launched by Penrose (1959). This perspective postulates "that the services rendered by tangible resources depend on how they are combined and applied, which in turn is a function of the firm's know-how (i.e., knowledge)" (Alavi & Leidner, 2001, p. 108). Knowledge is argued to be embedded in several organisational entities, including organisational culture, policies, routines, systems, as well as individual employees (Grant, 1996; Nelson & Winter, 1982; Spender, 1996). This reasoning gave birth to *resources and capabilities* theory, building on the assumption that companies have different resources and capabilities that are sources of competitive advantages (Wernerfelt, 1984; Barney, 1991; Grant, 1991; Peteraf, 1993). Many researchers have analysed companies' ability to utilise their resources and capabilities in response to their external environment to stay strategically competitive and profitable (Wernerfelt, 1984; Peteraf, 1993), but relatively few have focused on investigating knowledge development for sustainability-related activities (e.g., Boiral, 2002; Bond et al., 2010; Klewitz & Hansen, 2014; Johnson, 2016; Roy & Thérin, 2008).

Resources and capabilities theory was, however, seen as static by some researchers, as it neglects market dynamics (Eisenhardt & Martin, 2000). The concept of *dynamic capabilities* was therefore launched, which further enhanced the field's explanatory capacity by integrating the dynamics of the market (Eisenhardt & Martin, 2000). Dynamic capabilities can be defined as the "subset of the competences/capabilities which allow the firm to create new products and processes and respond to changing market circumstances" (Lawson & Samson, 2001, p. 379). In changing market environments, the dynamic capabilities of a company's **management** become critical, and the knowledge within the company becomes a fundamental strategic resource (Grant, 1996). Knowledge is therefore seen as a primary strategic resource, and the company's skill of attaining it is seen as a primary capability leading to competitiveness (Kogut & Zander, 1992; Grant, 1996; Cohen & Levinthal, 1990).

The view of attaining knowledge as a dynamic capability is a suitable theoretical perspective for this thesis for two reasons. First, it emphasises the strategic importance of knowledge and highlight its implications for companies' competitiveness (Eisenhardt & Martin, 2000). Secondly, sustainability is a rapidly changing knowledge field, and companies should embrace a sustainable mindset in their decision-making processes to coevolve with their surroundings (Clark et al., 2015).

Below follow discussions on why we chose the concept of *absorptive capacity* as the individual board member's capability, including our hypotheses regarding personal characteristics potential influence on absorptive capacity, and why we chose *internal education* as the company capability.

2.3.2 The Board Members' Capability

One of the most widely researched dynamic capabilities within knowledge management is absorptive capacity (Hurtado-Ayala & Gonzalez-Campo, 2015). The concept was introduced by Cohen & Levinthal (1990), and highlights the need for organisations to develop their absorptive capacity to utilise external knowledge flows. It was initially defined as an organisation's ability to (1) **identify** the value of new knowledge, (2) **assimilate** it, and (3) **apply** it to commercial ends (Cohen & Levinthal, 1990).

2.3.2.1 Integrating Absorptive Capacity, Sustainability and Board Members

Even though absorptive capacity is a well-established construct, it is important to further elaborate upon its suitability to this thesis. Two aspects of absorptive capacity can be highlighted to demonstrate this. First, the concept has earlier been used in many different research fields (innovation, networks, R&D, performance, etc.), illustrating its multidisciplinary adaptability (Hurtado-Ayala & Gonzalez-Campo, 2015; Murovec & Prodan, 2009; Cohen & Levinthal, 1989; Kauppi et al., 2013). In fact, Johnson (2016) recently attempted to use absorptive capacity as a theoretical foundation to investigate general knowledge acquisition and development in *sustainability-oriented* small and medium-sized enterprises.

Secondly, the concept has been applied to many different levels of analysis in a company, such as the organisation, the business unit and the individual (e.g., Cohen & Levinthal, 1990; Szulanski, 1996; Ter Wal et al., 2011). The role of the individual has furthermore been highlighted as extra important, since the absorptive capacity of the organisation largely depends on the absorptive capacity of its individual members (Cohen & Levinthal, 1990; Lane et al., 2006).

2.3.2.2 Definition and Dimensions of Individual Absorptive Capacity

Even though Cohen & Levinthal (1990) pointed out from the start that an organisation's absorptive capacity is dependent on its individuals' absorptive capacities, their and the most cited redefinitions of absorptive capacity does not include a specific definition for individual absorptive capacity (Zahra & George, 2002; Lane et al., 2006). A recent review article have also concluded that the individual-level of analysis of absorptive capacity has been neglected, and that the insights regarding individual absorptive capacity remain limited, despite being a fundamental part of the original concept of absorptive capacity (Volberda et al., 2010).

One of the first to define and create a measurement for *individual absorptive capacity* was Ter Wal et al. (2011, p. 20), who argued that it was crucial to create a proper definition of individual absorptive capacity to "enrich the understanding of how individuals learn from external knowledge and how such efforts shape the ability of an individual to contribute to its organisation's innovative efforts". Staying close to the original definition by Cohen & Levinthal (1990), they defined individual-level absorptive capacity as "the level of effort that individuals undertake to **identify** external knowledge, **assimilate** it and **utilise** it to commercial ends" (Ter Wal et al., 2011, p. 4).

Individual Sustainability-Oriented Absorptive Capacity (SACAP)

Given the limited research on individual absorptive capacity, Ter Wal et al. (2011) three-dimensional definition of individual absorptive capacity is a comprehensible and reasonable foundation to operationalise and measure individual board members' sustainability-oriented absorptive capacity. Individual **sustainability-oriented absorptive capacity** (from here on called SACAP), is in this thesis defined by us as "the level of effort that individuals undertake to *identify* external sustainability-oriented knowledge, *assimilate* it and *utilise* it to commercial ends".

The first dimension, **identify**, includes the identification and subsequent acquisition of external knowledge (Lane et al., 2006). Identifying potential relevant external knowledge is essentially a search process, in which individual organisational members monitor, scan and explore their environment (Hambrick, 1982; Levinthal & March, 1981). For SACAP, this dimension represents the effort individual board members commit to searching for external sustainability-oriented knowledge.

The second dimension, **assimilate**, includes the process of assimilation and is a crucial step of applying external knowledge in novel processes, products or technologies (Lane et al., 2006). As it might not be apparent how external knowledge brings value to the company, it requires effort from individual "assimilators" that integrate useful external knowledge and information with internal knowledge (Cohen & Levinthal, 1990). For SACAP, this dimension represents the effort individual board members take to add their sustainability-oriented knowledge to the common pool of knowledge held by the board of directors as an entity.

The third and final dimension, **utilise**, includes the process of applying the now assimilated knowledge in processes, products or technologies (Ter Wal et al., 2011). Even though the external knowledge may be successfully assimilated into the firm, it still needs organisational members to advocate its utilisation (Anderson & Bateman, 2000). For SACAP, this represents the effort that board members place in overcoming potential sustainability-resistance from other board members, to make the sustainability-oriented knowledge commercially useful for the board of directors.

Other knowledge management theory also points out that an increased understanding of the **roles** that individuals take when absorbing knowledge is critical to analyse how knowledge is transferred into the organisation (Allen, 1977). This reveals which individuals that transform external knowledge into a format that is exploitable by the organisation in the long-term (Harada, 2003). For example, Howell & Higgins (1990) showed that individuals need to act as "champions" to utilise external knowledge to overcome internal scepticism and to gain support by showing personal commitment to the external ideas. This supports the reasoning that it is important to examine if board members take on specialised roles when absorbing sustainability-oriented external knowledge.

In conclusion, our definition of SACAP enables us to answer RQ1a, as it allows us to examine if individual board members have a generally high or low SACAP, or if they rather take on specialised roles as "identifiers", "assimilators" or "utilisers".

2.3.2.3 Personal Characteristics and Hypotheses

Earlier literature emphasises the importance of increasing our understanding of personal characteristics influence on absorptive capacity (Lichtenthaler, 2011; Foss, 2007; Lane et al., 2006). This reasoning is in accordance with studies within board theory too, where both demographics and individual characteristics have been discussed to affect board performance (Korac-Kakabadse et al., 2001; Zahra and Pearce, 1989; Maassen, 1999; Hambrick, 1987). Consequently, we can reasonably assume that it is relevant to explore if board members' personal characteristics influence their degree of SACAP. We will now go through four previously discussed personal characteristics, subsequently formulating our hypotheses for RQ1b.

Prior Sustainability-Related Knowledge

Individual organisational members' **prior related knowledge** has been highlighted as one of the main components influencing an individual's absorptive capacity (Lane et al., 2006; Hurtado-Ayala & Gonzalez-Campo, 2015). Lane et al. (2006, p. 857) pointed out that "while a firm's strategy focuses its efforts, the prior knowledge of the firm that is a function of individuals' existing mental models, influences the assessment of the value of new external knowledge". Prior related knowledge has earlier been suggested to have a positive effect on individual absorptive capacity because it influences all three dimensions: identify value in external knowledge, assimilate it, and apply the knowledge to commercial ends (Cohen & Levinthal, 1990). Hypothesis one is therefore formulated as:

> **H1:** *Board members with a high degree of prior sustainability-related knowledge have a higher degree of sustainability-oriented absorptive capacity than board members with low prior knowledge.*

While it may seem likely that board members with a high prior-knowledge also have a high SACAP, the inverse relationship is also possible. Individuals with low prior sustainability-oriented knowledge could have a high SACAP as a tool to learn more about sustainability. This highlights the need for empirical exploration and verification.

Board Experience

Both studies connected to absorptive capacity and board theory have emphasised relevant **experience** as an influencer of individuals' behaviour. Within absorptive capacity literature, Cohen & Levinthal (1990) argued that absorptive capacity is path-dependent because organisational experience facilitates the use of new knowledge. Within board theory, Cox & Munsinger (1985) concluded that board members with substantial experience within the company tend to acquire company and industry specific knowledge that are of relevance for the company's performance.

Similarly, Cornforth (2001) emphasised that the key to successful board performance is the individual board members and their capabilities, mainly consisting of their experience, skills and time. This reasoning suggests that board members with more board experience are better in absorbing external knowledge because they have the capability to better match external sustainability-related knowledge with their organisations' needs. Consequently, hypothesis two is formulated as:

H2: *Board members with long experience of working in corporate boards have a higher degree of sustainability-oriented absorptive capacity than board members with less board experience.*

Intrinsic Motivation to Learn About Sustainability

Another previously discussed personal characteristic is organisational members' **intrinsic motivation** to absorb new knowledge. Minbaeva et al. (2003) concluded that absorptive capacity should be conceptualised as being composed of both employees' ability and their motivation to facilitate the transfer of knowledge. The motivation of the employees is also discussed in theory about cognitive processes. Baldwin et al. (1991) concluded that even though the organisation may consist of individuals with high abilities to learn, its ability to utilise the absorbed knowledge will be low if employees' motivation is low or absent. Hypothesis three is therefore formulated as:

H3: *Board members with a high degree of intrinsic motivation to learn about sustainability have a higher degree of sustainability-oriented absorptive capacity than board members with low intrinsic motivation.*

While this relationship may seem obvious, it is also possible that board members with low intrinsic motivation to learn about sustainability could have a high SACAP due to external factors, such as organisational learning efforts, social compliance and incentives. This highlights the need for empirical exploration and verification.

Perceived Board Colleague Support

Individuals' **perceived organisational support** have also been highlighted as an important facilitator of knowledge. Zerwas (2014) concluded that one of the main influencing factors of absorptive capacity is a knowledge-friendly organisational culture. Board theory have also argued similarly. Cox & Munsinger (1985) concluded that when individuals highly value their membership in a corporate board, the awareness that continued participation is conditional tends to make board members conform with the board's expectations. This reasoning suggests that if board members' colleagues are supportive, which in turn creates a more knowledge-friendly culture in the boardroom, the knowledge absorbing behaviour of the individual board members can be better facilitated. Hypothesis four is therefore formulated as:

H4: *Board members with high a perceived support from their board colleagues have a higher degree of sustainability-oriented absorptive capacity than board members with low perceived support.*

2.3.3 The Learning Capability of the Company

Meanwhile the previous section discussed the perspective of individual board members, this section takes the perspective of their organisation. Below we therefore discuss that an organisation's educational efforts might enhance its individual members' sustainability-oriented knowledge (Bond et al., 2010; Caloghirou et al., 2004), subsequently forming the theoretical foundation to answer RQ2.

The ability of organisations to utilise value from their knowledge assets is central for the prosperity of their business (Gold et al., 2001). Being a crucial competitive resource, the implications of knowledge is influencing everything from a company's strategy to its processes, products and how it is organised (Ruggles, 1998). This means that a company can choose from a wide spectrum of efforts to increase its knowledge capabilities, such as utilising information technology (Gold et al., 2001) and appointing a Chief Knowledge Officer (Quintas et al., 1997). One of the most common organisational learning efforts that has been highlighted in both knowledge management and board literature is **internal education and training**. These efforts, also known as the *learning capability of a company*, has been stressed as instrumental to increase individuals' ability to identify and appreciate knowledge (e.g., Bond et al., 2010; Caloghirou et al., 2004; Johnson, 2016).

Within board theory, Herman (1989) emphasised the value of giving board members additional training and orientation after recruitment, thus enhancing their ability to align with the board's current way of working. Holland & Jackson (1998) also highlighted education as one of the most important dimensions of effective governance and high performance in boards. Similarly, within absorptive capacity literature, Lane et al. (2006) highlighted that the organisations absorptive capacity is dependent upon the formal knowledge management processes, and that the characteristics of the company's structures and processes drive the efficiency of its individuals assimilation and application of knowledge. Moreover, general human capital is largely created by formal education, which in turn generates a wider individual knowledge content base that improves problem-solving skills and cognitive processing (Bierly et al., 2009; Chandler & Lyon, 2009; Bates, 1990; Gimeno et al., 1997). Education also increases the effort devoted to knowledge acquisition, and people with higher levels of formal education are expected to be more open to change and new ideas (Boeker, 1997; Autio et al., 2000).

When examining board members' sustainability-oriented knowledge, it therefore seems to be feasible to combine SACAP with an educational perspective, considering that individuals' absorptive capacity and education has been discussed to be interconnected in previous literature (da Mota Pedrosa et al., 2013; Foss, 2007; Lichtenthaler, 2011; Lane et al., 2006). This allows for complementary analyses between our two studies. In the same vein, Matusik & Heeley (2005) stressed the need of a dynamic interaction between external and internal sources of knowledge, a

two-sided interaction that becomes especially important in changing business environments (Van den Bosch et al., 1999).

This also allows us to analyse the companies' **coordination capability** of sustainability-oriented knowledge in their board of directors. A company's coordination capability is its ability to enhance the knowledge absorption between members of a group through lateral ways of coordination (Van den Bosch et al., 1999). Education is a part of a company's coordination capability, as it helps to control, coordinate, and absorb knowledge to the firm, which in turn increases the individual's absorptive capacity (Van den Bosch et al., 1999). In other words, if companies internally educate their board members and ensure that the board members absorb sustainability-oriented knowledge, they can then be said to have a high coordination capability. A low coordination capability means, in the scope of education, that the companies does not utilise synergy effects between the individual's knowledge and internal education (Van den Bosch et al., 1999).

In summary, this suggests that the more education a board member receives within sustainability, the higher their sustainability-oriented knowledge will be. At the same time, this will increase the organisation's capability to attain sustainability-oriented knowledge, as they are interconnected. Shedding light on what type of sustainability-oriented knowledge companies expect their individual board members to possess, and which educational efforts that are used to ensure this knowledge, is therefore relevant when exploring individual board members' sustainability-oriented knowledge.

2.4 Theoretical Summary

This thesis integrates three theoretical domains: sustainability theory, knowledge management theory and board theory. We operationalise sustainability through corporate sustainability (CSR), using McWilliams & Siegel's (2001, p. 117) definition: "actions that appear to further some social good, beyond the sole interests of the firm and that which is required by law". Within board theory, we interpret and define the board of directors with the help of different roles and attributes. In terms of attributes, the board *composition* and board *characteristics* are relevant, considering its emphasis on individual board members' characteristics. The most relevant roles are the *service* role and the *strategic* role, where sustainability-oriented knowledge can be assumed to have most importance.

Within knowledge management theory, to answer RQ1a and RQ1b, we use Ter Wal et al. (2011) definition of individual absorptive capacity to coin the concept of individual sustainability-oriented absorptive capacity (SACAP), which is defined as "the level of effort that individuals undertake to *identify* external sustainability-oriented knowledge, *assimilate* it and *utilise* it to commercial ends". To answer RQ2, we utilise theories regarding internal education and training, as it has been stressed as instrumental to increase the organisations individual's ability to identify and appreciate knowledge.

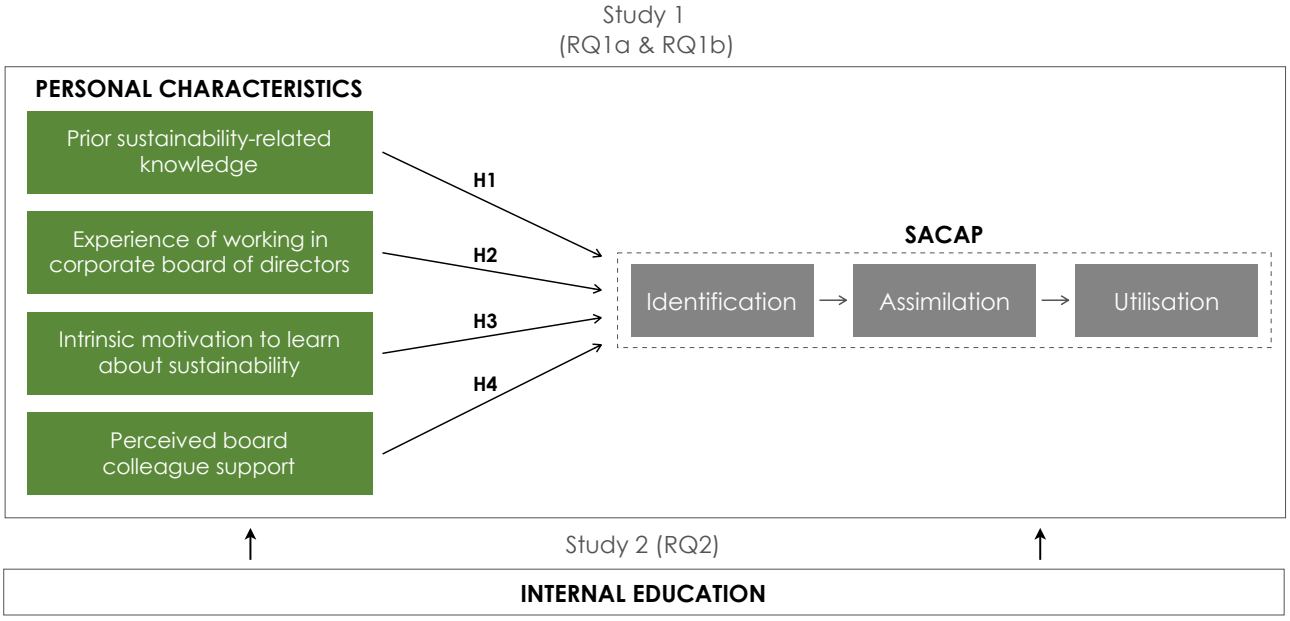

Figure 2 - Overview of theoretical framework and hypotheses.

3. METHOD

This chapter discusses our chosen topic, approach and units of study, to answer our problem statement and research questions.

3.1 Choice of Topic

The three subjects included in the problem statement are sustainability theory, board theory, and knowledge management theory. As sustainability is becoming increasingly integral in every business decision, there is a need for more studies aimed at increasing the understanding of corporate sustainability. However, even though these three subjects have received attention for decades separately, there is an academic gap in the intersection between them, making the topic even more intriguing. Shedding light on how companies better can manage sustainability-oriented knowledge is therefore highly relevant, generating a high value for practitioners and academics. We therefore believe that our results contribute with new and exciting insights, creating a theoretical foundation for further research on individual board members' sustainability-oriented knowledge.

The part of this thesis that explores personal characteristics of board members touches upon three additional academic subjects. These are psychology (prior sustainability-related knowledge, board experience and intrinsic motivation to learn about sustainability), sociology (board colleague support and internal education) and gender studies (control variables: age and gender). Since our knowledge in these areas are limited, we want to emphasise that our discussion regarding these topics are slightly more narrow.

3.2 Choice of Approach

Given that our problem statement is theoretically substantiated and based on a combination of subjects that is unexplored, we had many options when it comes our research approach. After having considered both the advantages and the disadvantages with a deductive and an inductive approach, we decided that a combination of the two is the most suitable way forward to create a high validity of our results.

In **study 1**, which intends to answer RQ1a and RQ1b, we use a deductive approach with a quantitative research method (Jacobsen et al., 2002). In this study, theory from the three subjects have been reviewed and integrated in a theoretical model of hypotheses, creating a foundation for study 1. A deductive approach is suitable as both literature about absorptive capacity literature and board theory previously have discussed personal characteristics as influencers of individuals' behaviour. This generates theoretically substantiated hypotheses suitable for a deductive approach. A quantitative and deductive approach is also helpful for our individual-level of analysis, as we intend to investigate a wider perspective, providing results that are representative for Swedish board members in general (Jacobsen et al., 2002).

In **study 2**, which intends to answer RQ2, we use an inductive approach with a qualitative research method (Jacobsen et al., 2002). An inductive approach is appropriate considering our focus on Swedish companies' own expectations on their board members' sustainability-oriented knowledge, and educational efforts used to ensure this knowledge. An inductive approach allows us to conduct our qualitative study without any stricter theoretical guidelines, and afterwards try to link our findings to existing theory.

The main reason why we have decided to use an integrated approach is that we want to cover our topic's novelty with a comprehensive and exploratory approach. Accordingly, this combined approach provides us with more comprehensive results, as the two studies complement each other through both qualitative and quantitative measures, which is appropriate for an unexplored topic as this (Jacobsen et al., 2002). A combined approach is also feasible as we aim to avoid industry and company specific insights. However, this approach has its limitations as well. Our deductive approach in study 1 might steer us away from important information we did not take into account when creating our framework of hypotheses and our inductive approach in study 2 might lead to problems linking results to earlier theory and literature (Jacobsen et al., 2002).

3.3 Choice of Units of Study

As study 1 intends to generate results representable for the average Swedish board member, board members with differentiated backgrounds have been targeted as units of study. With our individual-level of analysis, we have focused on contacting individual board members directly, rather than targeting entire board of directors as units of study. Considering this, the units of study for study 1 are board members from various *company sizes* (from SMEs to large cap on NASDAQ Stockholm), *industries* (from FMCG to banking and construction), *geographical locations* (from Växjö to Gothenburg and Stockholm) and with evenly distributed *demographics* (gender and age). As for the sample size (81 respondents), enough board members were contacted to allow for proper statistical analyses (more than 30 respondents in each categorisation). However, the choice of board members was influenced by availability due to limited accessibility to board members, which characterises studies on the board of directors in general (Holland & Jackson, 1998; Letendre, 2004). A detailed description of the final sample will be presented in the next chapter.

In study 2, ten different Swedish companies were chosen as units of study. The reason why we have decided to use several different units of study is that we want to obtain as rich results as possible, but still convey the variation and nuances that exists in business on an in-depth level of analysis. The ten included companies are: Investor, ICA Gruppen, Sandvik, JM, Telia Company, Vattenfall, Storebrand, Apollo, Handelsbanken and SSAB. These ten companies were chosen based on three criteria. First, they all are committed to sustainability within their industry, creating a high relevance and validity for this study. Secondly, they complement each other well, as they represent ten

different industries: investment & holding, FMCG, industrial technology, construction, telecom, energy, insurance, travel, banking and heavy industry. Thirdly, we have established networks and contacts into these organisations, which facilitates easier access to their true standpoints and opinions, leading to a more effective data collection and more reliable results. The highest-ranking representative for sustainability at each company was chosen as interviewee, as they possess the required knowledge. A more detailed description of the companies and representatives is presented in appendix 2.

4. DESIGN OF STUDIES

This chapter begins by describing how study 1 and study 2 were designed and conducted. This is followed by a discussion regarding the design's limitations and methodological quality, including its validity and reliability.

4.1 Study 1

To answer RQ1a and RQ1b, we had to analyse the level of SACAP for a broad spectrum of Swedish board members. This means that we study a phenomenon with relatively few variables, but based upon many individual units, which makes an extensive research approach suitable (Jacobsen et al., 2002). One of the most common ways to gather individual-level data is to use a quantitative approach and an online questionnaire. This allowed us to understand SACAP in general, and the influencing personal characteristics specifically. This approach was also aligned with our intention to generate insights that can be generalised for the average Swedish board member, since a representative sample can reveal behavioural patterns for the tested population (Jacobsen et al., 2002).

4.1.1 Variables

This study relies upon self-evaluation by the respondents, since this kind of approach is growing as a mean to measure companies' resources and capabilities, and is argued to be similar to equivalent objective indicators (Camisón, 2005). Most of the included variables consisted of Likert-type scales, with responses ranging from 1 "strongly disagree", to 7 "strongly agree", including some reversed scales for higher internal validity (Weng, 2004). In order to make sure that all respondents were given the same perspective, we started the survey by defining sustainability using our chosen definition: "all actions that appear to further some social good, beyond the interests of the firm and that which is required by law" (McWilliams & Siegel's, 2001, p. 117). The complete questionnaire can be found in appendix 1.

4.1.1.1 Dependent Variable: Individual Sustainability Absorptive Capacity

To measure the board members' SACAP, we used a measurement with seven-point Likert-type scales, originally developed and validated by Ter Wal et al. (2011), that reflect the board members' perception of their own capacity to identify, assimilate, and utilise external sustainability-oriented knowledge. We analogously adapted this measurement by logically aligning the questions to sustainability. The measurement consists of three batteries with a total of 17 questions, each battery corresponding to one of the three phases of individual absorptive capacity.

4.1.1.2 Independent Variables: Personal Characteristics

Prior Sustainability-Related Knowledge

To our knowledge, there is no measurement within earlier absorptive capacity studies that quantitatively has measured prior knowledge, even though it is mentioned as an important influencer in many influential articles about absorptive capacity (e.g., Cohen & Levinthal, 1990; Lane et al., 2006). To measure board members' prior sustainability-related knowledge, we therefore had to search for more general measurements of knowledge. There are two types of self-evaluative knowledge measurements commonly figuring in social sciences: *objective* and *subjective* knowledge (Brucks, 1985; Flynn & Goldsmith, 1999).

To measure objective knowledge, the respondents would have to judge if facts regarding an area is true or false. This would entail that we would need to use the same sustainability information to evaluate each respondent's level of sustainability-oriented knowledge. However, since we have chosen a wide definition of sustainability, from which the respondent translates sustainability into its own experience and context, this would be practically challenging to achieve. We therefore chose to measure board members' prior sustainability-related knowledge in a subjective way (i.e., the level of sustainability knowledge they think they possess). Flynn & Goldsmith (1999) has created a widely used five question Likert-type measurement of subjective knowledge (constructed to be especially adaptable into new knowledge fields) which was used to measure board members' prior sustainability-related knowledge.

Board Experience

To measure the board members' board experience, we used a numerical question, asking the respondents "For how many years have you been working within corporate board of directors?".

Intrinsic Motivation to Learn About Sustainability

To measure board members' intrinsic motivation to learn about sustainability, we used Guay et al. (2000) Situational Motivational Scale (SIMS). We used the first part of SIMS, which "consists of a brief and versatile self-report measure of situational intrinsic motivation" (Guay et al., 2000, p. 175). Its four questions are measured with seven-point Likert-type scales.

Perceived Board Colleague Support

To measure the perceived support of board colleagues, we adapted a version of the scale from the "Survey of Perceived Organisational Support" (Armeli et al., 1986). It consists of eight questions, measured with seven-point Likert-type scales. We substituted the word "organisation" in the original measurement to "board colleague" to represent the perceived support from the respondent's board colleagues.

4.1.1.3 Control Variables

We have decided to include gender and age as control variables, since demographics frequently have been discussed in board theory as potential influencers of board members' performance (Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989; Maassen, 1999; Hambrick, 1987). These are measured with a binary statement of gender, and a numerical question of age.

4.1.2 Sample

To ensure representativeness of our sample, we have targeted board members — in contrast to a random distribution — from various industries, company sizes and geographical regions of Sweden, ranging from Large Cap companies on NASDAQ Stockholm to SMEs. The survey was emailed to 867 board members, with a response rate of 18 percent, resulting in 156 respondents. However, due to non-complete responses, our final sample was reduced to 81 board members. The sample consists of 37 men and 44 females, with an equal age distribution ranging from 26 to 72, as well as an equal board experience distribution, ranging from 1 to 40 years of board experience.

4.1.3 Execution

The survey was programmed and distributed through the web-based program Qualtrics, and was sent out during March 2017. The survey was distributed through direct email addresses. To get contact details to board members, we browsed internet through sites such as Google, LinkedIn, Almi and Allabolag, as well as used our personal networks. As the response-rate of our emails was rather low, we had to continuously browse the internet and send out emails throughout March to create a large enough sample to allow for proper statistical analyses.

4.1.4 Analytical Tools

We used the software SPSS 23 to conduct statistical analyses on the survey data. Below follows a description of the analyses we used to answer research RQ1a and RQ1b, including the underlying hypotheses. By combining SPSS-analysis with previously used measurements, our methodology allows us to generate a high level of statistical conclusion validity, which enhances our ability to draw more precise conclusions and insights (Shadish et al., 2002). To evaluate the means of the variables in a consistent way, we categorised the respondents into two segments (low / high), with the median as the intersection between the two. The median was chosen as the intersection as a consequence of high means on several variables in our sample, and its impact on the methodological validity is discussed in section 4.3.

4.1.4.1 RQ1a - Do Board Members take on Specialised Roles?

To investigate if board members have a generally high level of SACAP, or if they rather take on specialised roles along its three dimensions, we used the same system-approach used by Ter Wal et

al. (2011). This three step system-approach enables analysis of co-occurrence of high-level efforts on the three dimensions of absorptive capacity.

First, an index for each of the three question batteries was created. To ensure high reliability and investigate how related the individual items of each index are, which is especially important considering our adaption of the scale to sustainability, three Cronbach's Alpha tests were conducted. In accordance with Nunnally (1978), a Cronbach's Alpha value over 0.7 was accepted for each index (identification, $\alpha = 0.741$; assimilation, $\alpha = 0.922$; and utilisation, $\alpha = 0.881$).

Secondly, the median in each dimension (identification = 4.67, assimilation = 4.6, utilisation = 4.5) was used to categorise the respondents into either a low or high level. In the third step, we categorised the board members into groups with either low levels on all dimensions, high level on one dimension (*identifiers*, *assimilators* or *utilisers*), high levels on two dimensions (*identify-assimilate*, *assimilate-utilise*, *identify-utilise*), or high levels on all three dimensions.

4.1.4.2 RQ1b - Do Personal Characteristics Influence Absorptive Capacity?

To investigate whether personal characteristics influence board members' SACAP, an index for all 17 questions was created with an acceptable Cronbach's Alpha value ($\alpha = 0.948$). To study the mean differences between different groups, we used Independent Sample T-Tests. The analyses are deemed as statistically significant when exceeding a confidence level of 95 percent. We only compare group sizes with a minimum of 30 respondents in each group for adequate parametric methods (Jacobsen et al., 2002). All independent variables scored acceptable Cronbach Alpha scores, suggesting that the measurement's adaption to the sustainability context is valid.

Prior Sustainability-Related Knowledge

An index of the five questions was created after scoring an acceptable Cronbach's Alpha value ($\alpha = 0.860$). The median (5) was used to divide the sample into two groups to investigate potential differences between board members with low and high *degree of prior sustainability-related knowledge*.

Board Experience

The median (10 years) was used to divide the sample into two groups to investigate differences between board members with low and high *board experience*.

Intrinsic Motivation to Learn About Sustainability

An index of the four questions related to intrinsic motivation was created after scoring an acceptable Cronbach's Alpha value ($\alpha = 0.848$). The median (6) was used to divide the sample into two groups to investigate differences between board members with low and high degree of *intrinsic motivation to learn about sustainability*.

Perceived Board Colleague Support

An index of the eight questions was created after scoring an acceptable (only 0.014 below Nunnally's recommendation) Cronbach's Alpha value ($\alpha = 0.686$). The median (5.57) was used to divide the sample into two groups to investigate differences between board members with low and high *degree of perceived board colleague support*.

Control Variables: Age and Gender

To control for potential influences of age and gender, the median age (50 years) and the two gender categories were used to divide the sample into groups.

4.1.4.3 Robustness Tests

To examine the strengths of the potential relationships between the independent (and control) variables and the dependent variable, regression analyses and a correlation analysis were conducted. The regression analyses were significant, and tested for multicollinearity through a Condition index test, in which values below 25 were accepted (Malhotra et al., 2010). Since the indexes were created with approval from Cronbach's Alpha tests, the risk for multicollinearity was reduced (Malhotra et al., 2010). The regression models were also tested for autocorrelation through Durbin-Watson tests, in which values between 1.5 and 2.5 were accepted (Malhotra et al., 2010). Finally, the regression models were tested for heteroscedasticity by visual inspection, allowing comparison of the actual residuals with the estimated residuals. Heteroscedasticity could be excluded since the variances does not include any obvious skewness (White, 1980).

The correlation analysis indicated possible multicollinearity, and a slight degree of internal cohesion between the included variables. However, the Condition Index tests in the regression analyses approved the quality of the analyses (condition index < 25), allowing us to use the analyses despite indications of multicollinearity.

4.2 Study 2 - Internal Education

To answer RQ2, we had to analyse different types of companies and their knowledge expectations, providing us with insights of the organisational efforts used to increase the sustainability-oriented knowledge of their board members. This means that we are studying a limited number of companies in their own context and environment, which is suitable for an intensive research methodology (Jacobsen et al., 2002). A suitable way to achieve this is to collect data qualitatively through semi-structured in-depth interviews with representatives from a variety of companies. These in-depth interviews allowed us to identify similarities and differences of their knowledge expectations and educational efforts to enhance their board members' sustainability-oriented knowledge.

4.2.1 Interview Preparation

We used a semi-structured approach with focus on specific **areas** of interest, rather than questions of interest (Drever, 1995). The included areas were chosen since they are closely connected to RQ2: *educational need assessment and goal setting*; *perceived obstacles to the goal;* and *methods and educational efforts* (Lusterman, 1985). The first two areas relate to the first part of RQ2, where we focus on the knowledge expectations of the companies. The last area relates to the second part of RQ2, where we focus on the company's educational efforts to enhance the sustainability-oriented knowledge of their board members. As we are interested in each representative's own view, each interview started with the representative elaborating on their own opinions on board of directors' sustainability-oriented knowledge in general, and afterwards directing them towards the three areas.

4.2.2 Sample

When selecting companies for our sample, we used three criteria. The first criterion was to achieve a differentiated selection of industries and companies to generate more comprehensive results. The second criterion was to include companies that have an established sustainability profile, since this allows us to gain insights from companies with qualitative knowledge about the topic. The third criterion was to include companies where access was granted to the highest-ranking sustainability representative. These representatives have a more comprehensive knowledge of sustainability compared to their colleagues, making their opinions more relevant and useful for our knowledge-centred thesis. These individuals do also, in most cases, have a close communication with their board of directors, enabling them to apply their knowledge in the setting of the board.

The final sample included the highest-ranking sustainability representative from ten different companies. A description of each company and interviewee is available in appendix 2.

4.2.3 Execution

The interviews were conducted between the 27th of February to the 7th of April, 2017. All of the interviews were scheduled in advance, and either conducted face-to-face at the company's headquarters or by phone. All the interviews were conducted in a relaxed manner, and lasted between 30 to 45 minutes. With the approval of each representative, all interviews were recorded with a dictaphone to direct our attention on the actual conversation, making it easier for us to state clarifying and follow-up questions. In the end of each interview, the interviewee was given the possibility to add anything that they found relevant for the topic.

4.2.4 Analytical Tools

To analyse the transcripts from our interviews, we have been using the software Nvivo to help us find trends and patterns. This type of analysis and synthesis is appropriate to identify patterns in the representative's thoughts and opinions, as well as outline the educational efforts used by each company.

4.3 Methodological Quality & Limitations

The main reasons for using a combined quantitative and qualitative research approach is to increase the quality of our results, in the sense that they are relevant and correct (high validity), as well as credible and reliable (high reliability) (Jacobsen et al., 2002). This is especially important considering our integration of three theoretical fields and adaptations of measurements to sustainability. However, there will always be limitations and possible areas of improvement. We believe it is important to highlight and discuss these limitations to assess the quality of our work in an objective way.

4.3.1 Validity

Validity can be defined as the degree subjects are measured in a correct and valid way (Jacobsen et al., 2002). A high validity enables more generalisation of our findings to populations larger than the study sample (Jacobsen et al., 2002). The validity of our thesis can be evaluated from two complementary perspectives: *external* and *internal* validity (Jacobsen et al., 2002; Shadish et al., 2002).

4.3.1.1 External Validity

External validity is the degree to which our findings and results are representative, relevant and generalisable to larger populations with variations of the setting, persons and outcome compared to the context of the study (Jacobsen et al., 2002; Shadish et al., 2002). As we aim to acquire results that are representative for Swedish board members, it is important to highlight the limitations of our external validity, as well as the efforts taken to mitigate these limitations.

A Diverse and Secretive Group of Individuals

Despite that we include a differentiated selection of board members, the sample for study 1 is influenced by the fact that the amount of companies in Sweden is around one million, which in turn generates a high number of board members. It is therefore not likely that we created a perfectly representative sample of the population of Swedish board members. We therefore want to emphasise that the data have been collected with the resources available to us as students, limiting our possibility to gather data in a more comprehensive way. With more resources, one could gain a higher external validity by using randomisation to capture more of the variations of Swedish board members (Shadish et al., 2002). In addition, the secretive character of the board of directors made it harder to reach out to board members.

Risk for Self-Selection Bias

Since we had no other option than to ask respondents and companies for voluntary participation in our studies, there is a risk for *self-selection bias*; the study objects actively had to accept participation. This creates a risk that our sample might include “green champions”, i.e. persons that are highly motivated to increase the presence of sustainability in the board of directors, as the more

sustainability-resistant board members might have been less inclined to accept our invitations. The analysis of our data from study 1 supports this reasoning, as our sample is characterised by a high overall SACAP mean ($\mu = 4.25$), as well as high medians for prior sustainability-related knowledge (5), and intrinsic motivation to learn about sustainability (6). As a consequence, we were forced to use the median to analyse differences between board members with low or high score on the independent variables. This negatively impacted the validity as we then are measuring differences within board members that most likely are more sustainability inclined than the average Swedish board member.

There is also a potential language bias in study 1 since our survey is in English, resulting in that participants must be business-proficient in English. Our sample can therefore never represent the "non-volunteering" and "non-English speaking" parts of Swedish board members.

Risk for Common-Method bias and Self-Promotion

Since the board of directors is the highest decision-making unit, it constitutes a secretive area of the company to which outside stakeholders seldom get access. We therefore had to capture as much information as possible during the short time of attention we received from the board members in study 1. This type of time-framed and self-evaluative research method increases the risk of *common-method bias*, since we only interact with the board members through the survey, which impacts our external validity negatively (Shadish et al., 2002).

Considering the secrecy characterising the board of directors, the results we obtain risk to be *compliant* with the official stance of the company, limiting the studies internal validity. This kind of compliance, combined with sustainability being a trendy subject that most companies try to be up-to-date within, increases the risk of *self-promotion*. In other words, both board members answering our survey and the representatives we interviewed might provide us with answers that are consistent with the public's expectations, rather than reflecting their actual opinions and situation. This might be especially apparent for the representatives, as they represent companies with strong sustainability profiles. However, we are confident that our combined methodology of both quantitative and qualitative measurements mitigates some of the potential biased results.

External Validity of Study 1

To address the secrecy and limited access to board members, three efforts were taken to increase study 1's external validity. First, we used an approach and sample size that enables parametric tests for all our variables (Jacobsen et al., 2002). Secondly, the effort to create a sample with board members from companies of different sizes, industries and geographical locations, as well as with an even spread of board experience, age and gender, created a sample that can be assumed to be more representative to the whole population (Bryman & Bell, 2011). Thirdly, we test our hypotheses as statistically significant with a confidence level of 95 percent, making our conclusions more precise (Jacobsen et al., 2002).

External Validity of Study 2

Despite its diverse sample, study 2's results cannot be assumed to represent all Swedish companies' expectations and educational efforts. We want to stress that our intention with study 2 was to conduct a first descriptive study on knowledge expectations and educational efforts, rather than creating a representative picture of sustainability-oriented education in general. However, the focus on education towards board members gives us more relevant and interconnected studies, increasing the external validity, since our results can be integrated and discussed.

In conclusion, our topic has brought challenges for the studies' external validity. Nonetheless, we are confident that we have managed to secure a sufficient level of external validity in both study 1 and study 2 to adequately answer our problem statement and research questions.

4.3.1.2 Internal Validity

Internal validity is the degree to which the included variables are relevant to answer our problem statement and research questions, and are measured with the operational equivalents of our theoretical framework (Jacobsen et al., 2002; Shadish et al., 2002). We have taken several efforts to secure that our results are measured correctly. The internal validity is mainly increased due to our usage of earlier tested theory, methodology and measurements (and only words have been adapted to logically fit the context of sustainability), as well as focus on creating qualitative samples for our two studies. Overall, we believe that this thesis has a high degree of internal validity, considering that we are examining variables that all are theoretically substantiated with a clear connection to how they might influence board members' sustainability-oriented knowledge.

Internal Validity of Study 1

The variables in study 1 have been carefully chosen and only previously tested theories and measurements were included to *actually* measure what we intend to measure (Jacobsen et al., 2002). Our hypotheses are based upon personal characteristics that has been discussed in both absorptive capacity and board literature, making them theoretically substantiated. Using previously discussed variables reduces the risk for misinterpretations, allows for an easier comparison of our results with previous studies and increases the internal validity (Jacobsen et al., 2002). We also used seven-point Likert-type scales for all interval questions, which allows for larger differences between the response alternatives (Malhotra et al., 2010). However, collecting data through Internet has lowered the internal validity, as it does not allow us to control that the respondents read the instructions thoroughly and grasp all the questions.

Internal Validity of Study 2

Education has previously been pointed out as instrumental for companies to increase the knowledge of their employees. This increases our internal validity, as the results can be connected to study 1. Our choice of the highest-ranking responsible for sustainability increases study 2's internal validity, as they can be expected to have the required knowledge to properly answer RQ2.

4.3.2 Reliability

Reliability can be defined as the studies' credibility and trustworthiness (Jacobsen et al., 2002). In other words, a high reliability entails that similar results would arise if someone else would try to replicate our studies in the future (Jacobsen et al., 2002). We have taken several efforts to increase the reliability of our results.

We have designed both our studies in a way that increases objectivity in terms of content and execution. For study 1, we have only used previously tested measurements that have been empirically proven to measure the dimensions we want to investigate. However, study 1's reliability is to some extent limited as we had to rephrase the wording of the measurements to logically fit sustainability and the board of directors. To mitigate any reliability issues concerning this, we have conducted Cronbach's Alpha tests to see if the questions for each scale seems to measure the same behaviour, and in turn can be integrated to indexes. In this reliability tests, we accepted a Cronbach's Alpha value over 0.7 to ensure that the questions have a high internal cohesion (Nunnally, 1978). For study 2, we allowed the representatives to steer the interview in the direction they wanted, without us interfering and redirecting their answers towards our own subjective beliefs, thereby facilitating an objective picture of the subject.

5. RESULTS & ANALYSIS OF STUDY 1

This chapter presents the results from the survey data gathered in study 1. The results follow our two research questions (RQ1a and RQ1b) and our four hypotheses.

5.1 RQ1a - Do Board Members Take on Specialised Roles?

To take a first step in outlining board members' SACAP, we start by answering RQ1a:

RQ1a

Do individual board members have a generally high or low sustainability-oriented absorptive capacity, or do they rather take on specialised roles as "identifiers", "assimilators" or "utilisers"?

To answer RQ1a, the system-approach segmentation analysis generated eight different groups, presented in table 1. The results show that board members either have a generally low (37 percent) or a high SACAP across all dimensions (28,4 percent). There are a few board members (17,3 percent) that take on the role of *assimilate-utilise*, but there are no clear patterns in board members having higher SACAP in certain dimensions, nor engaging in only a single dimension.

TABLE 1: SEGMENTATION ANALYSIS (RQ1a)

SACAP Dimension	Frequency	Percent
Low all	30	37 %
Identifiers	3	3,7 %
Assimilators	2	2,5 %
Utilisers	6	7,4 %
Identify-assimilate	2	2,5 %
Assimilate-utilise	14	17,3 %
Identify-utilise	1	1,2 %
High all	23	28,4 %
Total	81	100 %

The table shows the results of the system-approach segmentation analysis to test RQ1a.

5.2 RQ1b - Do Personal Characteristics Influence SACAP?

We will now analyse the differences found in board members' SACAP by examining if personal characteristics influence their degree of SACAP, and in turn answer RQ1b:

RQ1b

Do personal characteristics influence individual board members' absorptive capacity of external sustainability-oriented knowledge?

5.2.1 Prior Sustainability-Related Knowledge

To investigate if there is a relationship between board members' prior sustainability-related knowledge and their degree of SACAP, hypothesis 1 is tested:

H1: *Board members with a high degree of prior sustainability-related knowledge have a higher degree of sustainability-oriented absorptive capacity than board members with low prior knowledge.*

The Independent Sample T-test shows a statistically significant, positive relationship between board members' degree of *prior sustainability-related knowledge* and their degree of SACAP. This suggests that board members with a high degree of prior sustainability-related knowledge have a higher degree of SACAP ($\mu = 4.78$) than board members with low prior knowledge ($\mu = 3.65$). **We can therefore confirm H1.**

TABLE 2: INDEPENDENT SAMPLE T-TEST - PRIOR SUSTAINABILITY KNOWLEDGE (H1)

Grouping variable	Groups	N	Mean (SACAP)	p
Prior sustainability related knowledge	Low	38	3.65	0,000
	High	43	4.78	

The table shows the results of the Independent Sample T-test to examine differences in SACAP between board members with low and high degree of prior sustainability-oriented knowledge.

5.2.2 Board Experience

To investigate if there is a relationship between board members' board experience and their degree of SACAP, hypothesis 2 is tested:

H2: *Board members with long experience of working in corporate boards have a higher degree of sustainability-oriented absorptive capacity than board members with less board experience.*

The Independent Sample T-test shows **tendencies** (p = 0.055) of a positive relationship between board members' *board experience* and their degree of SACAP. This indicates that board members with long experience of working in corporate boards tend to have a higher degree of SACAP (μ = 4.46) than board members with less board experience (μ = 3.99). **We can therefore <u>partially</u> confirm H2.**

TABLE 3: INDEPENDENT SAMPLE T-TEST - BOARD EXPERIENCE (H2)

Grouping variable	Groups	N	Mean (SACAP)	p
Board experience	Low	36	3.99	0.055
	High	45	4.46	

The table shows the results of the Independent Sample T-test to examine differences in SACAP between board members with low and high degree of board experience.

5.2.3 Intrinsic Motivation to Learn About Sustainability

To investigate if there is a relationship between board members' intrinsic motivation to learn about sustainability and their degree of SACAP, hypothesis 3 is tested:

H3: *Board members with a high degree of intrinsic motivation to learn about sustainability have a higher degree of sustainability-oriented absorptive capacity than board members with low intrinsic motivation.*

The Independent Sample T-test shows a statistically significant, positive relationship between board members' degree of *intrinsic motivation to learn about sustainability* and their degree of SACAP. This suggests that board members with a high degree of intrinsic motivation to learn about sustainability have a higher degree of SACAP (μ = 4.61) than board members with low intrinsic motivation (μ = 3.87). **We can therefore confirm H3.**

TABLE 4: INDEPENDENT SAMPLE T-TEST - INTRINSIC MOTIVATION TO LEARN (H3)

Grouping variable	Groups	N	Mean (SACAP)	p
Intrinsic motivation to learn about sustainability	Low	39	3.87	0.002
	High	42	4.61	

The table shows the results of the Independent Sample T-test to examine differences in SACAP between board members with low and high intrinsic motivation to learn about sustainability.

5.2.4 Perceived Board Colleague Support

To investigate if there is a relationship between board members' perceived board colleague support and their degree of SACAP, hypothesis 4 is tested:

> **H4:** *Board members with high a perceived support from their board colleagues have a higher degree of sustainability-oriented absorptive capacity than board members with low perceived support.*

The Independent Sample T-test indicates no relationship between board members' *perceived board colleague support* and their degree of SACAP. This suggests that board members' SACAP is not influenced by the board members' perception of their board colleagues being supportive or not. **We can therefore reject H4.**

TABLE 5: INDEPENDENT SAMPLE T-TEST - PERCEIVED BOARD COLLEAGUE SUPPORT (H4)

Grouping variable	Groups	N	Mean (SACAP)	p
Perceived board colleague support	Low	38	4.28	0.820
	High	43	4.22	

The table shows the results of the Independent Sample T-test to examine differences in SACAP between board members with low and high perceived board colleague support.

5.2.5 Control Variables: Age and Gender

The Independent Sample T-tests, to investigate the potential influence of the control variables age and gender, show a statistically significant, positive relationship between board members' *age* and their degree of SACAP. This suggests that older board members have a higher degree of SACAP ($\mu = 4.63$) than younger board members ($\mu = 3.80$). At the same time, no gender effect was found on the board members' SACAP.

TABLE 6: INDEPENDENT SAMPLE T-TEST - AGE & GENDER (control variables)

Grouping variable	Groups	N	Mean (SACAP)	p
Age	Low	37	3.80	0.001
	High	44	4.63	
Gender	Female	44	4.21	0.742
	Male	37	4.30	

The table shows the results of the Independent Sample T-tests to examine differences in SACAP between board members with low and high age, as well as for gender differences.

5.3 Robustness Tests

5.3.1 Regression Analyses

By conducting regression analyses, we can confirm above results, showing that **prior sustainability-related knowledge** (β = 0.392) and **intrinsic motivation to learn about sustainability** (β = 0.228) have positive relationships with SACAP, presented in table 7. The beta coefficients suggest that prior sustainability-related knowledge influence board members' SACAP more than their intrinsic motivation to learn about sustainability.

When including **age** and **board experience** in separate regression analyses (along with the other independent variables), we found positive relationships for both, but when included in the same regression analysis, only age was found to have a positive relationship (β = 0.220) with SACAP. This suggests that board members' age influences their SACAP more than their board experience. The regression analysis with all variables has an acceptable adjusted r^2 value (0.400), indicating that the included variables explain almost half of the variations in SACAP of our sample of Swedish board members.

TABLE 7: REGRESSION COEFFICIENTS FOR ROBUSTNESS TEST

Dependent Variable	Independent Variables				
	Prior knowledge	**Board exp.**	**Intrinsic motivation**	**Board support**	**Age**
SACAP	β = 0.392***	β = 0.077*	β = 0.228**	n.s.	β = 0.220**
Adjusted r^2	0,400				
Durbin-Watson test	2.1				
Condition index test	24.6				

The table shows the results of the regression analyses with SACAP as the dependent variable and prior sustainability-related knowledge, board experience, intrinsic motivation to learn about sustainability, perceived board support and age as independent variables. Gender was not included due to its nominal scale.

*Sig.10 %
**Sig. 5 %,
***Sig. 1 %
n.s. = non-significant

5.3.2 Correlation Analysis

By conducting a correlation analysis (see appendix 3), we found a strong, positive correlation between **age** and **board experience** (r = 0.557). Logically, this implies that older board members tend to have longer board experience, and that these two in turn generate a higher SACAP, as previous results indicate. The correlation analysis also reveals a positive correlation between **prior sustainability-oriented knowledge** and **intrinsic motivation to learn about sustainability** (r = 0.448), suggesting that board members with a high degree of prior sustainability-related knowledge tend to be more intrinsically motivated to learn about sustainability. As previous results indicate, these two variables do in turn generate a higher SACAP.

5.3.3 Dimensional Regression Analyses

To investigate if the variables have a relationship with SACAP in general, or to specific dimensions of it, three more regression analyses were conducted (see appendix 3). The analyses reveal that the degree of *prior sustainability-related knowledge* influences **all phases** (identify, β = 0.319; assimilate, β = 0.432; utilise, β = 0.259), meanwhile the *intrinsic motivation to learn about sustainability* only influences **identify** (β = 0.237) and **utilise** (β = 0.312). *Age* was only positively related with **identify** (β = 0.303). *Perceived board colleague support* and *board experience* were not significant for any dimension.

Consistent with previous results, this suggests that the degree of prior sustainability-related knowledge is the personal characteristic that influences board members' degree of SACAP the most. Interestingly, the intrinsic motivation to learn about sustainability only affects the effort board members' put into the *identify* and *utilise* dimension. This indicates that if board members' have a high intrinsic motivation to learn about sustainability, they only put in effort to identify external sustainability-oriented knowledge as well as help utilise it to commercial ends within the board, but do not engage in "translating" it into the board's context. Age only increases the effort to *identify* sustainability-oriented knowledge, but does not increase the effort in assimilating or utilising it for commercial ends.

In conclusion, all robustness tests clearly show that prior sustainability-related knowledge and the intrinsic motivation to learn about sustainability are the personal characteristics that influences board members' SACAP the most. Prior sustainability-related knowledge is the largest influencer, intrinsic motivation to learn about sustainability is the second largest and age the third largest.

5.4 Summary

Regarding RQ1a, the results show that board members either have a generally low (37 percent) or high SACAP (28,4 percent). No clear patterns could be found supporting that board members take on specialised roles along the dimensions of SACAP.

Regarding RQ1b, the results confirm that certain personal characteristics influence board members' SACAP, resulting in confirmation of two hypotheses, and partial confirmation of one. Both the degree of **prior sustainability-related knowledge** and **intrinsic motivation to learn about sustainability** have positive relationships with board members' degree of SACAP. We found that there is a tendency that **board experience** has a positive relationship with the board members' SACAP. **Perceived board colleague support** had no relationship with board members' SACAP. When controlling for **age** and **gender**, no gender effect was found, while age was confirmed to have a positive relationship with board members' SACAP.

TABLE 8: SUMMARY OF HYPOTHESES TESTS

Hypothesis	Result
H1: Board members with a high degree of prior sustainability-related knowledge have a higher degree of sustainability-oriented absorptive capacity than board members with low prior knowledge.	CONFIRMED
H2: Board members with long experience of working in corporate boards have a higher degree of sustainability-oriented absorptive capacity than board members with less board experience.	PARTIALLY CONFIRMED
H3: Board members with a high degree of intrinsic motivation to learn about sustainability have a higher degree of sustainability-oriented absorptive capacity than board members with low intrinsic motivation.	CONFIRMED
H4: Board members with high perceived support from their board colleagues have a higher degree of sustainability-oriented absorptive capacity than board members with low perceived support.	REJECTED
CONTROL VARIABLES	
Age	POSITIVE RELATIONSHIP
Gender	NO RELATIONSHIP

The results from the hypotheses tests were confirmed by robustness tests. However, these tests also revealed that the degree of prior sustainability-related knowledge influences board members' SACAP **more** than their intrinsic motivation to learn about sustainability. We also found internal cohesion between age and board experience, implying that older board members tend to have longer board experience, with age being the confirmed influencer. Prior knowledge and intrinsic motivation were proven to be correlated with each other, suggesting that board members with a high degree of prior sustainability-related knowledge also tend to have a high intrinsic motivation to learn about sustainability.

6. RESULTS & ANALYSIS OF STUDY 2

This chapter presents the results from the interview data gathered in study 2. The chapter is structured after three main areas of findings, and each area is briefly summarised before the next area is presented.

The purpose of the interviews was to answer RQ2:

> **RQ2**
>
> *What type of sustainability-oriented knowledge do companies expect their individual board members to possess, and which educational efforts are used to ensure this knowledge?*

The ten interviews resulted in three main areas of findings: (1) a consensus that board members should possess sustainability-oriented knowledge; (2) two challenges and one complication regarding integrating sustainability-oriented knowledge into boards of directors; and (3) common educational efforts and general key success factors.

6.1 Board Members Need Sustainability-Oriented Knowledge

During the interviews, a central perspective when discussing board members' sustainability-oriented knowledge was whether they believe it is important, and what level of sustainability-oriented knowledge that should be expected from a board member. Overall, the representatives had similar views on what type of sustainability-oriented knowledge we should expect from board members. This allowed us to identify findings related to the first part of RQ2 - *what type of sustainability-oriented knowledge do companies expect their board members to possess.*

6.1.1 Sustainability-Oriented Knowledge is a Strategic Resource

By emphasising the strategic role of board members for business prosperity, the opinion that board members' **sustainability-oriented knowledge is important** was shared by all representatives. Sustainability as a topic was argued to create both risks and opportunities for the representatives' companies, and knowledge about the topic was therefore described as a crucial strategic resource for their board members to ensure that the board of directors has the required capability to cope with sustainability-related questions. Maria Långberg from SSAB stated that:

> *"You need a deep understanding of how the company works with sustainability, covering all aspects from risk management and cost avoidance to utilising sustainability as a true business driver. It should form a foundation for all the work carried out in the boardroom."*
>
> **Maria Långberg, SSAB**

Even though there is a consensus regarding that board members should possess sustainability-oriented knowledge, we could identify a more divided set of opinions among the representatives regarding how this knowledge should be **allocated** among the individual board members. Half of them believe that all board members should possess a sufficient level of sustainability-oriented knowledge, while the other half emphasised that every board member not necessarily need to possess the same level of knowledge in all subjects. Instead, they argued, that it can be beneficial to have a board constitution with *complementary knowledge structures*, meaning that it can be sufficient if only some of the board members have a significant degree of sustainability-oriented knowledge. With this reasoning, the overall sustainability-oriented knowledge of the board as an entity can be sufficient, even though all of its members does not have the same level of knowledge. Filippa Bergin from Storebrand illustrated this by saying:

> *"A board as an entity is supposed to know many different things, so I don't think it is reasonable to expect the same level of knowledge in subject X, Y and Z from each and every board member"*
>
> **Filippa Bergin, Storebrand**

The other half of the representatives, who did not support a complementary knowledge structure, instead emphasised the importance of not separating sustainability as an expertise subject compared to other common subjects within the board of directors. They argued that instead of allowing sustainability to be managed by only one or a few board members, multidisciplinary subjects must be **interdisciplinary integrated** into all of the company's functions, even within the board of directors. As sustainability influences most functions of a company, these representatives argued that even though board members are experts in certain fields, they should possess enough sustainability-oriented knowledge to know how sustainability influences important aspects of their firm and its long-term strategies. As an example, one of the representatives referred to when quality initially was treated as a standalone domain within companies, but today is a natural business aspect integrated across all functions of a company. This reasoning can be exemplified by Annika Ramsköld from Vattenfall, who expressed:

> *"As a member of the board, the first thing you must understand is that sustainability can't be treated as a sole specialist dimension, but rather that is the foundation for all work related to long term strategies."*
>
> **Annika Ramsköld, Vattenfall**

6.1.2 Integration is Key for Long-Term Value

Despite the divided opinions regarding how sustainability-oriented knowledge should be allocated among the board members, the representatives agreed that a **minimum level** of sustainability-oriented knowledge should be expected from all board members. The appropriate minimum level of

sustainability-oriented knowledge, or the *knowledge goal* as some of the representatives called it, was unanimous among the representatives. They all agreed that sustainability-oriented knowledge should be **integrated** into the knowledge structures of board members, meaning that all board members should understand how sustainability can be integrated into its company's **value-creating process**. This includes, for example, company and industry specific risks, issues and opportunities related to sustainability. Jenny Gustafsson from Handelsbanken stated that:

> *"Many board members probably have some general knowledge about sustainability, but what is interesting is the more integrated and specific knowledge about how sustainability affect the company and the industry. That is the minimum they should understand."*
>
> **Jenny Gustafsson, Handelsbanken**

Another representative claimed that the linkages between financial metrics and sustainability issues should be as clear as a cash flow statement. Per Löfgren from JM argued that this type of integration is the only way to secure that sustainability is **institutionalised** into the board of directors, which in turn make the board of directors less dependent on certain sustainability-knowledgeable board members and their presence at board meetings:

> *"In my opinion, we need to strive for reducing the human factor by institutionalising and integrating sustainability knowledge into the structure of the board and across all board members. By doing so, we can avoid dependence on one or a few sustainability enthusiasts."*
>
> **Per Löfgren, JM**

Besides the importance of enhancing the board members' knowledge in how sustainability influences their company and industry, an additional requirement was mentioned by a few of the representatives. The representatives from ICA Gruppen, JM, Handelsbanken and Storebrand emphasised that a basic knowledge about **sustainability reporting** should be expected from each board member, especially considering that they sign the annual reports and the sustainability reports. Kerstin Lindvall from ICA Gruppen expressed that:

> *"A basic knowledge of sustainability reporting can be seen as quite generic, and I believe that board members that normally can handle financial reporting in the annual report also should be able to cope with sustainability reporting."*
>
> **Kerstin Lindvall, ICA Gruppen**

6.1.3 Summary

The representatives unanimously expressed the importance of integrating sustainability-oriented knowledge into the board of directors, meaning that board members should possess relevant sustainability-oriented knowledge to their company and industry. The representatives emphasised

that a basic, minimum level of sustainability-oriented knowledge therefore should be expected from each individual board member. Within the minimum specification, knowledge regarding how sustainability can be integrated into its company's *value-creating process* was highlighted as key for long-term integration and strategic prosperity.

However, the representatives had different opinions regarding how more advanced sustainability-oriented knowledge should be **allocated** between the board members. Half of the representatives stressed that every board member *individually* should possess a high degree of sustainability-oriented knowledge, while the other half stressed that it is the sustainability-oriented knowledge of the board as an *entity* that is important. These representatives argued that each board member's knowledge can be allowed to vary, referring to it as *complementary knowledge structures*.

6.2 Two Challenges and One Complication

Despite the consensus that sustainability-oriented knowledge should be a knowledge requirement of the board members, the representatives highlighted two challenges that together leads to one overshadowing complication, hindering sustainability-oriented knowledge to be fully integrated into the board of directors.

6.2.1 Challenge 1: Low Maturation of Sustainability as a Subject

The first challenge, mentioned by half of the representatives, is that sustainability as a subject has a relatively **low degree of maturation** in many markets, resulting in varying knowledge and interest for sustainability. As a consequence, board members in these markets possess a lower degree of sustainability-oriented knowledge than the minimum degree in how it impacts their company and industry. When asked to define low maturation of sustainability as a subject, a majority of the representatives explained it as a consequence of a low demand of sustainable products and services from their customers. Nina Hornewall from Apollo explained this as customers prioritising other purchase criteria, consequently deprioritising potential environmental and societal impacts:

> *"The consequence is that sustainability often is highlighted as important in public relations, but later neglected for other buying criteria, such as price and convenience, in the final purchase decision."*
>
> **Nina Hornewall, Apollo**

Nina Hornewall further explained that this affects how companies **prioritise** sustainability, especially higher up in the decision-making hierarchy. Henrik Weinestedt, from Telia Company, had the same reasoning, and emphasised that most people simply have not fully grasped how sustainability simultaneously can be transformed into business value and have positive effects

outside the company. The low demand's negative effect on prioritisation was also noted by Stefan Stern from Investor, who stated that:

> *"A challenge in terms of sustainability is that the demand for sustainable products or services vary greatly depending on the industry and environment. This is further reflected in the sustainability knowledge that higher management and board members, in general, acquire in that industry."*
>
> **Stefan Stern, Investor**

6.2.2 Challenge 2: Personal Characteristics

The second challenge, highlighted by a third of the representatives, is the influence of the board members' **personal characteristics** on their degree of sustainability-oriented knowledge. All stressed that they have no empirical evidence of their opinion, but instead an intuition based on their own experience. They highlighted factors such as age, earlier experience, gender, as well as general curiosity of new knowledge as potential influencers on board members' interest and capability to learn about how sustainability affects their business and life in general. Jenny Gustafsson from Handelsbanken stated that:

> *"I think we have to understand knowledge from an individualistic perspective, where everyone are formed from different experiences and therefore can be expected to have different abilities to learn about new subjects."*
>
> **Jenny Gustafsson, Handelsbanken**

The effect of personal characteristics on the board members' sustainability-oriented knowledge capability was argued to result in varying interest and priority of sustainability from board members, especially regarding allocating their own time to learn more about the subject. Tying back to the previous challenge, in which the low maturation of sustainability as a subject lead to a lower prioritisation by the *organisations* in general, the board members own interpretation of sustainability could potentially decrease their *personal* priority to enhance their sustainability-oriented knowledge.

6.2.3 The Complication: Low Priority and Interest

The two challenges can be synthesised into one overshadowing complication. Neglecting sustainability's strategic value for their company leads to **low priority and interest** for sustainability from some of the board members. From a knowledge management perspective, this hinders sustainability-oriented knowledge to be integrated into the knowledge structure of the board, and negatively affects the board members' sustainability-oriented knowledge capability. Christina Båge-Friborg from Sandvik concluded that:

> *"In all situations of resistance to change, I believe it is a question of attitudes and priorities from the individuals involved."*
>
> **Christina Båge-Friborg, Sandvik**

6.2.4 Summary

Our interviews indicate that companies face challenges to integrate sustainability-oriented knowledge into the knowledge structure of their board members. The first challenge is a **low maturation of sustainability** as a subject, meaning that the demand for sustainable products and services varies between industries. The second challenge is the board members' **personal characteristics,** and their potential impact on the board members' sustainability-oriented knowledge capability. These two challenges were argued to result in lower **prioritisation** and **interest** of sustainability from both organisations and individual board members.

6.3 Current Educational Efforts and Key Success Factors

When elaborating on how to overcome these challenges to integrate sustainability-oriented knowledge in the board members' knowledge structures, the representatives discussed their current efforts to educate their board members about sustainability. They also highlighted three general key success factors for a proper knowledge integration. These results therefore help to answer the second part of RQ2 - *which educational efforts are used to ensure this knowledge?*

6.3.1 Which Educational Efforts are Used Today?

6.3.1.1 Yearly Reports and Daily Interaction

Overall, many of the interviewed companies have a lot in common and use similar education efforts. The most commonly used educational effort, utilised by almost all the companies, constituted of a yearly (or sometimes more frequent) sustainability-oriented **presentation and report** performed by the sustainability manager or someone with equal expertise (CEO, sustainability consultant, etc.) to the board of directors. The structure of this presentation varied from formal lectures and interactive seminars to physical reports to be read at home. This type of comprehensive presentation effort was argued to be *complementary* to the board members' daily work, as they were argued to be exposed to sustainability through the strategic questions they encounter daily. Filippa Bergin from Storebrand stated that:

> *"I go up in our different boards and talk about sustainability about one time per year, but more importantly, the subject is integrated into our strategy, making it more like an on-the-job training which our board members engages in every day."*
>
> **Filippa Bergin, Storebrand**

6.3.1.2 Sustainability Committee

Some companies used more unique education efforts. One of these efforts was to implement a **sustainability committee** in the board of directors, which previously has been tried by Vattenfall, and is currently used by ICA Gruppen and Telia Company. The purpose of the sustainability

committee varied between the companies, but all of them emphasised the committee's effect in giving sustainability an institutionalised and prioritised position. This enhanced the participating board members sustainability-oriented knowledge. Annika Ramsköld from Vattenfall emphasised this knowledge creation among its board members:

> *"We used a sustainability committee during two and a half year consisting of almost half of our board members. It was a great way to enhance the sustainability-oriented competence and knowledge among the board members, since we could really start to discuss the questions on a more profound strategic level. As soon as we felt that sustainability was integrated into our strategy, we realised that the committee had played out its role and therefore removed it."*
>
> **Annika Ramsköld, Vattenfall**

6.3.1.3 Value-Creation Plans and Collaborative Learning Sessions

Another more unique educational effort is used by Investor. Considering Investor's investment-oriented business model, actively managing interests through their holdings' board of directors is one of their key activities. To do so in a structured and consistent manner, Investor utilises a **value-creation plan** for each of its assets. These plans are of strategic character and outline how Investor should proceed with its long-term ownership. Sustainability is integrated as one of the main components in these value-plans. Sustainability is evaluated both from a *structural perspective* of formal processes (sustainability KPI's, reports, etc.), and from an *integrated perspective* of how sustainability is integrated into the company's everyday resource usage and how it can create value for its customers. The holdings' different board members sometimes also meet to discuss potential learnings and to spread insights across the different companies. Sustainability, amongst many other topics, is frequently discussed in these collaborative learning sessions. Stefan Stern from Investor stated that:

> *"When our different boards meet, they discuss experiences. And sustainability is a constantly discussed theme, among other very important topics."*
>
> **Stefan Stern, Investor**

6.3.1.4 Chairman Education and Field Trips

Two additional examples of more unique educational efforts are **chairman education** and **field trips**, used by JM and ICA Gruppen, respectively. JM recently implemented a personal sustainability education for its new chairman of the board, performed by their sustainability manager. The purpose of this education is to ensure that the new chairman possess the necessary knowledge to understand the company and its future risks and opportunities related to sustainability. A field trip was used by ICA Gruppen, who brought all its board members to China to show how some of ICA Gruppen's sustainability areas works in reality. The field trip was a new and

complementary effort to the more frequent informational lectures at ICA Gruppen's headquarters. Kerstin Lindvall from ICA Gruppen stated that:

> *"Our field trip to China generated true engagement and interest since it enabled our board members to understand a more qualitative discussion about how sustainability affects our daily operation."*
>
> **Kerstin Lindvall, ICA Gruppen**

6.3.2 Key Success Factors

To properly integrate sustainability in the board members' knowledge structures in the long-term, the representatives highlighted three more general key success factors. They emphasised that these should be jointly considered to successfully overcome the low priority and interest from certain board members.

6.3.2.1 Sustainability Knowledge in the Recruitment Profile

Half of the representatives argued that an efficient way to attain an appropriate sustainability-oriented knowledge among the board members, is to make sure that they possess the knowledge before being recruited to the board of directors. These representatives therefore suggested that the board's election committee should demand higher sustainability-oriented knowledge requirements when recruiting new board members. One representative, who asked to remain anonymous, stated that:

> *"The board's election committee is the key to the competence within the board of directors. It should demand certain levels of sustainability knowledge from the beginning, because then we can secure that each board member will understand the sustainability dimension in our company. This kind of demands from the board's election committee would as well create more incentives to learn about sustainability, considering it is crucial to even qualify as a candidate."*
>
> **Anonymous**

6.3.2.2 Basic Knowledge is Crucial

In the same vein as adding sustainability-oriented knowledge in the recruitment profile of board members, a third of the representatives highlighted that basic knowledge about a subject is crucial to adequately being able to prioritise it. Consequently, introductory education for new board members regarding how sustainability affects their company and industry was suggested as a feasible way to enhance understanding and facilitate future prioritisation. Per Löfgren from JM stated that:

> *"I believe this kind of sustainability education could be valuable for all new board members, since it allows you to understand the operational reality and the dynamics of how sustainability actually matters."*
>
> **Per Löfgren, JM**

6.3.2.3 Regulations and Increased Demands from Shareholders

About a third of the representatives mentioned that new regulations and increased demands from shareholders is necessary to generate momentum, and create incentives for board members to enhance their sustainability-oriented knowledge. Only this kind of compliance-driven and mandatory requirements was argued to be sufficient to institutionalise sustainability in the board of directors, consequently overcoming challenges such as low subject maturation and personal prioritisation. Nina Hornewall from Apollo stated that:

> *"I am very confident that new regulation will be required because I think that is the only way to create order and priority for a subject like sustainability. Otherwise there will always be resistance and not enough momentum."*
>
> **Nina Hornewall, Apollo**

6.3.3 Summary

These results suggest that companies frequently use educational efforts to increase their board members' sustainability-oriented knowledge. The most common educational effort used is a **yearly visit** (or sometimes more frequent) to the board of directors from the sustainability manager or someone with equal expertise. This visit has the purpose of presenting the "latest" within the company's sustainability-related work. There were also some more unique educational efforts that were used by a few of the companies. One of these efforts was to implement a **sustainability committee**, with the purpose of giving sustainability an institutionalised and prioritised position within the board of directors. Other more unique efforts were **collaborative learning sessions** between board members, **sustainability-education for new chairmen** and **field trips**.

Besides these educational efforts, the representatives highlighted three more general key success factors to properly integrate sustainability into the board members' knowledge structures in the long-term: (1) stricter demands for sustainability-oriented knowledge from the board's election committee when recruiting new board members; (2) introductory sustainability-education for new board members; and (3) new regulations and laws, as well as increasing demands from shareholders.

7. SUMMARY OF RESULTS

This chapter summarises the results from our two studies with our three research questions.

RQ1a

Do individual board members have a generally high or low sustainability-oriented absorptive capacity, or do they rather take on specialised roles as "identifiers", "assimilators" or "utilisers"?

The results generated in study 1 reveal that individual board members generally have a high (28,4 percent) or low (37 percent) SACAP, rather than taking on specialised roles as "identifiers", "assimilators" or "utilisers". This suggests that board members' either put in a high effort in *identifying* sustainability-oriented knowledge, *assimilating* it into the board's context, and *utilising* it for the board's commercial ends, or put in a low effort in all dimensions.

RQ1b

Do personal characteristics influence individual board members' absorptive capacity of external sustainability-oriented knowledge?

The results generated in study 1 confirm that some personal characteristics influence board members' SACAP. Board members with a high SACAP possess a high amount of *prior sustainability-related knowledge* and *intrinsic motivation to learn* about sustainability, are *older* and tend to have *long board experience.* This suggests that sustainability-oriented knowledge should be integrated in recruitment policies and educational efforts, since board members have different sustainability-oriented knowledge capabilities.

RQ2

What type of sustainability-oriented knowledge do companies expect their individual board members to possess, and which educational efforts are used to ensure this knowledge?

The results generated in study 2 reveal that companies expect their individual board members to have a minimum level of knowledge regarding how sustainability can be integrated into the company's value-creation process. The results also show that all companies utilise educational efforts to increase their board members' sustainability-oriented knowledge. The most common educational effort was a yearly informational visit to the board by its highest-ranking sustainability representative. Other less common efforts were a sustainability committee, collaborative learning sessions between board members and sustainability-education for new chairmen. Even though the educational efforts varied, the main purpose of the efforts was consistent, namely to align the board members regarding how sustainability is integrated into the company's value-creating process, thereby enhancing the board members' capability to take sustainability-related strategic decisions.

8. CONCLUSIONS

This chapter discusses the findings from our two studies with the help of our theoretical framework and research questions. It ends with the practical and theoretical implications of our conclusions.

From the results generated in our two studies, we can conclude that the sustainability-oriented knowledge of individual board members is affected by both their personal characteristics and by educational efforts from their companies. This suggests that the management of board members' sustainability-oriented knowledge is a multidimensional practice that requires parallel efforts from both the individual board members themselves and their organisation.

8.1 The Individual Perspective

8.1.1 Board Members Do Not Take on Specialised Roles

Our results showing that individual board members do not take on specialised roles along the dimensions of SACAP, but rather possess a low or high SACAP, entail that the board members' sustainability-oriented knowledge capabilities varies, and that some board members are better in absorbing external sustainability-oriented knowledge into the board of directors than others. The individual board member therefore matters in order to strengthen the *dynamic capabilities* of the board of directors (Eisenhardt & Martin, 2000). This suggests that for boards to integrate sustainability, they need to focus on individuals with strong sustainability-oriented knowledge capabilities in the recruitment process.

This finding is consistent with Grant (1996), emphasising individuals as the primary actors in knowledge management, and Ricart et al. (2005), claiming that the *Who-dimension* in the board of directors affects the degree to which sustainability is integrated into the board of directors. At the same time, this finding contradicts conclusions in other studies, arguing that individuals' *specialised roles* are central components in the knowledge absorption process (Allen, 1977; Howell & Higgins, 1990). However, one can also consider a generally high SACAP as a specialised role itself, making these board members act as '*green champions*', engaging in all dimensions to utilise external sustainability-oriented knowledge flows. Sustainability might therefore be a subject in which board members either engage fully in, or neglects entirely, with few taking knowledge-roles in between. One must also remember that sustainability as a subject is characterised by ambiguity and openness. This implies that it might be hard to distinguish between situations where you solely engage in one of SACAP's dimensions, as it is easier to understand SACAP as an iterative process where each dimension is intertwined with the others.

From the perspective of board members' **roles**, we believe it is important to highlight the negative impact of board members with low SACAP for the *service* and the *strategic* role of the board of

directors (Zahra & Pearce, 1989), considering the centrality of knowledge absorption capabilities for competitiveness. From the perspective of the board of directors **attributes**, having board members with the *characteristic* of low SACAP included in the *composition* of the board (Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989), can be argued to limit the board of directors' ability to properly manage the company's sustainability-related affairs and strengthen its sustainability-oriented dynamic capabilities in the long run. This is especially alarming, considering that the sustainability-oriented knowledge-absorption function is put on a few of the board members (those with high SACAP), rather than on all of them. This is consistent with Russel & Jordan (2009), arguing that individuals interpret corporate sustainability in different ways, thereby requiring an integration of the subject throughout the entire organisation. If the individuals in the board of directors have a low SACAP, one can therefore question how the board of directors effectively can take the responsibility it is expected to do in terms of sustainable development (Borglund et al., 2012. This becomes even more concerning when emphasising the shared value-dimension of corporate sustainability, and its alignment with the purpose of the board of directors to evaluate and monitor the company's economic situation, including aspects such as innovation, cost reduction and risk management (ABL, 8 Ch, 4 §; Elkington, 1994; Pharoah, 2003).

8.1.2 Personal Characteristics Affect SACAP

Our results showing that certain personal characteristics have a positive impact on the board members' degree of SACAP is in accordance with earlier literature from both knowledge management theory and board theory, as well as our own personal expectations (Lichtenthaler, 2011; Lane et al., 2006; Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989). The positive relationship between prior sustainability-related knowledge and SACAP is consistent with earlier theory and our hypothesis (Lane et al., 2006; Cohen & Levinthal, 1990). Similarly, that the individual's intrinsic motivation to learn about sustainability had a positive impact on SACAP is consistent with earlier literature and our hypothesis (Minbaeva et al., 2003, Baldwin et al., 1991; Murovec & Prodan, 2009). These two characteristics was also proven to be strongly correlated with each other, suggesting that if the board member possess one of the characteristics, they will also have the other one. This entails that companies who want to increase their board members' sustainability-oriented knowledge might be able to educate them to increase their SACAP. This would in turn increase their intrinsic motivation to learn more about sustainability, or vice versa, starting a positive knowledge-absorbing spiral.

Our partial acceptance of hypothesis 2 and our robustness tests indicates that the reasoning in earlier literature concerning a positive relationship between board experience and SACAP is not entirely wrong (Cohen & Levinthal, 1990; Cox & Munsinger, 1985; Cornforth, 2001). Interestingly, age was found to have a positive relationship with SACAP, as well as a strong correlation with the board members' board experience. That older board members are more sustainability-oriented are

somewhat surprising, given the common stereotype that younger people are more environmentally conscious than old. That age influences SACAP more than board experience may suggest that older board members are more inclined to absorb external sustainability-oriented knowledge, regardless of their board experience. One possible explanation for this might be that older board members have longer experience of working in general, and are therefore better in understanding the value of relevant external sustainability-oriented knowledge for their specific company.

Finally, regarding that we did not find any support for a relationship between the board members' perceived board colleague support and SACAP, we can conclude that it was not in accordance with earlier theory (Zerwas, 2014; Cox & Munsinger, 1985). One possible explanation might be that board members often engage in several board of directors simultaneously, working with several different groups of board colleagues, which in turn makes a too high influence from the perceived board colleague support unmanageable from the perspective of the board's *service* role. The board member's ability to support several different companies' internal representatives with expertise, knowledge and advice would be severely limited if the capability to absorb new knowledge was group-dependent. Another explanation for this might be the individualistic character of a board member's engagement in general, and the context of Sweden and Swedish individualism specifically, as these studies were conducted in other countries.

8.2 The Organisational Perspective

8.2.1 Board Members' Should Possess Sustainability Knowledge

Our finding that sustainability-oriented knowledge is considered to be a crucial strategic resource for board members is not surprising, considering that it is in most companies' interest to embrace a sustainable mindset in their decision-making processes (Clark et al., 2015). This is also consistent with Grant (1996), emphasising the importance of dynamic capabilities for a company's management in changing market environments. As such, it is not unexpected that the representatives believe that the sustainability-oriented knowledge in corporate board of directors should be **integrated**, meaning that all board members should be expected to understand how sustainability can be integrated into the company's and industry's *value-creating process* in order cope with risks and opportunities related to sustainability. This finding is consistent with the *strategic role* of the board, as well as the dynamic capabilities view of sustainability-oriented knowledge, as it emphasises the need for the board of directors to coevolve with its changing knowledge surroundings to stay competitive (Zahra & Pearce, 1989; Eisenhardt & Martin, 2000). Integrating sustainability-oriented knowledge into the knowledge structures of individual board members therefore seems to be central to enhance the board's capability to cope with sustainability issues. This is consistent with previous knowledge management studies highlighting individual organisational members as the key repositories in knowledge management (Grant, 1996, Foss,

2007), and with Ricart et al. (2005), who emphasised the impact of the individual board members for the integration of sustainability into the board of directors. In the same vein, the emphasis on enhancing the board members' sustainability-oriented knowledge is in accordance with Kiron et al. (2015), who concluded that most board of directors lack sustainability-oriented knowledge.

Our identification of a key **complication** facing the integration of sustainability-oriented knowledge into the board, namely low interest and priority of sustainability from both organisations and individual board members, is consistent with our results from study 1 and previous theory stating that individual board members' traits and capabilities influences their performance (Korac-Kakabadse et al., 2001; Zahra & Pearce, 1989; Maassen, 1999; Hambrick, 1987). The suggestion that low maturation of sustainability as a subject possibly leads to a lower prioritisation by the *organisations* in general, and that board members' own interpretation of sustainability potentially decrease their *personal* priority, is in accordance with earlier theory stating that the board engagement in sustainability remain low, especially through low prioritisation and lack of knowledge and expertise (Kiron et al., 2015).

From a perspective of **dynamic capabilities**, this indicates that different industries must acquire different sustainability-oriented knowledge to stay competitive, and if the industry does not incentivise the board members to attain sustainability-oriented knowledge, they will not put in the needed personal effort. This suggests that the board of directors do not take on a *service role* within sustainability (Zahra & Pearce, 1989), as the current situation is more about the company supporting and making sure that the board members are knowledgeable about the company's sustainability issues, rather than the board members supporting their company's employees'.

8.2.2 Educational Efforts Align Board Members with their Company

Our findings show that all companies utilise educational efforts in order to: (1) integrate sustainability-oriented knowledge into their board of directors, and (2) align the board members with how sustainability is a natural part of the company's value-creating process to enhance their capability to take sustainability-related strategic decisions. This is consistent with previous literature emphasising education as instrumental to increase organisational members' ability to identify and appreciate knowledge (Bond et al., 2010; Caloghirou et al., 2004; Johnson, 2016), as well as studies highlighting education as one of the most important dimensions of effective board governance (Holland & Jackson, 1998). This also stresses the importance of increasing the company's *coordination capability* (Van den Bosch et al., 1999), meaning that education can be used as a tool to coordinate the board members with the sustainability-profile of their company, thus making sure that the board members receive the right **type** of sustainability-oriented knowledge for the strategic questions they engage in.

This reasoning is consistent with previous research about sustainability in the board of directors, where the assignment of responsibility to certain individuals is being questioned because individuals are argued to understand and interpret corporate sustainability in different ways (Russel & Jordan, 2009; Linnenluecke et al., 2009). Similarly, this is close to Herman (1989), who emphasised the value of giving board members additional training and orientation after recruitment, thus enhancing their ability to align with the board's current way of working.

8.2.3 Different Educational Efforts, Different Level of Integration

Study 2 revealed numerous educational efforts that companies can utilise to enhance their board members' sustainability-oriented knowledge. These efforts are differentiated from each other through their focus on either educating the entire board, or assigning responsibility to certain individuals. The most common activity — a yearly visit and presentation — separates sustainability from the board members' daily work, and one can question if this helps to institutionalise sustainability, or rather separates it further into the hands of specialists (Russel & Jordan, 2009; Linnenluecke et al., 2009). Moreover, consistent with earlier literature, sustainability committees are being used by some companies, and constitutes a promising solution to increase board members' sustainability-oriented knowledge through proper institutionalisation (Paine, 2014). The effectiveness of the other educational efforts (value-creation plan integration, collaborative learning sessions, chairman education and field trips) is an interesting question, which unfortunately is hard to evaluate, considering that they have not been discussed in previous literature. The possible effects of these efforts are therefore out of our scope, and they should rather be interpreted as examples of how the board members' sustainability-oriented knowledge can be enhanced.

8.3 Synergy Effects of Internal and External Knowledge Flows

PROBLEM STATEMENT

How is the sustainability-oriented knowledge of individual board members affected by (1) the individuals themselves, and (2) by educational efforts from their companies?

Coming back to the overarching problem statement, we can conclude that the sustainability-oriented knowledge of individual board members is affected by both the individuals themselves and educational efforts from their companies. For both our studies, our findings are mostly consistent with previous literature; confirming personal characteristics as influencers of SACAP in study 1, and sustainability-oriented educational efforts as commonly used by companies to enhance their board members' sustainability-oriented knowledge in study 2.

A higher degree of SACAP will increase the board members' own capability to absorb *external knowledge*, while the sustainability educational efforts from the company will increase the board members' capability to absorb *internal knowledge*. This is in accordance with Matusik & Heeley

(2005), who stressed the need of a dynamic interaction between external and internal sources of knowledge, and Van den Bosch et al. (1999), who emphasised this two-sided interaction as especially important in changing business environments. This suggests that the external knowledge the board members absorb through their SACAP can be accentuated by internal education, and vice versa.

These two dimensions are in turn influenced by *external factors*, which were emphasised as potential influencers of board members' sustainability-oriented knowledge in our studies. The factors highlighted were: the maturity-level of sustainability in the industry; shareholder demands; and institutional regulations. However, considering our focus on individual board members', these are not mutually exclusive and collectively exhaustive, and further research on the topic would most likely identify more external factors.

8.4 Implications

Our conclusions have narrowed the theoretical gap by identifying influencers of individual board members' sustainability-oriented knowledge by utilising concepts from knowledge management and board theory. We also contribute to corporate decision-makers by illuminating educational efforts they can utilise to enhance their board of directors' sustainability-oriented knowledge, as well as a deeper understanding of some personal characteristics that affect individual board members' sustainability-oriented knowledge.

8.4.1 Implications for Practice

From the perspective of practitioners, we believe that this thesis contributes with a first explorative study on sustainability-oriented knowledge in Swedish corporate board of directors, as it illuminates important factors to enhance board members' sustainability-oriented knowledge. Our results could help functions such as human resources and sustainability departments to improve their knowledge-creation approaches and thereby integrate sustainability-oriented knowledge into their board of directors. They could utilise our findings related to the individual board members' knowledge structures, as well as find inspiration from how other companies currently educate their board members. This reasoning is valid for the board members themselves too, who can gain a deeper understanding of themselves and take actions to improve their sustainability-oriented knowledge.

In the long run, we hope that our thesis conveys an important message saying that integration and institutionalisation of sustainability into the board of directors is crucial to increase the board members' sustainability-oriented knowledge. Companies need to consider both the individual and the organisational perspective when trying to enhance the sustainability-oriented knowledge of their board members. Companies would also benefit from analysing external factors that influences the board members' prioritisation of knowledge, including, for example, new laws and regulations promoting corporate sustainability.

8.4.2 Theoretical Implications

Our findings are useful for researchers who want to continue to explore this subject. For board theory, this entails that quantitative studies on individual board members' sustainability-oriented behaviours is a feasible level of analysis, even though it is not as accessible as an entity-approach. For absorptive capacity literature, our thesis shows that absorptive capacity can be applied to individuals to better understand their knowledge-behaviour, which strengthens previous literature emphasising the need of increasing the understanding of individuals' absorptive capacities (Volberda et al., 2010). We have also proven that individual absorptive capacity can be applied to board members within the context of sustainability, which strengthens the concept's multidisciplinary adaptability. Our confirmation that some personal characteristics is important influencers of board members' SACAP supports previous literature that stresses the influence of individuals' mental models on absorptive capacity (Lane et al., 2006). For literature regarding internal education, our results show that educational efforts are commonly used to enhance the board of directors sustainability-oriented knowledge, confirming that education is an important dimension to enhance the board's governance and performance (Herman, 1989; Holland & Jackson, 1998).

9. DISCUSSION

This chapter presents a conceptualisation of our conclusions to further discuss our overarching problem statement, as well as proposing alternative theoretical perspectives and future studies.

9.1 Conceptualisation of Conclusions

Synthesising our conclusions into one matrix will help convey our findings in a more comprehensible way. The intention of this conceptualisation is therefore to fulfil the purpose of this thesis by illuminating important perspectives and factors that our explorative study have identified as potential influencers of individual board members' sustainability-oriented knowledge.

Utilising our two perspectives, we propose that individual board members' sustainability-oriented knowledge is a function of: (1) the board members' own efforts to increase their board of directors sustainability-oriented knowledge, and (2) the organisational efforts to increase their board of directors sustainability-oriented knowledge.

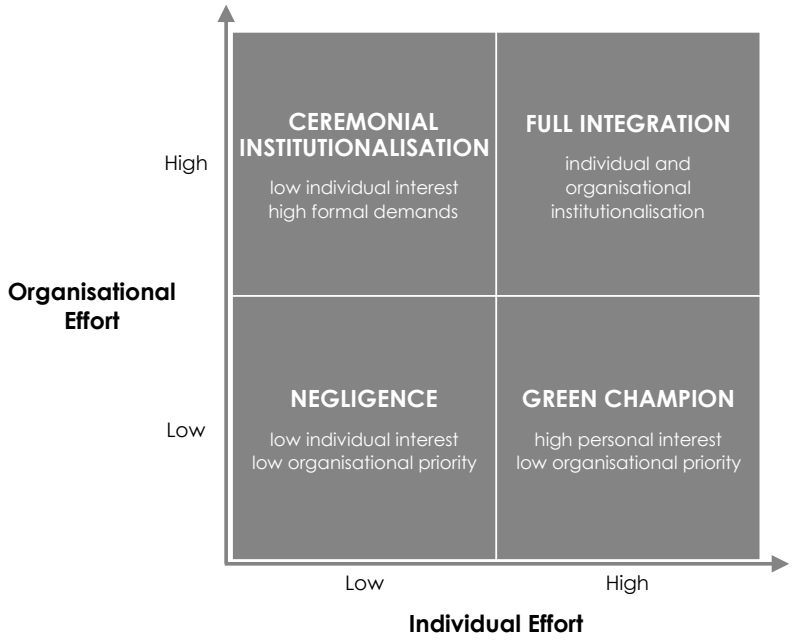

Figure 3 - Four states of board members' sustainability-oriented knowledge.

Organisational efforts can, for example, be internal education, sustainability reporting of the board, and integration of sustainability-oriented knowledge into the board's recruitment profile. This represents the organisations' formal demands and compliance tools to institutionalise sustainability into their board of directors. *Individual board member efforts* can, for example, be a high SACAP, personally lifting sustainability-aspects of business decisions with board colleagues, and personal interest. Depending on the degree of effort in each dimension, a board of directors sustainability-oriented knowledge can be categorised into four states.

In the **negligence** state, neither the organisation nor the individual exert much effort, resulting in low prioritisation and resource allocation for sustainability-oriented knowledge in the board of directors. In the **ceremonial institutionalisation** state, the organisation has a high formal compliance demand towards its board of directors, while the board members have low personal interest and knowledge, resulting in that sustainability-oriented knowledge is compliance-driven, and to some extent integrated into the board. In the **green champion** state, it is instead the board members that put in a high effort in increasing the board of directors sustainability-oriented knowledge, while the organisation deprioritise sustainability, resulting in individual board members acting as 'green champions' as an attempt to increase the sustainability-oriented knowledge in their board of directors. The final state, **full integration**, means that sustainability is prioritised by both the organisation and the individual board member, resulting in a high institutionalisation of sustainability-oriented knowledge in the board of directors.

What is then the optimal state? *Full integration* seems to be the given answer, considering that both individual board members and their organisation contribute to a higher degree of sustainability-oriented knowledge in their board of directors. However, one can ask if it should be required from organisations to use compliance techniques to enhance their board members' sustainability-oriented knowledge. In the long-term, if sustainability is truly to be integrated into the board members' knowledge structures, perhaps the *green champion* state is optimal. In this state, utopian as it may be, the individual board members are the core enhancers of the board of directors' sustainability-oriented knowledge, and the organisation can allocate its resources somewhere else.

Building on our exploratory studies and matrix, this research field's explanatory capacity would therefore benefit from: (1) further examining different types of organisational and individual efforts (beyond education and SACAP); (2) examining the organisational and individual perspectives relative importance to enhance board members' sustainability-oriented knowledge; and (3) exploring other relevant perspectives, such as the influence of external stakeholders and regulations.

9.2 From a Perspective of Institutional and Resource Dependency Theory

Thinking ahead toward further studies, one could discuss our results through institutional theory. It strikes us that the formal structure in the **ceremonial institutionalisation** stage resembles what institutional theory refers to as "myth and ceremony" (Meyer and Rowan 1977), that the corporation enacts as a signal to the external environment without having any operational significance. The formal structure of the **full integration stage**, on the other hand, has "real guts", as Stinchcombe (1997) would put it, in that organisational members fully understand and believe in the underlying purpose of the formal rules, and integrate it in their daily work. These differences are worth exploring in more detail in future studies.

It is also important to consider the role of external actors. As the results from study 2 indicate, there is a limit to how much individuals and organisations can integrate sustainability into the

organisation, as shareholders and regulators exert significant control. This indicates that future studies might benefit from including *resources dependence theory,* and the importance of external control of organisations (Pfeffer & Salancik, 2003). Perhaps this would be a third dimension influencing the integration of sustainability-oriented knowledge into the board of directors.

9.3 Proposal for Future Studies

The concept of SACAP would benefit by further being explored within the context of the board of directors. This can be done by including more personal characteristics or other independent variables to increase its explanatory capacity, such as the degree of personal sustainability education, company size and industry. These studies would also benefit from including a more randomised sample of individual Swedish board members and companies with less established sustainability profiles. Future studies can also disseminate the dimensions of SACAP, exploring specific activities that individual board members engage in. These kind of studies could, for example, reveal common external knowledge sources for board members to *identify* sustainability-oriented knowledge, different *assimilation* techniques, as well as different *utilisation* approaches used. This in-depth dimensional-analysis would be interesting to combine with the internal education efforts that we found in our study, and in invite other explorative studies investigating the effectiveness of, for example, yearly reports and sustainability committees from a knowledge perspective. To test SACAP's validity and reliability, our measurement scale would also benefit from being applied in other contexts than within the board of directors.

Similarly, board members' sustainability-oriented knowledge can be studied with other concepts than SACAP and internal education efforts. For example, researchers could investigate the difference between necessary *tacit* and *explicit* sustainability-oriented knowledge for board members', as formal education enhances explicit knowledge, while tacit knowledge may bring the real competitive advantages (Nonaka, 1994; Davidsson & Honig, 2003). That would allow for insights regarding different types of sustainability-oriented knowledge, enabling a more comprehensive discussion of the topic (Alavi & Leidner, 2001). Another interesting research path would be to take a more comparative approach in order to examine differences and similarities between different units of study. One can, for example, compare board members from different companies, industries and geographical regions in order to analyse if certain knowledge environments have reached further in their integration of sustainability-oriented knowledge compared to others. Regarding the key success factors highlighted by the representatives, the role of the election committee and how it can be optimised from a perspective of securing the right knowledge within the board of directors, is an interesting research question. Utilising our matrix, one could also try to identify other perspectives influencing a board of directors sustainability-oriented knowledge. Considering that one of the board's primary tasks is to provide resources (Hillman & Dalziel, 2003), one could for example use *resource dependency theory* (Pfeffer & Salancik, 2003) to investigate the effect of the company's resource providers. Another feasible perspective could be to investigate the impact of new regulation and laws.

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11. APPENDIX

Appendix 1 - Questionnaire for Study 1

The explanatory titles were not included in the survey.

1. Intro

Hi!

Thank you for taking your time to complete this survey. The survey takes about 5 minutes to complete.

We are two students from the master program in Business & Management at Stockholm School of Economics, and are currently in the process of writing our master thesis within the domain of board governance and sustainability. Your response constitute the fundamental base of valuable data and insights that our thesis builds upon.

Your answers are completely anonymous, and if you would like to know more about our findings later, you will have the possibility to enter your email-address after finishing the survey.

If you have any questions, feedback or concerns, you are more than welcome to contact us by either phone or mail:

Kind Regards,

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2. Definition of Sustainability

This definition of CSR is taken from McWilliams & Siegel (2001, p. 117).

Corporate sustainability is in this survey defined as:

"All actions that appear to further some social good, beyond the interests of the firm and that which is required by law".

3. SACAP

This scale is adapted to the context of sustainability from Ter Wal et al. (2011).

Please indicate to which degree you agree with the following statements on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

3.1 Identify

- When interacting with others I always actively try to obtain information about sustainability-related issues
- I read magazines and newspapers every day to keep up-to-date on sustainability-related topics
- I frequently read sustainability-related scientific journals, publications or patents to keep track on sustainability-related trends

3.2 Assimilate

- I work hard to critically assess the potential value of sustainability-related external knowledge against our business needs
- I am deeply involved in appraising the usefulness of external ideas related to sustainability
- I often analyse the way sustainability-related expertise of external contacts could be related to my company's business needs
- I spend little time processing external sustainability-related knowledge to get a sense of how it might be meaningful for our business (REVERSED)
- I strive to comprehend how external sustainability-related knowledge connects to my company's ongoing business development activities
- I try to excite my colleagues about novel external ideas or technologies related to sustainability
- I frequently meet up with colleagues to explain and discuss new knowledge about sustainability that I obtained externally
- I perform a central role in diffusing externally sourced sustainability-related knowledge to other parts of my company
- I take the time to "translate" external sustainability-related knowledge to ensure that it is properly understood by my colleagues
- I make an effort to "repackage" external sustainability-related knowledge to make sure it gets the attention it deserves

3.3 Utilise

- When a sustainability-related external idea appeals to me, I work vigorously to make sure it is implemented, even if the idea was not originally mine
- When new and sustainability-related external ideas I believe in meet resistance within my company, I put in a great deal of effort to guarantee the idea is brought to fruition
- I would do almost anything to have my external sustainability-related ideas taken up by my company
- I am willing to take action to make sure that the potential of sustainability-related external ideas I believe in will be realised

4. Prior Sustainability-Related Knowledge

This scale measures the respondent's subjective knowledge, and is adapted from Flynn & Goldsmith (1999).

Please indicate for each of the following statements about sustainability to what extent you agree on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

- I know pretty much about sustainability
- I do not feel very knowledgeable about sustainability (REVERSED)
- Among my circle of friends I am one of the experts on sustainability
- Compared to most other people I know less about sustainability (REVERSED)
- When it comes to sustainability, I really do not know a lot (REVERSED)

5. Board Experience

For how many years have you been working within corporate board of directors?

6. Intrinsic Motivation to Learn About Sustainability

This is the first part of the Situational Motivational Scale (SIMS) and was adapted to fit sustainability from Guay et al. (2000).

Please indicate for each of the following statements about sustainability to what extent you agree on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

- I think it is interesting to learn more about sustainability
- I think it is pleasant to learn more about sustainability
- I think it is fun to learn more about sustainability
- I feel good when I learn more about sustainability

7. Perceived Board Colleague Support

This is an adapted a version of the scale from the "Survey of Perceived Organisational Support", (Armeli et al., 1986).

Please indicate for each of the following statements to what extent you agree on a scale ranging from 1 (strongly disagree) to 7 (strongly agree).

- My board colleagues considers my goals and values
- My board colleagues really cares about my well-being
- My board colleagues shows little concern for me (R)
- My board colleagues would forgive an honest mistake on my part
- My board colleagues cares about my opinion
- If given the opportunity, my board colleagues would take advantage of me (R)
- Help is available from my board colleagues when I have a problem
- My board colleagues is willing to help me when I need a special favour

8. Age & Gender

How old are you? (dropdown list)

What is your gender?
Female___ Male___

Appendix 2 - Interviewee Description for Study 2

ICA Gruppen

ICA Gruppen is a leading Swedish retail chain with focus on groceries and fast moving consumer goods, with a turnover of 104 BSEK in 2016. ICA Gruppen has stores in four different countries, as well as assets related to the finance and estate industries. Some of the commonly discussed sustainability topics that ICA Gruppen faces relates to issues concerning food security, consumption, energy and responsible sourcing. The person we interviewed was Kerstin Lindvall, the Senior Vice President of Corporate Responsibility at ICA Gruppen.

Sandvik

Sandvik is a Swedish company producing high technology industry tools for the global mining market, with a turnover of 80 BSEK in 2016. The company has 43 000 employees, and customers in more than 150 different countries. Some of the most commonly discussed sustainability topics that Sandvik faces relates to issues concerning health and safety, environmental impact, innovation & productivity, and circular operations. The person we interviewed was Christina Båge-Friborg, the Head of Sustainable Business at Sandvik.

Investor

Investor is a Swedish holding company that actively have shares in 20 different companies, with a turnover of 33 BSEK in 2015. The company have offices in six different countries and operate with an emphasis on long-term ownership. Being a holding company, Investor faces a variety of sustainability topics. Two common topics are, for example, responsible investment and sustainable financing. The person we interviewed was Stefan Stern, the President of Communication & Sustainability at Investor.

JM

JM is a Swedish developer of housing and residential areas with operation in five different countries and a turnover of 15 BSEK in 2016. Some of the most commonly discussed sustainability topics that JM faces relate to issues concerning environmental impact, waste management & resource productivity, and societal improvements. The person we interviewed was Per Löfgren, the Head of Sustainability at JM.

Telia Company

Telia Company is a telecommunications company partly owned by the Swedish and the Finnish States, with a turnover of 90 BSEK in 2106. It has operations in all Nordic countries, as well as in Russia, Eastern Europe, Spain and Turkey. Some of the most commonly discussed sustainability topics that Telia Company faces relates to issues concerning environmental impact, anti-corruption

and societal development. The person we interviewed was Henrik Weinestedt, the Sustainability Director at Telia Company.

Vattenfall

Vattenfall is a Swedish energy company owned by the Swedish State, with a turnover of 150 BSEK in 2016. Vattenfall's geographical focus is the Nordic countries, Germany and Netherlands. Some of the most commonly discussed sustainability topics that Vattenfall faces relates to issues concerning environmental impact, renewable energy, innovation and productivity. The person we interviewed was Annika Ramsköld, the Vice President Corporate Responsibility at Vattenfall.

Storebrand

Storebrand is a Norwegian holding company with focus on insurances and asset management, with a turnover of 55 BSEK in 2016. Most relevant for the Sweden, Storebrand owns the Swedish pension and insurance provider SPP Pension & Livförsäkring. Some of the most commonly discussed sustainability topics that Storebrand faces relates to issues concerning environmental impact, responsible investments and societal impact. The person we interviewed was Filippa Bergin, the Head of Sustainability at Storebrand.

Apollo

Apollo is one of the Nordic Region's largest travel agencies, with destinations in 48 different countries and a turnover of 5,3 BSEK in 2015. Apollo is owned by the Swiss travel holding company Kuoni Travel. Some of the most commonly discussed sustainability topics that Apollo faces relates to issues concerning environmental impact, human rights and sustainable supply chains. The person we interviewed was Nina Hornewall, Senior Vice President and Commercial Director at Apollo, who is the highest responsible for questions related to sustainability at the company

Handelsbanken

Handelsbanken is one of the largest actors in the Nordic bank sector, with operations in 25 different countries, and a turnover of 40 BSEK in 2015. Some of the most commonly discussed sustainability topics that Handelsbanken faces relates to issues concerning responsible investment, climate finance and societal impact. The person we interviewed was Jenny Gustafsson, Head of Responsible Investment at Handelsbanken.

SSAB

SSAB is a Swedish steel company and the largest producer of steel in the Nordic countries, with a turnover of 55 BSEK in 2015. Some of the most commonly discussed sustainability topics that SSAB faces relates to issues concerning health and safety, environmental impact, innovation & productivity. The person we interviewed was Maria Långberg, Executive Vice President and Head of Group HR & Sustainability at SSAB.

Appendix 3 - Robustness Test

Correlation Test

CORRELATION ANALYSES WITH INDEPENDENT AND CONTROL VARIABLES

	Prior knowledge	Board exp.	Intrinsic motivation	Board support	Age
Prior knowledge		.196*	.448***	n.s.	.246**
Board exp.	.196*		n.s.	n.s.	.557**
Intrinsic motivation	.448***	n.s.		.189*	n.s.
Board support	n.s.	n.s.	.189*		n.s.
Age	.246**	.557**	n.s.	n.s.	

The table shows the results of the Pearson correlation analyses with all the independent variables and age. Gender was not included due to its nominal scale.

*Sig.10 %
**Sig. 5 %,
***Sig. 1 %
n.s. = non-significant

Regression Analysis per Dimension

REGRESSION COEFFICIENTS FOR IDENTIFY

Dependent Variable	Independent Variables				
	Prior knowledge	**Board exp.**	**Intrinsic motivation**	**Board support**	**Age**
Identify	β = 0.319**	n.s.	β = 0.237**	n.s.	β = 0.303**
Adjusted r^2	0.413				
Durbin-Watson test	2.3				
Condition index test	24.4				

The table shows the results of the regression analyses with Identify (from SACAP) as the dependent variable and prior sustainability-related knowledge, board experience, intrinsic motivation to learn about sustainability, perceived board support and age as independent variables.

*Sig.10 %
**Sig. 5 %,
***Sig. 1 %
n.s. = non-significant

REGRESSION COEFFICIENTS FOR ASSIMILATE

Dependent Variable — Independent Variables

	Prior knowledge	Board exp.	Intrinsic motivation	Board support	Age
Assimilate	β = 0.432***	n.s.	n.s.	n.s.	β = 0.198*
Adjusted r^2	0.344				
Durbin-Watson test	2.1				
Condition index test	24.8				

The table shows the results of the regression analyses with Assimilate (from SACAP) as the dependent variable and prior sustainability-related knowledge, board experience, intrinsic motivation to learn about sustainability, perceived board support and age as independent variables.

*Sig.10 %
**Sig. 5 %,
***Sig. 1 %
n.s. = non-significant

REGRESSION COEFFICIENTS FOR UTILISE

Dependent Variable — Independent Variables

	Prior knowledge	Board exp.	Intrinsic motivation	Board support	Age
Utilise	β = 0.259**	n.s.	β = 0.312**	n.s.	n.s.
Adjusted r^2	0.303				
Durbin-Watson test	1.7				
Condition index test	24.3				

The table shows the results of the regression analyses with Utilise (from SACAP) as the dependent variable and prior sustainability-related knowledge, board experience, intrinsic motivation to learn about sustainability, perceived board support and age as independent variables.

*Sig.10 %
**Sig. 5 %,
***Sig. 1 %
n.s. = non-significant