

Leading Through an “Emotional Roller Coaster”: The Centrality of Emotion Management in Achieving Sustainable Innovation

A Qualitative Case Study from the Norwegian energy sector

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**Hanne Gulbrandsen
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Abstract

Organizations are increasingly expected to engage in sustainable innovation to remain competitive, and leadership is essential to this process. Specifically, there is a great need for sustainable innovations in the energy sector as it is currently considered fundamentally unsustainable. Due to the volatile, uncertain, complex, and ambiguous nature of the innovation process, leadership is likely to differ from other leadership situations, in that a pivotal function of leadership appears to involve managing emotions during the innovation process. Yet, how multiple innovation leaders engage in emotion management to maintain committed to achieve sustainable innovation represents a nascent field. Thus, we investigate how leaders manage emotions during critical phases of the innovation process to foster commitment to the achievement of sustainable innovations.

We conduct an explorative multiple case study, interviewing leaders in four small-to-medium-sized companies in the Norwegian energy sector. Our qualitative analysis first reveals that leadership involves experiencing sudden shifts in emotions that become particularly salient in three distinct transition phases during the innovation management process. Second, the innovation leaders use a set of specific emotion regulation strategies to navigate the “emotional roller coaster” of the innovation process toward a future desirable goal. Finally, overall, innovation leaders manage their own and others’ emotions, based on an overarching hopeful metaemotion driven by their commitment to the achievement of sustainable innovation.

Through this study, we contribute to the management innovation literature by illuminating how, surprisingly, despite experiencing the innovation phases as an “emotional roller coaster”, leaders manage these emotions overall through an overarching metaemotion. In conjunction with specific emotion regulation strategies, which we also identified that the leaders applied during critical phases of the innovation management process, we specifically find that the metaemotion allows innovation leaders to stay committed to the achievement of sustainable innovation.

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1. Introduction

1.1 Background and research question

Organizations are increasingly expected to innovate as sustainability is becoming vital to remain competitive (Khosravi, Newton & Rezvani, 2019). Changes in consumer preferences and new technologies from competitors are pushing organizations toward an innovative path (Jørgensen & Pedersen, 2018). Simultaneously, global directives like the Sustainable Development Goals (UN, n.d.) and EU's Green Deal (European Commission, n.d.) are "changing the rules of the game" demanding organizations to deliver on both social and environmental goals in innovative and sustainable ways. Past research has claimed that leadership is pivotal in achieving innovation in such a disruptive context (Birkinshaw, Hamel & Mol, 2008; Nesse & Grepne, 2022), however, little is known about how leadership influences sustainable innovation processes (Waite, 2014). Particularly, leaders and others participating in innovation may experience strong emotions due to the volatile, uncertain, complex, and ambiguous (VUCA) nature of the innovation process (Vuori & Huy, 2016). Thus, leadership in this disruptive context is likely to create a need to manage emotions. Specifically, as emotions tend to influence behavior (Elfenbein, 2007), leaders need to know how to manage their emotions in innovation management processes (Ashkanasy, Humphrey & Huy, 2017). Leaders who are capable of deliberately managing own and others' emotions are more likely to contribute to the competitive advantage of the firm (Brundin, Liu & Cyron, 2021), such as achieving sustainable innovation (Nesse & Grepne, 2022).

Research to date has shown that leadership plays a pivotal role in achieving innovation (Anderson, Potočnik & Zhou, 2014; Hughes, Lee, Tian, Newman & Leegood, 2018). For instance, both Anderson and colleagues (2014) and Hughes and colleagues (2018) find in their review studies that leaders who promote transformational leadership have a significant impact on innovation. Further, effective leadership may vary over time, where different leaders may be needed in different phases of the innovation process, such as during value creation and value capturing phases (Hughes et al., 2018). Although a comprehensive amount of research has been dedicated to uncovering the effects of individual leaders' traits and styles on innovation and creativity, Anderson et al. (2014) find that research is limited on how contextual factors, such as the VUCA nature of the innovation process, affect leaders in their aim to achieve innovation and how they manage this process. Indeed, the nature of the context is likely to require leaders

to engage in managing emotions, which is typically a collective effort by multiple leaders (Vuori & Huy, 2022).

To move research forward regarding how leaders manage emotions that occur in the VUCA context of achieving sustainable innovation, a few aspects need to be addressed. First, although research tends to focus on the individual leader, innovation leadership is currently frequently depicted as a collective phenomenon. A pluralistic view of leadership is characterized by multiple leaders and diffused power relations as leadership roles, and those who possess them may change over time (Denis, Langley & Sergi, 2012). Thus, it includes a mutual influence process between different leadership sources that collectively take on leadership roles to satisfy organizational needs (Morgeson, DeRue & Karam, 2010), which is typically seen in innovation leadership contexts (Knight, Greer & De Jong, 2020). Second, despite the centrality of emotions in innovation processes, leadership theories have tended to treat emotions as irrational, and therefore the role of emotions as a valuable aspect of effective leadership has generally not been studied (Küpers & Weibler, 2006). Third, leadership appears to be important in influencing behavior under uncertain conditions such as during an innovation management process (Lv, Tian, Wei & Xi, 2018). Yet, little attention has been directed at how different leaders engage in managing emotions, for instance by applying different emotion regulation strategies that might influence the innovation outcome (Huy, 2012a). As emotions can either energize or obstruct uncertain processes, attending to leadership in emotion management is more pivotal than ever in an innovation context (Küpers & Weibler, 2006; Huy, 2012a).

While to date, leadership, emotions, and sustainable innovation research have typically been disparate streams of research (Waite, 2014), we align these concepts when it comes to attempting to illuminate how leadership through managing emotions may influence the achievement of sustainable innovation. Our starting point is that effective innovation leadership appears to involve different leaders at different times, and be collective in its nature (Denis, Lamothe & Langley, 2001; Denis et al., 2012; Hughes et al., 2018; Nesse & Grepne, 2022). Further, we posit that a key aspect of effective innovation leadership is to manage emotions during critical and uncertain phases of the innovation management process. Emotions are commonly depicted as arising from stimuli that are perceived to be relevant to achieving needs, goals, and values. Thus, emotions can vary in valence and intensity, involving a physiologically felt state that causes an action-potential (Elfenbein, 2007). However, any single emotion is

typically related to a broader set of behaviors in a given context, such as fearful or seeking behavior (Alcaro & Panksepp, 2011). Leaders, and anyone experiencing emotions, are likely to attempt to manage their emotions, and the emotions of others, to “fit” with this broader set of behaviors in a context, such as an innovation context, based on “metaemotions”. Metaemotions, or emotions about having emotions, are likely to inform leaders about how it is useful to manage an emotion, and these metaemotions could be constructive. Metaemotions may also influence the commitment to succeeding with the overarching goal of the process (Norman & Furnes, 2016). Thus, we aim to examine how leaders experience and manage emotions using constructive metaemotions to foster commitment to the achievement of sustainable innovation. In accordance with a call for research on how leadership can be developed to support sustainable innovations (Birkinshaw et al., 2008; Hughes et al., 2018), especially through the management of emotions (Nesse & Grepne, 2022; Vuori & Huy, 2016), we explore the following research question:

How do leaders manage emotions in critical phases of an innovation process to foster commitment to the achievement of sustainable innovation?

How leaders manage emotions during uncertain innovation processes represents a nascent field of research (Huy, 2012a) that appears to be important to study further to foster a pressing need to achieve sustainable innovation. Thus, to address our research question, we apply a qualitative, inductive, and explorative research approach suitable for developing new and relevant theory. We follow Eisenhardt’s (1989) recommendation for theoretical sampling using case companies that we compare to find patterns showing the relationship between leadership, emotion management, and commitment to achieving sustainable innovation. The cases have been selected based on a set of growth criteria (Delmar, Davidsson & Gartner, 2003) which is used as a proxy to indicate that the firms are viable. Further, until now, research on innovation has mainly applied to large companies, however, innovation processes in small and medium-sized enterprises (SMEs) are different (Bos-Brouwers, 2010). We focus on the Norwegian energy sector as sustainable innovations are greatly needed in this sector. We specifically investigate SMEs developing environmental technology to achieve sustainable innovation as these firms tend to have less management structures in place and therefore be more susceptible to leaders’ emotion management to survive and thrive (Nesse & Grepne, 2022). We conducted

eight semi-structured interviews with central innovation leaders and asked them open-ended questions to facilitate theory-building on the currently nascent field of research.

We organize our thesis as follows: First, in chapter 2, we present relevant literature on our three key concepts collective leadership, emotion management, and achieving sustainable innovation. In chapter 3, we elaborate on the methodological choices, and present ethical considerations and limitations of our chosen research design. Our contribution and conceptual model derived from the findings are presented in chapter 4. In chapter 5, we discuss theoretical and practical implications and elaborate on the strengths and limitations of this study. Lastly, in chapter 6, we present our conclusion. A reference list and appendix can be found in chapters 7 and 8.

2. Theoretical Framework

In this chapter, we review previous research and literature to introduce a theoretical framework in relation to our three key concepts collective leadership, emotion management, and commitment to achieving sustainable innovation. We examine the relationship between leadership and commitment to achieving sustainable innovation in an organizational context, and how leaders can manage their emotions to successfully achieve this aim. Together, these concepts form a theoretical framework that serves as a foundation throughout our study to examine the current gap in research concerning how leadership, through emotion management, may foster a commitment to the achievement of sustainable innovation.

2.1 Sustainable Innovation

2.1.1 The Innovation process

Innovation as a key concept for renewal emerged as a theoretical perspective in the first half of the twentieth century (Schumpeter, 1982). The conceptual standards for innovation theory are not rooted in a single discipline or school of thought (Greenacre, Gross & Speirs, 2012), but drawn from different academic disciplines and research areas, such as business and management, entrepreneurship, and technology (Baregheh, Rowley & Sambrook, 2009). Some of the early research in this field viewed the innovation process as a linear model, while others saw innovation as a disruptive process leading to progress (Schumpeter, 1982). In the latter years of the 20th century, innovation was portrayed from a system perspective, reflecting the complexity and interdependency of the innovation process (Greenacre et al., 2012). Innovation was eventually seen as a dynamic process occurring over time, between levels, and in interaction with the environment (Nesse & Grepne, 2022). Building on the comprehensive content analysis by Baregheh et al. (2009), we define innovation as:

“The multi-stage process whereby organizations transform ideas into new/improved products, services, or processes, to advance, compete and differentiate themselves successfully in their marketplace”

(Baregheh et al., 2009, p. 1334)

The field of innovation mainly distinguishes between two types of innovation and suggests presenting innovation as a continuum ranging from incremental to radical innovation (Pisano,

2015). Incremental innovation represents a step-by-step type of innovation, which refers to minor improvements in existing products and operations to increase efficiency and customer value (O'Reilly & Tushman, 2004). In contrast, radical innovations break with traditions and can be explained as innovations that "produce fundamental changes in the activities of an organization and represent clear departures from existing practices" (Damanpour, 1991, p. 561). The distinction between incremental and radical innovation is often made in line with its consideration of impact and novelty (Kasmire, Korhonen & Nikolic, 2012). While incremental innovation contributes to short-term competitiveness, radical innovations are vital to long-term survival (Pisano, 2015; Nesse & Grepne, 2022). Although it has been commonly assumed that innovation is the main driver of economic growth by strengthening the competitiveness and continuity of the firm (Grossman & Helpman, 1994), Jørgensen and Pedersen (2018) find that it is only when organizations develop sustainable innovations and place sustainability at the core of their business that they will remain competitive and relevant in the long run. Thus, we take as a key assumption that an effective innovation process should lead to sustainable innovation.

2.1.2 Sustainable Innovation

The concept of sustainability was first defined by the Brundtland report with the aim of creating a common international agenda, linked to the environmental and social challenges the world is facing (UN, 1987). The report defines sustainability as *"a development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (UN, 1987, p.16). Often used interchangeably with the concept of sustainability, is the term triple bottom line constituting the three P's: profit, planet, and people (Elkington & Rowlands, 1999; Alhaddi, 2015). This three-dimensional perspective emphasizes the need for organizations to balance their impact on company profit, the environment, and society (UN, n.d.). As such, the concept of sustainability captures the current global climate concern and addresses the need for organizations to rethink their business model and develop innovations that are sustainable (Bocken & Short, 2021). According to Bos-Brouwers (2010, p. 422), sustainable innovations focus on renewable or improvements of products or services, technological or organizational processes that simultaneously emphasize economic, social, and environmental performance. Building on this, we define sustainable innovations as:

“The development of new product, processes, services and technologies that contribute to the development and well-being of human needs and institutions while respecting natural resources and regeneration capacities”

(Tello & Yoon, 2008, p. 165).

Developing sustainable innovations is particularly relevant to the energy sector, as the sector is currently considered to be fundamentally unsustainable (Bocken & Short, 2021). The energy sector is a large contributor to greenhouse emissions and has a direct role in climate change due to the continuous use of fossil fuels and exploitation of finite resources (Bocken & Short, 2021). According to a report by the UN (2020), the share of renewable energy sources within the energy sector still accounts for less than 20% of total energy consumption, and the report also concludes that the sector has failed to reach the annual improvement rate to reach the Sustainable Development Goals (Bocken & Short, 2021). The UN Sustainable Development Goals (SDGs) were established in 2015 with the purpose of creating a set of global guidelines that would serve as a common direction for countries, economies, and organizations worldwide. The SDGs have been pivotal in defining a global industry standard for sustainable practices and have brought attention to many of the unintended social and environmental externalities innovation efforts have led to (UN, n.d.).

The Norwegian energy sector in particular is faced with a challenge to reduce their negative footprint and contribute to a more sustainable sector. Norway is also one of many countries that has committed to the UN SDGs, and together with the formal and informal regulation pressure from the Paris agreement, EU's Green deal, and the EU taxonomy (European Commission, n.d.), as well as from other stakeholders (Jørgensen & Pedersen, 2018; Wu, Fang, Jacoby & Wu, 2022), there is a pressuring need to deliver sustainable innovations in this sector. Today, the Norwegian Energy sector relies on their petroleum industry, although the sector has begun its transition toward exploiting renewable energy sources (UNEP, 2022). For instance, some parts of the Norwegian energy sector have transitioned to renewable sources stemming from solar, water, and wind power (Miljødirektoratet, 2022). To reach the SDGs, however, Bocken and Short (2021) argue that actors in the energy sector must find ways to maximize energy efficiency by developing sustainable technical innovations such as hydrogen solutions aimed at decarbonizing the sector. However, radical innovation seems to be driven most effectively by small- and medium-sized enterprises (Anderson & King, 1993). Thus, we focus

on SMEs, building on the assumption that these are key actors in driving the achievement of sustainable innovation.

2.1.3 Sustainable Innovation in SMEs

The innovation literature has suggested a positive relationship between organizational size and innovation potential (Anderson & King, 1993). Following this relationship, the majority of available research on innovations, and specifically sustainable innovation, concerns large organizations (Bos-Brouwers, 2010). While it has been suggested that large organizations have resource advantages and capabilities to succeed with innovation (Anderson & King, 1993; Karlsson & Olsson, 1998), most studies investigating innovation in SMEs show no distinct difference between small and large firms in quality or significance of innovations produced (Van Dijk, Hertog, Menkveld & Thyrik, 1997). Rather, Bos-Brouwers (2010) argues that innovation processes in SMEs should be considered differently than those of large firms. For instance, SMEs are less reliant on internal bureaucratic structures (Bos-Brouwers, 2010), and have increased decision-making at lower levels (Rothwell, 1992). Arguably, being more flexible and adaptive in their response to changes in their external environment, SMEs have innovation advantages (Bos-Brouwers, 2010). The most prominent difference between the two, however, is the number of employees (Davig & Brown, 1992), as SMEs in the Norwegian Economy have less than 100 employees (NHO, 2022). Having fewer employees, SMEs can make decisions faster as having a more horizontal management style may lead to efficient communication (Rothwell, 1992; Bos-Brouwers, 2010). In addition, leaders in SMEs are more directly involved in the innovation process (Bos-Brouwers, 2010), which should indicate that these leaders are more involved in managing their own and others' emotions throughout the innovation process. Thus, we argue that how leaders manage emotions is essential to achieving sustainable innovation in SMEs.

2.2 Collective Leadership and Innovation

Leadership has since long been identified as a key predictor of creativity, which can be considered the precursor of all innovation (Amabile, Conti, Coon, Lazenby & Herron, 1996). However, the leadership of innovation involves both a creative ideation phase where value is created, and a value capturing phase where realizing the value from the creative ideation occurs (Anderson et al., 2014). Hughes and colleagues (2018) find that successful innovation beyond doubt is dependent upon effective leadership, both across and within both phases. Although

transformational leadership has been found to have a significant impact on innovation (Anderson et al., 2014; Hughes et al., 2018), scholars have long been disagreeing on what forms or styles of leadership are most prominent to facilitate a successful innovation outcome in different phases (Hughes et al., 2018). First, while transformational leadership seems the most effective overall, various innovation phases may pose different leadership requirements. Second, when facing global challenges leaders must develop a capacity to innovate and perform in ways that ensure flexibility and fluency (House, Dorfman, Javidan, Hanges & De Luque, 2013). Further, while top managers are deemed important facilitators of innovation (Birkinshaw et al., 2008), these, especially in smaller teams, depend on other sources of leadership engaging in managing emotions during innovation processes as well.

Building on the notion that leadership has vertical and horizontal virtues, much research is currently more frequently addressing the potential benefits of distributing leadership across different individuals (Hoch, 2013), suggesting that leadership may in fact be pluralistic (Denis et al., 2012) or shared (Morgeson et al., 2010). Hock (2013) indeed finds that collective forms of leadership may be key to successfully achieving organizational innovation outcomes. Collective leadership is thought to enable organizations to deliver on highly complex and ambidextrous demands, as they can leverage multiple sources of expertise (Gibeau, Langley, Denis & Schendel, 2020). This is particularly true when uncertainty in the external organizational environment is high (Denis et al., 2012). In a collective context, multiple leaders engage in a mutual influence process where responsibility is shared (Hoch, 2013). In other words, collective leadership represents a form of distributed leadership, where leadership is fluid and constructed in the interaction between different members of an organization (Denis et al., 2012). Research on collective forms of leadership in an innovation context, however, remains underexplored, and as of today, how collective leadership may contribute to sustainable innovation outcomes in SMEs remains relatively unilluminated. Thus, we return to extant research to examine how collective leadership may play out in such a context.

Traditional conceptualizations of leadership usually portray leadership at the individual level (Ospina, Foldy, Fairhurst & Jackson, 2020), although Gronn (2002) for instance argues that, in practice, this is rarely how leadership occurs. Rather, the process of leadership can be viewed as a dynamic phenomenon where leadership roles can be held by multiple individuals (Friedrich, Vessey, Schuelke, Ruark & Mumford, 2009). Indeed, Birkinshaw et al. (2008)

posits that innovation leadership is a collective process. This resonates with the work of other researchers showing how multiple individuals come together sharing leadership roles to satisfy the needs of others within an organizational group (Denis et al., 2001; Gronn, 2002; Morgeson et al., 2010; Denis et al., 2012; Hughes et al., 2018; Gibeau et al., 2020).

One of the most influential papers on collective leadership is the comprehensive review by Denis et al. (2012), which presents four different streams that have dominated leadership research in pluralistic settings (Fairhurst et al., 2020). They examine collective leadership looks in terms of how structured or emergent it is, and its mutuality versus its coalitional nature. These four streams are: shared leadership in teams; pooled leadership at the top management level; the spreading of leadership across traditional boundaries and the production of leadership that emerges through interaction (Denis et al., 2012). All these four streams appear relevant to innovation leadership in distinct ways.

First, leadership in an innovation context is typically shared among team members, yet with the founder as a central figure, especially at the outset (Wasserman, 2017). While vertical leadership structures may help facilitate a collective vision that could spread across leadership levels, this does not imply an absence of sharedness of leadership. Instead, sharedness includes different roles taking on different responsibilities to achieve collective needs and is not a case of being “for or against hierarchy” (see i.e., Aime, Humphrey, DeRue & Paul, 2014; Morgeson et al., 2010). However, it is often seen as a more fluid and dynamic form of collectiveness, where formality is not as central in driving who engages in leadership to solve the task at hand. Indeed, it may entail elements of both vertical leadership when it comes to envisioning the future innovation, which is typically the task of the CEO (Birkinshaw et al., 2008), as well as other members contributing with their expertise when relevant, as seen in other leadership team settings (i.e., Aime et al., 2014; Nesse, 2017). Thus, it is relevant to research the aspects of innovation leadership where for instance the management of emotions could be the task of more than one individual. Based on an assumption that leadership may be distributed or shared, we assume that top managers, or founders, could be important in managing emotions, but other sources of leadership may contribute to emotion management as well.

The second stream, “pooled leadership at the top” represents a more formally structured way of organizing leadership and has attracted attention from many managerial-oriented scholars.

Research within this stream has mainly targeted knowledge-based organizations, looking at how role constellations change over time (Denis et al., 2012). The effectiveness of pluralistic leadership is dependent on the complementarity of individuals that form the collective leadership group (Denis et al., 2001). Complementarity refers to the adequate coverage of knowledge within chosen activity domains, as well as the existence of necessary mechanisms that allow for the contribution of different actors in various leadership roles. However, having multiple actors is not enough to sustain successful collective leadership efforts; there also must be a division of roles between the actors in the groups (Denis et al., 2001). Leadership viewed as pooled implies a process where people jointly work together as co-leaders. This stream of research, however, argues that members of the leadership group must inhere highly specialized and differentiated roles (Denis et al., 2012). This could be expected to be the case in an innovation context, where who leads, for instance when it comes to emotion management, may be related to formality, but also to expertise, and that it may change over time, in particularly in relation to the phase of the innovation process.

Further, from a pluralistic perspective, leadership may involve multiple sources of leadership spreading across time and boundaries. Morgeson et al. (2010) for instance, argue that a leadership role is exhibited by whoever, either inside or outside of a team, assumes responsibility for satisfying specific team needs. The leadership role may adapt between individuals at different phases, and in addition, vary between individuals having either internal or external relations to the team or formal or informal responsibility for the team's performance. To illustrate this, Morgeson et al. (2010) presents a framework conceptualizing the sources of leadership along two dimensions: locus of leadership and formality of leadership. The locus of leadership reflects if the leadership dimension is internal or external, meaning whether the leader is included as a member of the team and is participating in the team's day-to-day activities. The formality of the leadership dimension, on the other hand, indicates the leader's responsibility regarding team performance and whether leadership is largely formalized or informal in terms of having a direct responsibility regarding team performance (Morgeson et al., 2010). Thus, we draw from this that in an innovation context, leadership that is directed toward managing emotions may come from multiple sources engaging in collective leadership over time and across organizational boundaries.

Fourth, leadership may be seen as something that is being produced over time and therefore can be seen as a continuously evolving process in a given social context (Denis et al., 2012). Collective approaches to leadership focus more on the social context in which leadership occurs, looking at the creation of social networks and the empowerment of followers and relationships, in addition to an ongoing and open exchange between leaders and all stakeholders (Mumford, Friedrich, Vessy & Ruark, 2012). The inherent relational nature and shared social influence of collective leadership reflect the psychologically based process that emerges from the relationships between people, and the psychological contracts that govern such relationships (Sowcik, Andenoro, McNutt & Murphy, 2015, p. 165). These relationships, highly tied to being able to manage emotions, have been found to contribute to innovative behavior (Chang, Hsu, Liou & Tsai, 2013). It emphasizes the need for understanding the relational outcomes of leadership, such as the leader's attributes or competencies (Sowcik et al., 2015), and links the leader's integrity when it comes to engaging with followers' emotional constructs and innovation (Salicru & Chelliah, 2014). Thus, in producing leadership in an innovation context, leadership is produced by multiple actors and is likely to be relational and engaged with managing emotions that occur in the innovation process over time.

Building on these four streams, collective leadership may change and adapt among individuals in different contexts and vary over time. As collective leadership may be shared, and different individuals may exert influence, we view leadership as something that stems from various sources and is constructed in interaction. Thus, these four aspects of leadership are assumptions we find relevant to build our exploration upon.

2.3 Leadership, Emotion Management, and Innovation

Leaders and others participating in sustainable innovation are likely to experience emotions that are strong in valence due to the VUCA nature of the innovation process acting as triggers (Vuori & Huy, 2016; Nesse & Grepne, 2022). Emotions are elicited in the individual when they are exposed to a stimulus that they perceive to be relevant in achieving important needs, goals, and values (Reeve, 2018; Scherer & Moors, 2019). When the individual registers the stimulus and appraises it meaning, a set of psychological and physiological changes are triggered, leading to consequences for how the individual behaves, thinks, perceives, and appraises a situation (Gross, 2002). Building on Elfenbein (2007), we apply the following definition of emotions:

“A process which begins with a focal individual who is exposed to an eliciting stimulus, registers the stimulus for its meaning, and experiences a feeling state and physiological changes, with downstream consequences for attitudes, behaviors, and cognitions, as well as facial expressions and other emotionally expressive cues”.

(Elfenbein, 2007, p. 315)

A stimulus can be any contact between the focal individual and their respective environment that triggers a response (Elfenbein, 2007). Although interactions with co-workers appear to be a common trigger in organizational settings, large economical and planetary events have also been identified as significant emotional triggers (Elfenbein, 2007). Emotions typically arise automatically, however, they may also emerge after giving a situation a considerable amount of thought (Reeve, 2018). As such, some emotions may be appraised as intense and positive, such as excitement or eagerness, whereas other emotions, such as frustration or hopelessness, may be appraised as unpleasant and categorized as negative emotions (Elfenbein, 2007). Navigating the innovation process, innovation leaders are likely to experience future-oriented emotions like fear or hope (Vuori & Huy, 2016, p. 13). These emotions can vary in valence, being both positive and negative, and may also appear simultaneously, thus leading to a state of emotional ambivalence (Rothman, Pratt, Rees & Vogus, 2017). Such emotions can vary in intensity and arousal, which involves experiencing a psychologically felt state that causes action potential (Elfenbein, 2007).

Research on emotions in organizational settings has emerged among scholars as a key concept of study (Elfenbein, 2007), as emotions have been found to significantly influence decision-making and behavior (Huy & Zott, 2018). Brundin et al. (2021) find that addressing the interplay between emotions and behavior in an organizational context is pivotal to understanding innovation processes and resulting outcomes. In their study on emotions during strategy making, Vuori & Huy (2022) find that the greater the perceived impact a given triggering stimulus has on the firm, the stronger the emotional state will be. Thus, the emotional reactions top management leaders experience is likely to be more intense and impactful when the firm is facing a major threat or change that will significantly impact the firm (Huy, 2002). Although emotions are short-lived in nature, they result in response tendencies that may be longer-lasting (Gross, 2002) which may significantly affect the innovation outcome of the firm (Vuori & Huy, 2022). In addition, emotional states that recur consistently over time are likely

to have a stronger effect on the innovation process than occasional emotions (Vuori & Huy, 2016). Thus, innovation leaders need to know how to manage their emotions to promote a beneficial innovation outcome (Ashkanasy et al., 2017).

However, any single emotion is typically related to a broader set of behaviors in a given context, such as fearful or seeking behavior (Alcaro & Panksepp, 2011). Experiencing a sense of fear has been found to play a vital role in the innovation process (Vuori & Huy, 2016). Fear is an emotion related to the perception of threat, which causes increased levels of emotional arousal, found to result in poor decision-making and constrained communication between team members (Vuori & Huy, 2016). Fear may not only stem from threats but can also be triggered by perceptions of weakened status or influence (i.e., when organizations grow stronger in numbers and founders lose their centrality) (Vuori & Huy, 2016; Morgeson et al., 2010). Negative emotions may require more attention from the individual, as these emotions are thought to ensure protection and survival from an evolutionary perspective (Vuori & Huy, 2016; Scherer & Moors, 2019). A negative stimulus, such as feeling threatened by a competitor, often leads to avoidance, as the individual will be motivated to withdraw from a situation to reduce the negative emotion. However, Scherer & Moors (2019) finds that a negative stimulus may also lead to aggressive approach tendencies where individuals act, rather than avoid to react, to reduce the negative emotion.

The main purpose of action tendencies is to help an individual achieve a beneficial outcome within a particular setting (Vuori & Huy, 2016). According to Alcaro and Panksepp (2011), humans possess a system with a state – control function, which upon activation changes individuals' attitude towards a future desirable goal. This system is referred to as a *seeking* system, which is characterized by an explorative appetitive state, where the individual builds a strong cognitive commitment directed toward a future reward (Panksepp, 2011). This reward appetite is often described as euphoric, constituting positive emotions serving as an emotional drive helping individuals to attend to, and approach objects they perceive to be desirable for their own goals and needs (Alcaro & Panksepp, 2011). This tendency is often referred to as a heightened attention and has been observed triggered after stimulating events such as when an individual feels deprived from having limited resources to survive. In other instances, the seeking tendency has been activated when environments surrounding the individual contains physical or social rewards, as well as when the individual experience stress in aversive

contexts, such as the VUCA context assumed to affect the innovation process (Alcaro & Panksepp, 2011). Thus, from this we derive that when individuals perceive goals or objects to be desirable, the seeking system will ensure that they stay committed to the process of achieving this goal.

Leaders, and anyone experiencing emotions, are likely to attempt to manage their emotions, as well as the emotions of others (Norman & Furnes, 2016). When an individual actively manages their emotions, they try to influence what emotions they have, when they have them and how they experience and act on their emotions (Gross, 1999). An individual holds the power to manage their emotions at any point of the emotion generation process (Schutte, Manes & Malouff, 2009), from registering a stimulus, to having the experience and expressing their emotions (Elfenbein, 2007). When leaders manage their emotions, they usually aim for a desired emotion, which can take form as hedonic, meaning that an individual does something that will make them feel good in the moment, or it can be instrumental, meaning they do something now to adjust future emotional states (Vuori & Huy, 2022). This indicates that there are different ways in which leaders can manage their own and others' emotions.

First, building on the work by Schutte et al. (2009), emotion management often occurs through either antecedent-focused mechanisms or response-focused mechanisms. When an individual seeks to use antecedent-focused mechanisms to regulate how they feel, they change their initial appraisal that leads to the emotion (Schutte et al., 2009), meaning that they regulate the emotion *before* it fully arises (Huy & Zott, 2018). For instance, deep acting is one such strategy, where individuals make efforts to align their feelings with what appears to be appropriate (Hülshager & Schewe, 2011). As an emotion is triggered by a situation, the first opportunity an individual has to control their emotions, is to intentionally select which types of situations they put themselves in (Reeve, 2018). A way of doing this is to avoid situations that may cause negative emotions. An individual may also choose to cognitively change how to think about a situation, thus intentionally altering their attention toward a future desirable state.

Response-focused mechanisms on the other hand, are used when individuals seek to control or suppress an emotion *after* it occurred by altering their response (Schutte et al., 2009). Hülshager and Schewe (2011) refers to this strategy as surface acting, where an individual attempts to display emotions that they assume to be appropriate. An individual may do this to block an

emotion or resolve issues to reduce their feeling (Huy & Zott, 2018). Thus, innovation leaders can manage the emotions of their own and others by engaging in different strategies prior to and after an emotionally triggering event has taken place. It has been suggested, however, that making efforts to regulate one's emotions may lead to neglect of important emotional information. Thus, some scholars argue that leaders should attempt to manage their emotions, rather than regulating them in a manner that leads to neglecting the potential significant information an emotion may provide (George & Zhou, 2002).

Second, along the same lines, Alcaro and Panksepp (2011) posits that our seeking tendency may help manage negative emotions that are likely to be triggered by stressful situations. They find that seeking contributes to managing other emotions by decreasing the intensity of negative emotions with the sole purpose of promoting desired emotions to resolve an undesired triggering situation. Thus, seeking appears to function as a strategy to manage emotions, by downregulating negative emotions and elevating positive emotions associated with individual's appetitive eagerness to reach a future goal (Alcaro & Panksepp, 2011). By directing attention toward a particular target, Vuori and Huy (2016) find that one temporarily reduces the attention toward other stimuli, thus narrowing focus toward a desired goal.

Third, Edmondson (1999) posits that expressing and sharing emotions may promote a psychologically safe environment, which in turn may strengthen interpersonal relationships in companies. Looking particularly at a leader-follower relation, emotional expressions are valuable as followers tend to interpret expressions from their leaders and use these interpretations as stimuli to experience similar emotions (Elfenbein, 2007). Emotions are not solely an individual phenomenon but can also exist on a group and firm level as emotions may be transmitted to others through emotional contagion (Brundin et al., 2021). For instance, if an innovation leader explicitly express how they feel after experiencing a positive event or show facial expressions of positive emotions, this may be evaluated by followers as a cue, thus influencing them to express and share these emotions of their own. Thus, emotional contagion describes a process of how group emotions emerge, meaning that emotions residing in the individual may lead to collective emotions (Vuori & Huy, 2022).

Lastly, metaemotions, how one feels about one's feelings, may be useful to provide "fit" between different emotions that may initially seem contradictory. A more overarching emotion

has been suggested as an alternative way to manage one's continuously felt emotions (Norman & Furnes, 2016). Such metaemotions are likely to inform leaders about how it is useful to manage an emotion, and such metaemotions could be constructive. Metaemotions have often been described as a reflexive property, meaning that having a metaemotion may impact the primary emotion, which in turn has the potential to change the perceived meaning of the emotional experience itself (Norman & Furnes, 2016, p. 188). Thus, it involves having affective reactions toward a primary emotion, and like the seeking tendency, having a strengthened motivation to change the expected course of the primary emotion. According to Norman and Furnes (2016), metaemotions have a regulative control function, which suggests it is useful in the management of emotions. For instance, they find that metaemotions can occur on a superordinate level, although metaemotions may also be involved in identifying current emotions, as well as the planning of other regulation strategies and evaluation of emotional regulatory attempts (Norman & Furnes, 2016). Such metaemotions are found to be constructive when individuals have positive emotions toward their negative emotions, meaning that the individual can use the positive metaemotion to manage the primary negative emotion at hand.

Based on the assumption that individuals will make efforts to promote positive emotions when faced with negative emotions, we assume that a constructive metaemotion will be central in enduring a commitment toward reaching a desirable future goal. As metaemotions are regulative in nature, and often occur on a superordinate level, we assume that metaemotions will help identify emotions that are not goal congruent for the individual, nor for the organizational group. As leaders will make efforts to satisfy organizational needs, we build our thesis on the assumption that the seeking tendency residing in all members of a group, will constitute an emotional drive to uphold a collective overarching metaemotion serving as a commitment to reach a future desirable goal, such as achieving sustainable innovation.

2.4 Summary: A Theoretical Framework

In this section, we build on the theoretical review to present a theoretical framework that provides a conceptual foundation for this thesis relating the three concepts of collective leadership, emotion management, and commitment to achieving sustainable innovation. First, we build our framework on the premise that different sources of leadership may be needed at different stages of the innovation process (Hughes et al., 2018), suggesting that leadership is a collective process where multiple individuals take on a leadership role to satisfy organizational needs (Morgeson et al., 2010). Second, we set as a premise that the innovation process triggers different emotions that leaders, either individually or collectively, need to manage. Third, we assume that being able to manage emotions effectively will contribute to maintaining their commitment to the achievement of sustainable innovation. This is illustrated in Figure 1 below.



Figure 1: Theoretical framework of the commitment to sustainable innovation

Thus, in this thesis, we aim to examine the relationship between collective leadership, emotion management, and commitment to achieving sustainable innovation. As research to date has not yet examined how these concepts are related, we address how leaders manage emotions in critical phases of the innovation process to foster commitment to the achievement of sustainable innovation.

3. Methodology

The purpose of this chapter is to elaborate on the methodical choices and approaches we have chosen to examine our research question. The chapter is divided into seven subsections and begins with an introduction to our research philosophy and research approach. Further, we describe our chosen research design and discuss our approach to collecting and analyzing data. Finally, we present an evaluation of the research quality, ethical considerations, and limitations of our study.

3.1 Research philosophy and approach

Research philosophy is a system of beliefs and assumptions that influence the development of knowledge within a particular field (Saunders, Lewis & Thornhill, 2019). The philosophical foundation will impact every stage of the research process and our understanding of the research question. Saunders et al. (2019) explain that humans hold ontological, epistemological, and axiological assumptions that affect how researchers interpret and study a chosen research field. Ontological assumptions relate to our understanding of the research object, whilst epistemological assumptions concern the researchers' own beliefs about knowledge, and legitimacy. Lastly, the role of ethics and values during the research process is influenced by axiological assumptions (Saunders et al., 2019).

This study is explorative and will be conducted from an interpretive point of view as we conduct interviews with central leaders in the Norwegian energy sector to account for their rich and complex realities (Saunders et al., 2019). An interpretive philosophy emphasizes that humans create meanings, and that every human being will experience different social realities as everyone has a distinct background, and experiences phenomena under different circumstances (Saunders et al., 2019). The interviews will constitute our primary source of data; thus, this data will represent socially constructed realities from each of our informants. We study their realities by taking on a phenomenologist approach, indicating that we must account for the informant's own personal lived experiences (Saunders et al., 2019). The interpretive research philosophy is highly subjective, indicating that the research will be value-bound as our own axiological assumptions and interpretations as researchers will be present (Saunders et al., 2019).

An interpretive perspective is typically chosen in relation to an inductive approach to theory generation and a qualitative methodological choice due to its connectedness to humanities and the emphasis on subjective interpretations (Saunders et al., 2019, p. 155). However, Edmundson and McManus (2007) argue that such methodological choices should be considered based on the current state of available theory within a research field. In accordance with their framework on methodological fit for management field research, the state of prior research can be positioned along a socially constructed continuum ranging from mature to nascent theory. Research can also be categorized as intermediate. Assessing our research topic, extensive research has been dedicated to the field of leadership, emotion management, and sustainable innovation. However, these streams of research have been disparate, and consequently, a cohesive theory on the combined field is missing. Thus, we argue that our chosen research topic represents a nascent field of research. When less is known about a particular topic, an inductive approach is recommended to ask open-ended questions and facilitate understanding of the evolving phenomenon (Edmundson & McManus, 2007).

An inductive research approach begins with data collection to identify patterns and specific themes of an evolving phenomenon, before a conceptual framework is created to explain the phenomenon being studied (Saunders et al., 2019). Conducting inductive research is also encouraged when there are process-related matters concerning the behaviour or emotions of individuals (Huy, 2012b). An inductive approach further allows us to study our research topic in a less structured manner (Saunders et al., 2019), without being dependent on previous theoretical contributions (Eisenhardt, 2021). This is beneficial as our informants can communicate freely on the topic. This increases the possibility of finding new understandings of the phenomenon that may lead to new insight and theory generation (Saunders et al., 2019).

3.2 Research design

The research design is considered a roadmap for how the research question will be answered (Saunders et al., 2019). We find a qualitative and explorative multi-case study design appropriate to answer our research question. Conducting a qualitative study involves using non-numerical data and is commonly associated with the inductive approach (Saunders et al., 2019). This thesis is exploratory as the purpose of our study is to gain insight into how leaders manage emotions when faced with emotional triggers during sustainable innovation processes. We aim to deepen our understanding of *how* this phenomenon is emerging by conducting in-

depth interviews with innovation leaders in the Norwegian energy sector and searching for literature in related fields to our research topic (Saunders et al., 2019). An exploratory purpose is advantageous in qualitative research as it is flexible and allows the researchers to easily adapt to changes occurring as the research process evolves (Saunders et al., 2019).

In line with our inductive approach, we follow Eisenhardt's (1989) "roadmap for building theories from case study research" and apply her definition of case studies as a research strategy that focuses on understanding the dynamics present within single settings (Eisenhardt, 1989, p. 534). The roadmap builds on Yin's (2009) work regarding case study research, as well as Glaser and Strauss' iterative process of constant comparison of data and theory from a grounded theory perspective (Saunders et al., 2019). In her method, Eisenhardt employs multiple levels of analysis and argues that case studies may take form as one or more cases that can be studied as *within-case analysis* and *cross-case analysis* (Eisenhardt, 1989). Conducting within-case analysis is central to the generation of insight and refers to detailed descriptive write-ups from each individual interview. Accordingly, it helps keep the attention in place when analyzing large data sets from several interviews and case companies (Eisenhardt, 1989). By conducting a thorough within-case analysis, we lay the foundation for our cross-case analysis, where we investigate and search for patterns across interviews and case companies (Eisenhardt, 1989).

By applying a multi-case design, we can study a phenomenon in its real context, leading to rich and empirical descriptions that may serve as a foundation for developing theory in the nascent field (Saunders et al., 2019). Our choice of conducting a case study is in line with our aspirations of approaching our thesis from an interpretive point of view as we aspire to gain insight into real emotions and interpretations of leaders participating in sustainable innovation processes. With a case study research strategy, we note that findings from specific case contexts may not be considered representative outside of the specific context (Eisenhardt & Graebner, 2007). For our study, however, this is less of a concern, due to the purpose of this thesis being to broaden the insight on the topic, rather than seeking to find one correct answer.

3.2.1 Timeline

Our research is a cross-sectional study as it is conducted over a period of three months and provides snapshots of the context we study (Saunders et al., 2019). We note that a longitudinal

study could have been beneficial to study changes or developments over time, which could have provided us with richer data in this specific case context.

3.2.2 Context and case selection

To truly understand how leadership can be developed to achieve sustainable innovation, we narrow the scope aiming to explore SMEs in the Norwegian energy sector. On a global scale, the energy sector is considered fundamentally unsustainable as the sector still uses fossil fuels and exploits finite resources (Bocken & Short, 2021). As Norway is positioned as Europe's largest energy exporter (IEA, 2022), we find it specifically interesting to select case companies within this domain to explore our research question.

We began our search for case companies looking into Innovation Norway and their database on which companies have received funding for their innovations over the last years. After consulting a representative from Innovation Norway, we were recommended to narrow our search by applying a proxy to select companies engaging in environmental innovation (eco-innovation), looking specifically at those companies who received funding through "Miljøteknologi-ordningen". This arrangement specifically grants funding to companies that take part in solving environmental problems and offer solutions that are considered sustainable (Innovation Norway, 2022). Altogether, we applied eco-innovation as a proxy for identifying SMEs in the Norwegian energy sector. To make sure we included all potential case companies, we searched the database from Innovation Norway to identify companies within the energy sector. The search returned an extensive list of companies, which we further narrowed by comparing the list to companies that had also received funding from EIC. Offering funding to companies that demonstrate potential for sustainable innovation within a given field, EIC aims to "identify, develop, and scale up breakthrough technologies and game-changing innovations" (European Innovation Council, n.d.). Thus, we cross-checked our companies in EIC's database to validate that our companies had received recognition for their sustainable innovations. In addition, we looked at energy-specific clusters to search for similar companies. Our extensive search returned a list of 67 companies that develop sustainable innovations in the Norwegian energy sector.

To narrow our scope, we selected case companies that began their innovation journey between the years 2016 and 2018. We also looked for SMEs innovating similar types of products and

aimed to select SMEs that were similar in size by considering their financial growth and number of employees. Building on recommendations from Delmar et al. (2003), we used growth as an indicator of vitality and specifically aimed to identify growth in sales revenue and growth in employment numbers, as these criteria are widely used in empirical growth research (Delmar et al., 2003). To find financial and supporting information about the respective companies, we used the search engine www.proff.no and annual reports. We also contacted the companies directly when we lacked information. The selection process returned a list of 14 SMEs, however, due to availability reasons, four companies were eventually chosen for our research. A short description of each of the four companies' development is presented below.

Company A was established in 2017. When founded, there were two employees working in the company, however, the number of employees is currently at eleven. Their aim is to produce semiconductors to facilitate the transition toward renewable energy sources in their sector. This company entered a market with relatively few established players and shows a steady increase in income.

Company B was also established in 2017 by three founders and there are currently nine employees working in the company. This company has developed a "state of the art" construction with the potential to disrupt the current market solutions. Their aim is to provide an innovative and environmentally friendly solution to the market and thus contribute to the achievement of the EU's renewables ambition. The company has had a slow increase in sales revenue but has shown considerable growth in the last financial year.

Company C was established in 2016 by two founders, and currently there are ten people working in the company. Their prototype solution has disrupted current market solutions, and they are currently in the launch phase ready to industrialize their product. The company shows steady growth in sales revenue.

Company D was established in 2018 by one founder, who was shortly after joined by two others. Thus, there were three employees in the company during the first year. The company is currently in the funding phase, working to receive trust from investors to take their product further. This company aims to produce semiconductors to facilitate the transition toward a renewable energy sector. Due to a lack of funding, the company had to reduce their activity.

Thus, there is currently one employee working in the company. Although the company only accounts for growth in its first years, we chose to include the company to gain a deeper understanding of leadership during critical phases of the innovation process.

Overall, all four case companies develop technical sustainable innovations. We searched annual reports to cross-check our findings and were able to identify similar patterns across case companies. All case companies start out with one to three founders where everyone has central leadership roles, and assessing their development over the years, we find that several of the companies now have about ten employees working full time. Thus, we consider these companies to fall under the definition of SMEs. The selected companies develop similar sustainable innovation products in the Norwegian energy sector and a few of them are on the verge of industrializing their innovations. We have explicitly chosen not to present any revealing details about our case companies to protect their anonymity in this case study, as there are a limited number of other companies in this industry that develop similar products.

3.3 Data collection

Collecting data for a case study typically involves multiple data sources, and Saunders et al. (2019) separate primary and secondary sources of data. Primary data is specifically collected for the given research project, whilst secondary data typically consist of information gathered from other sources concerning the research topic (Saunders et al., 2019). Triangulating the data by using multiple sources strengthens the knowledge contribution to the study, and ultimately the research credibility (Schwandt, Lincoln & Guba, 2007; Eisenhardt, 2021). In this study, our primary source of data stems from semi-structured interviews, whilst relevant documents from websites, journals, and topic-specific articles will be used as secondary data.

3.3.1 Preparing the interview guide

In line with recommended techniques when collecting data for nascent theory research, we use semi-structured interviews as primary data (Edmundson & McManus, 2007). Semi-structured interviews are beneficial when conducting qualitative research with an explorative design as it allows the researcher to systematically explore how the phenomenon evolves with the informants (Saunders et al., 2019). Such interviews, however, represent a non-standardized way of conducting interviews, meaning that the researcher has flexibility to adjust the interview. The structure includes deciding on main themes and identifying key questions that

help guide the informants through the interview. In addition, it helps the researcher compare responses from informants as it is easier to identify underlying patterns (Saunders et al., 2019). Whether the predetermined list of themes and questions is used depends on how the interview evolves. However, being able to adjust the questions to each informant as the researcher sees fit, is considered a strength of using semi-structured interviews (Saunders et al., 2019).

After we decided to go forward with the chosen SMEs, we narrowed our focus to specific themes and research topics we were curious to learn more about. Taking part in a bigger DIG RaCE project, LEAD IN, we have access to a larger set of data and benefit from knowledge sharing with other members of the project. In collaboration with the other teams, we drafted an initial interview guide and developed the part of the interview guide with specific questions related to emotion management, and then tested and adapted the guide together with the group to fit our specific theme. We are aware that unconsciously asking leading questions is a common mistake when conducting semi-structured interviews, and that this can reduce the credibility of the study (Saunders et al., 2019). Thus, we made sure to be conscious of this during the interview process and let our supervisors approve the interview guide. In addition, we conducted a real-time test interview that helped us navigate the preferred length of the interview and sort out the most relevant questions.

We structured our interview guide to last 45 minutes and depending on the time available we adapted to the circumstances and adjusted the questions accordingly. We made sure to ask questions about emotion management, collective leadership, and sustainable innovation such as asking who was influential during different critical moments, and how leadership has evolved in the company over time when developing a sustainable innovation. In addition, we tied the emotional management concept to leadership by asking “how did you deal with the feelings arising from the critical moments – did you deal with them individually or did you rely on the leader group/board of directors, partner/spouse, or other” and then following up with questions related to how the persons thought-process evolved, how the informant reacted in critical situations, and how this may have had an implication on other people in the company.

3.3.2 Sample

We conducted eight interviews with innovation leaders from four different case companies during fall 2022. An overview of the interviews can be found in Table 1. Following guidance

for how to conduct case study research, we selected relevant case companies using a theoretical sampling technique and chose cases which are likely to extend or replicate the emergent theory (Eisenhardt, 1989). A non-probability sampling technique includes elements of subjectiveness and differs from probability sampling where samples are drawn at random (Saunders et al., 2019). With this method, informants are chosen based on their relevance and assumed ability to help answer our research question and contribute with important insight to theory generation. Hence, we argue that we sample our informants based on *purposive sampling* (Saunders et al., 2019; Eisenhardt, 2021). According to the Eisenhardt method (1989), the number of recommended informants is not given. However, Eisenhardt argues that researchers should consider the data saturation of the study, and interviews should be held to a minimum until additional data adds limited or no new value to the research project (Eisenhardt, 2021).

Pseudonym	Company	Role
Informant 1	A	CEO
Informant 2	A	Founder
Informant 3	B	CEO and founder
Informant 4	C	CEO and founder
Informant 5	C	Chairman of the board
Informant 6	C	COO
Informant 7	D	CEO and founder
Informant 8	B	COO and founder

Table 1 Overview of informants

We specifically aspired to talk to representatives that have knowledge about the process of leadership in their organizations, and that inherit a leadership role, either formal or informal. Investigating emotions in an organizational context requires specifically looking at the target of the emotion (Vuroi & Huy, 2016). We applied the “snowballing technique” during the first interviews and asked the informants to further identify other leaders, such as board members or other employees that could contribute to the research project by adding important insight to the study (Saunders et al., 2019). By using this method to target individuals with influence within a company, we aimed to study leadership as a collective process and not directly assume that the current CEO holds all leadership responsibility.

In accordance with Saunders et al. (2019) we provided the informants with information about the interview setting and shared the interview guide prior to the interview. In this way, our informants had the chance to prepare in advance. In addition, we sent our informants a declaration of consent to ensure that they consciously understood their rights and how their information and answers would be used as contributions to our thesis (Saunders et al., 2019).

3.3.3 Execution

At the beginning of each interview, we notified our informants about their rights and asked to record the interview. All the interviews were conducted via Teams. Recording the interviews allowed us to pay full attention to what the informants said and ask follow-up questions. In addition, we believe that the informants felt more comfortable in the interview setting being in their own safe environment. To ensure we gathered detailed information about the interview setting, we took notes right after each interview and noted important aspects and insights that we considered valuable to have readily available at a later stage in the research process.

3.3.4 Secondary data

We carefully reviewed each company's annual reports and information on their respective websites. As previously mentioned, we used data from Innovation Norway and EIC to acquire information about the funding stage of each company and used this information as proxies to sort out relevant companies for our case study. We also examined other relevant websites such as www.proff.no and www.bronnoysundsregisteret.no to find financial data about each company.

3.4 Data analysis

Saunders et al. (2019) describe data analysis as an interactive process where the researcher continuously interprets and evaluates the collected data. To make sense of the large volume of collected raw data from the interviews, our data needed to be systematized and standardized to be analyzed properly. Eisenhardt (2021) refers to this process as a way of organizing data by defining constructs, measures, and abstract conceptualizations as a foundation to build well-grounded theory.

3.4.1 Transcribing the collected data

According to Eisenhardt (2021), data analysis should be undertaken both during and after the data collection process as this will allow for recognition of important themes and patterns that may present themselves as the process moves forward. This intertwined process was flexible as we adjusted and followed leads on emergent themes (Saunders et al., 2019; Eisenhardt, 2021). We began the data analyzing process by transcribing the recorded data immediately after collecting it, as we aspired to include additional information from the interviews, describing facial expressions and emotionally expressed cues that could support our findings (Saunders et al., 2019). We also went back to our recordings continuously throughout the analysis to capture not only what our informants said, but also how they said it.

Almost all interviews were conducted in English, but some were translated. We structured the transcribed material in a format of questions and corresponding answers and decided in advance on a marking system which allowed us to identify important quotes. In line with recommendations from Eisenhardt (2021), we transcribed and analyzed each case individually by first conducting a within-case analysis. This was highly beneficial for us as it allowed us to gain deep familiarity with each case before conducting the cross-case analysis where we looked for similar patterns between our case companies.

3.4.2 Coding and categorizing constructs and measures

After transcribing our material, we categorized our data into first-order codes and second-order themes, and then conceptualized them in an abstract manner.

Our first-order codes involved labeling each unit of data with a specific code as a phrase describing the marked quote from the transcription. We based our codes on descriptions of what we considered most appropriate from the quote, and we aspired to use “in vivo” codes, using the informants’ own descriptions. In contrast, “a priori” codes are based on descriptions and related terms from existing literature (Saunders et al., 2019). The number of codes were continuously modified throughout the analysis. An example of a quote could be “we were very committed to the business plan we were raising money on, and we were convinced that the business plan was really the way to go to create values”, which we coded in relation to what we perceived to be a phase in the innovation management process. Together with other similar quotes, we labeled the quote as the first-order code “Building trust”.

Second, we grouped the first-order codes into themes which made it easier for us to recognize patterns in the data. Categorizing the codes into second-order themes was useful when making comparisons and contrasting the collected data (Saunders et al., 2019). Following the example with the quote above, we gave it the second-order code “phase” and grouped quotes with similar meaning. To bring forth another example, we made “altering cognition” and “modifying a situation”, which are first-order codes, into the second-order theme “self-regulation”.

Based on our codes and complementary data from recordings and notes, we began the process of constructing more abstract conceptualizations (Eisenhardt, 2021). We had a creative process where we tried to identify overarching conceptualizations and found that the various phases we had identified as second-order themes, represented “emotional triggers” that elicited emotions in the informants. In this phase, we were also able to identify different emotion regulation strategies that were used prior to and after an emotional trigger. Thus, we structured our data into conceptualizations showing a distinction in emotion regulation strategies. Examples from our conceptualizations with corresponding themes, codes, and quotes are presented in the figures below.



Figure 2: Example quotes of emotional phase related triggers

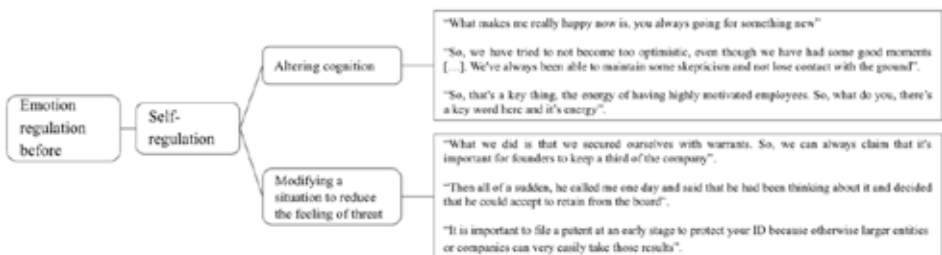


Figure 3: Example quotes of emotion regulation strategies before an emotional trigger

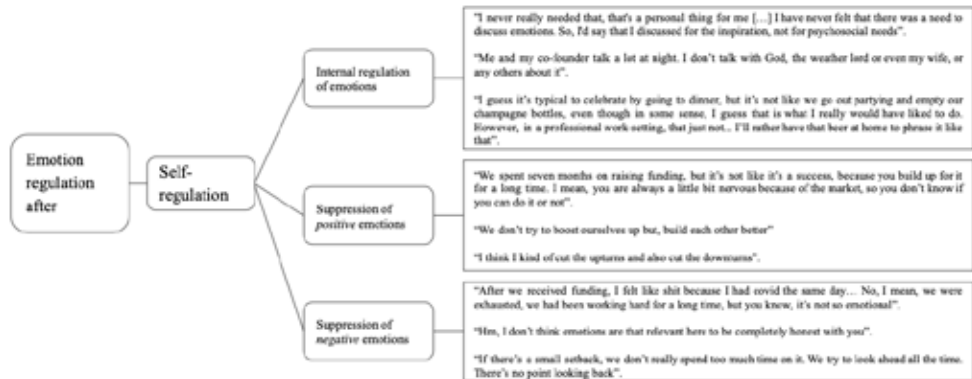


Figure 4: Example quotes of emotion regulation after an emotional trigger

3.5 Research quality

In this section, we examine the research quality of our master thesis in relation to our choice of conducting a qualitative and exploratory multiple-case study using an inductive approach.

Assessments of research quality are traditionally based on the concepts of validity, reliability (Saunders et al., 2019), and objectivity (Schwandt et al., 2007). Firstly, ensuring validity in your research refers to the appropriateness of the study and is typically separated into: (1) internal validity, which refers to the accuracy of the research, and (2) external validity, which concerns the generalizability of the study. Secondly, reliability examines whether the findings from the study can be replicated by others if they follow the same approach (Saunders et al., 2019). Although these concepts are highly used throughout both quantitative and qualitative research, Schwandt, Guba, and Lincoln (2007) argue that other criteria should be considered when evaluating the richness and complexity of research that is interpretive in nature. Ultimately, dependent on this distinction, we evaluate our research based on the dependability, credibility, transferability, and conformability of our study. These measures are highly encouraged when assessing the trustworthiness of a qualitative study and can be considered parallel to the traditional criteria when assessing research quality (Schwandt et al., 2007).

3.5.1 Dependability

Assessing the dependability of a study is much like the concept of reliability and is concerned with how stable the findings from a study are over time (Saunders et al., 2019). Research that is based on semi-structured interviews is heavily reliant on researchers' interpretations of the

informants' realities at the time that the interviews are conducted. We note that such interpretations, both those on the part of the researcher and those of the informants, are likely to be subjective and change over time (Saunders et al., 2019). However, to ensure dependability in our study, we provide a detailed overview of how we conducted our study (Saunders et al., 2019). In addition, we received continuous feedback from our supervisors as the process developed and benefited from having fellow students in the LEAD IN project that gave us constructive feedback on our work. In addition, we contacted Innovation Norway to make sure we created appropriate proxies for how to find and select our case companies. When receiving external feedback, we documented our thoughts and perspectives on the process by continuously writing in a shared document.

3.5.2 Credibility

In qualitative research, the term credibility can be associated with the quantitative term for internal validity (Schwandt et al, 2007), focusing on establishing a match between the constructed realities of our informants and the realities represented by us as researchers (Sinkovics & Ghauri, 2008). To assess this, we immersed ourselves in the field of research literature on how to study emotions within management and qualitative research. Gross (1999) stresses that an individual may or may not be aware of his own emotion regulation on a continuum from controlled and effortful awareness to awareness without further reflection (Brundin et al., 2021, p. 10). Consequently, we learned what non-verbal cues to be aware of during the interviews. In addition, we aimed to interview multiple informants from the same SME to address the same event and strengthen the credibility of our data (Vuori & Huy, 2016).

Having all the interviews conducted over Teams may be considered a weakness, as it may be more challenging to establish psychological safety. However, we also consider this to be one of the strengths of our thesis, as we were able to rewatch the interviews and look for additional expressive cues. To facilitate a safe environment, we reached out to the informants in advance to make them feel safe and answer freely and honestly on the topics. During the interviews, we made sure to pay attention to facial expressions, tone of voice, and other cues. However, being in a digital environment presented some difficulties for us in terms of picking up on non-verbal cues and capturing the whole "picture". Fortunately, we had the benefit of reviewing the recordings, which provided us with the possibility of capturing additional cues from our informants, which we consider a great strength of our thesis.

When we conducted the analysis, we made sure to receive feedback from our informants regarding the use of specific quotes in our text to ensure that included quotations were in line with what the informants conveyed (Guba, 1981). However, to ensure credibility, we made sure the informants did not change or add to their answers completely (Saunders et al., 2019).

3.5.3 Transferability

Assessing the transferability of our study is parallel to external validity (Schwandt et al., 2007), however, the two concepts have essential differences. External validity is about using findings to state statistical generalizations on behalf of a larger population, whereas transferability concerns the application of findings in other settings, situations, and times (Guba, 1981). Our data does not have the potential to form generalizations that will hold across context and time, as our companies represent a small selection of a population drawn from a non-probability sample (Guba, 1981). However, the purpose of our thesis is not to conduct hypothesis testing in a large-scale format, rather we take part in exploring and developing theory (Eisenhardt & Graebner, 2007). Our goal is to explore the emerging development of theory using an adequate level of abstraction, to ensure that our research can transfer to other case studies and settings, and thus contribute to new research. Further, to ensure transferability to other settings with similar conditions, we provided rich detail on context, case selection, and design. To ensure findings are comprehensible, we included details of both physical and social contexts, facilitating for others to replicate a similar study.

3.5.4 Confirmability

Confirmability is associated with a researcher's ability to present the data in an objective manner and avoid researcher biases, motivation, or interest in influencing conclusions (Sinkovics & Ghauri, 2008). We appraise this by being aware of our responsibility of conducting research with an objective and neutral mindset. Additionally, being two researchers, we were able to have discussions and reflect on our findings, which enabled us to avoid personal opinions and values interfering with our data (Sinkovics & Ghauri, 2008).

3.6 Ethical considerations

Ethics must be considered throughout the entirety of a research project and should be planned for to avoid potential unethical behavior (Saunders et al., 2019). We have conducted our research in line with ethical guidelines set by the Norwegian School of Economics and have

carefully considered the ethical aspects in every stage of the research process. One of our main concerns has been to ensure protection of informants that participated in our study. Our study specifically focuses on personal and intimate issues concerning individuals' own emotion management. Hence, we believe that some individuals may have experienced vulnerability or a feeling of exposure from participating. To reduce the likeliness of this, and to promote a safe environment for our informants, we sent out consent forms and notified informants about their rights. This information was also repeated to the participants at the beginning of the interview. The consent form can be found in Appendix 8.

Assessing the privacy of our informants, we are not able to completely assure anonymity of those participating in this study as the steps we conducted to identify and select potential case companies are thoroughly outlined in this thesis. In addition, we interview central innovation leaders within SMEs in a narrow Norwegian energy sector, meaning that these individuals are possible to identify. However, to protect their privacy and assure confidentiality, we replaced their names with pseudonyms to avoid potentially negative consequences of participation (Wiles, Crow, Heath & Charles, 2008).

Further, we have gone to great lengths to execute our research with high levels of objectivity, respect, and integrity. Although our research is partially subjectively conducted, we have aimed at being objective where this was possible, and accurately account for our participants' interpretations in our analysis. All our collected primary data were saved and shared with our supervisors and the other members in the DiG RaCE LEAD IN research project through a common One Drive location to facilitate learning and a deeper understanding of how leadership can be developed to support sustainable innovation. When the research project comes to an end, we will make sure to delete all collected material. Lastly, this study is approved by the Norwegian Center for Research Data (NSD).

3.7 Study limitations

We are aware that our thesis has some limitations, especially considering our limited timeframe, selection of case companies and the capturing and examining of emotions in management research.

Firstly, our interviews were conducted over a period of four months, which may be considered a limited timeframe when conducting qualitative research. Thus, making it necessary to conduct a cross-sectional case analysis instead of a longitudinal study. Additionally, our time constraint also limits the number of informants we were able to interview for this thesis. We are looking at leadership as a collective process and would have benefitted from interviewing as many relevant informal and formal leaders within each SME as possible. We are, however, aware of this and conducted thorough research on the case companies and innovation leaders prior to the interviews taking place.

Secondly, we could have benefitted from having a larger group of case companies. However, we decided on the described method in chapter 3 to be able to create objective criteria for the case selection. Thus, not having to rely on our own assumptions and considerations. As previously mentioned, our study is not generalizable in a quantitative manner, but rather it seeks to provide new insight and explore a nascent research field.

Third, we are aware that it may be difficult to elicit true emotions in an interview setting, as informants may not recall how they felt looking back. Thus, we consider it to be a limitation that we are asking questions related to previous events where we did not ourselves witness or observe the emotions at play. We applied Vuori and Huy's (2016) approach by asking the informants to describe concrete events, making sure they relied on their own episodic memory when answering our questions (Kouamé & Liu, 2021).

4. Findings

In this chapter, we present the findings from our inductive analysis where we explored how leaders manage emotions to commit to the achievement of sustainable innovation. This chapter is structured into three subsections illustrating our three findings. First, we find that leadership involves experiencing phase-related emotional triggers during the innovation process. We find that innovation leaders experience sudden shifts in emotions that vary in valence and intensity, causing an “emotional roller coaster” ranging from experiencing a sense of hopelessness to a sense of hopefulness. Second, we find that innovation leaders address these emotions by engaging in different emotion regulation strategies before and after an emotionally triggering event, where regulation primarily is involved with promoting an emotionally stable state of mind. However, thirdly, and most importantly, we find that innovation leaders have a superordinate emotion or metaemotion of “hopefulness” that sustains their drive and seeking behaviors through the “emotional roller coaster” they experience. Over time, the innovation leaders seem to be highly motivated to bring about their sustainable innovation product, and receiving recognition appears to give them additional drive in their landscape. Overall, we find that leadership engagement in emotion management contributes to the leader’s collective commitment to achieving sustainable innovation through an overarching “hopeful” and constructive metaemotion. These findings are presented in more detail below.

4.1 Phase-related emotional triggers in the innovation management process

First, our data show that leadership in the SMEs in the energy sector involves experiencing emotional triggers that appear during different phases of the innovation process. We find that the innovation leaders we interviewed experienced sudden shifts in emotions that vary in terms of valence and intensity. Simultaneously, we find that they experience a sense of emotional ambivalence from navigating what they refer to as the “emotional roller coaster”, working towards achieving sustainable innovation. From our data, we have been able to identify three phase-related emotional triggers during the innovation management process. These transition phases are (1) Building trust, (2) Receiving trust, and (3) Delivering on promises. The transition between the second and third phases appears to be a turning point as those who are not as successful as others in the second phase move back and rethink their innovation in the first phase. In these phases, we find that leadership is collective and evolving throughout the

innovation process, where multiple individuals exert influence to satisfy organizational needs for managing emotions. These phases are presented in Figure 5 below.

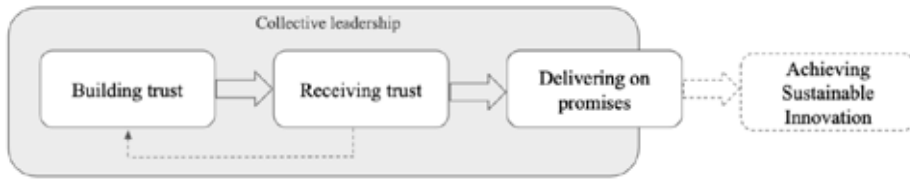


Figure 5: Emotion-triggering phases

The figure represents the innovation process of our four case companies. Thus, our figure is an illustration of how far these companies have come in their process of developing sustainable innovations and identifies phases of the innovation management process.

4.1.1 Building trust

From our data, it appears that the founders used the first phase to create a strong business plan and build trust in their own innovation product. In this phase, the innovation leaders determine the scope and scaling potential of their business and create plans for what competencies to acquire to take their company further. We also find that the innovation leaders worked highly collaboratively in this phase to establish their core values, vision, and mission together. As one informant states:

“One of the first things we did when we had the core team together, was that we sat down and had a good process on our values, vision, and mission. And we spend a lot of time discussing how we would do things”. (Informant 3)

As the quote states, the process of establishing a business plan was a collaborative effort, and it appears that this step was vital to create a strong commitment to the innovation process. Our informants describe this phase as exciting, where they felt emotions like eagerness related to realizing their innovation idea and making it into a business. The informant also appears to have a sense of confidence looking back to this phase. From our data, we interpret that all our companies seemed to be highly reliant on the team and that collaborating on their business plan was important to raise a collective mindset and trust to the process. As our informant states:

“We were very committed to the business plan we were raising money on, and we were convinced that the business plan was really the way to create values”. (Informant 1)

As the quote states, the founders were highly committed to their business plan. In this process, they developed a foundation where they decided how to reach their goals of contributing to sustainability with their innovative product. It appears that deciding on a common direction was evident in developing a strong commitment to their product, building on the informant's statement that they felt strongly convinced that their business would create value. In this phase, the founders seemed to be highly motivated to bring about their sustainable innovation product, and they worked day and night to build their innovation. As one informant states:

"It was me (COO) and the CEO that basically worked day and night with this project".
(Informant 8)

As the quote states, the informant worked long hours to build their business and it appears that they were highly dedicated to the process. We interpret this as them having a high sense of trust in their product. As such, this phase also seemed important for the innovation leaders in terms of protecting their company from potential competitors when they were working to position themselves. As one informant states:

"It is important to file a patent at an early stage to protect your ID because otherwise larger entities or companies can very easily take those results". (Informant 4)

As the quote states, the innovation leaders were concerned that larger companies would respond faster to market opportunities and outperform them, thus they filed for patents to protect their identity and respond to the perceived threat. It appears that this felt threat of not surviving triggered negative emotions such as fear, which are emotions that seem to be of a negative valence and high in intensity. Our data shows that trying to survive was emotional and challenging to get through for the innovation leaders. As one informant acknowledges:

"And of course, that's when you are in a stressful situation, and you try to survive. Of course, that's the challenge itself". (Informant 2)

As the quote portrays, the informant describes feeling stress related to trying to survive. Talking to the informants, we find that the affective feelings of stress and anxiety relate to the primary emotion of fear, and that this emotion is highly present in the first phase. Fear is commonly felt among the innovation leaders that constantly show similar affective feelings, stemming from the underlying threat to survival, and it appears that these emotions are of negative valence and

highly intensive. This felt stress may also be triggered by being under constant pressure, stemming from their own established thoughts about their vision of succeeding, as well as constantly being reviewed and judged by others for their ideas. As this informant displays:

“As an inventor, you are never really judged by how many ideas you have, but by how many ideas you get industrialized. That’s what counts. You can have lots of ideas that might be important, but if you don’t industrialize them, they are not important”. (Informant 8)

This quote portrays the constant pressure that innovation leaders are dealing with trying to realize their ideas and succeed with their innovation. The informant states that to reach success and recognition from others it does not help to have a solid idea on paper or a highly creative mindset. Rather, one needs to manage realizing the product and building trust in the process appears to be central in this stage. Innovation leaders appear to be constantly experiencing underlying stress that affects them and challenges them psychologically. It appears they are experiencing sudden shifts in emotions, going from feeling a sense of trust in their product to experiencing emotions like fear when their innovation is threatened.

4.1.2 Receiving trust

The second phase is particularly central to the companies as they begin the process of raising funding and attracting the right competence to take their company further. This phase also appears to be the most emotionally loaded phase, as the innovation leaders are working to receive trust from investors. We find that they navigate various emotions during this phase, leading them to experience a sense of hopelessness and shifting to a sense of hopefulness. We find that the companies acquire one or two people in this phase and view team building as critical to set the core energy in the company. As one informant describes:

“I mean, you can have an extremely good idea and if you don’t have the right team, you won’t succeed. And you can have a pretty poor idea with a good team, and you could succeed anyway [...] And that’s what investors are going for”. (Informant 3)

As the quotes shows, this informant is convinced that building the right team is essential to attract trust from the right investors. From our interpretations, it appears that the innovation leader is fearful that they will not succeed. It appears that getting in position as a company and attracting the right investors is a challenging task. As one informant describes it:

“[...] it is a very tough phase for a startup to get in position and get funding and to progress the company”. (Informant 4)

This quote illustrates the challenges related to getting funding and touches upon the emotionally triggering aspects of positioning themselves within their landscape. The process appears to be emotionally draining, as the innovation leaders constantly need to overcome obstacles moving forward with their innovation. Although negative valent emotions appear to be elicited in this phase, several informants also describe the process of attracting interest and receiving trust from potential investors as a trigger of emotions of positive valence. As one informant shares:

“We had a lot of fun getting around and trying to kind of sell our thing”.
(Informant 2)

As the quote states, the innovation leaders express having fun, which is a joyful emotion that is positive in valence and of high intensity. From our data, it appears as though the innovation leaders share this feeling with each other, and that they find strength in collaborating on decision-making and relying on their specialized competencies as they work to attract investors. As one informant elaborates in terms of leadership during the funding phase:

“We have a very close and collaborative approach in the company. We are not that many people, so in the management team we will collaborate on the process”.
(Informant 1)

As the quotes portray, innovation leaders focus on having a collaborative approach in the team, where they work closely together. From our data, we find that there are different sources of leadership that have influence in this process. For instance, we find that the chairman of the board is typically present during the funding phase, and in some of our case companies, the chairman has full responsibility for attracting external investors. This phase involves creating shared interest in the innovative product between leaders as well as from external sources. Thus, the chairman holds an external and formal leadership role, but when taking on the responsibility of satisfying the team's need of raising funding, the locus of leadership changes, and the chairman then possess an internal leadership role. As one informant states:

“He had a dual role as both the chairman of the board, and he was responsible for attracting investors to the company”. (Informant 7)

As the quote states, some of the individuals had dual roles in the phase, and it appears that everyone fulfilled roles based on what needed to be done. From our data, we find that leadership was more formally structured in this second funding phase, compared to the execution of leadership in the initial phase, where they worked without any formal structure. Different individuals exhibit influence in various ways, ultimately striving to not become overly structured as they focus on having a transparent organization. As one informant illustrates:

“Yes, there is active collaboration with perhaps not all of the board members, but many of them. So, everyone contributes a lot directly into the company, and they talk a lot with the chairman, but also even the large owners”. (Informant 4)

As the quote states, there is openness in the organizations, as everyone is free to interact with different leadership sources. It appears that these founders have a heightened sense of trust and patience in each other that strengthens the quality of their work. In contrast, one of the case companies is distinct from the others, as they are not able to collaborate in the same trustful way. One factor that led us to this interpretation is how one informant stated who did most of the work in fundraising. As the informant states:

“[Long thinking pause] ...Yeah, everybody contributed I would say, but I did the bulk of the work when it came to writing the application”. (Informant 7)

From talking to the informant, we interpret that there were tensions present in the relationship, as the informant became more uncertain in his tone of voice, and it also seemed like he wanted to avoid the topic by moving on to the next question. Another informant also describes having a professional relationship with one of his companions, and that lack of emotions in their relationship resulted in high tensions and disagreements that led to low valent and highly intensive emotions. As the informant states:

“People are very different and I'm more open to my feelings, which is something I find as a strength. Those who I connect with who are in the same area – we work well together. I fully respect those who don't and try to work together, but of course, we get

a connection on a different level. [...] At some point you don't kind of have the emotional companion feeling". (Informant 2)

As the quote states, the informant did not connect with his companion during the funding phase, which in our interpretations resulted in a psychological distance that led to tensions in their relationship. It appears that lack of trust led them to spend longer time in the funding phase, as they were not able to attract the investors that they wanted. Although the process of fundraising was affected by tensions, we find that all our informants recall having positive emotions triggered by receiving funding. Some informants describe feeling happy, and joyful, triggered by receiving acceptance and trust. As one informant states:

"When this amount of money is brought to the table, we get board meetings and then we got greetings from (investor), and that is really exciting, that is super thrilling". (Informant 8)

As the quote shows, there are a range of emotions present when receiving funding and especially gaining recognition from large investors. The informant describes the feeling as "thrilling", expressing excitement, and having fun in the process. We find that the event triggered emotions of positive valence and intensity, indicating that when innovation leaders are experiencing positive emotions, they elevate the emotion by continuing to describe it, using different words and additional details to showcase how they felt. As one informant states:

"The biggest event was when we got support from Innovation Norway [...] It was very nice because we just got a confirmation that somebody bought that our solution had that potential". (Informant 7)

The quote illustrates that the funding made them experience a sense of confidence triggered by having others believe and trust in their product. Several of the informants recall receiving funding as being the most impactful upturn since they began their innovation journey. From talking to the informants, we observed that several of the informants changed their behavior. For instance, we noticed that some of them leaned back and became more comfortable in the interview setting. Some also had a clear smile on their face and seemed to be more eager to talk about positive events. From our data, we find that there are intense emotions present when the informants talk about their positive experiences, specifically when it relates to receiving funding. As one informant describes:

“I think proudness would describe it. We were of course proud to have achieved what we have been working on for half a year. And also, some humbleness. But most of all, I think proudness is really just a description”. (Informant 1)

The informant expresses that pride and humbleness were elicited as emotional reactions to receiving funding. It appears that these positively valent emotions are high in intensity, and it is clear from talking to the informant that this was a special moment looking back. Although the informant seemed a bit uncertain of his feelings during that time, it is certain that the feeling of pride is evident in this case. Pride is indeed one of our strongest predictors of continued effort and is the opposite of shame. It appears from our findings that several of our informant's experience having an underlying feeling of shame elicited by the risk of feeling like an underdog in our society, constantly battling the emotion of fear as they are trying to survive. However, the ambivalence of going from feeling like an underdog or being someone who has not yet achieved something, having the risk of shame at hand, and suddenly shifting to the feeling of pride, is evident in the quote above. Several of the informants also emphasize that positive emotions were triggered by the possibility of realizing their business potential and continuing to develop their product. As one informant describes:

“[...] getting the first investments and making it possible to not have it as a hobby, but to have it become your real occupation was perhaps the largest event”.
(Informant 4)

This quote illustrates the excitement that one informant experienced after realizing it was possible to live off his “hobby” and move forward with their business plan. Contrastingly, not receiving funding also appears to be an evident trigger of emotions. Talking to one of the case companies, we found that they had not received trust, thus they were not able to raise the necessary amount of funding to further develop their company. As the informant states:

“At that point, we were not able to pay salaries, and that was like a negative thing that happened. For that reason, we sort of had to reduce activity, and I was forced to work elsewhere to get income”. (Informant 7)

As stated in the quote, the informant felt that he was forced to reduce the activity in the company, and from our interpretations, this was a clear emotional moment for the innovation leader. As such, the company was forced back to the “initial phase” where they kept trying to

redefine the concept and further develop their product. Thus, this quote serves to illustrate an important turning point between the second and third phases.

4.1.3 Delivering on promises

Although highly valent and intensively positive emotions, such as proudness, joy, and humbleness, were triggered by receiving funding in the previous phase, many of the informants also state feeling a certain emotional ambivalence as they move into the third phase. From our data, we find that the third phase usually begins with a change of leadership as new investors enter the company and claim ownership. As one informant states:

“What many founders fail to do is the ability to give away more shares than you think you should. But, if you're not willing to give away more than 50% of the company [...] you won't get the money. Nobody wants to invest in a company where the founders have full control. That's a key thing and that's a psychology we had to overcome”.
(Informant 3)

As the informant states in the quote, it is important to be able to give away shares to develop the company further. We find in our data that several of the informants address this issue as a “psychology” they need to overcome. From our interpretations, this specifically relates to their need to balance their own influence in the company versus the external resources they need for continuing to develop the company. It appears that the case companies in our study who have made it to this phase have overcome this obstacle as they now appear to be working quite collectively both within the leadership group and with investors and other owners in the company. We interpret that both internal and external leadership sources exert formal influence during this phase, such as the management team who possess more internal and formal leadership roles, and the owners and investors who exert formal influence externally. Several of our informants also address that everyone is knowledgeable within their field and that they use this diversity as an advantage in decision-making. As one informant describes:

“Everyone has their share of influence in their professional field. But we don't sit and decide without listening to the rest of the group. Of course not. We try to get everyone on the same page as much as possible”. (Informant 8)

As the quote states, everyone in the company exerts influence within their professional fields and the company focuses on including everyone. It appears all members of the companies hold

an internal and formal leadership role, where everyone can take on a more influential role to satisfy organizational needs. From our interpretations, it seems that the companies benefit from still being small, as everyone can exert influence, and communication between different leaders flows easily. We find that innovation leaders rely on each other during this phase, particularly when facing challenges or making large decisions. When asked about how they conduct leadership under high uncertainty, one informant states:

“I think it's a collective effort. Of course, in a company, everyone has their role and I think luckily, all of us are doing our best to our abilities and within our limitations. So, this is the way it works. All contributions are important in reaching the goals of the company, and this is the way we look upon it”. (Informant 4)

The informant describes their leadership as collective when managing uncertainty during this phase, particularly focusing on the common goal of the company. It appears that the leader groups in each of the companies are close and focused on using each other's strengths to manage the challenges and opportunities at hand. We find that this collaborative approach was important for the case companies when dealing with the pressure arising after the funding phase, as they started to feel an obligation to deliver on their promises to their investors. From our data, it appears that several of our informants experience a highly intensive feeling of pressure after receiving trust. As one informant states:

“I mean, we had raised a lot of money and of course, we feel pressure to deliver on our promises after such a process, so it's also a certain amount of pressure”. (Informant 1)

As the quote states, there was a felt pressure to deliver on their promises that arose after receiving funding. It appears that our informants did not spend too much time on positive emotions elicited by receiving funding, rather they swiftly shift to affective feelings such as stress and anxiety triggered by the pressure to deliver. We find these emotions to be of negative valence and high in intensity as they seem to affect innovation leaders in this phase. For instance, one informant describes the constant feeling of stress as the “valley of death”, indicating stress is always present, always being aware that their business may not succeed as envisioned. As the informant states:

“We're still in “the valley of death”. We're still there and will be there until we have financed the first large-scale prototype”. (Informant 8)

From the quote, we interpret that being in the “valley of death” triggers the innovation leaders to experience tensions related to fear while still pursuing happiness, which leads to a state of emotional ambivalence, experiencing both positive and negative emotions. To illustrate, it appears as though they have happy emotions related to being given trust from external investors, and simultaneously facing constant uncertainty related to the likelihood of project failure. As the informant describes:

“When you're given that kind of trust you also in this sense feel an obligation to deliver. It's not just about getting the money, you know, it's refined and then the hard work starts”. (Informant 4)

As the quote states, the informant feels pressure to deliver after receiving trust from investors. We find that there are a lot of stressful emotions present being an innovation leader, as there are several hurdles to overcome, especially in the third phase where innovation leaders work to test their product. The innovation leaders address that this phase was characterized by technical setbacks and that they had to make several changes to their product to remain competitive, as well as make sure that their product would contribute to sustainability. As the informant states:

“The things that have happened are technical. [...] At that moment we wondered if the project would follow through, or to redraw. It was one of those problematic things we can call a crisis”. (Informant 8)

As the quote portrays, there was an impactful technical setback in this phase where they had to adjust their product to deliver on their promises. From our interpretations, there were fearful emotions at play, as the founders were debating whether they would have to redraw their project. These emotions appeared to be of negative valence and high in intensity. Another informant also elaborates on how technical setbacks challenged the motivation:

“Okay, that is kind of the motivation challenge from time to time, to see projects dragging out. So, both for the management and also of course for the team to kind of keep the motivation high when you see that projects are not being sanctioned as planned”. (Informant 1)

As the quote states, the innovation leader finds it challenging to stay motivated, both for himself, but also for the team when time is dragging out and the pressure to deliver increases. Another informant also elaborates on the challenges and frustration arising:

“Yes, it was very demanding. In the worst case, the whole company would have failed”.
(Informant 5)

As the quote states, the informant looks back at a technical setback as very demanding. From our interpretations, this event was highly emotional, as they were questioning the likelihood of their survival. We find that the innovation leaders seem to jump to the last conclusion, by quickly addressing their fear of not succeeding. From our data, we find that this feeling of fear triggered by the constant stress related to feeling unsuccessful, is present throughout the entire innovation process, and not necessarily related to specific events. Thus, as the innovation leaders navigate the different phases-related emotional triggers of the innovation management process, they appear to experience sudden shifts in emotions that vary distinctively in valence and intensity.

4.2 The use of emotion regulation strategies to manage phase-related emotional triggers

Our second finding relates to how innovation leaders manage their emotions triggered in different phases of the innovation management process. We find that innovation leaders use a set of emotion regulation strategies both prior to and after an emotionally triggering event to manage their emotions. The innovation leaders refer to the innovation process as an “emotional roller coaster”, and it appears as though they are engaging in various strategies to portray a stable state of mind rather than attending to their emotions. Thus, we structure this section in three parts. First, we address the apparent lack of emotional awareness, and then we describe the various emotion regulation strategies the innovation leaders engage in both before and after an emotionally triggering event.

4.2.1 Lack of awareness

Innovation leaders appear to have difficulties expressing their true feelings looking back at triggering events, and this seems to be related to their lack of emotional language and unwillingness to engage in emotional reflection. We interpret that the innovation leaders have

an aversion toward expressing emotions, and that this might be related to their inability to think about how they feel during emotional triggering moments. From our viewpoint, these leaders are not able to address their emotions, rather do they feel the need to acknowledge them. When we asked the informants how they dealt with their emotions, one informant was quick to address that he did not delve too much into them as he believed emotions would negatively affect his decision-making. As the informant directly states:

“You could very quickly get super depressed you know”. (Informant 4)

As the quote illustrates, the informant appears to avoid attending to his emotions in fear of depression. We find that the informants have a mindset where they avoid attending to their stressful negative emotions, and they appear to lack an understanding of how attending to emotions may be vital in their development as a company. As one informant states:

“But I haven't really thought about it in a very analytical way, as you may understand from my answers”. (Informant 3)

As the quote illustrates, the innovation leader has not reflected on how his emotions may be relevant in a business context. This is supported by another informant who, when asked about how he attends to his emotions, states that he wants to celebrate his successes and attend to his positive emotions, but he admits that he still has a long way to go and that he usually does not share how he feels with others at work. Another informant adds that focusing on the task and performance is what keeps him going through emotionally challenging moments. The same informant follows up by stating how emotions are not relevant in a professional setting:

“[...] In a company or in a business, you cannot start crying and sit down or have some very emotional moments”. (Informant 4)

As the quote states, the informant is of the opinion that attending to negative emotions does not belong in a business context. From our data, we find that the innovation leaders think that emotions are time-consuming, and not considered appropriate in a business context. It appears the innovation leaders explicitly have chosen a strategy where they do not attend to their emotions, and it also appears as though these innovation leaders find it challenging to be relational and attend to their emotions in a professional setting. Rather, they appear to be mostly focused on the technical aspects of their company, thus portraying a rational mindset.

4.2.2 Emotion regulation strategies before a triggering event

Prior to an emotionally triggering event, we find that the innovation leaders engage in two emotion regulation strategies to change their perceived emotional reaction. First, we find that innovation leaders engage in cognitive reappraisals where they alter the cognitive meaning of a future situation. Second, we find that they modify a situation to reduce the perceived threat of an upcoming event. The regulation strategies are presented below.

Altering the cognitive meaning of a future situation

We find that the innovation leaders engage in cognitive reappraisal strategies to come forward as being “in control”. From our data, it appears as though the innovation leaders prepare for future events by cognitively adjusting the way they think about a situation. As one informant states:

“I think it's a bit difficult to really think back and as a person [...] I think I'm trying to maintain a relatively stable state of mind”. (Informant 1)

The informant appears to have difficulties thinking back to a specific emotional event, which we interpret as an indication of him being “flatter” in terms of expressing himself emotionally. In addition, the informant intentionally tries to maintain a stable state of mind prior to an event. Interestingly, it appears as though the innovation leader intentionally focuses on not elevating any positive or negative emotions. Another informant also stated how he intentionally altered his cognition prior to an event taking place, as he tried not to become too optimistic, but rather focused on maintaining some skepticism to stay grounded. As the informant states:

“So, we have tried to not become too optimistic, even though we have had some good moments [...]. We've always been able to maintain some skepticism and not lose contact with the ground”. (Informant 7)

The informant prepares for a funding meeting by ensuring he maintains some skepticism. From our interpretations, it appears as though some of the innovation leaders “wants” to feel these negative emotions, as those negative feelings appear to drive them to action. Obtaining some skepticism and thus not being overwhelmed by the potentially positive emotions appears to keep them grounded. We interpret that this is something they do intentionally prior to an event taking place. As such, the positive emotions elicited by a triggering event appear to be

downregulated, whereas they intentionally elevate the negative emotions to remain emotionally balanced in the innovation process. However, some of the innovation leaders also seem to focus on positive emotions to foster motivation and use these emotions to drive the team forward. As the informant states:

“So, that's a key thing, the energy of having highly motivated employees. So, what do you, there's a key word here and its energy”. (Informant 3)

From the quote, it appears as though the innovation leader focuses on showing an energetic mindset based on his assumption that this will transfer to others around him. The informant appears to be taking on a “display role” prior to an event, based on an assumption that positing positive emotions will serve as emotionally expressive cues cognitively influencing others to experience the same emotions. Thus, we find that the innovation leader uses an energetic mindset to cognitively reappraise a potentially negative situation, by focusing on the energy they have and the team they are building. Thus, the innovation leader uses this strategy to regulate himself, however, if others perceive these positive emotions as an emotionally expressive cue, the innovation leader also unconsciously engages in the emotion regulation of others.

Modifying a situation to reduce the feeling of threat

We find that the innovation leaders also engage in a regulation strategy where they aim to reduce potentially negative emotions by modifying an emotional situation. We find that innovation leaders search for ways to eliminate threats, thus also finding ways to eliminate their negative emotions. Although negative emotions often lead to avoidance, our data show that the innovation leaders respond by acting, for instance when they filed for patents in the first phase of building commitment and trust to their innovation journey. It appears that they do something prior to potentially being outperformed by competitors to reduce the negative emotions that could be triggered. Another informant states how he protected his ownership in the company by writing up warrants:

“What we did is that we secured ourselves with warrants. So, we can always claim that it's important for founders to keep a third of the company”. (Informant 3)

As the quote states, the informant was concerned with his ownership stake in the company and feared that he would experience low valent and intensive emotions because of potentially losing his influence in the company. The informant acted to reduce the potential threat by protecting himself. Thus, modifying a future situation by adjusting to eliminate or reduce the potentially negative emotion being triggered. From our data, we also find that one CEO is actively engaged in a strategy to modify a future situation where he feared he would lose his formal influence in the company. As the quote illustrates:

“Then all of a sudden, he called me one day and said that he had been thinking about it and decided that he could accept to retain from the board”. (Informant 5)

As the quote states, the CEO decided that it was better to leave than be forced to step down. We find that the innovation leader modified an emotional future situation by acting to reduce the potential harm. We find that even though it appears that these innovation leaders aim to be in a “dark place emotionally”, as they find drive from being in a low place, they also seem to engage in regulation strategies that will reduce the negative emotions before they occur. Thus, the innovation leaders act in ways that will ensure they are in control of their emotions prior to an emotionally triggering event.

4.2.3 Emotion regulation after an emotionally triggering event

From our data, we find that innovation leaders also regulate their emotions after an emotionally triggering event. We find that they do this in two ways: the innovation leaders engage in *self-regulation*, and they also engage in *the regulation of others*.

Self-regulation

Internal regulation of emotions

It appears from our data that the informants are not comfortable expressing their emotions to others, rather they address them internally in a professional setting. As one informant states:

“I never really needed that, that's a personal thing for me [...] I have never felt that there was a need to discuss emotions. So, I'd say that I discussed for inspiration, not for psychosocial needs”. (Informant 3)

From the quote, we find that the informant does not feel the need to talk openly about his emotions, rather he discusses for inspiration and not to cover psychological needs. Another

informant also states how he does most of his thinking at night, rather than expressing to others how he is feeling:

“Me and my co-founder talk a lot at night. I don’t talk with God, the weather lord or even my wife, or any others about it”. (Informant 8)

As the quote states, it appears that the informant has chosen one partner to share his concerns with, otherwise he manages emotions internally. Similarly, another informant addresses that he deals with his emotions internally, although he acknowledges how he would like to share his positive emotions with others. As the informant states:

“I guess it’s typical to celebrate by going to dinner, but it’s not like we go out partying and empty our champagne bottles, even though in some sense, I guess that is what I really would have liked to do. However, in a professional work-setting, that just not... I’ll rather have that beer at home to phrase it like that”. (Informant 5)

As the quote states, the informant acknowledges that he would prefer to celebrate with his team. However, he leads by the belief that celebrating successes is not accepted in a professional context. Interestingly, the informant closes his answer by stating how he celebrates privately at home, rather than sharing how he feels with others. From our interpretations, it appears that many of our informants are under the impression that emotions are to be dealt with internally, and do not belong in a professional setting. Thus, they keep their emotions to themselves rather than sharing them openly with others in their team.

Suppression of positive emotions

It appears from our data that innovation leaders actively engage in strategies to suppress their positive emotions publicly. From our interpretations, they do this to appear more “in control” in front of others. Even though we find that the innovation leaders work intensively towards something, such as the first funding round, we find that they do not necessarily appear to elevate or intensify the positive emotion of succeeding. Several of our informants stated that the time leading up to a positive event was characterized by uncertainty, however, after receiving funding this uncertainty appears to remain. As the informant clearly states:

“We spent seven months raising funding, but it’s not like it’s a success, because you build up for it for a long time. I mean, you are always a little bit nervous because of the market, so you don’t know if you can do it or not”. (Informant 3)

As previously shown, receiving funding was considered the most impactful event, leading to highly valent and intensive emotions such as pride and satisfaction. However, this informant seems to actively engage in a strategy where he suppresses the positive emotion and focuses on the negatives instead. It appears as there is a fear of hybris, thus they suppress positive emotions to come forward as being in control. Interestingly, they do not seem to focus on current emotions, rather they always look ahead to their perception of having positive emotions in the future when they are successful. Hence, the innovation leaders downregulate their emotions, even though they are highly valent emotions. As stated by another informant:

“We don’t try to boost ourselves up but, build each other better”. (Informant 8)

As the quote states, the informant attempts to regulate his positive emotions by rather focusing on what can be done to build the team better. From our interpretations, it appears that the innovation leaders maintain a “stable state of mind” by suppressing positive emotions after an emotional trigger to manage their emotions at hand. As another informant explicitly states:

“I think I kind of cut the upturns and also cut the downturns”. (Informant 1)

This quote shows how the innovation leader attempts to avoid letting emotions navigate him through the innovation process, by suppressing his positive emotion to appear “in control”. From our interpretations, the informants in question intentionally “cuts” the upturns and downturns he is experiencing in the “emotional roller coaster” to appear more in control throughout the innovation process.

Suppression of negative emotions

The innovation leaders also appear to suppress their negative emotions, and we find that they do this in two ways:

Masking emotions: We find that innovation leaders do not delve into their emotions, but rather showcase a future-oriented mindset where they focus on the technicalities of their innovative product. Some informants engage in strategies where they regulate their emotions by masking

them as something other than what they are after they have occurred. For instance, as one informant states:

“After we received funding, I felt like shit because I got Covid-19 symptoms the same day... [laughs]. No, I mean, we were exhausted, we had been working hard for a long time, but you know, it’s not so emotional”. (Informant 3)

From this quote, it appears as though the informant attempts to make jokes as a strategy to avoid the negatively valent emotions triggered by the event. We interpret that the informant uses a positive tone to suppress the negative emotions triggered during this event. Another informant also appears to be masking his emotions by stating that the situation at hand does not involve emotions:

“Hm, I don’t think emotions are that relevant here to be completely honest with you”. (Informant 5)

As the quote illustrates, there is an unwillingness to engage in emotional topics, and from our interpretations it appears that the informant attempts to mask how he feels by claiming that the situation did not include any emotional aspects. It appears that the informant is strict in his voice when he makes the claim, to come forward as being unaffected. From our interpretations, it appears as though the innovation leaders mask how they are feeling because they are convinced that emotions do not belong in a professional setting. Thus, they make efforts to come forward as emotionally unaffected by the situation at hand.

Altering their attention: We also find that innovation leaders alter their attention after an emotional event. We find that when innovation leaders are faced with an emotional trigger, they always look ahead to a desirable future goal, rather than focusing on what is going on in the present. As one informant states:

“If there’s a small setback, we don’t really spend too much time on it. We try to look ahead all the time. There’s no point looking back”. (Informant 3)

As the quote illustrates, the informant is of the opinion that there is no need to look back at negative emotions, but rather focus on what positive emotions are to come. When talking to the informant, he appears rather uninterested in talking about previous events as the informant

quickly moves forward and focuses on the opportunities in the future. Another informant also addresses this mindset:

“I think, luckily, I behaved quite rationally. And we started to make plans for how to get back and what it would take to get back from this”. (Informant 4)

As the quote states, the informant appears to not spend time addressing his emotions, rather he is altering attention to reduce the emotions that he is experiencing in the moment. Thus, rather than addressing how he was feeling at the time, the informant focuses on how he will deal with the situation, hence, we find that the informant regulates how he feels by altering his attention. As such, we find that the innovation leaders suppress negative emotions after a triggering event by altering their attention toward the future.

Regulation of others

Even though we find that innovation leaders mostly manage their emotions internally, it appears as though they make efforts to engage in the emotion regulation of others. Like the self-regulation strategies, we find that they do this in two ways:

Not openly sharing their successes

Overall, we find that the informants do not focus on celebrating their successes. Rather, from our interpretations, it appears as though they choose to celebrate successes privately, and that they are under the impression that sharing positive emotions does not belong in a professional setting. As one informant states:

“We were not going out having a crazy party. I think we had a dinner, but it was a low-key celebration [...] It’s more enthusiastic dialogue about opportunities”. (Informant 1)

As the quote states, the company was not celebrating its success, rather they focused on having an enthusiastic dialogue. The informant seems to speak very vaguely about how they celebrated an impactful event. As another informant also addresses:

“We went out for dinner and had a couple of drinks, but we don’t really celebrate [...] everybody is an owner as well, so everybody gets a part of the success regardless”. (Informant 3)

As the quote states, the innovation leader does not spend time celebrating successes. Rather, the informant states that everybody is an owner and will get a part of the success regardless. We chose to include this aspect of emotion regulation as we interpret that not celebrating is part of downregulating their positive emotions. It appears they are not aware of how emotions may transfer to others through emotional contagion. We interpret that if innovation leaders do not showcase positive emotions when experiencing positive events, others may interpret this as an expressive cue indicating that positive emotions are not to be shared. Thus, the innovation leaders appear to be engaged in the emotion management of others by not openly sharing their success.

Exposing emotions in others

Lastly, we find that innovation leaders try to regulate the emotions of others by engaging in different strategies with the intention of exposing emotions. When asked about how they collectively dealt with the pressure they felt after receiving funding, one informant states:

“One thing is for certain, there's no hidden feelings here, everything is visible, and we are very direct. It's an immediate feedback type of situation if you like”. (Informant 3)

As the quote states, the company focuses on showing how they feel and providing immediate feedback. Although we have uncovered that several of the informants manage their emotions internally, some of them still express that emotions are shared and that they have a very direct type of communication in their company. Another informant also stated how it was the board's job to support the management during a negative event. As the informant states:

“Our job as a board, was to make sure that the right choices were made, but also support the CEO and the team during a demanding time”. (Informant 5)

As the quote states, the board was highly involved and focused on talking to and supporting the management team after a significantly negative event that evoked a lot of emotions of negative valence and intensity in several of the informants we talked to. As such, we find that in the last phase, the board becomes more involved in the regulation of emotions as well. Another informant also describes how they worked collectively to deal with the pressure of being an innovator:

“I think our way to deal with the pressure is to talk together about how we feel, what is our fears, and what is our motivation? What scares me today and be transparent and open and listening to each other's emotions really is a good kind of recipe for staying sane in such a landscape, because it's often been described as an emotional roller coaster to be an entrepreneur”. (Informant 1)

As the quote illustrates, the innovation leader focuses on communicating with his team about how he feels, and he appears to be promoting an open environment. The informant draws links to the “emotional roller coaster” of being an innovator, and we find that the informant considers it of importance to promote transparency to get through emotions triggered by being in a startup. From our interpretations, it appears that innovation leaders are better at exposing emotions in others, rather than portraying and managing emotions of their own.

4.3 Committing to achieving sustainable innovation through a hopeful and constructive metaemotion

In our third finding, we suggest a relationship between the three concepts emotion management, collective leadership, and achieving sustainable innovation. Based on our findings we posit that leadership engagement in emotion management leads to commitment towards the achievement of sustainable innovation. Overall, it appears as though the innovation leaders are able to have positive emotions about their negative emotions when faced with phase-related emotional triggers. Thus, we find that innovation leaders manage the “emotional roller coaster” by engaging in a constructive metaemotion that makes them endure the innovation process.

Although we find that innovation leadership involves experiencing phase-related emotional triggers and engaging in different emotion regulation strategies to manage the “emotional roller coaster”, it is something about the innovation leaders being committed to the innovation journey no matter how they feel. Our findings suggest that even though these innovation leaders experience sudden shifts in emotions that vary in valence and intensity, it appears as though they are able to endure the ambivalence of emotions they are faced with. From our data, it appears that innovation leaders find drive from being able to take part in something that has

the potential to affect society at large. They also appear to be highly motivated by contributing to transitioning the energy sector into a more sustainable one. As one informant describes:

“We saw the opportunity back in 2015-2016, and we saw a huge market there because the European Union had renewables ambition, which was enormous [...] Our solution was clearly going to be a big part of the ambition in the EU, and [...] was ready for disruption”. (Informant 3)

As the quote states, the informant saw a market opportunity some years back that motivated him to pursue his innovation idea. In line with the EU’s renewable ambition, the informant felt that their sustainable innovation had the potential to disrupt current market solutions and contribute to a more sustainable energy sector. Thus, when innovation leaders perceive that their actions can lead to a sustainable innovation outcome, we find that they are able to use this as a drive to move forward. Another informant also states how he feels motivated by working with something that contributes to sustainability:

“I would say I’m a little bit lucky working in the sustainable business or the renewables because many of the employees and also owner side is very motivated by the task at hand, and everyone has the feeling that they’re part of something really important”. (Informant 4)

As the quote states, the informant describes that he is feeling lucky because it is easier to find motivation as they feel like they are part of something bigger. From our interpretations, it appears as though these innovation leaders feel committed to the possibility of leading the transition toward a more sustainable energy sector. For instance, as we uncovered in section 4.1, the innovation leaders express feeling satisfaction, joy and pride from receiving trust and recognition for their sustainable product. Thus, these leaders seem highly motivated to bring about their sustainable innovation product, and the fact that it is sustainable appears to contribute to recognition that they find intrinsic drive from, as it brings forth positively intensive emotions. It appears that these innovation leaders are able to use this drive to endure the “emotional roller coaster”, by using the positive emotions related to the chance of future success and recognition to manage various emotions at hand during the innovation process. For instance, in the third phase, we found that innovation leaders typically experienced strong negative affective emotions such as stress and anxiety from facing technical setbacks.

However, the innovation leaders seem to be able to feel positively about negative emotions. As one informant states:

“We managed to turn a technical setback into a very positive drive”. (Informant 4)

As the quote states, the innovation leader is able to both feel positively about a particularly negative event, as the informant describes turning the situation into a positive drive. Another informant also explicitly states how they focus on the mega-trend and use this as a drive to move past short-term distractions. As the informant states:

“What we do is really to focus on the mega-trend. We go back to our vision, and we see that our mission is strongly supported by the mega-trends. We tend to try to look beyond another short-term noise”. (Informant 1)

As the quote portrays, the innovation leaders are able to look beyond any short-term distractions by focusing on the mega-trend and being committed to their business plan and vision for how they will reach a sustainable outcome in the future. Thus, it appears that they are able to manage negative emotions that are not congruent goals by using their hope of success in the future to endure any short-term noise. We note that talking positively about a negative event may also be a framing strategy these innovation leaders use to suppress their negative emotions. However, from our interpretations, it appears that the innovation leaders have a constructive metaemotion where they are able to feel positive emotions about having negative emotions.

This metaemotion appears to be driven by their hope of reaching success in the future. Indeed, it appears that their seeking tendency is activated when they are faced with distractions, as they are able to direct their eagerness and appetite toward their goal. Innovation leaders appear to engage in specific actions, such as regulating their emotions by suppressing them, to “get back in control”, and as such manage emotions triggered during the innovation process. Although seeking behavior has been found triggered after suffering from food deprivation or when social needs are unmet, it appears as though this system also helps the innovation leaders to redirect their attention back to the overarching metaemotion when faced with emotional triggers. Thus, the overarching metaemotion appears to keep the innovation leaders committed to the achievement of sustainable innovation. However, withholding this metaemotion also appears

to require a certain psychological control that the innovation leaders use to battle the ambiguity of emotions during the innovation process. As one informant also explicitly states:

“You need a certain psychological strength to not fall off this roller coaster under the way, you know”. (Informant 4)

As the quote states, the innovation leader believes that having psychological strength is advantageous to manage emotional triggers during the innovation process and endure the “emotional roller coaster”. Thus, from our interpretations, it appears as though this psychological strength is related to seeking behavior, and thus their ability to engage in emotion regulation strategies to retain attention toward the overarching metaemotion. As one informant describes it:

“You have to keep your eyes on the ball and run as fast as you can [...] You try again, and a different way and you get results, and we still have the results that we wanted anyway. So, we are okay”. (Informant 3)

As the informant states, he narrows his attention to committing to the end goal, and even though there are distractions on the way, he retains a positive mindset and finds alternative ways to reach the end goal. Overall, it appears as though these innovation leaders are able to sustain the negative emotions at hand, and transition from being some kind of an underdog, where they constantly experience freight and hopelessness as they fight to survive. Suddenly, their emotions shift, and they experience a sense of more pleasant emotions, such as the feeling of pride, when they receive trust or deliver on their promises. However, from our interpretations, it appears as though these innovation leaders aim to be in a “dark place emotionally”. Rather than avoiding the negative emotion at hand, the leaders approach the negative emotion and act in ways to promote the overarching positive emotions related to their future goal of having success. Thus, we find that when innovation leaders perceive that they are under threat, having emotions of negative valence and high intensity, they appear to use these emotions as a positive drive to survive, thus they focus on their metaemotion of reaching success in the future. As one informant illustrates:

“It was not a walk in the park to raise money. It was a lot of meetings, a lot of “Yes, nice but no” kind of answers. So, it was hard work to raise the necessary commitment from investors [...] and that was, of course a bit challenging for the motivation. And

from time to time, you're starting to think that "no this will never work", but suddenly you have a more optimistic answer and then you're back on track". (Informant 1)

As the quote portrays, there were a lot of emotions present in the process of raising funding as the innovation leader was experiencing challenges related to raising the necessary commitment and dealing with freight of failing early in the innovation process. We find that the innovation leaders engage in strategies to regulate their emotions at hand, both the positive and the negative ones. Thus, these innovation leaders act in ways that will lead to a desirable outcome. From our interpretations, it appears that this metaemotion is constructive as it is filled with hopeful emotions, and that the innovation leaders promote this metaemotion by saying that "we just have to get through this", even though they are constantly battling crossroads of dynamic and ambivalent emotions. Thus, we find that their ability to change swiftly from low-valent to high-valent emotions is a metaemotion that keeps them committed to the achievement of sustainable innovation.

Although emotion management appears to be an individual process, our collective view on leadership suggests that the individual management of emotions may transfer to others in the group through emotional contagion. We uncovered in section 4.2 that innovation leaders engage in exposing emotions in each other, for instance by promoting an environment where emotions and concerns are to be shared. However, as our findings suggest, these leaders appear to be better at exposing emotions in others than they are at expressing emotions of their own. Building on our assumption that leaders will make efforts to satisfy organizational needs, and that different leadership sources may be involved in emotion management, we interpret that the seeking behavior, that drives the metaemotion of each individual towards a future goal, may also be a collective behavior in the way that everyone will make efforts to reach the future goal of the company. Thus, this collective drive may strengthen the overarching metaemotion serving as a collective commitment to reach the goal of achieving sustainable innovations in their sector.

5. Discussion

The purpose of this thesis is to contribute to the existing literature in the field of management innovation research (Khosravi et al., 2019), especially concerning how leaders engage in emotion management (Vuori & Huy, 2016) to achieve sustainable innovation (Birkinshaw et al., 2008; Hughes et al., 2018). Specifically, our study shows how leadership involves experiencing phase-related emotional triggers and describes how multiple leaders sustain their engagement through a positive metaemotion as well as through engaging in different strategies to manage their emotions to foster commitment to achieving sustainable innovation. In the following subsections, we present our contribution and discuss theoretical and practical implications of our study. Further, we address the strengths and limitations of our research and present suggestions for future research.

5.1 Contribution

By gathering qualitative data through conducting semi-structured interviews and analyzing the data carefully, we have generated several compelling findings. Our contribution is presented as a conceptual framework in figure 6 below, showing a process model illustrating the proposed connection between our three concepts emotion management, collective leadership, and commitment to achieving sustainable innovation. We assume that in the current disruptive context of achieving sustainable innovations, leadership is relational and emotion management is a collective process where different leadership sources contribute to satisfy organizational needs. Overall, we show how a hopeful and overarching constructive metaemotion allows multiple leaders to collectively sustain the “emotional roller coaster” to foster commitment to achieving sustainable innovation.

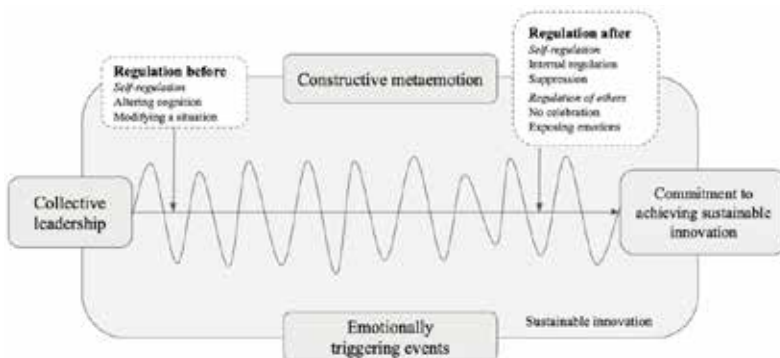


Figure 6 A process model of committing to achieving sustainable innovation through a constructive metaemotion

Our contribution shows the following: First, we identified critical phase-related emotional triggers where leaders appear to experience sudden shifts in emotions of different valence and intensity, which innovation leaders refer to as an “emotional roller coaster”, illustrated in the figure as a wavy line. Second, we find that innovation leaders engage in different emotion regulation strategies prior to and after an emotionally triggering event to manage emotions elicited in the innovation process. Finally, in our third finding, we suggest that leaders manage the “emotional roller coaster” through a hopeful and overarching constructive metaemotion. Our most interesting finding is that this metaemotion appears to foster a collective commitment to achieving sustainable innovation.

5.2 Theoretical implications

Understanding how leadership may be developed to support sustainable innovation is still a nascent field of research (Birkinshaw et al., 2008; Hughes et al., 2018). Research is limited when it relates to emotion management during uncertain innovation processes, and how innovation leaders can sustain emotional triggers to commit to achieving sustainable innovation (Huy, 2012b). Overall, we contribute to this field of research by combining extant theory from leadership, sustainable innovation, and emotion management to provide new insights into how leaders engage in emotion management to deal with phase-related emotional triggers during innovation management processes.

In our first finding, we contribute to management innovation research by illuminating the centrality of emotions in organizational settings and how managing phase-related emotional triggers may be a collective effort. Thiel, Connelly and Griffith (2012) argue that a central characteristic of effective leadership includes the management of emotions, where prior research on leadership and innovation in SMEs has mainly focused on the CEO and the individual management of such emotions (De Cock et al., 2020; Huy & Zott, 2018). Rather, we provide a collective lens on leadership to bring new insights into the field of management innovation. We find that leadership involves experiencing phase-related emotional triggers, and that leadership during these phases evolve as a collective, where multiple individuals contribute to satisfy organizational needs. Thus, our study addresses the importance of acknowledging that leadership may stem from different sources and extends the research by Huy (2012a) and Vuori and Huy (2016;2022) by highlighting that who leads may change over

time, especially when it relates to the management of emotions in distinct phases of uncertain innovation processes that enable leaders to stay committed.

In our second finding, we contribute to existing research on leadership and emotion management in a sustainable innovation context by exploring how innovation leaders regulate emotions elicited by phase-related emotional triggers. We approach these regulation strategies from two different angles: emotion regulation before and after an emotionally triggering event and suggest that innovation leaders engage in different strategies when the external valence of their emotions are low. Few previous studies have investigated how leaders engage in managing emotions, and according to Thiel et al. (2012), there is a lack of theoretical knowledge regarding the identification of specific emotion regulation strategies for managing various emotional experiences. Our research extends the work by Thiel et al. (2012) as we identify several emotion regulation strategies that innovation leaders engage in to manage the “emotional roller coaster” of the innovation process. For instance, we found that innovation leaders engage in cognitive reappraisal strategies prior to an event, to fuel the overarching metaemotion of reaching success and committing to achieving sustainable innovation. Thus, as a theoretical implication, we lay the ground for further research as we begin to illuminate what emotion regulation strategies may be constructive in a sustainable innovation context.

Third, innovation leaders collectively attempt to manage emotions based on a hopeful and overarching constructive metaemotion to fit with a broader set of behaviors in an innovation context. Researchers have been disagreeing whether a metaemotion is indeed an emotion in its pure sense, or if the metaemotion could be considered a self-regulation mechanism (Norman & Furnes, 2016). Although our study does not touch upon the definitional aspects of metaemotions, we find that innovation leaders direct their efforts and attention toward a future desirable goal of contributing to sustainable innovation despite facing distinctive emotional triggers. Thus, our study expands current research by highlighting the centrality of metaemotions in an innovation context, looking particularly at the role of metaemotions in fostering commitment to achieving sustainable innovation.

Another interesting theoretical implication of our third finding relates to our assumption that having the overarching and hopeful metaemotion about a future desirable state, will lead innovation leaders to collectively commit to the achievement of sustainable innovation.

Specifically, this finding is based on the theoretical assumption that individuals will look to similar others for emotionally expressive cues as indicators of how they should feel when faced with an emotionally triggering event (Elfenbein, 2007). Thus, our contribution illuminates how emotional contagion may be central to the innovation process, as we find that innovation leaders who are able to feel positively about having low valent emotions in the short term, may show emotionally expressive cues that others in the organization may register as stimuli for how they themselves should feel and respond in a particular moment. Especially, Elfenbein (2007) argues that emotional contagion effects may be stronger when cognitive reappraisal strategies are involved, as individuals collectively may deploy their attention toward a common goal. Our research suggests that leaders engage in cognitive emotion regulation strategies, however, the study does not specifically touch upon the various aspects of emotional contagion. Rather, we lay the grounds for future research on emotional contagion and raising a collective commitment to achieving sustainable innovation.

Although past research has examined emotions in innovation contexts (Küpers & Weibler, 2006; Vuori & Huy, 2016;2022), investigated leadership influence on innovation outcomes (Lv et al., 2018; Hughes et al., 2018; Knight et al., 2020), or looked at the role of leadership in emotion management (Thiel et al., 2012; Ashkanasy et al., 2017), our study is one of the first to examine the centrality of leadership emotion management in management innovation research, and its proposed relation to committing to achieving sustainable innovation. We expand current research on management innovation by suggesting that the management of emotions is typically a collective effort by multiple leaders, where the overarching hopeful and constructive metaemotion is central in fostering a collective commitment to achieve sustainable innovation. In addition, our contribution also expands research on leadership and innovation in SMEs, as this field of research mostly has investigated large organizations (Bos-Brouwers, 2010).

5.3 Practical implications

Our research investigates innovation leaders in SMEs in the Norwegian energy sector that develops sustainable innovations, and as an overall practical implication of our study, we acknowledge the importance of attending to leadership in managing phase-related emotional triggers to stay committed to achieving sustainable innovation. It is suggested that leaders should know how to manage one's own and other's emotions, particularly in innovation

processes where SME leaders are assumed to be more directly involved, as emotion management may offset negative consequences of emotional responses in an organizational context (Thiel et al., 2012). While some researchers acknowledge the importance of leadership in managing emotions (Ashkanasy et al., 2017; Anderson et al., 2014; Hughes et al., 2018) and achieving sustainable innovation (Nesse & Grepne, 2022), this research is an early contribution to the centrality of emotion management in achieving sustainable innovation in practice.

First, by conducting this study and illuminating leadership engagement in emotion management to foster a collective commitment to achieving sustainable innovation, we raise awareness to the centrality of collective leadership in managing phase-related emotional triggers. An interesting aspect of this study is that raising awareness to the vitality of emotions in an innovation process may help leaders better understand what emotions are and how they may evolve. Thus, by illuminating what emotions may play out in different phases of an innovation process, and what situations are likely to trigger emotions, we suggest that a practical implication of our study is that we raise awareness to the centrality of leaders in managing emotions during highly uncertain innovation processes. Following this awareness, leaders will be more knowledgeable of their role in managing emotions.

Second, we provide innovation leaders with knowledge about specific emotion regulation strategies, which according to Thiel et al., (2012) has been found vital to conduct effective leadership and ensure sustained performance. We imply that providing the innovation leaders with specific emotion regulation strategies may be key in this process, as emotions have been found to interfere with decision-making processes (Vuori & Huy, 2022) and affect behavior (Elfenbein, 2007). Thus, providing knowledge of what may be constructive strategies, may help leaders better navigate the uncertain innovation process. For instance, our findings suggest that leaders make specific efforts to maintain a “stable state of mind” by engaging in reappraisal strategies. Indeed, it appears that this strategy is effective in enduring commitment to their future desirable goal of succeeding with achieving sustainable innovation. We also found that innovation leaders made efforts to modify a future situation, although Thiel et al. (2012) argue that modification strategies may not be as effective as cognitive strategies. This is due to individuals not always having the luxury of specifically selecting what situations they emerge themselves into when participating in uncertain innovation processes (Hülshager & Schewe, 2011; Thiel et al., 2012).

Third, our findings suggest that innovation leaders engage in various emotion regulation strategies after an emotionally triggering event, for instance by suppressing emotions. Although we find that these strategies allowed innovation leaders to maintain a “stable state of mind”, Hülshager and Schewe (2011) argue that these emotion regulation strategies may be draining of mental resources. Engagement in such emotion strategies may have downstream consequences for performance, specifically when it relates to complex decision-making (Hülshager & Schewe, 2011). While the expression of emotions in the workplace, particularly the negative ones, may lead to negative consequences (Elfenbein, 2007), it has been suggested that expressing these emotions may facilitate task performance (Thiel et al., 2012). Our findings suggest that leaders make efforts to regulate their own emotions internally, both the positive and negative ones, and that they do not share their positive emotions with others. Although they make efforts to share and express emotions in others, it appears that they have an ability to “cut” the upturns and downturns to fit with an overarching metaemotion promoting a “stable state of mind”. It appears that this indeed makes them endure the “emotional roller coaster” and potentially ensures their sustained commitment to achieving sustainable innovation. Thus, a practical implication of our study is that we raise awareness to how these strategies may help leaders manage various emotional triggers during the innovation management process.

Fourth, a practical implication of our findings relates to the overarching hopeful and constructive metaemotion that allow innovation leaders to stay committed to achieving sustainable innovation. By raising awareness to the effectiveness of such strategies, a practical implication of our study is that we provide leaders with more knowledge about how metaemotions may positively lead to sustained commitment. Conversely, researchers have been addressing the consequences of engaging in various emotion regulation strategies, suggesting that constantly “monitoring” and altering how one feels to change the initial emotional expression, is likely to drain mental resources and negatively affect well-being and performance (Elfenbein, 2007; Hülshager & Schewe, 2011). This effect is found to be stronger when leaders engage in emotional regulation strategies after an emotionally triggering event. However, it is suggested that engagement in cognitive reappraisal strategies prior to an event may be less mentally draining (Elfenbein, 2007). The field of research and practical aspects of the use of metaemotions is still in its early stages (Norman & Furnes, 2016). However, our findings regarding the centrality of metaemotions in innovation management processes

represent an early contribution to the practical use of metaemotions in such contexts and should be further explored.

Another practical implication related to our third finding concerns the lack of awareness innovation leaders have regarding the effects of emotional contagion in organizational settings. As we find that innovation leaders benefit from engaging in various emotion management strategies to manage different phase-related emotional triggers, we also suggest that leaders will benefit from sharing and exposing emotions in each other as this will serve as emotionally expressive cues for others to learn from. We assume that emotional contagion will be even more relevant as SMEs grow stronger in numbers and acquire more competence. Thus, as a practical implication of our third finding, we raise awareness to the potential benefits of sharing and expressing emotions as this may transfer to others. Innovation leaders are likely to benefit from acknowledging that their emotions and their ability to manage these emotions may influence the SME at large if these strategies are to be shared. We note, however, that this implication may be more advantageous in SMEs where decision-making is more horizontal and less reliant on internal bureaucratic structures, as individuals will be able to learn from each other and pick up on emotionally expressive cues.

5.4 Strengths and limitations

Conducting a multiple case study, our proposed process model of committing to achieving sustainable innovation through a hopeful constructive metaemotion comes with strengths and limitations that presents opportunities for future research.

The most compelling strength of this research is that our thesis constitutes one of the first studies that explore the combined research field of collective leadership, emotion management, and achieving sustainable innovation. Through our study, we begin to illuminate the centrality of leadership in managing emotions to commit to the achievement of sustainable innovation. By providing specific emotion management strategies and raising awareness to the collective aspects of emotions and leadership, our study represents a starting point for future research to further investigate this unexplored field. Further, a strength of our research concerns the methodological choices, and particularly our choice of conducting a multiple case study. First, we ensured credibility and conformability in our study by allowing the informants to talk freely on the research topics and we accounted for their realities as objectively as possible. Second,

we explored four SMEs in the Norwegian energy sector which allowed us to collect qualitative data from various innovation leaders, which ensured a higher transferability of our study compared to conducting the research as a one-case study. Also, as there is a pressuring need to develop sustainable innovations in the energy sector in particular, a strength of our study is that we begin to illuminate how leadership can be developed to support this aim. Although we specifically explore the energy sector, our findings may also be transferable to other innovation settings.

Our research also presents some limitations that we find essential to address. First, although conducting a qualitative case study was favorable, it also limits the transferability of our study compared to quantitative studies that more easily apply to other settings. Second, even though we consider having four companies a strength of our study, exploring one case company could for instance allow us to attain a deeper understanding of how emotions may transfer between members of a team. Third, primarily building our findings section on interpretations of the informants' explicitly expressed statements and emotionally expressive cues, further limits our study's transferability. Thus, we are aware that our ontological, epistemological, and axiological assumptions are present in the research. We consider being two researchers a strength of our study as we have been able to ensure presenting neutralized interpretations. Fourth, by studying emotions in a retrospective manner, we acknowledge that we may not have been able to sufficiently account for the informants' primary emotion at play during critical events, which represents a limitation of our study. Lastly, although we raise awareness to the centrality of metaemotions in an innovation context, the field of research on metaemotions is still in its early stage, and scholars have still not agreed on the definitional aspects concerning this phenomenon. Thus, the proposed relationship between our three key concepts is highly reliant on the hopeful and constructive metaemotion that we assume fuels innovation leaders' collective commitment to achieving sustainable innovation.

5.5 Future research

Research on management innovation, and its antecedents and outcomes, is still in its early stage (Damanpour & Aravind, 2012), specifically when it relates to how leaders manage emotions (Vuori & Huy, 2016;2022) and the use of metaemotions which still represent a nascent field of research (Norman & Furnes, 2016). Thus, we hope that our study of leadership engagement in emotion management during critical phases of the innovation management process will

stimulate future research on this less studied but still highly important aspect of management innovation research to support the achievement of sustainable innovation. The combined field of emotion management, collective leadership, and sustainable innovation offers several directions for future research. For instance, it would be interesting to conduct the same study using a longitudinal design, looking at how emotions are evoked in real time as innovation leaders navigate various emotional triggers in the innovation process. Conducting such a study could potentially contribute to the research field by validating and confirming the suggested relationships in this study.

In addition, our study touches upon the effects of emotional contagion in innovation contexts. Future research could look further into the collective emotion management process and investigate the implications of sharing and expressing emotions of different valence, intensity, and ambivalence. This study suggests that the sharing of emotions would be beneficial for innovation leaders. However, future research should focus on validating this suggestion, and particularly investigate the real consequences and implications of withholding emotions, both the positive and the negative ones. We found that innovation leaders make specific efforts to cut the upturns and downturns they experience while navigating the innovation process. Thus, future research could benefit from investigating if this emotion management strategy is indeed effective and promoting the achievement of sustainable innovation.

6. Conclusion

As the purpose of this thesis being to illuminate a currently nascent field of research, we explored how leaders in critical phases manage emotions during innovation processes to foster commitment to the achievement of sustainable innovation. We reviewed extant theory from leadership, sustainable innovation, and emotion management, and conducted a qualitative multiple case study where we interviewed four SMEs developing environmental technology in the Norwegian energy sector. Our inductive analysis revealed that leadership involves managing emotions elicited by phase-related emotional triggers, and that innovation leaders collectively engage in various emotion management strategies to endure the “emotional roller coaster” of the innovation process. We found that innovation leaders have an overarching hopeful and constructive metaemotion that allows them to change swiftly between emotions, transitioning from a potentially destructive sense of hopelessness to a constructive sense of hopefulness. This metaemotion contributes to the leader’s collective commitment to achieving sustainable innovation. Overall, we contribute to the leadership literature by illuminating the centrality of emotion management in achieving sustainable innovations.

7. References

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8. Appendix

8.1 Consent form

Consent form- participation in research project at NHH

Background and purpose

This research project is part of the RaCE program at SNF and NHH. The purpose is to investigate how Norwegian companies respond to technology-driven change. The main focus is to understand how leadership can be developed to support sustainable innovation, particularly looking at business model experimentation and emotion regulation.

What does participation in the study involve?

The interview will take roughly 45 minutes. If you approve, we will record the interview on audio file and transcribe it afterwards. The audio file will be deleted after transcription, and the transcribed version of the interview will be anonymized.

What happens to the information about you?

All personal information will be treated confidentially, and the information stored with the transcribed version of the interview will not contain a name - but a dedicated code. Names and any contact information, as well as this form, will be kept separate from interview data. Only the project group at NHH / SNF will be able to access the anonymized interviews.

Your company will be anonymized. The project is scheduled to end in December 2022.

Voluntary participation

It is voluntary to participate in the research project, and you can withdraw your consent at any time without giving any reason. If you withdraw, all information about you, and your interview, will be deleted. If you have any questions about the project, you may contact Synnøve Nesse (synnove.nesse@snf.no) for any questions regarding this research.

On behalf of SFN / NHH, NSD - Norwegian Center for Research Data AS has assessed that the processing of personal data in this project is in accordance with the privacy regulations.

Your rights

As long as you can be identified in the data material, you have the right to

- access which personal information is registered about you
- to have personal information about you corrected
- to have personal information about you deleted
- to receive a copy of your personal information (data portability), and
- to send a complaint about the processing of your personal data.

What entitles us to process personal information about you?

We process information about you based on your consent.

Consent to participate in the study

Please reply to the email that you received the consent form from to accept your participation in this study.

(Signed by the informant, date)

8.2 Interview guide

Our aim with this interview is to understand how emotion regulation may influence the process of succeeding with sustainable innovations in the Norwegian Energy sector. This master thesis is part of a larger DiG/RaCE Research Project at the Norwegian School of Economics.

We define emotion regulation as the efforts people make to deal with their own or other's emotions. We hope to be able to ask you questions about your role, other leaders in and around your company and critical points in the sustainable innovation process and ask how you dealt with those situations and how and if emotion regulation may be connected to achieving successful sustainable innovation in your company.

For the purpose of this interview, we would like to address that you have received a consent form prior to taking part in this interview, which states your rights to voluntary participation. In the interview we would like to ask for your consent to record and transcribe your answers and use this in our master thesis for the purpose of generating theory about how leadership can be developed to support sustainable innovation.

The findings from the study will be part of a larger project concerning leadership and sustainable innovation led by our supervisors, researcher/consultant Synnøve Nesse (SNF/AFF) and consultant Anne Line Grepne (AFF) through DIG/SNF which is part of the larger research project RaCE (Radical Technology-Driven Change in Established Firms and LEAD IN (Innovating Leadership to Innovate in Organizations).

First, we see leadership as something that can stem from the CEO, the board of directors, other formal leaders in the firm, or informal leaders or teams in the firm, or even an advisor or more – or an investor.

- (1) What is your role and relationship with the others in your company?
- (2) Can you describe the process in your firm leading to a new sustainable innovation?
- (3) How has leadership changed over time in the process of a new innovation?
- (4) Looking back at your company's ups and downs over the years, can you describe any critical moments or events during this time that you would consider as particularly positive or negative for your company?

- a. Who were influential during these critical moments?
 - b. Any individual or was it a collective effort?
- (5) Critical events tend to evoke feelings- how did you and others feel at that time- and were these feelings visible or expressed or discussed/reacted to in any way?
- (6) How did you deal with these feelings - did you deal with them individually or did you rely on the leader group/board of directors, partners/spouse, or others such as friends, mentors, coaches, formal or informal?
- 1. In what way do you think your ability to regulate/adjust your own emotions during such events has an impact on
 - a. your relationships, for instance with your board, your employees, your customers, key stakeholders
 - b. Process of innovation
 - c. The company's success
 - d. A sustainable innovation outcome
- 2. Anything else you want to add to the topic of leadership, emotions, and sustainable innovation?

8.3 Example quotes from interview data

Additional example quotes

Overarching category	Second order theme	First order code	Quotations from the interview data
Emotional triggers	Phases	Building trust	
		Receiving trust	“That was a very high satisfaction, of course between the team, because that was a very clear goal for us. [...] That was clearly one of the big upturns”. (Informant 1)
		Delivering on promises	<p>“There are always technical setbacks”. (Informant 4)</p> <p>“There are easy to see delays, especially when you are kind of bringing in new technology into a market. There are a lot of hurdles that needs to be passed. That tends to take time”. (Informant 1)</p> <p>“The important thing was to get things done, and we made that happen”. (Informant 5)</p>
Leadership	Phases	Building trust	<p>“The third person had a full-time job elsewhere, so he wasn't able to contribute or spend so much time”. (Informant 7)</p> <p>“I think the plan we decided to pursue [...] was really to establish a business plan and to establish kind of our recruitment plan and capital race plan to support it”. (Informant 1)</p>
		Receiving trust	<p>“We need to be very cautious about who we are hiring. I mean, for the first few people we've been very lucky. [...] Then you have the core energy set in the company, and the values are there. Then it's easier to motivate or get people into the same culture [...] that is actually the key thing”. (Informant 3)</p> <p>“It was so many events and we got more to show, but I couldn't point on anything specific”. (Informant 2).</p> <p>“So, we try to have a lean and transparent organization with kind of structure but not overly structured”. (Informant 1)</p> <p>“That (psychological safety) wasn't in place at the time”. (Informant 2)</p> <p>“[...] and then we run out of money, and I came to the realization that there are some weaknesses, and some parts are immature, so we were not able to attract the right investors. So, we sort of need to go back to the drawing board”. (Informant 7)</p> <p>“I think I am trying to let small decisions run by themselves by the team but, when there is important strategic decision to be taken, it needs a firmer or a more structured involvement”. (Informant 1)</p> <p>“It's never been possible to make a decision without me and CEO's approval. We have always agreed with each other. Sometimes it takes time to get to an agreement. Even though we have gotten many new owners, it would be difficult to make a big decision here without my approval”. (Informant 8)</p>

		Delivering on promises	<p>"The chairman of board was very closely involved in the process. So, he was important and the two others in the administration at that time. It was the current CTO, and the COO and me, so that was teamwork". (Informant 1).</p> <p>"There are pretty easily defined roles here, and [...] it's pretty simple in terms of hierarchy. [...] So, I think that's helpful when you're fairly tight to start with and a fairly small group where information flows very easily. We are a very tight leadership group, so, we really had to stick together". (Informant 6)</p> <p>"It's a pretty knowledgeable group when it comes to how to run the business". (Informant 6)</p> <p>"You know, decision making is heavily discussed among (all departments) of course the board which consists of many experienced people, but also large owners also are directly involved in how to approach these things". (Informant 4)</p>
Emotion Regulation	Regulation before	Self-regulation	<p>"What makes me really happy now is, you always going for something new". (Informant 3)</p> <p>"Well, I'm aware to some degree, so I would say that I do celebrate successes if it's important, but... I am not sure that I'm too good at it, but I'm definitely aware of it". (Informant 5)</p> <p>"We have been around the block a few times before. So, we know what to do. We don't really spend time wondering what to do we know exactly what to do. And I've hired people that knows exactly what to do as well" (Informant 3)</p>
	Regulation after	Self-regulation	"I don't really get that stressful. It never bothered me to have a lot of things to do. I just get tired". (Informant 3)
		Regulating others	<p>"Let's put it this way. I have stopped going out celebrating. I am too old for that. We don't celebrate in a particular way, we don't". (Informant 8)</p> <p>"I'll rather have that beer at home to phrase it like that". (Informant 5)</p> <p>"We have not really had that system in place, but we do support each other. We are a good team, and others can step in and do the job if you don't have the time". (Informant 3)</p> <p>"We're like two old ladies on Facebook, we brag about each other and make cakes and stuff, and usually I say to the CEO at he has worked damn well. I usually make a sketch that he likes and then I get an immediate type of positive response". (Informant 8).</p>

Organizations are increasingly expected to engage in sustainable innovation to remain competitive, and leadership is essential to this process. Specifically, there is a great need for sustainable innovations in the energy sector as it is currently considered fundamentally unsustainable. Due to the volatile, uncertain, complex, and ambiguous nature of the innovation process, leadership is likely to differ from other leadership situations, in that a pivotal function of leadership appears to involve managing emotions during the innovation process. Yet, how multiple innovation leaders engage in emotion management to maintain committed to achieve sustainable innovation represents a nascent field. Thus, we investigate how leaders manage emotions during critical phases of the innovation process to foster commitment to the achievement of sustainable innovations.

We conduct an explorative multiple case study, interviewing leaders in four small-to-medium-sized companies in the Norwegian energy sector. Our qualitative analysis first reveals that leadership involves experiencing sudden shifts in emotions that become particularly salient in three distinct transition phases during the innovation management process. Second, the innovation leaders use a set of specific emotion regulation strategies to navigate the “emotional roller coaster” of the innovation process toward a future desirable goal. Finally, overall, innovation leaders manage their own and others’ emotions, based on an overarching hopeful metaemotion driven by their commitment to the achievement of sustainable innovation.

Through this study, we contribute to the management innovation literature by illuminating how, surprisingly, despite experiencing the innovation phases as an “emotional roller coaster”, leaders manage these emotions overall through an overarching metaemotion. In conjunction with specific emotion regulation strategies, which we also identified that the leaders applied during critical phases of the innovation management process, we specifically find that the metaemotion allows innovation leaders to stay committed to the achievement of sustainable innovation.

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