

**Exploring Knowledge Work: Organizational Practices and Work  
Characteristics in Three Knowledge Work Settings**

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## Summary

In recent decades, the landscapes of work and organizations in developed economies have undergone dramatic changes, including the growth in service- and knowledge-oriented industries. Based on the rapid growth and increasing importance of knowledge work leading scholars have called for research exploring questions such as: What are the salient organizational practices and characteristics in knowledge work settings? To what extent are these organizational practices and work characteristics captured by existing theories and models?

In this PhD research project and thesis I have sought to elucidate these questions through two overall research aims: First, to examine the value of situation-specific and general models of work in knowledge work settings. Second, to develop theory of salient organizational practices and work characteristics in three particular knowledge work settings: universities, police investigative work and large-scale projects in the oil and gas industry. In the thesis I present four papers that contribute to these two overall aims.

In Paper I, we examined to what extent general and situation-specific work environment instruments capture the organizational practices and work characteristics experienced as salient in a university setting. We compared three situation-specific survey instruments (Assessing the climate for creativity [KEYS], Situational Outlook Questionnaire [SOQ], and the Organizational Climate Measure – an adapted version for the university setting [OCM]) and two general survey instruments (the General Nordic Questionnaire for Psychological and Social Factors at Work [QPSNordic] and the Job Diagnostic Survey [JDS]). The findings indicated that the situation-specific instruments KEYS and OCM captured more of the employees' interview statements about the work environment than the general instruments QPSNordic and JDS. As such, the findings support the relevance of situation-specific instruments in the Norwegian university setting.

In Paper II, we investigated how the broader social and economic environment was perceived to affect the work system in a university setting. The findings indicated that a market-oriented model of governance was experienced to have complex negative and positive effects on the work system. The perceived negative effects included stronger management, reduced job security and autonomy, increased demands, and exacerbated intergroup relations, while the perceived positive effects comprised enhanced intra-group interdependence, feedback, and support. In sum, the findings suggest that a market-oriented model of governance could have negative effects on the long-term effectiveness of the work system in this setting.

In Paper III, we aimed to identify climate dimensions experienced as central to project success, and to develop a model of organizational climate in large-scale projects in the oil and gas industry. The findings showed that a climate characterized by a strong focus on a) communication and cooperation with actors in the external environment such as vendors, and b) internal cooperation and communication with other projects and with the line organization was perceived as perceived as critical to project success. We used these findings to develop a situation-specific model of organizational climate for this setting called the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP).

In Paper IV, we aimed to identify a) organizational climate dimensions that are salient for performance in police investigations and b) potential mechanisms of the relationship between climate and investigation performance. The findings indicated that two climate types, a Human Relations climate and a Rational Goal climate, were perceived to enhance police investigation performance. A Human Relations climate was perceived to enhance investigation performance by developing collective human, capital, and by supporting internal and external cooperation and coordination of resources. A Rational Goal climate was experienced to increase investigation performance by encouraging planning, goal-setting, and task focus.

In summary, the studies in this thesis generally support the value of situation-specific survey instruments and models in the university setting, large-scale projects in the oil and gas industry, and to some extent in police investigative work. Moreover, the findings expand our understanding of central organizational practices and work characteristics in the three work settings. Researchers and practitioners are likely to benefit from using the situation-specific models developed in Paper II, III, and IV for further research as well as organizational development processes in these settings. Finally, the studies provide insight into knowledge work more generally as they identify and describe two categories of organizational practices and work characteristics experienced as salient across the three work settings: a) Organizational climate dimensions and social characteristics related to within-group and intergroup cooperation, and b) practices of high-commitment HRM systems. Based on the findings in the papers I outline promising avenues for future research.

## List of Papers

- Paper I** Lone, J. A., Bjørklund, R., Østerud, K. B., Anderssen, L. A., Hoff, T., & Bjørkli, C. A. (2014). Assessing knowledge-intensive work environment: General versus situation-specific instruments. *European Journal of Work and Organizational Psychology, 23*(3), 469-482. doi: 10.1080/1359432X.2012.750449
- Paper II** Lone, J. A., Riege, A. H., Bjørklund, R., Hoff, T., & Bjørkli, C. (2015). The relationship between the broader environment and the work system in a university setting: a systems approach. *Studies in Higher Education, 1-20*. doi: 10.1080/03075079.2015.1034259
- Paper III** Hannevik, M. B., Lone, J. A., Bjørklund, R., Bjørkli, C. A., & Hoff, T. (2014). Organizational climate in large-scale projects in the oil and gas industry: A competing values perspective. *International Journal of Project Management, 32*(4), 687–697. doi: 10.1016/j.ijproman.2013.08.006
- Paper IV** Lone, J.A., Garnås, A., Myklebust, T., Bjørklund, R., Hoff, T., & Bjørkli, C.A. Organizational Climate and Investigation Performance in the Norwegian Police: A Qualitative Study. *Manuscript submitted for publication.*

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## **1. Introduction**

### **1.1. The Current Work Context and the Growth in Knowledge Work**

In recent decades, the landscapes of work and organizations in developed economies have undergone dramatic changes driven by rapid development of digital technology and enhanced global competition (Cordery & Parker, 2012; Fried et al., 2008; Grant, Fried, & Juillerat, 2011; Morgeson & Humphrey, 2008; Parker, Wall, & Cordery, 2001). One of the most prominent changes is the growth in service- and knowledge-oriented industries and the corresponding decline of jobs in the manufacturing sector. Although there is no consensus about the definition of knowledge-oriented industries estimates indicate that they now generally represent between a quarter and a half of all workers in developed economies (Davenport, 2013; Schricke, Zenke, & Stahlecker, 2012).

Several scholars have recently suggested that rapid development within information and communication technology is likely to accelerate these changes, and could have dramatic consequences for employment across a broad range of occupations and industries in the near future (Brynjolfsson & McAfee, 2011, 2014; Cowen, 2013; Frey & Osborne, 2013). For example, a recent influential study estimated that approximately 47 percent of total US employment is at high risk for computerization, meaning that these jobs could be expected to be substituted by computers within the next decade or two (Frey & Osborne, 2013). In Norway, similar analyses indicate that one third of employment is likely to be computerized in the next two decades (Pajarinen, Rouvinen, & Ekeland, 2015). According to these scholars the so-called computerization of jobs is likely to further enhance the importance of jobs in knowledge-oriented industries often referred to as knowledge work (Brynjolfsson & McAfee, 2011, 2014; Cowen, 2013; Frey & Osborne, 2013).

What then, are the consequences of the growth in knowledge work for how work is organized and experienced? There is no consensus about the answer to this question, but there is general agreement that collaboration, adaptability, and problem-solving have become more important, as the main key to success in knowledge work is the creation of innovative products and services (see e.g. Grant, 1996; Kogut & Zander, 1992; Morgeson & Humphrey, 2008). Accordingly, organizations have responded to these changes by introducing new work forms like self-managing teams and flexible work methods such as virtual teams and teleworking. Many organizations have also reduced their hierarchies and increased the autonomy of employees, and thereby enhanced opportunities for role expansion and job crafting. In turn, these organizational practices could have several positive consequences for

how work is experienced, such as enhanced job satisfaction and work motivation (Cordery & Parker, 2012; Fried, Levi, & Laurence, 2008; Grant, Fried, & Juillerat, 2011; Morgeson & Humphrey, 2008; Parker, Wall, & Cordery, 2001). On the other hand, researchers have also argued that the emergence of knowledge work is associated with new demands and challenges such as increased complexity and uncertainty, chronically high workload pressure, and decreased boundaries between work and home, which in turn could enhance work stress and burnout, and diminish creativity (Elsbach & Hargadon, 2006; Fried et al., 2008; Grant, Fried, Parker, & Frese, 2010; Näswall, Hellgren, & Sverke, 2008). In addition, some scholars have observed that different types of controlling organizational practices are increasingly introduced in knowledge work settings such as schools and hospitals to achieve consistency and cost efficiency, and these practices could have negative consequences for motivation and creativity (Davis, 2010; Oldham & Hackman, 2010; Parker, 2014). In sum, knowledge work seems to be associated with new organizational practices and work characteristics that might have both positive and negative implications for satisfaction, motivation, stress, creativity, and performance.

The growth in knowledge work and introduction of new organizational practices and work characteristics has led researchers to question the relevance of the existing body of knowledge in industrial and organizational psychology. Several scholars have recently argued that dominant theories about the nature of work have not kept pace with the changes in the modern work context, and do not sufficiently capture central characteristics of knowledge work (Cordery & Parker, 2012; Fried et al., 2008; Grant et al., 2011; Morgeson & Humphrey, 2006, 2008; Parker et al., 2001). If these claims are valid they have important academic and practical implications. First, from an academic perspective this criticism implies that researchers do not fully capture the reality and complexity of knowledge work, and are not capable of understanding and predicting how organizational practices and work characteristics influence individual attitudes and behavior in knowledge work settings. Second, from a practical perspective, it implies that managers in organizations in knowledge work settings would benefit from increased knowledge about the salient organizational practices and work characteristics that could enhance outcomes such as motivation, well-being, creativity, and work performance.

Consequently, although there is a growing research literature about knowledge work, leading researchers have called for research studies exploring questions such as: What are the salient organizational practices and characteristics in knowledge work? To what extent are these organizational practices and work characteristics captured by existing theories and

models? (Cabrera & Cabrera, 2005; Cordery & Parker, 2012; Fried et al., 2008; Gagne, 2009; Grant et al., 2011; Kelloway & Barling, 2000; Morgeson & Humphrey, 2008; Parker et al., 2001). However, in order to identify and study the salient organizational practices and work characteristics in knowledge work, it is first necessary to clearly define the knowledge work concept.

## **1.2. Definitions of Knowledge Work**

The concept of knowledge work has been widely discussed in publications targeting both academics and practitioners for several decades (Drucker, 1959; Davenport, 2013). There have been numerous attempts to define it, and it is often used interchangeably with other similar concepts such as professional work and creative work (e.g. Alvesson, 2001; Florida, 2002). In a comprehensive literature review Kelloway & Barling (2000) summarized existing definitions, and argued that they could be categorized into four different approaches: Knowledge work as a profession, knowledge work as an individual characteristic, knowledge work as an individual activity, and knowledge work as discretionary use of knowledge (Kelloway & Barling, 2000). The definition of knowledge work has implications for how we study it, which theoretical frameworks that are relevant, and what kind of research questions we ask. Thus, in the following I will discuss these four approaches, and explain why I have chosen the latter to guide the research in this thesis.

First, the most frequent approach to describe knowledge work has been to define it as a profession (Kelloway & Barling, 2000). This approach can be dated back to the “knowledge worker” phrase, coined by Peter Drucker (1959). Scholars using the approach typically define knowledge work by providing a list of professional occupations including engineers, physicians, consultants within law, accounting, management, and advertising, and occupations generally associated with information and communication technology (ICT) or high-technology industries (e.g. Alvesson, 2001; Starbuck, 1992). Some researchers within this approach also include characteristics such as high educational and organizational level rather than naming specific occupations (Kelloway & Barling, 2000). An example of this type of definition is found in an influential study by Janz, Colquitt and Noe (1997), who defined knowledge workers as “high level employees who apply theoretical and analytical knowledge, acquired through formal education” (p. 878). This approach to knowledge work has been criticized for being elitist and ignoring the fact that modern work organization often imply employee participation in planning, decision-making, and creative problem-solving across different occupations and organizational roles. An additional weakness is that it focuses on

past behavior (e.g. education, experience) rather than current behavior and contribution to the organization, and that scholars risk lumping together occupational groups (e.g physicians, scientists, and consultants) that are likely to experience widely different work settings (Kelloway & Barling, 2000).

Second, knowledge work has also been defined through certain individual characteristics. Scholars within this approach describe “knowledge workers” (sometimes also referred to as “creative workers”) as workers that add value economic value through their creative and innovative contributions. (Elsbach & Flynn, 2013; Florida, 2002). A typical example is found in the work of Richard Florida (2002) who defines creative workers as “‘people who add economic value through their creativity’ (Florida, 2002, p. 68), and “[..] exhibit a strong preference for individuality and self-statement” (p. 77). This approach to knowledge work moves the emphasis from occupational titles and past behavior to current behavior. However, it could lead to a simplistic categorization of employees into two classes; those who are creative, and those who are not. Moreover, it is unclear whether knowledge workers are inherently more creative or innovative, or whether their work settings provide more opportunities to express creativity (Kelloway & Barling, 2000).

A third approach has defined knowledge work as an individual activity, emphasizing the daily work behavior of knowledge workers. According to these definitions knowledge workers use their heads and intellectual abilities rather than their hands, use information to make decisions and create ideas, and their work implies high levels of cognitive activity (Kelloway & Barling, 2000). An example of this approach is found in the work of Alvesson (2001) who describes knowledge-intensive firms as “firms where most work is said to be of an intellectual nature” (p. 863). Again, this approach to knowledge work also moves the focus onto current behavior. However, critics have pointed out that most employees use some of their intellectual abilities and process information in their everyday work. Thus, if knowledge work includes all work in which intellectual abilities are used, it could be stated that we all are doing some form of knowledge work, and the concept would be not be very useful.

Finally, building on criticisms of the former definitional strategies, scholars have suggested that categorical approaches to define knowledge work should be discarded, and that knowledge work instead should be understood as a dimension of work that varies along a continuum (Kelloway & Barling, 2000). The main emphasis in this approach is on the discretionary use of knowledge at work. According to Kelloway & Barling (2000) the extent and nature of knowledge use is likely to vary considerably both within an organization and across different occupations and organizations. Moreover, knowledge work comprises four

forms of knowledge use in organizations: a) The creation of new knowledge or innovation, b) the application of existing knowledge to current problems, c) the packaging and teaching (“transmission”) of knowledge, and d) the acquisition of existing knowledge through research and learning (Kelloway & Barling, 2000). An important feature of this definition is that knowledge work is seen as an inherently discretionary behavior. Kelloway & Barling (2000) draw from classic formulations in work and organizational psychology of work performance and suggest that performance in knowledge work = Ability  $\times$  Motivation  $\times$  Opportunity. It follows from this formulation that increasing the knowledge (ability) in an organization does not enhance performance if the employees are not motivated or do not have opportunities to use their knowledge. According to Kelloway & Barling (2000) this is particularly important in the knowledge work setting because it is very difficult to observe or measure the use of knowledge directly. Thus, organizations cannot ensure an efficient use of knowledge through direct control, but should rather focus on stimulating knowledge use by creating motivating and supportive work conditions. Based on these assumptions, Kelloway & Barling (2000) developed a model proposing that knowledge work is stimulated by four organizational practices, leadership, job design, social interaction, and organizational culture, that a) increase employees’ knowledge (ability), b) employees’ motivation to use knowledge, and c) employees’ opportunity to use knowledge.

As mentioned above, how we define knowledge work have implications for how we study it and what kind of research questions we ask. I have chosen the latter definitional approach in this thesis for three reasons: First, it moves the emphasis from individual characteristics on to daily work behavior in organizations, and recognizes that knowledge work could be performed in a broad range of different occupations and organizations. Second, it focuses on the organizational practices and work characteristics that influence knowledge work. Finally, it is based on classic conceptualizations of work performance in work and organizational psychology. As such, it acknowledges that there is a large existing body of knowledge in industrial and organizational psychology that could be used to develop an enhanced understanding about knowledge work (Kelloway & Barling, 2000).

Although existing theory and research could provide a useful fundament for understanding knowledge work, several scholars have recently argued that some of the most dominant models in industrial and organizational psychology (e.g. the Job Characteristics Model and the Demand-control model) were developed in a different context and therefore do not sufficiently capture the important organizational practices and work characteristics of knowledge work (Cordery & Parker, 2012; Fried et al., 2008; Grant et al., 2011; Morgeson &

Humphrey, 2006; 2008; Parker et al., 2001). These models have also been criticized for their underlying assumption that the same work characteristics are salient in widely different work contexts, although research indicates that work characteristics are important in certain work context or jobs, and less so in others (Bakker & Demerouti, 2007; Parker et al., 2001; Sparks & Cooper, 1999). For instance, information processing demands are likely to be salient in knowledge work settings and less relevant in low-skill jobs within service or administrative support. Consequently, researchers have advocated the use of a situation-specific approach, which implies that in order to understand a specific work context such as knowledge work, one must identify the salient work characteristics in that context (Bakker & Demerouti, 2007; Parker et al., 2001; Sparks & Cooper, 1999).

To summarize, this thesis is based on the definition of knowledge work by Kelloway & Barling (2000) and a situation-specific approach. Based on a comprehensive literature review I have identified five streams of research that have made relevant contributions to the understanding of knowledge work: Human Resource Management, leadership and management, organizational climate and organizational culture, work design, and job stress. In the following, I will discuss the organizational practices and work characteristics that have been put forward as salient in knowledge work within each of these research streams, and identify potential research gaps.



## **2. Theory and Research of Knowledge Work: Five Research Streams**

### **2.1. Human Resource Management Practices**

During the last two decades, researchers in Strategic Human Resource Management (SHRM) have sought to understand the relationship between Human Resource Management (HRM) practices and performance in firms. Accordingly, a central question is what role HRM practices play in knowledge work. Indeed, some scholars have suggested that the growth in knowledge work is likely to lead to an even stronger emphasis on Human Resource Management (HRM) in organizations, due to the increased emphasis on creating competitive advantage through enhancing employees' skills, abilities, and motivation (Kelloway & Barling, 2000). Nevertheless, there have been relatively few empirical studies of how HRM practices affect knowledge work. Consequently, our current knowledge is to a large extent based on studies in other work settings. In addition, literature reviews and conceptual models of the role of HRM in knowledge use and knowledge sharing have made relevant contributions that could enhance our understanding of the role of HRM in knowledge work (Cabrera & Cabrera, 2005; Gagne, 2009; Kelloway & Barling, 2000; Wang & Noe, 2010). I will briefly summarize the current status of knowledge about relationships between HRM and central attitudinal and behavioral outcomes, and then describe the contributions of conceptual models of knowledge use and knowledge sharing. Finally, I discuss a small number of recent studies of HRM practices in knowledge work settings in more detail.

Research within the HRM field has traditionally focused on the effects of single HRM practices, but there has been an increased emphasis on bundles of internally coherent HRM practices referred to as high-commitment, high-performance, or high-involvement work systems (Combs, Liu, Hall, & Ketchen, 2006; Jiang, Lepak, Hu, & Baer, 2012; Jiang, Takeuchi, & Lepak, 2013). There is no consensus concerning which practices high-commitment systems consists of, but the following practices are often included: incentive compensation, extensive training, high compensation levels, employee involvement, selective hiring, internal promotion and career development, job design and flexible work arrangements, performance appraisal, grievance procedures, self-managed teams, information sharing, and employment security (Combs et al., 2006; Jiang et al., 2012; Pfeffer, 1998). A vast number of studies have indicated that high-commitment practices are positively related to organizational performance (e.g. Arthur, 1994, Datta, Guthrie, & Wright, 2005; Guthrie, 2001), and this has been recently supported by two comprehensive meta-analyses (Combs et al., 2006; Jiang et al., 2012). Importantly, the results indicate that the effects of internally consistent high-

commitment systems are stronger than the effects of individual high-commitment practices (Combs et al., 2006; Jiang et al., 2012).

Recently, HRM research has focused on on the mediating mechanisms through which HRM systems and practices impact organizational performance outcomes (for a recent review, see e.g. Jiang et al., 2013). A broad range of different theoretical perspectives has been used, but a framework that integrates these perspectives, the so-called AMO framework (abilities, motivation, and opportunities) suggests that high-commitment HRM systems influence organizational performance through its effects on employees' ability, motivation, and opportunity to perform (Appelbaum, Bailey, Berg, & Kalleberg, 2000; Jiang et al., 2012; Jiang et al., 2013). Several empirical studies have applied this framework over the years, and a recent meta-analysis provided support for its main tenets (Jiang et al., 2012).

Conceptual models of knowledge use and knowledge sharing consider the HRM practices in an organization as central antecedents (Cabrera & Cabrera, 2005; Gagne, 2009; Kelloway & Barling, 2000; Wang & Noe, 2010). First, implementing selection practices emphasizing person-organization fit, or the compatibility between the values of the organization and individual is assumed to enhance knowledge sharing in the organization. By identifying and hiring employees that have knowledge sharing as an important value, the organization will increase the number of employees with positive attitudes towards knowledge sharing, more employees are likely to experience that the organization fulfills their needs and to identify themselves with the organization, and it will facilitate the development of a knowledge-sharing culture in the organization. Second, training and development practices emphasizing knowledge sharing are assumed to create and strengthen norms for knowledge sharing as well as increase the social capital in the organization, and thereby stimulate knowledge sharing. Third, performance appraisal and reward systems that recognize and rewarding knowledge sharing are hypothesized to communicate the value of knowledge sharing in the organization and to increase knowledge sharing motivation (Cabrera & Cabrera, 2005; Gagne, 2009; Kelloway & Barling, 2000; Wang & Noe, 2010).

A small number of studies have examined the role of HRM practices and HRM systems in knowledge work settings. According research by Lepak and Snell (1999; 2002) knowledge workers are characterized by high uniqueness and high strategic value, and organizations are therefore likely to use a "knowledge-based employment mode" emphasizing internal development and long-term commitment and a commitment-based HRM system for this group. In addition, three recent studies have examined the relationship between high-commitment HRM systems and performance in knowledge work settings:

First, a study of R&D departments in innovative Spanish companies showed that collaborative HRM practices, with an emphasis on team work and information sharing, were positively associated with unique knowledge, which was positively related to innovative activity, and innovative activity was in turn positively associated with organizational performance (Lopez-Cabrales, Perez-Luño, & Cabrera, 2009). Moreover, knowledge-based HRM practices, with an emphasis on extensive internal training and development of employee skills, were related to valuable knowledge, but valuable knowledge was not related to innovative activity.

Second, Collins & Smith (2006) investigated the relationship between high-commitment HRM systems, social climate, knowledge exchange, and organizational performance. Drawing on theory from the knowledge creation literature (Grant, 1996; Nahapiet & Ghoshal, 1998) and the HRM literature (Bowen & Ostroff, 2004) they argued that commitment-based HRM practices create organizational social climates characterized by trust, cooperation, and shared language. Specifically, these HRM practices are hypothesized to increase trust, cooperation, and shared language by facilitating contact, communication, and understanding across groups in the organization, and by emphasizing group and organizational goals. Thus, these social climates stimulate the development of employees' abilities and motivation to exchange knowledge. In turn, the enhanced knowledge exchange is assumed to increase competitive advantage and organizational performance. The results, based on a sample of technology companies, fully supported the hypotheses, and showed that social climate and knowledge exchange mediated the effects of commitment-based HRM practices on both firm revenue from new products and services and firm sales growth (Collins & Smith, 2006).

Third, Chuang and colleagues (2016) posited that knowledge-intensive teamwork, described as “collaborative activities that locate, share, create, and apply knowledge among a group of people” (p. 2) is central to transform individual knowledge into intellectual capital for the organization, and thereby providing a competitive advantage. Specifically, they argued that a HRM system for knowledge-intensive teamwork include competency-enhancing HR practices (e.g. training in teamwork skills), motivation-enhancing HR practices (e.g. rewarding creativity, and knowledge sharing), and opportunity-enhancing HR practices (e.g. job rotation). This type of HRM system is likely to increase two vital activities in in knowledge-intensive team work; team knowledge acquisition which involves gaining new knowledge from the external environment and transferring it to the team, and team knowledge sharing, which involves transferring knowledge among team members. Based on a sample of

R&D teams, the study showed that knowledge-intensive teamwork HRM systems were associated with higher levels of both team knowledge sharing and team knowledge acquisitions. In addition, the results indicated that the relationship between HRM systems and team knowledge activities was stronger when empowering team leadership was perceived as low, and when the team work involved less tacit knowledge. Consequently, this study shows that commitment-based HRM systems may play an important role in knowledge work settings by stimulating knowledge activities. Moreover, it suggests that contextual factors such as knowledge attributes and leadership style could affect the effectiveness of HRM systems.

Taken together, research within the HRM field has provided four important contributions to our understanding of organizational practices and work characteristics in knowledge work. First, organizations seem to prefer to use commitment-based HRM systems in knowledge work settings. Second, high-commitment HRM practices and systems are positively associated with organizational performance outcomes in knowledge work settings. Third, studies suggest that high-commitment HRM practices affect organizational performance through a) its effects on employees' ability, motivation, and opportunity to perform, b) by fostering organizational climates that stimulate knowledge exchange, and c) by supporting knowledge-intensive team work activities. Fourth, contextual factors such as knowledge tacitness and leadership style may moderate the relationship between HRM systems and organizational performance. Yet, there are still only a small number of empirical studies of HRM systems in knowledge work settings, and the research has primarily focused on high-technology companies and R&D departments. Consequently, future studies are needed to examine to what extent high-commitment practices and systems are salient in a broader range of knowledge work settings.

## **2.2. Leadership and Management Support**

Research concerning the role of leadership in organizational knowledge creation and sharing as well as in creativity and innovation constitute a second research stream of relevance to knowledge work.

First, leadership is assumed to be a strong predictor of organizational knowledge creation and knowledge sharing. Specifically, studies suggest that managerial autonomy support and transformational leadership are beneficial to knowledge creation and knowledge sharing (Cabrera & Cabrera, 2005; Gagne, 2009; Kelloway & Barling, 2000; Von Krogh, Nonaka, & Rechsteiner, 2012; Wang & Noe, 2010). Managerial autonomy support is a group of leadership behaviors that include encouraging initiative, acknowledging the perspectives of

employees, reducing control and pressure, and providing information and resources. Managerial autonomy support is assumed to satisfy the basic psychological needs for autonomy, competence, and relatedness described in self-determination theory (Gagne & Deci, 2005) and thereby increase autonomous motivation to share knowledge, which in turn is expected to enhance knowledge sharing (Gagne, 2009). Furthermore, studies indicate that transformational leadership, consisting of the four core dimensions idealized influence, intellectual stimulation, inspiration motivation, and individualized attention stimulates knowledge creation and knowledge sharing by fostering trust, commitment, and motivation to share knowledge. Research has also suggested that leadership may have indirect effects on knowledge creation and knowledge sharing by working as an important antecedent of knowledge-sharing norms and a knowledge sharing culture (Gagne, 2009; Von Krogh et al., 2012; Wang & Noe, 2010).

Second, scholars have argued that leadership behavior has a strong influence on creativity and innovation in organizations (Mumford, Scott, Gaddis, & Strange, 2002; Shalley & Gibson, 2004). There is substantial evidence that managerial autonomy support, sometimes referred to as supportive leadership, is positively related to creativity through its effects on intrinsic motivation, and that more controlling leadership styles are negatively related to creativity (Shalley & Gibson, 2004). Mumford and colleagues (2002) summarized the body of knowledge concerning leadership of creative people in their model of an integrative leadership style. According to the model, leaders stimulate idea generation through intellectual stimulation and encouragement of new ideas, by providing autonomy to pursue ideas, and by creating a work environment characterized by open communication and diversity. Leaders also provide the necessary structure of the creative process by identifying the projects that should be pursued and by communicating output expectations for these projects. In addition, leaders are important in the idea promotion phase, which involves “selling” the idea in the broader organization in order to gather the necessary support and resources needed to implement the idea (Mumford et al., 2002).

In a recent literature review, Von Krogh and colleagues (2012) identified two major limitations: First, existing research has been dominated by studies focusing on leadership as “[...] a central activity, exercised by a privileged few in the upper echelons of the organization”(Von Krogh, Nonaka, & Rechsteiner, 2012, p.241). Second, no studies have taken an integrated view of the leadership roles necessary in different knowledge processes. Based on this criticism, Von Krogh and colleagues (2012) developed a new framework for situational leadership in organizational knowledge creation that describes how both

centralized and distributed leadership work across three organizational layers; a core layer of informal knowledge creation through collaboration in small groups, a conditional layer in which the resources and context for knowledge creation are provided, and a structural layer which provides a direction and overall structure for knowledge creation in the organization. Moreover, they proposed that future studies should investigate the nature of leadership at different layers in the organization and how it affects the effectiveness of knowledge processes.

In sum, leadership behavior and management support seems to be important in knowledge work settings, both as antecedents of knowledge creation, knowledge sharing and creativity, and as antecedents that foster beneficial types of organizational culture. Nevertheless, additional theory development as well as further empirical studies of leadership in knowledge work is needed.

### **2.3. Organizational Culture and Organizational Climate**

The organizational culture and climate research literature is a third research stream providing relevant contributions to the understanding of knowledge work. The concepts of organizational climate and culture have received considerable attention in the organizational research literature (see e.g. Kuenzi & Schminke, 2009; Schneider, Ehrhart, & Macey, 2013). Studies of organizational culture have mainly been concerned with organizational values, beliefs, and assumptions, while organizational climate research has generally focused on policies, practices and procedures in organizations (Schneider et al., 2013). I will first review research suggesting that specific types and dimensions of organizational culture are salient in knowledge work, and then move on to the role of organizational climate.

**2.3.1. Organizational culture.** The organizational culture could play an important role in knowledge work due to its assumed influence on creativity and innovation and knowledge sharing (Mumford et al., 2002; Tesluk, Farr, & Klein, 1997). Organizational culture could be briefly defined as “the basic assumptions about the world and the values that guide life in organizations” (Schneider et al., 2013, p.361). Studies of organizational culture have mainly been concerned with organizational values, beliefs, and assumptions, while climate research has emphasized organizational practices and procedures. As such, the organizational climate could be understood as the behavioral manifestation of the values and beliefs that constitute the organizational culture (Schein, 1985; Schneider et al., 2013). Many empirical studies and literature reviews do not clearly distinguish between climate and culture, and there is therefore considerable overlap with the research literature on climate for

creativity and innovation (Mumford et al., 2002). Yet, two areas of research suggest that organizational culture is salient in knowledge work: Studies of organizational culture as a predictor of knowledge use and knowledge sharing, and studies of organizational culture as an antecedent to creativity and innovation.

Several researchers have argued that the organizational culture is important in knowledge work settings, because it facilitates knowledge sharing and dissemination (Cabrera & Cabrera, 2005; Gagne, 2009; Janz & Prasarnphanich, 2003; Kelloway & Barling, 2000; Wang & Noe, 2010). Put briefly, knowledge sharing cultures are argued to be characterized by a) strong norms that emphasize, encourage and reward knowledge sharing, b) trust, openness, and cooperation which motivates knowledge sharing and alleviate its potentially negative effects, c) employee support which facilitates commitment to the organization and motivates knowledge sharing, and d) autonomy which encourage cooperative learning and knowledge sharing. Some studies have supported the importance of these cultural characteristics (e.g. Janz & Prasarnphanich, 2003; Park, Ribière, & Schulte, 2004), but additional studies are needed to illuminate the relationship between organizational culture and knowledge sharing (Wang & Noe, 2010).

Scholars have also proposed that organizational culture is an important antecedent to creativity and innovation (e.g. Cameron & Quinn, 2011; Mumford et al., 2002; Tesluk et al., 1997), exemplified by the integrated model of organizational culture and climate for creativity developed by Tesluk and colleagues (1997). The model posit that an organizational culture consisting of values, beliefs and norms that support creativity (e.g. risk-taking) will be reflected by organizational practices, structures and work designs, and arrangements of the physical environment. These factors are in turn expected to create an organizational climate for creativity which facilitates creativity. Providing some support for these hypotheses, studies indicate that an organizational culture that motivates and encourages the employees to search for opportunities to be creative by a supporting a diversity of beliefs, free exchange of information, open questioning, and change is positively related to creativity and innovation (Mumford et al., 2002; Tesluk et al., 1997).

To summarize, organizational culture could be expected to play an important role in knowledge work, both by influencing critical outcomes such as knowledge sharing and creativity, but also by working as an antecedent of organizational climates.

**2.3.2. Organizational climate.** Studies show that organizational climate is linked to individual attitudes (satisfaction, commitment, and turnover intentions), behaviors (absenteeism, Organizational Citizenship Behaviors), and job performance, as well as specific

and broad unit-level outcomes (service, safety, innovation, performance, effectiveness) (Carr, Schmidt, Ford, & DeShon, 2003; Hartnell et al., 2011; Kuenzi & Schminke, 2009, Schneider et al., 2013). Within the climate research literature the distinction between global climate and so-called focused or domain-specific climate approaches to climate has been a central discussion. Global climate is defined as the shared perceptions regarding the policies, practices, and procedures that an organization expects, supports, and rewards (Schneider & Reichers, 1983; Kuenzi & Schminke, 2009), while focused climates are related to a specific strategic focus, such as climates for creativity (Amabile et al., 1996), innovation (Anderson & West, 1998), service (Schneider, White, & Paul, 1998) and safety (Zohar & Luria, 2005). Focused climates are considered the best predictors for specific strategic outcomes, whereas global climate is assumed to be a better predictor of broad outcomes such as work-unit performance (Carr et al., 2003, Kuenzi, 2008). Global climate also seems to work as a foundation on which focused climates are built (Kuenzi & Schminke, 2009, Schneider et al., 2013). Hence, researchers interested in specific outcomes should use focused climate, and scholars interested in global outcomes should study global climate (Kuenzi & Schminke, 2009). Creativity and innovation are two specific outcomes considered as vital in knowledge work. Hence, it is reasonable to assume that organizational climates for creativity and innovation are particularly relevant in knowledge work settings.

**2.3.2.1. Climate for creativity and innovation.** Researchers have developed several models of climate for creativity and innovation drawing from theories of intrinsic motivation and creativity (Amabile et al 1996), team work (Anderson & West, 1998), and organizational climate (Ekvall, 1996; Isaksen, Lauer & Ekvall, 2001). These models posit that shared perceptions of specific organizational practices and procedures, referred to as organizational climate dimensions, foster and stifle creativity and innovation in organizations. For instance, Amabile and colleagues (1996) proposed that a creative climate consisted of eight climate dimensions representing encouragement of and support for creativity in the organization (organizational encouragement), support for autonomous and challenging work (e.g. autonomy), resources supporting innovation (e.g sufficient time), and impediments to creativity (e.g. workload pressure).

Two recent reviews by Hunter and colleagues (2005; 2007) show that climate dimensions predict levels of creativity and innovation and that instruments for assessing creative and innovative climate can be successfully used to develop interventions that stimulate creativity and innovation (Hunter, Bedell, & Mumford, 2005; 2007). Specifically, the most salient climate dimensions include positive interpersonal exchange, intellectual



stimulation, challenge, flexibility and risk-taking, and top management support. Interestingly, the reviews suggest that these climate dimensions were particularly strong predictors of creative performance in jobs requiring creativity, in organizations with a high degree of professionalism and knowledge-based work, and in turbulent, high-pressure, competitive business environments emphasizing innovation.

**2.3.2.2. Global climate.** As mentioned above, global organizational climate seems to work as a foundation on which focused climates are built (Kuenzi & Schminke, 2009, Schneider et al., 2013). Based on this reasoning scholars have recently proposed that climates for creativity and innovation mediate the relationship between global climates and creativity/innovation (Kuenzi, 2008; Kuenzi & Schminke, 2009, Schneider et al., 2013). Few empirical studies have examined these hypotheses, but a recent study by Kuenzi (2008) elucidated this relationship by developing and testing an integrative model that included both global climate and focused climates (training, service, safety, innovation). In the integrative model global climate was conceptualized through the Competing Values Framework (Quinn & Rohrbaugh, 1983; Cameron & Quinn, 2011), originally developed by Quinn and colleagues (Quinn and Rohrbaugh, 1983). The Competing Values Framework is organized along two fundamental dimensions – flexibility versus control and internal versus external orientation, and consists of four quadrants that represent four different types of global climate (Kuenzi, 2008): The human relations approach (flexibility and internal focus) which emphasizes the cohesion and morale of employees within an organization as means, and human resource development as an end. The open systems model (flexibility and external focus) which emphasizes flexibility and readiness as means, and growth, resource acquisition, and external support as ends. The internal process approach (control and internal focus) emphasizes information management and communication as means, and stability and control as ends. The rational goal approach (control and external focus) emphasizes planning and goal setting as means, and productivity and efficiency as ends (Quinn and Rohrbaugh, 1983). Kuenzi (2008) tested the integrative model by investigating the relationships between global climates (human relations, open systems, internal process, rational goal), focused climates (e.g. innovation climate), specific outcomes (e.g. innovation), and global outcomes (e.g. departmental performance) in a broad sample of US organizations. The results showed that climate for innovation were more strongly related to innovation than global climate, and that global climate was more strongly related to global outcomes such departmental performance. The findings also indicated that global climate was an antecedent to climate for innovation, and that climate for innovation mediated the relationship between global climates and

innovation. Specifically, open systems climate and human relations climate were most strongly related to innovation climate, which was in turn related to innovation (Kuenzi, 2008).

In sum, both focused climates for creativity, innovation, and motivation, as well as global climates are likely to play important roles in knowledge work settings. In short, focused climates are practices that stimulate creativity, innovation, and knowledge sharing, whereas global climates seem to provide the broader foundations on which these practices are built. However, there is generally a scarcity of research that has investigated the consequences of global climates in knowledge work settings. In particular, there is a need for studies that simultaneously study the salience of global and focused climates.

#### **2.4. Work Design**

Work design is the fourth research stream that could elucidate salient organizational practices and work characteristics in knowledge work (for a recent review of work design, see Cordery & Parker, 2012). The dominant theoretical model in work design the past four decades has been Hackman and Oldham's (1976, 1980) Job Characteristics Model (Morgeson & Humphrey, 2008). The essence of the Job Characteristics Model (JCM) is that jobs can be described along the five core job characteristics task significance, task identity, skill variety, autonomy, and job feedback. These core characteristics are assumed to increase three critical psychological states, experienced meaningfulness, experienced responsibility, and knowledge of results, which in turn are hypothesized to enhance job satisfaction, intrinsic motivation, and performance, and to reduce turnover and absenteeism (Hackman & Oldham, 1976, 1980). Put briefly, the positive relationship between the five job characteristics and attitudinal outcomes has generally been supported in empirical studies and comprehensive meta-analyses (Fried & Ferris, 1987; Humphrey, Nahrgang, & Morgeson, 2007).

More recently, the Job Characteristics Model has been criticized by several leading scholars within the work design field (Cordery & Parker, 2012; Grant, 2007; Grant et al., 2011; Humphrey et al., 2007; Morgeson & Humphrey, 2006, 2008; Parker et al., 2001). These researchers argued that traditional work design models such as the JCM do not capture the complexity of the modern work context, and have developed new theoretical frameworks in response to the changing nature of work. These recent theoretical frameworks are highly relevant to enhance our understanding of salient organizational practices and work characteristics in knowledge work as they a) identify an expanded range of task, knowledge, social and contextual work characteristics relevant in the current work context, and b) suggest that the salience of different work characteristics depend on the organizational context.

The new theoretical frameworks make an important contribution by incorporating an expanded range of work characteristics. Whereas the Job Characteristics Model primarily emphasizes features of the task environment called task characteristics, the recent frameworks also recognize the relevance of the social, physical, and organizational environments. As such, they suggest that work characteristics can be organized into task, social, and contextual characteristics (Cordery & Parker, 2012; Morgeson & Humphrey, 2006; 2008). Task characteristics originate from the tasks, activities, and duties of the job and/or role, and include for instance autonomy as well as the other characteristics described by the JCM. Studies show that task characteristics are consistent positively associated with job satisfaction, work motivation and performance (Fried & Ferris, 1987; Humphrey et al., 2007), and they are generally expected to have these effects also in knowledge work settings (Fried et al., 2001; Parker et al., 2001). Indeed, several scholars have suggested that task characteristics such as autonomy may be particularly salient in knowledge work settings (Grant et al., 2011; Parker et al., 2001). Providing support for this argument, several studies have shown that task characteristics such as autonomy are positively related to critical outcomes in knowledge work such as knowledge-sharing, creativity, and innovation (Cabrera & Cabrera, 2005; Gagne, 2009; Kelloway & Barling, 2000; Shalley & Gibson, 2004).

In addition to the traditional task characteristics, the growth in knowledge work have created jobs that emphasize use of complex information technology and problem-solving, and has as a result led to increased knowledge demands. These so-called knowledge characteristics reflect the demands for knowledge, skills, and abilities in a job. Morgeson and colleagues (2006) have proposed that there are four central knowledge characteristics: problem-solving - the extent to which a job requires the production of unique solutions or ideas; job complexity - the extent to which the tasks in a job are complicated; information processing - the extent to which a job necessitates focusing on and processing information; skill variety- the extent to which a job requires an individual to use a variety of different skills; and specialization – the extent to which a job involves specialized tasks or requires specialized knowledge and skills. These knowledge characteristics are hypothesized to lead to more challenging and interesting work, to increase outcomes such as job satisfaction, intrinsic motivation, and in turn enhance job performance. On the other hand, knowledge work characteristics are also expected to have negative consequences for well-being by taxing cognitive resources and increasing stress and perceptions of overload (Morgeson & Humphrey, 2006; Humphrey et al., 2007). A recent comprehensive meta-analysis of task, knowledge, social, and contextual work characteristics by Humphrey and colleagues (2007)

provided some support for the importance of knowledge work characteristics. The results showed that job complexity and information-processing were positively related to job satisfaction and that job complexity was positively associated with overload. However, the analyses only included a small number of studies for both work characteristics, and there were not enough studies to draw conclusions about the other knowledge characteristics.

In addition to task and knowledge characteristics, recent work design frameworks also include social characteristics that arise from the social interactions and relationships in jobs. Some of the most social characteristics include interdependence, social support, feedback from others, and interaction outside the organization. The meta-analysis by Humphrey and colleagues (2007) showed that the first four of these social characteristics explained incremental variances beyond the task characteristics in outcome variables such as job satisfaction, organizational commitment, turnover intentions, and perceived job performance. Because knowledge work often involves extensive collaboration and is organized in self-managing teams it is highly likely that social characteristics play an important role in this setting. Specifically, several scholars have asserted that jobs in knowledge work are likely to be more interdependent and embedded in interpersonal relationships (Grant, 1996; Grant et al., 2011; Morgeson & Humphrey, 2008). There are few studies of social characteristics in knowledge work settings, but a small number of studies of knowledge team work effectiveness suggest that interdependence is positively associated with team satisfaction, team job motivation, and team performance, but could also reduce the effect of team autonomy on team job motivation (Campion, Papper, & Medsker, 1996; Janz et al., 1997).

The inclusion of the third category of work characteristics, contextual characteristics, is based on the argument that the experience of work is influenced by aspects of its broader physical and organizational environment. Specifically, the systems approach suggests that the work organization in a particular organization (“the work system”) results from a complex interplay between different “subsystems” in the organization, including technology, HRM practices, leadership behavior, work content, and employee characteristics. Furthermore, this work system interacts with its surrounding social, technological, and economic environment (see e.g. Cordery & Parker, 2007; Cordery & Parker, 2012). The contextual work characteristics included in recent models comprise physical workplace features, leadership, technological complexity, ergonomics, human resource management policies and practices, and organizational structure and design (Cordery & Parker, 2007; 2012; Morgeson & Humphrey, 2006; 2008). Studies show that contextual work characteristics are related to important attitudinal and behavioral outcomes and can influence and interact with task and

social work characteristics (Cordery & Parker, 2012; Humphrey et al., 2007; Morgeson & Humphrey, 2008). In knowledge work settings, this implies for example that the effectiveness of self-managing teams is dependent on supportive HRM systems with extensive information sharing and team-oriented rewards (Chuang et al., 2016), and that organizational practices such as formalization and direct supervision could be associated with perceptions of reduced autonomy (Briscoe, 2007; Yeh, 1996).

Taken together, work design theory and research has made three important contributions to our understanding of knowledge work: First, it suggests that several traditional work characteristics are relevant also in knowledge work settings. Second, it has identified new work characteristics that are likely to be particularly salient in knowledge work. Third, recent work design theory implies that an understanding of knowledge work must include an understanding of the organizational context and broader environment in which it takes place. Despite these contributions, there is still scarce research of work design issues in knowledge work, and empirical studies are needed both to examine the relevance of existing work characteristics and to identify new and salient work characteristics (Cordery & Parker, 2012; Fried et al., 2008; Grant et al., 2011).

## **2.5. Job Stress: Demands and Resources in Knowledge Work**

The job stress research literature constitutes a fifth research stream of relevance to understand organizational practices and work characteristics in knowledge work (for a recent review, see e.g. Bakker & Demerouti, 2014). The job stress research literature has during the past decades been dominated by two models, the demand-control-(support) model (Karasek, 1979; Karasek & Theorell, 1998) and the effort-reward imbalance model (Siegrist, 1996). These models, and particularly the demand-control model, have generally received empirical support but have also lately been criticized for their lacking ability to capture the nature of knowledge work, their one-sidedness (focusing primarily on job stress and not motivation), simplicity (including only a small number of work characteristics), and static character (assuming that the same work characteristics are salient in all jobs) (Bakker & Demerouti, 2014).

The Job Demands–Resources (JD–R) model was developed by Bakker and colleagues to address these shortcomings (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). According to the JD–R model, all jobs have their own risk factors that can be grouped in two general categories, job demands - “physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological

(cognitive and emotional) effort or skills”; and job resources - “physical, psychological, social, or organizational aspects of the job that are either/or: a) functional in achieving work goals, b) reduce job demands and the associated physiological and psychological costs, c) stimulate personal growth, learning, and development (Bakker & Demerouti, 2007, p. 307).

The JD-R model proposes that job demands are initiators of a health impairment process which could lead to burnout and reduced health and have negative effects on organizational outcomes, while job resources are initiators of a motivational process that could lead to work engagement and have positive effects on organizational outcomes. Moreover, job resources are hypothesized to buffer the impact of job demands on health impairment and burnout (Bakker & Demerouti, 2007). A growing number of studies have shown that the model can be used to predict burnout and work engagement, as well as organizational outcomes such as sickness absenteeism and job performance, and also supported the hypothesized interaction between demands and resources (Bakker & Demerouti, 2007; Crawford et al., 2010; Nahrgang, Morgeson, & Hofmann, 2011).

By using the JD-R as perspective to understand knowledge work, it becomes important to identify the demands and resources that are salient in the knowledge work context and a growing number of studies have followed this research agenda. Research has generally indicated that occupations in knowledge work settings often are associated with beneficial job resources such as autonomy, job complexity, skill variety, and opportunities for learning (Morgeson & Humphrey, 2006; Obschonka, Silbereisen, & Wasilewski, 2012; Schieman & Young, 2010). Moreover, it has also been suggested that creative work in itself could be considered as a job resource because it stimulates learning and development. Consistent with this hypothesis, studies have suggested that creative work is related to positive psychosocial and health outcomes (Mirowsky & Ross, 2007).

On the other hand, scholars have argued that the new working life and the growth in knowledge work have both increased existing job demands and introduced new demands (Fried et al., 2008; Grant et al., 2011; Näswall et al., 2008; Schieman & Young, 2010 ). According to these scholars, modern work in general, and knowledge work in particular could be described as “boundaryless work” (e.g. ). This concept refers to a shift from the traditional objective regulation towards more flexible and subjective regulation of work. Boundaryless work implies increased flexibility and autonomy for the employees, but also less clear tasks and goals, and therefore increased complexity and uncertainty, as well as enhanced demands for responsibility, independence and self-direction. As such, it has been suggested that the increase in autonomy and job complexity, which are generally considered as vital job

resources, under these circumstances could be perceived as a burden and lead to increased job stress (Näswall et al., 2008; Schieman & Young, 2010). Moreover, work is now less dependent on being carried out at a specific place and a specific time, which have blurred the boundaries between work and non-work. Another potential threat that has been described as part of modern work is the so-called intensification of work, which refers to the increased demands for pace and efficiency (Näswall et al., 2008). Finally, controlling organizational practices are increasingly introduced in knowledge work settings such as schools and hospitals to achieve consistency and cost efficiency (Davis, 2010; Oldham & Hackman, 2010; Parker, 2014). Taken together, these new demands could potentially have negative effects by enhancing work stress and burnout, and diminishing creativity (Elsbach & Hargadon, 2006; Fried et al., 2008; Grant et al., 2011; Kubicek, Paškvan, & Korunka, 2015; Näswall et al., 2008; Parker, 2014).

Based on these observations of modern work and knowledge work, a number of recent studies have investigated the influence of both traditional and new demands in knowledge work settings. First, research suggests that occupations with higher social status, including typical knowledge work settings, are accompanied by greater job demands such as responsibility and workload. These job demands seem to be increasing and are in turn associated with higher levels of work family conflicts and job stress (e.g. Schieman & Young, 2010). Yet, these studies also suggest that workers in knowledge work settings seem to experience fewer threats (e.g. labor market uncertainty) and more positive challenges (e.g. job-related learning) associated with the changes in the landscape of work, and to still be in the most privileged group of workers (Obschonka et al., 2010; Schieman & Young, 2010). Second, a few studies have shown that traditional job demands such as workload, role conflict, and role ambiguity seem to be relevant in a broad range of knowledge work settings as they are associated with outcomes such as satisfaction, commitment, cognitive stress, mental health, and performance (Albertsen, Rugulies, Garde, & Burr, 2010; Näswall et al., 2008). Third, these studies also suggest the salience of competency demands, task completion demands, and task quality ambiguity, as they explained incremental variance in satisfaction, commitment, mental health, and performance (Näswall et al., 2008).

Taken together, the job stress research literature has identified both job resources and job demands that could be expected to be salient in knowledge work settings. Studies indicate that although knowledge work often is associated with several beneficial job resources, it also seems to be accompanied by increasing job demands. Furthermore, an important implication of the JD-R model is that the salient organizational practices and work characteristics are

likely to differ between knowledge work settings. Based on this reasoning, it is therefore necessary to identify the salient job resources and job demands in specific knowledge work settings in order to enhance our understanding of knowledge work.

## **2.6. Research Gaps and Limitations of Existing Research**

I have now summarized five streams of research about organizational practices and work characteristics that could be expected to be central in knowledge work settings. Based on this literature review I have identified four important research gaps in our understanding about knowledge work.

First, theories and models of knowledge work assumes that it is somehow different from other types of work, and that these differences have implications for which organizational practices and work characteristics that are salient in this setting (Kelloway & Barling, 2000). This assumption is line with a situation-specific approach to work, which proposes that organizational practices and work characteristics are more or less relevant in different jobs and work settings (e.g. Bakker & Demerouti, 2007; Parker et al., 2001; Sparks & Cooper, 1999). However, few studies have compared the explanatory power of general and more situation-specific models in particular work settings (see e.g. Sparks & Cooper, 1999; Van Veldhoven et al., 2005). Consequently, it is important to test the relevance of both established general models as well as situation-specific models of work in different knowledge work settings. Models that include organizational practices and characteristics assumed to be particularly salient in knowledge work settings could be expected to have more explanatory power than established models, or should at least explain additional variance. If they do not, this suggests either that they do not capture the central situation-specific characteristics or that knowledge work may not be that different from other work settings.

Second, recent theories within both the work design and HRM literatures take a systems approach to describe the factors that influence the organization of work in different organizations (Cordery & Parker, 2007; 2012; Morgeson & Humphrey, 2008). Yet, there are so far few examples of studies of knowledge work that have used a systems perspective, which emphasizes both the interplay between the different subsystems in the work system and the interplay between the work system and the broader social, economic and technological environment of the organization. Existing research has mainly investigated one specific group of organizational practices and work characteristics, such as high-commitment HRM practices, task characteristics (e.g. autonomy) or job demands, rather than looking at the interplay between different organizational practices and work characteristics. Moreover, only a limited



number of studies have examined the role of the organizational context and the broader environment for work organization in knowledge work settings (for exceptions see e.g. Briscoe, 2007; Hempel, Zhang, & Han, 2012; Janz et al., 1997; Kinman, Jones, & Kinman, 2006; Yeh, 1996). There are reasons to assume that the organizational context is of particular salience in knowledge work settings, as scholars recently have observed that a range of controlling organizational practices are increasingly introduced in knowledge work settings to achieve consistency and cost efficiency (Davis, 2010; Oldham & Hackman, 2010; Parker, 2014). Hence, research in knowledge work settings should both investigate the interplay between different subsystems as well as the interplay between the broader environment and the work system (Cordery & Parker, 2012; Grant et al., 2011; Parker, 2014).

Third, studies of knowledge work have mainly focused on R&D units, information technology jobs, and technology companies within the private sector. Accordingly, studies in other knowledge work settings are needed. Specifically, several scholars have argued that work in public sector organizations such as universities, schools, hospitals, and the police could be considered as knowledge work because the main activity is to develop and provide knowledge (Luen & Al-Hawamdeh, 2001; Willem & Buelens, 2007). Furthermore, there has been scarce theory development and empirical studies of organizational practices and work characteristics in knowledge-intensive teamwork and project work settings, although teamwork and projects are central ways of organizing knowledge work (Amabile et al, 1996; Chuang et al., 2016; Jackson, Chuang, Harden, Jiang, & Joseph, 2006). In sum, studies of the salient organizational practices and work characteristics in these settings could provide valuable contributions to our understanding of knowledge work.

Finally, studies of knowledge work have mainly used quantitative survey methods to deductively test hypotheses. However, several scholars have argued that the landscapes of work have changed, and that we lack an understanding of new work settings such as knowledge work (Barley & Kunda, 2001; Grant et al., 2011; Parker, 2014). For instance Barley & Kunda (2001) stated that “[..] the dearth of data on what people actually do—the skills, knowledge, and practices that comprise their routine work—leaves us with increasingly anachronistic theories and outdated images of work and how it is organized” (p. 90). As such, these researchers suggest that there is a need for theory development rather than additional theory testing. Qualitative research is particularly suitable for this purpose because it occurs in the natural setting of the organization and originates from the participants’ perceptions (Barley & Kunda, 2001; Grant et al., 2011; Parker, 2014). Consequently, qualitative research designs should be used to identify new organizational practices and work characteristics that

are salient in knowledge work, and to develop new theory for particular knowledge work settings (Grant et al., 2011; Parker, 2014).

### **3. Research Aims**

The thesis had two main aims based on the research gaps identified above: The first aim was to examine the value of situation-specific and general models of work in knowledge work settings. The second aim was to develop new theory of salient organizational practices and work characteristics in three specific knowledge work settings: Universities and in police investigative work, both public sector settings; and in large-scale projects in the oil and gas industry, representing a knowledge-intensive project work setting. In the following, I describe how these two research aims were implemented through the specific research aims of the four individual papers.

#### **3.1. Paper I**

The aim of the first study was to examine to what extent general and situation-specific work environment instruments capture the organizational practices and work characteristics experienced as salient in a university setting. We compared three situation-specific instruments comprising work characteristics assumed to have particular relevance in knowledge work settings (Assessing the climate for creativity [KEYS], Situational Outlook Questionnaire [SOQ], and the Organizational Climate Measure – an adapted version for the university setting [OCM]) and two general instruments consisting of work characteristics assumed to be relevant in a wide range of contexts (the General Nordic Questionnaire for Psychological and Social Factors at Work [QPSNordic] and the Job Diagnostic Survey [JDS]). We expected that the situation-specific instruments would cover more of the employees' perceptions of the work environment than the general instruments.

#### **3.2. Paper II**

The aim of the second study was to investigate how the broader social and economic environment is experienced to affect the work system (i.e. the work design configuration) in a university setting. We applied a qualitative theory-elaboration approach (Lee, Mitchell, and Sablinski, 1999) and used the systems approach to work organization by Cordery and Parker (2007) to drive the model development.

#### **3.3. Paper III**

The aim of the third study was twofold: First, to identify climate dimensions experienced as central to project success, and second to develop a model of organizational climate in large-scale projects in the oil and gas industry. We used two existing models of organizational climate to drive the analyses and theory development: a research-based global

model (the Organizational Climate Measure – based on the Competing Values Framework by Quinn and Rohrbaugh, 1983) and a domain-specific model (the People Project Survey) developed locally by the organization.

### **3.4. Paper IV**

The aim of the fourth study was twofold: To identify organizational climate dimensions that might have implications for performance in police investigations, and to identify potential mechanisms of the relationship between organizational climate and investigation performance. We analyzed the data by using a model of global climate, the Organizational Climate Measure, which is based on the Competing Values Framework (Quinn & Rohrbaugh, 1983).

In the following section I will describe the methods and results for the four studies in the thesis.

## **4. Methods and Results**

In this section I will discuss the methods and summarize the results for the four studies in the thesis. I start by discussing the rationale for choosing a qualitative research design in all four studies. We used open-ended interviews in all four papers and content analysis (Paper I, III and IV) and thematic analysis (Paper II, III, IV) in three papers each. Thus, I provide a general discussion of the rationale and the procedures for these methods. Subsequently, I elaborate on the specific methods and summarize the findings for each individual study. Because I have used partly overlapping samples in Paper I and II, I describe the university setting in the summary of Paper I. Finally, I summarize the main methodological considerations and findings for each individual paper. Readers seeking detailed statistical descriptions of the findings should read the papers placed at the end of the thesis.

### **4.1. Methodological Rationale and Procedures**

**4.1.1. Qualitative research design.** As discussed above, several researchers have proposed that qualitative research design should be used to identify new organizational practices, work characteristics, and mechanisms that are salient in new work settings such as knowledge work, and to inductively build theory for these settings (Barley & Kunda, 2001; Grant et al., 2011; Parker, 2014). Thus, in this thesis I aimed to use a qualitative research design to provide contextualized and rich information about different knowledge work settings based on the experiences of people actually working in them. Moreover, I wanted to build theory about the salient organizational practices and the mechanisms in specific knowledge work settings.

Concerning the particular type of qualitative research design, studies in qualitative research within organizational psychology have used a broad range of research designs such as case study research, ethnography, interview studies, and grounded theory (Lee, Mitchell, & Sablinski, 1999; Mazzola, Schonfeld, & Spector, 2011). In this thesis I have chosen to use open-ended interviews. This design is recommended when the underlying theories in the field need further development (Lee et al., 1999; Mazzola et al., 2011), and is well suited to identify and describe new organizational practices, work characteristics, and mechanisms in particular work settings (Bakker & Demerouti, 2007; Grant et al., 2011; Mazzola et al., 2011). It is therefore appropriate for the overall purpose as well as the specific aims of the studies in the thesis. Studies in qualitative research can be categorized according to three main purposes: Theory generation, theory elaboration, and theory testing (Lee et al., 1999). Theory generation occurs when the design of the study generates new theory that results in testable research

propositions. Theory elaboration occurs when the design of the study is driven by an existing model or theory, and typically does not include formal hypotheses. Theory testing occurs when formal hypotheses from existing theory determines the design of the study (Lee et al., 1999). In Paper I the purpose was theory testing of situation-specific and general instruments of the work environment, while the purpose in paper II, III and IV was theory elaboration, in which we used extant models within organizational climate and work design research to develop new theory in three knowledge work settings.

In the following, I discuss the rationale for the open-ended interviews, the content analyses, and the thematic analyses, and describe the specific procedures for these methods in more detail.

**4.1.2. Open-ended interviews.** The open-ended interview approach in all studies in this thesis was based on the combination of two frameworks: First, all interviews followed the PEACE model, which is based on cognitive interview procedures (Clarke & Milne, 2001; Milne & Bull, 1999). PEACE is a mnemonic for the five stages in the model: P - Planning and preparation, E - Engage and explain, A -Account, C - Closure and, E - Evaluation (of the interview and the interviewer's performance). The main advantage of the PEACE model is that facilitates open-ended, detailed accounts from interviewees in different situations, although it was originally developed for police investigative interviews (Clarke & Milne, 2001; Milne & Bull, 1999). Consequently, we considered it suitable for the methodological approach in the present study.

Second, the interview questions were open-ended and followed a modified SWOT format, referring to strengths, weaknesses, opportunities, and threats. The original SWOT format has three dimensions: positive-negative and past-future and internal-external, while the modified SWOT format provides a certain structure to the participants' reflections along the two dimensions of positive-negative and past-future. Compared to the original SWOT format the modified format is more open, because it does not require that strengths and weaknesses must be internal factors, or that opportunities and threats must be external factors. SWOT analysis has been mostly used for strategic analysis and planning in organizations (Helms & Nixon, 2010), but we applied it as an underlying framework to stimulate a broad range of reflections on specific issues (e.g. the work environment, police investigative work, project work) thereby reducing the influence of the interviewer's a priori assumptions. A central feature of the SWOT format is that it encourages reflections not only on the current situation (strengths, weaknesses), but also concerning the future (opportunities, threats). Hence, it could for instance provide valuable information about the participants' expectations about the

future development of the work environment, and identify both internal and external factors perceived as likely to influence for instance the work environment.

To ensure that the interviews followed a certain standardized structure, the interviewers were thoroughly trained in the PEACE model and the modified SWOT format. The interview guide always included the four open-ended SWOT questions, in which we asked about the strengths, weaknesses, opportunities and threats perceived by the participants in relation to the specific phenomena; the work environment (Paper I and II), project work (Paper III), and police investigative work (Paper IV). In addition, we used follow-up probes to encourage the participants to clarify and elaborate on specific issues, such as: “You have mentioned some strengths, are there other strengths related to...? Did I get you right when you say that...? Could you illustrate this by giving an example? Could you specify what you mean by...?” Finally, all interviews were recorded digitally and transcribed.

The research group established a standardized transcription procedure which was followed by the transcribers: We used verbatim transcription, and transcribed all content except repeated words and noises such as “ehm” and “hmm,” which were excluded from the transcriptions. The transcriptions were always conducted by persons that had extensive knowledge about the research project, the organizational context, the participants, and the interviews. In order to assess the reliability of the transcription procedure, we routinely compared independent transcriptions of randomly chosen interviews during the transcription process. The transcribers listened repeatedly to parts of interviews that were hard to comprehend by using the digital recordings. Utterances that could not be clarified were marked as unclear in the transcriptions in order to avoid speculation. The interview transcriptions were used as the basis for further analyses, including the content and thematic analyses.

**4.1.3. Content analysis.** Content analysis is a research methodology that has been used to identify the salient organizational practices and work characteristics in a broad range of different work settings (for a review see Mazzola et al., 2011, and for exemplary studies see Narayanan, Menon, & Spector, 1999 and Schneider, Wheeler, & Cox, 1992). Content analysis is at the intersection of qualitative and quantitative traditions, and could be briefly defined as “any methodological measurement applied to text (or other symbolic materials) for social science purposes” (Shapiro & Markoff, 1997, p. 14). A core assumption is that analysis of texts provides access to individual or collective cognitions, values, attitudes, and intentions. Groups of words are assumed to reveal underlying themes, and the frequency of these themes is generally interpreted as an indication of cognitive centrality. The main strengths of content

analysis are that it combines the richness of contextualized data with quantitative analysis, and that it can be used to conduct both deductive and inductive research (Duriau, Reger, & Pfarrer, 2007; Insch, Moore, & Murphy, 1997). Taken together, the content analysis is a well suited methodology for several research aims in this thesis; testing the value of situation-specific models in knowledge work settings (Paper I and III), to identify the salient organizational practices and work characteristics based on existing models (Papers I, III and IV) and to elaborate and develop new theory in particular knowledge work settings (Paper III and IV).

Researchers have developed detailed descriptions of the steps in the content analysis process (see e.g. Krippendorff, 2004; Neuendorf, 2002). Put briefly, these steps could be summarized as: a) defining and identifying the analytical units (e.g. paragraphs, phrases, words, themes) – sometimes called “unitizing”, b) developing, testing, and revising a coding scheme until sufficient inter-rater reliability is achieved, c) using the coding scheme to code all text, d) assessing final inter-rater reliability, and e) reporting the results.

First, unitizing implies organizing the data into individual units, which serves as the basis for the analysis. According to Neuendorf (2002) researchers should strive to define units that make sense within the data set and are large enough to provide a valid representation of the phenomenon of interest. Next, developing, testing, and revising the coding scheme is central to the quality of content analysis. This step involves providing precise definitions of the categories, testing the coding scheme on a sample of text, and then revising and clarifying the definitions. When the testing of the coding scheme achieves sufficient inter-rater reliability all of the text can be coded. The inter-rater reliability should be assessed during the coding process in order to avoid “drifting” and the final inter-rater reliability should be assessed on a representative a sample of the coded text. Neuendorf (2002) recommends that this sample should constitute a minimum of 10 % of the full sample. Inter-rater reliability is considered paramount in content analysis, and several scholars have stressed that it must be systematically assessed (Neuendorf, 2002; Krippendorff, 2004). An acceptable level of inter-rater reliability is necessary to provide a basic validation of a coding scheme, although reliability does not ensure validity (Neuendorf, 2002). There is no consensus about which measure of inter-rater reliability that should be used or which level of inter-rater reliability that should be considered as acceptable. Yet, there is general agreement that measures that do not account for chance agreement, such as percent agreement, often are too liberal, and that more conservative measures accounting for change agreement (e.g. Cohen’s Kappa and Krippendorffs alpha) should be preferred in most cases, although they may be too



conservative under certain circumstances (Neuendorf, 2002). In Paper I in this thesis I have used percent agreement, while I have used Cohen's Kappa in the remaining papers. In the following summary of Paper I have also calculated the values of Cohen's Kappa. Moreover, several scholars have developed more or less conservative and liberal "rules of thumb" describing what should be regarded as an acceptable level of inter-rater reliability (for a summary, see Neuendorf, 2002). In this thesis I will use the guidelines by Banerjee and colleagues, who suggested that values above 0.75 represent excellent agreement beyond chance, values between 0.40 and 0.75 represent fair to good agreement beyond chance, and values below 0.40 represent poor agreement beyond chance (Banerjee, Capozzoli, McSweeney, & Sinha, 1999). These guidelines could be considered as liberal (Neuendorf, 2002).

**4.1.4. Thematic analysis.** In addition to content analysis we have also used thematic analysis in three papers in this thesis (Paper II, III, and IV). Thematic analysis is widely used within psychological research and could be described as a "[...] method for identifying, analyzing and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 79). It differs from related qualitative methods such as grounded theory and discourse analysis because it is not a part of a pre-existing theoretical framework (Braun & Clarke, 2006).

Thematic analysis have two main strengths relevant to the research aims in this thesis: First, it is a flexible method compatible with different epistemological and theoretical frameworks and can be used for different purposes (both deductive and inductive approaches). Second, it can be used to summarize central characteristics in a large body of data and describe the data in rich detail (Braun & Clarke, 2006). Consequently, we have used thematic analysis in three ways in the papers in this thesis: First, we used it as a supplement to content analysis to identify and describe organizational practices and work characteristics that were experienced by the participants but not covered by the existing instruments and models (Paper III). Second, we used it to uncover how the generic organizational practices manifested themselves within a specific context (Paper IV). Third, we used it to identify and describe complex relationships and mechanisms (Paper II and IV). Specifically, in Paper II we used it to elucidate the interplay between the broader environment and the work system in the university setting, while in Paper IV we used it to illuminate the mechanisms in the relationship between organizational climate and police investigation performance.

While thematic analysis can be conducted in several different ways, I have used the guidelines by Braun & Clarke (2006), which describe it as a recursive process consisting of six phases: The first phase "familiarizing yourself with your data," involves transcribing and

reading data. The second phase, “generating initial codes,” includes the coding of salient features of data across the data set and organizing the data within these codes. The third phase, “searching for themes,” comprises assembling codes (sometimes called first-order categories) into potential themes and collating the data within the themes. The fourth phase, “reviewing themes,” involves testing the validity of the themes against the data set and developing a thematic map which is a visual representation of the codes and themes. The fifth phase, “defining and naming themes,” includes defining and naming each individual theme. Finally, the sixth phase, “producing the report,” comprises selecting vivid or representative example excerpts and writing a scientific paper about the findings in relation to the research questions. In addition to these six phases, several scholars have also argued that the assessment of inter-rater reliability should be embedded in the process of thematic analysis, to help ensure the reliability of the identified themes (Ryan & Bernard, 2003; Schonfeld & Mazzola, 2013). The discussion of inter-rater reliability in content analysis above is therefore also important for the approach to thematic analysis in the papers in this thesis.

I have now discussed the rationale for open-ended interviews, content analyses, and thematic analysis and provided generic descriptions of the procedures in these methods. In the following I will describe the methods and findings in each individual paper in the thesis in more detail.

## **4.2. Paper I**

**4.2.1. Design.** The aim of the study was to test the value of situation-specific and general instruments of the work environment in a university setting. Situation-specific instruments were defined as “instruments comprising work characteristics assumed to have particular relevance in knowledge work settings”, and general instruments were defined as “instruments of the work environment consisting of work characteristics assumed to be relevant in a wide range of contexts in a university setting.” Specifically, we used open-ended interviews and content analyses to examine the number of interview statements about the work environment covered by situation-specific and general instruments, respectively. This allowed us to compare to what extent situation-specific and general instruments captured the organizational practices and work characteristics emphasized by the participants.

We included three situation-specific instruments (Assessing the climate for creativity [KEYS] (Amabile et al., 1996), Situational Outlook Questionnaire [SOQ] (Isaksen et al., 2001), and the Organizational Climate Measure – an adapted version for the Norwegian university setting (Nordgård, 2011; Patterson et al., 2005), and two general instruments (the

General Nordic Questionnaire for Psychological and Social Factors at Work [QPSNordic] (Dallner et al., 2000) and the Job Diagnostic Survey [JDS] (Hackman & Oldham, 1976, 1980). Based on arguments for a situation-specific approach (Bakker & Demerouti, 2007; Parker et al., 2001), we expected that the situation-specific instruments would cover more interview statements than the general instruments.

**4.2.2. Organizational context and participants.** The university setting is a highly relevant setting for the investigation of knowledge work in public sector organizations for two reasons: First, as the main activities in the university setting are to create and transmit knowledge it could be regarded as a prototypical knowledge work setting in the public sector (Willem & Buelens, 2007). Second, international comparative studies suggest that changes such as a higher expectation of relevance from society, a growing internationalization, and a greater professionalization of higher education management have influenced how work is experienced in the university setting (Kogan & Teichler, 2007). In particular, findings suggest that the introduction of market-oriented models of governance and management in universities is associated with perceptions of reduced autonomy and increased demands among academics (Kinman et al., 2006; Shin & Jung, 2014; Teichler, Arimoto, & Cummings, 2013). Findings from the Norwegian university setting are generally consistent with these patterns, although a market-oriented model of governance has not been implemented to the same extent (Michelsen & Aamodt, 2007; Vabø, 2011). In sum, the changes in the university setting could be seen as part of the general trend in which controlling organizational practices increasingly are introduced in knowledge work settings to achieve consistency and cost efficiency (Davis, 2010; Oldham & Hackman, 2010; Parker, 2014).

In paper I, a sample of 46 participants at a Norwegian university department within the natural sciences (from a total sample of 196) was selected by the top management based on two inclusion criteria: They had to be full-time employees and they should represent the three groups of employees, namely scientific staff, administrative and technical staff, and temporary employees such as PhD students, as well as the different units at the department. Thirty employees (24 men and six women) from the preselected sample chose to participate and represented scientific staff (n = 11), administrative and technical staff (n = 11), and temporary employees (n = 8). Additional demographic data were not recorded, to maintain the anonymity of the participants.

**4.2.3. Open-ended interviews.** We used open-ended interviews based on the PEACE model (Clarke & Milne, 2001; Milne & Bull, 1999) and a modified SWOT format (Helms & Nixon, 2010). Two master students in work and organizational psychology were thoroughly

trained in the PEACE model and the modified SWOT format. The interview guide included the following four open-ended SWOT questions:

*“Please tell me about the strengths you perceive regarding your work environment in the present situation?”*

*“Please tell me about the weaknesses you perceive regarding your work environment in the present situation?”*

*“Please tell me about the opportunities you perceive regarding your work environment in the future?”*

*“Please tell me about threats you perceive regarding your work environment in the future?”*

In addition, we used follow-up probes to encourage the participants to clarify and elaborate on specific issues.

The interviews were conducted in the period between August 2010 and October 2010, and ranged between 15 minutes and 1 hr 48 minutes, with a mean length of 27 minutes. All interviews were conducted in Norwegian, except one interview with an English-speaking participant.

All interviews were recorded digitally and transcribed using a verbatim transcription procedure. The interviewers, who had extensive knowledge about the organizational context, the participants, and the interviews, conducted the transcriptions. To assess the reliability of the transcription procedure, two independent transcriptions of an excerpt of a randomly chosen interview was compared half-way through the transcription process. The comparison did not show any differences that affected the interpretation of the text.

**4.2.4. Content analysis.** In the present study, we used deductive content analysis as our purpose was to compare to what extent the three situation-specific (KEYS, OCM, SOQ) and the two general work environment instruments (QPSNordic, JDS) captured the employees' perceptions of the work environment.

First, we used interview statements as the recording units. A statement was defined as “a part of a sentence, a whole sentence, or several sentences expressed by the interviewee, that constituted a coherent, meaningful description of an aspect of the work environment.” We identified 4116 statements in the interview transcriptions. Second, we developed a coding scheme based on two frameworks; the SWOT framework (strengths, weaknesses, opportunities and threats) which also provided the structure of the interviews guide, and a framework classifying the organizational level of the statements (individual, group, leadership, organization - IGLO) (see e.g. Cordery & Parker, 2012; Morgeson & Humphrey, 2006; 2008; Parker et al., 2001). The IGLO framework included to enable analyses of whether the

situation-specific instruments and general instruments differed in their ability to capture work characteristics on different organizational levels.

The categories in SWOT framework were defined in the following way: *Strengths*: Positive aspects of the work environment in the present situation. *Weaknesses*: Negative aspects of the work environment in the present situation. *Opportunities*: *Opportunities* for a good work environment in the future. *Threats*: Threats towards a good work environment in the future. *SWOT residuals*: Statements that did not fit the previous categories. Moreover, the categories in the IGLO framework were defined in the following way: The *individual* level: Individual perceptions, feelings, and opinions. The *group* level: Interaction and cooperation in work groups, teams, and departments. The *leadership* level: Behavior of immediate supervisors, other leaders, or the top management. The *organization* level: Management practices, organizational culture, strategies, organizational goals and values, and the physical environment of the organization. *IGLO residuals*: Statements that did not fit the previous categories.

In the next step we trained the coders and tested the coding scheme for the SWOT and IGLO frameworks by having the coders collectively coding three randomly chosen interviews. The 4116 statements were coded on the SWOT and IGLO categories. 2845 statements (69.1%) were coded on the SWOT and IGLO categories, whereas 1271 statements were categorized as residuals and excluded from further analyses. All of the statements coded on the SWOT categories also allowed IGLO categorization. The 1271 SWOT and IGLO residuals included questions about the interview situation, non-coherent sentences, reflections on work life in general, and information about the work environment in the past or in other organizations. We assessed the inter-rater reliability for the SWOT and IGLO categories for three randomly chosen interviews. The inter-rater reliability for the SWOT framework ranged between 74% and 85%, with a mean of 81% (Cohens Kappa = 0.74), while the inter-rater reliability for the IGLO framework ranged between 61% and 77%, with a mean of 70% (Cohens Kappa = 0.58).

The next step of the content analysis included developing and testing a coding scheme for the scales of the five different work environment instruments; KEYS, [SOQ], the OCM – version adapted for the Norwegian university setting, QPSNordic, and JDS. We used descriptions provided by the developers of the instruments, and elaborated them when they did not provide adequate guidelines. After we had established a satisfactory coding scheme, the 2845 statements coded on SWOT and IGLO were coded on the scales of the instruments.

We assessed the final inter-rater reliability for the coding on two of the five work

environment instruments, the SOQ and the OCM, based on the assumption that the two instruments represented the variation in terms of number of scales and complexity of the three other instruments. We assessed the inter-rater reliability for the coding on the instruments in two ways: First, we assessed the inter-rater reliability for the instruments as a whole by looking at whether the coders categorized a statement within or outside of the scales of the instrument. The inter-rater reliability for the OCM (N = 5) ranged between 63% and 78% across the interviews, with a mean of 74% (Cohen's Kappa = 0.51). The inter-rater reliability for the SOQ (N = 2) ranged between 76% and 85%, with a mean of 81% (Cohen's Kappa = 0.56). Second, we assessed the inter-rater reliability for the scales of the instruments. The inter-rater reliability of the coding on the scales of the OCM ranged between 51% and 64% across the interviews, with a mean of 53% (Cohen's Kappa = 0.42), and the coding on the scales of the SOQ ranged between 73% and 79%, with a mean of 76% (Cohen's Kappa = 0.54)<sup>1</sup>. In sum, we considered it appropriate to proceed with the statistical analyses, as the measures of inter-rater reliability indicated fair to good agreement beyond chance (Banerjee et al., 1999). Nevertheless, conclusions about which organizational practices and work characteristics that seem to be particularly salient in a university setting should be interpreted with caution.

**4.2.5. Statistical analyses.** The 2845 statements coded on the SWOT and IGLO categories were used in the statistical analyses. The 1271 SWOT and IGLO residuals did not contain relevant information about the work environment and were excluded from these analyses. To test our hypotheses, we aggregated the number of statements for the individual participants. Some of the variables deviated from the assumption of normality and the data violated the assumption of sphericity. Hence, we used repeated measures multivariate tests (Wilks's lambda) to test our hypotheses, as these are known to be more robust than ANOVAs (Field, 2009). In addition, we conducted alternative analyses in which all variables were log-transformed. Put briefly, the alternative analyses generally provided similar results, so we chose to present results from the original analyses in the paper. Moreover, we used Bonferroni corrections with alpha level .05. due to a large number of post hoc tests, and calculated the effect sizes with partial eta squared.

**4.2.6. Findings.** The findings suggested that the situation-specific instruments KEYS and OCM (adapted version for the Norwegian university setting), and in particular KEYS,

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<sup>1</sup> The values for Cohen's Kappa for the OCM were calculated based on four interviews as the text in one interview almost exclusively was coded on two scales. In these instances, it is known that Cohen's Kappa could provide a too conservative estimate of inter-rater reliability (Neuendorf, 2002). When the fifth interview was included the mean values were 0.44 and 0.36 for the instruments and the scales, respectively.

captured more of the employees' statements about the work environment than the general instruments QPSNordic and JDS. Specifically, the differences between situation-specific and general instruments were most prominent at the organization level and included characteristics of the organizational context (e.g. resources and human resource management practices), social and relational characteristics (e.g. trust and openness, conflict, cooperation), and stimulants and obstacles to creativity and innovation (e.g. organizational impediments to creativity and encouragement of creativity). However, the findings concerning which organizational practices and work characteristics that were perceived as salient should be interpreted with caution, due to inter-rater reliability issues. Moreover, additional studies in university settings are needed to investigate the generalizability of the findings. In conclusion, the results provide tentative support for the relevance of situation-specific instruments in the Norwegian university setting, and highlight the importance of using methods that capture the salient situations-specific work characteristics in this setting.

**4.2.7. Ethical considerations.** The study followed the Norwegian national ethical standard for research on human beings. The participants gave their informed consent to take part in the study, and were informed that they could withdraw from the study at any time without any justification. We took care to ensure the anonymity of the participants. First, we deleted the digital recordings after the interviews were transcribed. Second, names and information in the transcriptions that could identify participants were deleted. Third, the results were presented mainly by using statistics and group level summaries both in the scientific study as well as in the report to the organization. A few representative quotes were used to illustrate main findings, but these statements were generic in their content and wording and could not be attributed to individual participants.

### **4.3. Paper II**

**4.3.1. Design.** The aim of the second study was to elucidate the interplay between the broader social and economic environment and the work system (i.e. the work design configuration) in a university setting. We conducted open-ended interviews and used a qualitative theory-elaboration approach (Lee, Mitchell, and Sablinski, 1999) in which the systems approach to work organization by Cordery and Parker (2007) drove the model development. This allowed us to analyze how social and economic features of the broader environment were perceived to influence both the subsystems in the work system (leadership, human resource management practices, task and social characteristics) and the work system as a whole.

**4.3.2. Organizational context and participants.** As the samples used in Paper I and II were partly overlapping, the description of the university setting in the summary of Paper I is equally relevant here. Put briefly, changes in the university setting, such as the introduction of market-oriented models of governance and management have influenced the experience of work. It is therefore an appropriate setting to elucidate the interplay between the broader environment and the work system.

The sample included participants from two different organizations from the same university; one department within the natural sciences ( $n = 30$ ), which constituted the sample in Paper I, in addition to participants from one faculty within social and educational sciences ( $n = 21$ ). The two organizations differed in terms of academic discipline, size, and structure. At the faculty within social and educational sciences, the participants were recruited through an open invitation to all employees. The 21 participants were employed at three of the four departments at the faculty. Our total sample consisted of fifty-one participants (33 men and 18 women), mainly academic staff (39 vs. 12 administrative and technical employees), and employees with permanent employment relationships (35 vs. 13 with temporary employment and 3 emeritus professors). Additional demographic data were not recorded, but the interviews indicated that the length of tenure varied from recently employed to approximately thirty years, and the participants' age varied from the late twenties to the mid-sixties. Previous studies have indicated differences in how academic and administrative staffs perceive their work environment (e.g. Tytherleigh et al., 2005; Winefield and Jarrett, 2001). Hence, we focused on the experiences of the academic staff, using the data from the administrative staff to expand on and corroborate their experiences. At the department within natural sciences, the selection of participants was left to the discretion of the top management, while all employees were invited at the faculty within social and educational sciences.

**4.3.3. Interviews.** We used open-ended interviews based on the PEACE model (Clarke & Milne, 2001; Milne & Bull, 1999) and a modified SWOT format (Helms & Nixon, 2010). Four master students in work and organizational psychology were thoroughly trained in the PEACE model and the modified SWOT format. The interview guide included the four open-ended SWOT questions also used in Paper I, as well as the same generic follow-up probes. The interviews were conducted between autumn 2009 and autumn 2010. All interviews were recorded digitally, and the length of the interviews ranged between 15 minutes and 1 hour and 48 minutes, with a mean length of 35 minutes. All interviews were recorded digitally and transcribed by the interviewers using the verbatim transcription procedure described earlier. We assessed the reliability of the transcriptions by comparing two



independent transcriptions of the same interview (for 30 interviews also used in Paper I), and by checking the transcription of five randomly chosen interviews against the audio files (21 interviews from the faculty within social and educational sciences). No salient differences were found.

**4.3.4. Thematic analysis.** The analysis of the interviews followed the guidelines for thematic analyses by Braun & Clarke (2006). However, our analyses consisted of three phases, in which phases 3-6 in Braun & Clarke were collated into phase three. We used an inductive approach and emphasized a rich description of the data in the early phases, while we used the systems perspective to work organization (Cordery & Parker, 2007) in the final phase. The qualitative analysis software package called QSR NVivo 10.0 for Windows supported the analyses.

In phase I we read all interviews separately to ensure diverse perspectives, and then met for discussion. In phase II we generated first-order categories by systematically identifying relevant features of the data throughout the data set. Next, we combined overlapping categories and generated a list of 26 first-order categories. We developed and tested a detailed coding scheme for all categories and the data by collating the interview transcriptions on the categories. As part of this process we assessed inter-rater reliability of the coding on first-order categories in eight randomly chosen interviews. The results showed a mean value of Cohen's Kappa of .66 across the categories, suggesting fair to good agreement beyond chance (Banerjee et al., 1999).

In phase III we assembled the first-order categories into themes, ultimately generating a list of eight themes (see Table 1 below). During this process we excluded the first-order category "change," because its content described change processes in other first-order categories. Furthermore, we used the system approach of Cordery and Parker (2007) to organize the eight themes on four aggregate dimensions (subsystems): Operating environment, leadership, management practices and policies, and work content. During this phase, we assessed the inter-rater reliability of the coding on the themes by having two independent coders placing 100 representative interview statements on them. The inter-rater reliability between the two coders, calculated by using the web service Recal2 (Freelon, 2010), yielded a Cohen's Kappa of .68. The two coders established a consensus in cases of disagreement, and the inter-rater reliability between this consensus and our original coding yielded a Cohen's Kappa of .78, indicating excellent agreement beyond chance (Banerjee et al., 1999). In sum, these analyses indicated sufficient reliability for the coding on the eight themes.

Finally, we developed models illuminating the interplay between the broader

environment and the work system, based on the findings as well as the framework of Cordery and Parker (2007). We emphasized statements that were coded on several themes, and where the participants had observations and reflections regarding the relationships between them. This process resulted in a common model which we refined by testing its validity on the data.

**4.3.5. Findings.** The final model in this paper (depicted in Figure 1 below) indicated that three interacting characteristics; the governance and funding system, societal standing and student flow, and the economic situation, were experienced as important features in the broader environment of university departments and faculties. Furthermore, the model indicated that the participants perceived the broader environment to affect the work system through its effects on human resource management practices and management and leadership, and by directly influencing task and social work characteristics. More specifically, the participants experienced that the broader environment, and in particular the market-oriented model of governance, had both complex negative and positive effects on the work system. The perceived negative effects included stronger management, reduced job security and autonomy, increased demands, and exacerbated intergroup relations, while the perceived positive effects comprised enhanced intra-group interdependence, feedback, and support. In conclusion, the findings suggest that the broader environment was perceived to diminish central characteristics of high-commitment work systems (e.g. Jiang et al., 2012; Pfeffer, 1998), implying that it could potentially reduce the long-term effectiveness of the work system. However, this interpretation should be treated with caution, as the design of the study do not allow us to draw firm conclusions about the effects of the broader environment on the work system.

**4.3.6. Ethical considerations.** The study followed the Norwegian national ethical standard for research on human beings. The participants gave their informed consent to take part in the study, and were informed that they could withdraw from the study at any time without any justification. We took care to ensure the anonymity of the participants as described in more detail in the summary of Paper I.

Table 1. *Eight Inductive Themes from the Thematic Analysis*

Theme	Participants	Description	Representative quotes
Governance and Funding System	41	Statements about how the governance and funding system introduced in the Quality reform affect the organization and the work system.	<p>“And now that we are forced so much to generate external funding ourselves, so we must operate as if we are more of a research institution than an actual university.”</p> <p>“[...]because the only thing that generates money, is to publish. So we pour out publications, all of us in the entire world, that no one has time to read anymore.”</p>
Societal Standing and Student Flow	34	Statements about standing in society and student flow, and the consequences for the economic situation and the work system.	<p>“Our student flow [...] has been reduced, so the future is bleak”</p> <p>“As long as everyone is interested in [researchers field], that is good for us. [...] ...if public opinion changes, then it will affect our funding, [...].”</p>
Economic Situation	26	Statements about the economic resources; current situation, outlook, and consequences for the organization and the different groups.	<p>“Well, research has not been the main focus [of the management], but the economy has been sorted out.”</p> <p>“So yes, economy and bureaucracy are the biggest threats, as I see it.”</p> <p>“We do not have sufficient money, we do not have enough students, we therefore start getting jealous at each other.”</p>
Management and Leadership	51	Statements about management and leadership: Power, roles and behavior (budgeting, organizing, controlling, emphasis on work environment, supporting and motivating).	<p>“Today leading a department is a fulltime job, and really more for professional leaders than for academics.”</p> <p>“[...], [the] management that took over here had a very demanding task clearing up the economy, but when moving quickly [making decisions] headstrong decisions sometimes appear annoying [...].”</p>
Human Resource Management	43	Statements about HRM practices and policies (attraction and retention of employees, employment relationship, staffing, and development).	<p>“If there is less money, some fields will be shut down, and positions will disappear.”</p> <p>“The temporary employments create big problems for us.”</p>
Freedom and Meaningful work	44	Statements about freedom at work (what you do, how, when, and where you do it, and with whom), and meaningful aspects of work: Engaging and important work, teaching, and variation.	<p>“The freedom you have to craft your own job is very positive”</p> <p>“Actually the flexibility is priceless, if we were to clock in, then I think things would start to break down.”</p> <p>“The freedom of research is dead. We don't do that anymore, we conduct research that generates funding.”</p>
Demands and Workload	35	Statements about work load, work demands, and the consequences of these.	<p>“Work load is very high for the one [professor] we have.”</p> <p>“The work load for certain people is very high, people are reaching their breaking point.”</p>
Cooperation and Community	51	Statements about cooperation and knowledge-sharing in groups, across groups, and outside of the organization. Statements about sense of social community vs individualism, competition, and the social climate.	<p>“We scientists are often individualists.”</p> <p>“If we talk about my nearest work environment, my group; we work quite closely together.”</p> <p>“I think it was two years ago, [...] that research groups were introduced at the department.”</p>

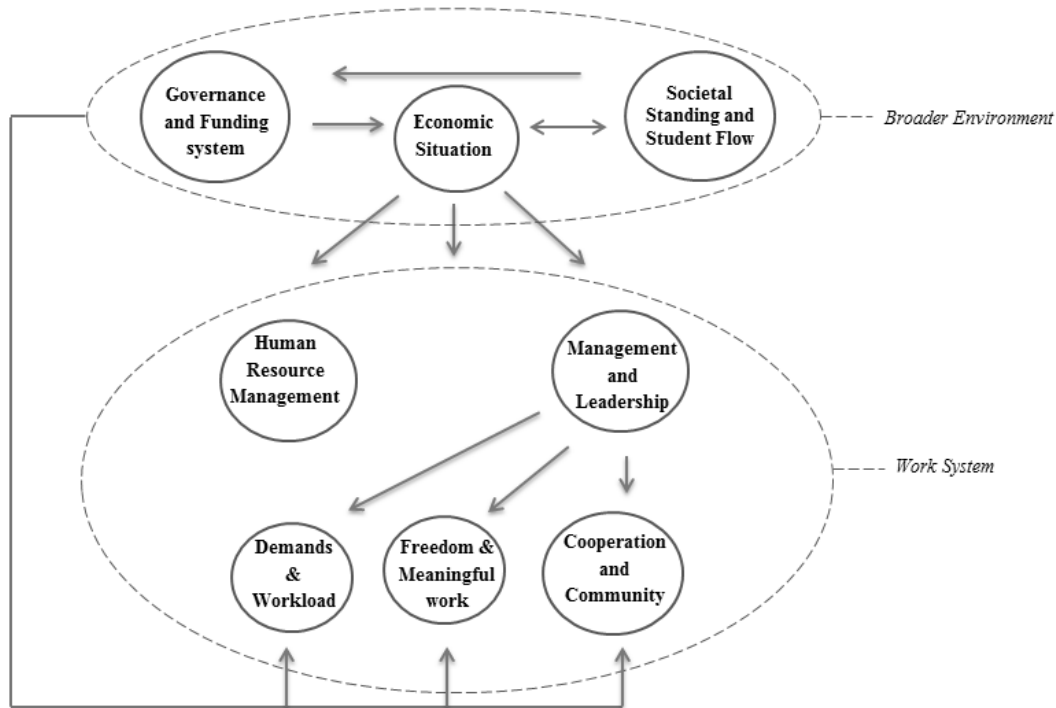


Figure 1. An Inductive Model of the Interplay between the Broader Environment and the Work System in a University Setting

#### 4.4. Paper III

**4.4.1. Design.** There were two related research aims in paper III: First, we sought to identify central climate dimensions large-scale projects in the oil and gas industry, and second we wanted to develop a model of organizational climate in this particular knowledge work setting. We used a theory elaboration approach (Lee et al., 1999), and applied two existing models of organizational climate to drive the analyses: a research-based global model (the Organizational Climate Measure – based on the Competing Values Framework) and a domain-specific model (the People Project Survey) developed locally by the organization.

**4.4.2. Organizational context and participants.** Projects in the oil and gas industry are characterized by “enormous investments, massive interfaces, and complex engineering endeavors” (Badiru & Osisanya, 2013, p. 28). Moreover, risk is an inherent part as the projects have substantial impact on the economy, people, and the environment. With the growing world demand for energy, the oil and gas business is increasingly moving into even more demanding environments. Simultaneously, society is adopting a low tolerance for failure, putting enormous pressure on the management and organization of these projects (Badiru and Osisanya, 2013). In brief, large-scale projects in the oil and gas industry could be considered

as extreme cases of knowledge-intensive project work. We considered the use of an extreme case as likely to be helpful for theory development, because the studied phenomena often are more visible and easier to observe in extreme cases (Pettigrew, 1990).

The studied organization was a large-scale offshore construction project within a Norwegian company in the oil and gas industry. The company was organized as a matrix organization and the project was organized in a balanced matrix, which refers to an organization in which the manager has moderate authority and reports to a functional manager (Badiru & Osisanya, 2013). The project organization was located in several geographical areas in Norway and abroad, and encompassed 140 employees. The project was in the building phase during the research project, and collaborated closely with several vendors.

The project manager was contacted and gave his consent to participate in the project. To represent the variation in the project organization we collaborated with the project manager to invite participants from a broad range of different organizational levels and geographic locations. The sample consisted of 18 participants (15 male, 3 female) from five different organizational levels and three geographical areas in Norway. The majority of the informants was Norwegian and had obtained university degrees equivalent to master degrees in engineering. The average age was 50.1 years ( $SD = 7.1$ ), and the average organizational tenure was 16.2 years ( $SD = 7.9$ ). As project manager selected the participants, it is possible that the sample might have been biased and mainly included participants with positive experiences of the project work. However, there were no indications of this bias in the data as the interviews uncovered a broad range of positive and negative experiences, including critical appraisal of the management and organizational practices.

**4.4.3. Interviews.** We used open-ended interviews based on the PEACE model (Clarke & Milne, 2001; Milne & Bull, 1999) and a modified SWOT format (Helms & Nixon, 2010). Three master students in Work and Organizational Psychology and Sociology were thoroughly trained in the PEACE model and the modified SWOT format. The interview guide consisted of four main questions focused on project work:

“Please tell me about what is going well in relation to the project work here; we call this the strengths of the project work.”

“Please tell me about what is not going so well in relation to the project work here, we call this the weaknesses of the project work.”

“Please tell me about what you consider to be the possibilities of improving the project work here, we call this the opportunities of the project work.”

“Please tell me about what you consider to be the obstacles to improve the project work here; we call this the threats of the project work.”

The interviews were conducted between October and November in 2011. All interviews were recorded digitally, and the length of the interviews ranged between 26 min to 1 hour and 16 minutes, with a mean length of 48 minutes. All interviews were recorded digitally and transcribed by the interviewers using the verbatim transcription procedure described earlier.

**4.4.4. Content analysis and thematic analysis.** In the present study, we used deductive content analysis based on the dimensions in two models, the research-based Organizational Climate Measure (OCM) and the People Project Survey (PPS) developed locally by the organization. The original version of OCM (Patterson et al., 2005), described earlier in this thesis, consists of 17 dimensions measuring the four quadrants in the Competing Values Framework (Quinn & Rohrbaugh, 1983). The PPS consists of the following 17 dimensions: Competence, development, goals, feedback, leadership, autonomy, collegial support, roles and responsibilities, workload, work life balance, governing system, change agenda, interface external, interface internal, communication, ethical awareness, work environment.

First, we used interview statements as the recording units. A statement was defined as “the smallest meaningful unit that represents one idea or one information unit. A statement should, to the extent possible, be comprehensive by itself to make sure it is understandable and meaningful, but contain only one piece of information, idea, or evaluation.” We identified 2875 meaningful statements in the interview transcriptions.

Second, we developed and tested a coding scheme for the scales of the two models using descriptions provided by the developers of the instruments. After we had established a satisfactory coding scheme, the statements were coded on the scales of the instruments. The findings showed that 1747 statements (61 %) were coded on the dimensions of OCM, and 1900 (66 %) statements were coded on the dimensions of PPS. 549 of the statements (19 %) could not be coded on the two models. We assessed the final inter-rater reliability for the coding in one random interview for both models. The Cohen’s Kappa’s were .62 for the OCM and .79 for the PPS, indicating fair to good agreement and excellent agreement beyond chance, respectively (Banerjee et al., 1999). Consequently, we concluded that there was sufficient reliability in the data.

Finally, we performed an inductive thematic analysis to explore the content of the statements that were coded as residuals (outside the scales of OCM and PPS). The thematic

analysis followed the guidelines by Braun and Clarke (2006) described earlier, and resulted in a list of eight themes interpreted as eight additional dimensions of organizational climate: Manning/Staffing, team, internationalization, tools, obstacles, project premises, organization, and identification. We excluded a tentative theme called “miscellaneous” from further analyses, as it referred to statements that were not considered relevant to the climate in project organizations, and consisted mainly of statements related to technical specifications. We did not assess the inter-rater reliability for the coding on the inductive themes.

**4.4.5. Statistical analyses and model development.** The 2875 meaningful statements about project work were aggregated on the individual participants. We used a paired t-test to compare the number of statements captured by the two models. Next, we used frequencies and mean number of statements to identify the climate dimensions perceived as salient by the participants. Furthermore, we used cross tabulations to analyze to what extent the dimensions in the two models had an overlap in the statements they covered. This enabled us to empirically identify similar climate dimensions and select the dimensions perceived as most relevant in this setting. Finally, we used these findings and the two existing models of organizational climate to develop a new model called the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP).

**4.4.6. Findings.** The findings indicated that two existing models of organizational climate, the research-based Organizational Climate Measure (OCM), and the locally developed People Project Survey (PPS), both include unique climate dimensions perceived as salient to project success, and that they should be integrated into one model. Above all, the results showed that a climate characterized by a strong focus on a) communication and cooperation with actors in the external environment such as vendors, and b) internal cooperation and communication with other projects and with the line organization was perceived as perceived as critical to project success. Based on these findings we propose a new model called the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP). The model is built on the OCM and the Competing Values Framework (Quinn & Rohrbaugh, 1983), includes dimensions from the both the PPS and the inductive thematic analyses, and consists of a total of 20 climate dimensions (see Table 2 for names and descriptions of the dimensions).

**4.4.7. Ethical considerations.** The study followed the Norwegian national ethical standard for research on human beings and was approved by the Norwegian Social Science Data Service (NSD). All informants signed an informed consent, and were informed before the interview that participation was voluntary, that they could withdraw their participation at

Table 2. *The Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP)*

Name	CVF quadrant	Description
Autonomy	HR	Designing jobs in ways which give employees wide scope to enact work
Integration	HR	The extent of interdepartmental trust and cooperation
Involvement	HR	Employees have considerable influence over decision-making and - the free sharing of information throughout the organization
Effective leadership	HR	The extent to which leadership behavior at all levels reflects a focus on both tasks and relationships.
Training	HR	A concern with developing employee skills
Welfare	HR	The extent to which the organization values and cares for employees
Human capital	HR	A concern with acquisition, retention, and utilization of human capital
Formalization	IP	A concern with formal rules and procedures
Tradition	IP	The extent to which established ways of doing things are valued
Roles and responsibilities	IP	A concern with clearly defined roles and responsibilities between the project organization and the functional organization, and between employees within the project organization.
Project premises	IP	The overall premises imposed on the project (economic resources, the standing of the project in the company)
Innovation and flexibility	OS	The extent of encouragement and support for new ideas and innovative approaches; and - an orientation toward change
Reflexivity	OS	A concern with reviewing and reflecting upon objectives, strategies, and work processes, in order to adapt to the wider environment
Outward focus	OS	The extent to which the organization is responsive to the needs of the customer and the marketplace in general
Clarity of organizational goals	RG	A concern with clearly defining the goals of the organization
Efficiency	RG	The degree of importance placed on employee efficiency and productivity at work
Effort	RG	How hard people in organizations work towards achieving goals
Performance feedback	RG	The measurement and feedback of job performance
Pressure to produce	RG	The extent of pressure for employees to meet targets
Project objectives	RG	An emphasis given to deliver, and continuously improve, on time, cost, quality, and HSE

Note. CVF quadrant refers to the quadrant in the Competing Values Framework. HR = Human Relations Model, IP = Internal Process Model, OS = Open Systems Model, RG = Rational Goal Model.



any time, that the interview was tape-recorded, and that their anonymity would be ensured. We took care to ensure the anonymity of the participants as described in more detail in the summary of Paper I.

#### **4.5. Paper IV**

**4.5.1. Design.** The aim of the fourth study was twofold: To identify organizational climate dimensions that are experienced as salient for investigation performance in police districts, and to identify potential mechanisms of the relationship between organizational climate and investigation performance. To achieve these goals we used a theory-elaboration approach that comprised two analyses. First, we performed a deductive content analysis using the Organizational Climate Measure (Patterson et al., 2005) based on the Competing Values Framework (Quinn & Rohrbaugh, 1983) to identify the generic climate dimensions perceived as most relevant to investigation performance. Second, we conducted an inductive thematic analysis. We applied the thematic analyses to uncover how the generic climate dimensions manifested themselves within the context of police investigative work and to develop a model elucidating how the context-specific climate dimensions were perceived to affect investigation performance.

**4.5.2. Organizational context and participants.** Police investigation is defined as the process of answering questions as to if, how, where, when, why, and by whom a crime was committed (Fahsing & Ask, 2013; Oxburgh, Myklebust, & Grant, 2010). Investigation performance could be broadly defined as success in the investigation process comprising the following phases: Understanding problems, finding investigation approaches, choosing an optimal investigation approach, implementing the optimal investigation approach, and solving the problem. The activities in the investigation process imply that investigators need to acquire, transmit and apply knowledge effectively, and police investigations could therefore be considered as prototypical knowledge work in public sector organizations (Dean, Fahsing, Glomseth, & Gottschalk, 2008; Luen & Al-Hawamdeh, 2001; Willem & Buelens, 2007).

The Norwegian police service is divided into 27 police districts. The police districts are in turn subordinated the National Police Directorate and the Ministry of Justice and Public Security. The prosecuting authority is involved from the outset of an investigation and the close cooperation between the police prosecutor and the Senior Investigating Officer is considered a premise of efficient investigation. The police prosecutor has the overriding responsibility for the progress and quality of an investigation, while the Senior Investigating Officer is responsible for carrying out the actual investigation. In this paper we used data

collected in police investigation units in Norwegian police districts as part of a large research project. Specifically, we used data collected from 11 of the 27 police districts after the 22nd of July terrorist attack in 2011.

The districts represented the variation in Norwegian police districts concerning size, population, geography, and organization. We included 38 participants from the three levels of investigative units in each district; The Chief of Police/Chief Constable (n =11), the investigation management level (Senior Investigating Officer, Major Crime Manager/Head of Crime Operations, n=14), and Detectives (investigators) (n =13). Each Chief of Police selected participants from the investigation management level and the investigating Detectives level in their districts. By including participants at three different levels in each district we attempted to incorporate diverse perspectives on the organizational climate and its relationship to investigation performance. As the Chief of Police in each district selected participants we cannot exclude the possibility of a biased sample. However, the rationale was that the Chief Constable would be in a position to identify participants with expert knowledge on investigation that were willing and able to share their reflections. In addition, there were no indications of this bias in the data, as the participants described a broad range of different strengths, weaknesses, opportunities, and threats of investigative work, and many of the weaknesses and threats were identified at the management level.

**4.5.3. Interviews.** We used open-ended interviews based on the PEACE model (Clarke & Milne, 2001; Milne & Bull, 1999) and a modified SWOT format (Helms & Nixon, 2010). All interviews were conducted by the third author who is an experienced interviewer thoroughly trained in the PEACE model and the modified SWOT format and who has formerly worked with police investigations as an investigating Detective. The interview guide consisted of four main questions focused on investigative police work:

Please tell us what you think works well regarding the investigative work here in the police district - we call this the strengths of the investigative work.

Please tell us what you think does not work well regarding the investigative work here in the police district – we call this the weaknesses of the investigative work.

Please tell us what you consider to be opportunities for improving the investigative work here in the police district – we call this the opportunities in the investigative work.

Please tell us what you consider to be threats against improving the investigative quality here in the police district - we call this the threats in the investigative work.

The interviews were conducted between August 2012 and November 2012. The length of the interviews ranged between 35 minutes and 2 hour and 9 minutes, with a mean length of 1 hour and 6 minutes. The interviews were recorded digitally and transcribed by seven master students in work and organizational psychology using the verbatim transcription procedure described earlier. We assessed the quality of the transcriptions by comparing independent transcriptions of three randomly chosen interviews, and by controlling the transcriptions against the audio files. No relevant differences were found between the independent transcriptions, or between the transcriptions and the audio files.

**4.5.4. Content analysis and thematic analysis.** First, we used deductive content analysis based on the 17 dimensions of the Organizational Climate Measure (OCM) (Patterson et al., 2005) which is built on the Competing Values Framework (CVM) (Quinn & Rohrbaugh, 1983). We used interview statements as the recording units. A statement was defined as “A statement is a part of a sentence, a whole sentence, or several sentences expressed by the interviewee, that constitute a coherent, meaningful point of view [that describe an aspect of police investigative work].” We identified 5749 meaningful statements in the interview transcriptions.

Second, we developed and tested a coding scheme for the scales of the OCM based on the definitions by Patterson and colleagues (2005) and the descriptions of the four quadrants in the CVM (Quinn & Rohrbaugh, 1983). After we had established a satisfactory coding scheme, the statements were coded, and the findings showed that 4467 statements (78 %) could be coded on the scales of the OCM. We assessed the inter-rater reliability for the coding on five randomly chosen interviews. The average Cohen’s kappa across all dimensions was .51, with values ranging from .42 to .59 between the interviews, indicating fair to good agreement beyond chance (Banerjee et al., 1999). Furthermore, we identified the climate dimensions experienced as the most relevant to investigation performance. The findings revealed that integration, training, and efficiency collectively covered almost 50 % of the statements about organizational climate (2095 of 4467 statements), and were the only dimensions discussed by all participants. The average Cohen’s kappa values for integration, training, and efficiency were .59, .69, and .51, respectively, suggesting fair to good agreement beyond chance (Banerjee et al., 1999). Consequently, we focused on these salient climate dimensions in the subsequent analysis.

Next, we conducted an inductive thematic analysis of the statements coded on the three generic climate dimensions. The analysis was conducted by the first and second author, followed the guidelines by Braun and Clarke (2006) described earlier. First, we familiarized ourselves with the data by reading all the interviews statements within the three climate dimensions. Second, we developed first-order categories for each climate dimension by systematically identifying central features of the data, resulting in a list of 19 first-order categories. Third, we developed and tested a coding scheme for the first-order categories. Prior to the coding we merged several interview statements to obtain more comprehensive descriptions of the organizational climate, reducing the number of statements from 2095 to 1196. Subsequently, we coded the interview statements on the first-order categories and assessed the inter-rater reliability in eight randomly chosen interviews. The results showed a value of Cohen's kappa across the categories of .64, indicating fair to good agreement beyond chance (Banerjee et al., 1999). Two categories were excluded from the subsequent analyses as they had values below .40.

Fourth, we developed themes by combining the 17 remaining first-order categories. Our final list consisted of six inductive themes, each representing a context-specific organizational climate dimension (see Table 3 below). We assessed inter-rater reliability for the climate dimensions in three steps: In the first step, the original coding of the first and second author (internal coders) on the first-order categories was recoded to the final six organizational climate dimensions, yielding a Cohen's Kappa between the internal coders of .72. In the second step, two trained external coders independently coded 120 interview statements on the six climate dimensions. The 120 statements were randomly chosen by the first and second author and represented all the climate dimensions. The inter-rater reliability between the two external coders yielded a Cohen's kappa of .61. In the third step, the two external coders discussed their coding and reached a consensus in cases of disagreement which was compared to with our original coding, yielding a Cohen's kappa of .67, indicating fair to good agreement beyond chance (Banerjee et al., 1999).

Finally, we developed a tentative model of how the six organizational climate dimensions were experienced to affect investigation performance. We refined the model through several iterations and used the Competing Values Framework (Quinn & Rohrbaugh, 1983) to shed light on the relationships between the climate dimensions, mechanisms, and investigation performance. Specifically, we organized the six climate dimensions into two climate types; Human Relations climate comprising three climate dimensions (HRM planning

Table 3. *Context-Specific Organizational Climate Dimensions, Quadrant in the Competing Values Framework (CVF), Number of Participants, Description, and Representative Quotes*

CVF	Climate Dimension	Participants (statements)	Description	Representative quotes
HR	Human resources planning and development	38 (455)	Emphasis on planning and developing human resources in the police district, including specialist knowledge, skills, and abilities (KSAs).	<i>“Criminal investigations have become very specialized and require specialized knowledge, so training and development is an important issue.”</i>
HR	Internal cooperation and coordination	35 (193)	Emphasis on cooperation and coordination of resources between units in the police district, and the extent of centralized coordination of resources.	<i>“We are one district, but the way I see it, we are organized in different ways in the two cities, and it is not very easy to cooperate.”</i>
HR	External cooperation and coordination	26 (87)	Emphasis on cooperation and coordination with other police districts, specialty agencies, and other governmental agencies.	<i>“We participate in the Project Borderless [a collaborative project between several police districts], and this is a priority for us. The project is very important, and beneficial for the district. We will continue to take part in the project.”</i>
HR/ RG	Use of information and communication technology (ICT)	26 (67)	Emphasis on using information and communication technology (e.g. information systems) in the investigation process.	<i>“We have an intelligence system called Indicia, which is an excellent tool that we eventually have started using. We are using it as much as we can.”</i>
RG	Investigation management	38 (346)	The emphasis on efficient planning and coordination of cases, and the extent of cooperation with the prosecuting authorities.	<i>“And this is one of the main strengths of the investigative work here; the proximity of the prosecuting authorities, and that we are working in close collaboration.”</i>
RG	Emphasis on investigation	35 (161)	Emphasis on investigation in the police district, and the extent of cooperation and coordination with uniformed/preventive police units.	<i>“We have two models: The simple cases are investigated immediately and finished [by the preventive police], while the more complicated cases are initiated [by the preventive police], and then sent to the investigator for further investigation.”</i>

and development, internal cooperation and coordination, and external cooperation and coordination) and Rational Goal climate comprising two climate dimensions (investigation management and emphasis on investigation).

**4.5.5. Findings.** The final model in this paper (depicted in Figure 2 below) indicated that two types of climate, Human Relations climate and Rational Goal climate were perceived to enhance police investigation performance. Based on our findings, we hypothesize that a Human Relations climate in the districts increases investigation performance in the police districts by enhancing: a) the collective human capital (knowledge, skills, and abilities) within the districts, b) cooperation and coordination of resources between units within the police districts, and c) cooperation and coordination of resources between police districts and between districts and special agencies. Furthermore, we hypothesize that a Rational Goal climate in the districts enhances investigation performance in the police districts by increasing: a) planning and goal-setting, and b) task focus within the police district, thereby enhancing investigation performance.

In conclusion, the study contributes by describing two types of organizational climate perceived as salient to police investigation performance, and by elucidating mechanisms that potentially can explain how these climate types influence investigation performance. Nevertheless, the findings cannot be used to draw conclusions about causality as the study was cross-sectional, entirely based on the participants' perceptions, and did not include independent measures of investigation performance.

**4.5.6. Ethical considerations.** The study followed the Norwegian national ethical standard for research on human beings and was approved by the Norwegian Social Science Data Service (NSD). All informants signed an informed consent, and were informed before the interview that participation was voluntary, that they could withdraw their participation at any time, that the interview was recorded, and that their anonymity would be ensured. We took care to ensure the anonymity of the participants using a similar procedure to the one described in more detail in the summary of Paper I.

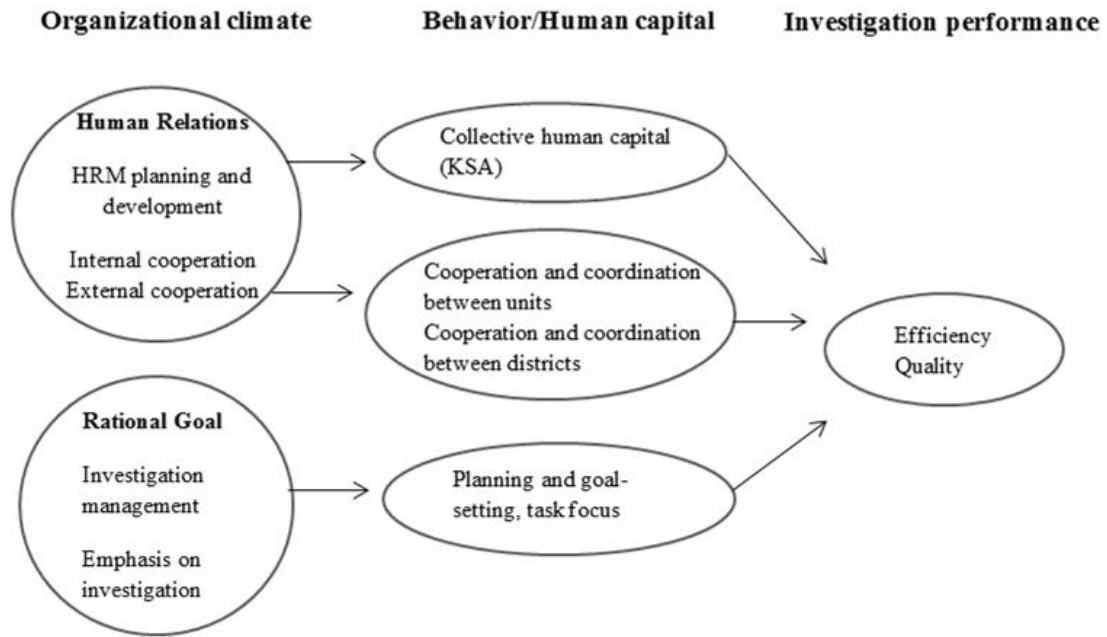


Figure 2. A Tentative Model of Organizational Climate, Mechanisms, and Investigation Performance in the Norwegian Police

## 5. Discussion

This thesis had two overall aims: To examine the value of situation-specific and general models of work in knowledge work settings, and to develop new theory of salient organizational practices and work characteristics in three specific knowledge work settings; universities, large-scale projects in the oil and gas industry, and police investigative work.

In the following, I discuss how the main findings from the studies individually and collectively contribute to the two overall research aims of the thesis. Subsequently, I discuss the academic and practical implications of the findings.

### 5.1. Main Findings

**5.1.1. The value of situation-specific models.** The first overall research aim of the thesis concerns whether and to what extent situation-specific models of work are relevant and add explanatory power in three specific knowledge work settings. I will initially briefly summarize and discuss the findings in each setting, and then discuss how they could be interpreted more generally.

First, the findings in Paper I showed that in a university setting two situation-specific survey instruments (KEYS, OCM – version adapted for the Norwegian university setting) covered more work characteristics perceived as salient by the participants than two general instruments (QPSNordic and JDS). The situation-specific instruments, and in particular KEYS, seemed to better capture organizational practices and work characteristics at the organizational level such as sufficient resources, human resource management (HRM) practices, and climate dimensions related to social relationships and cooperation and encouragement of creativity. The findings in Paper II also supported the perceived salience of these organizational practices and work characteristics. In sum, the results indicate that situation-specific survey instruments and models such as KEYS add incremental explanatory power in this setting because they include organizational practices and work characteristics that are not sufficiently covered by existing general instruments. Consequently, using these instruments could provide a more accurate and holistic understanding of the university work setting.

Second, the findings in Paper III indicated that in a large-scale project work setting in the oil and gas sector a domain-specific climate survey instrument, the PPS, captured more work characteristics perceived as salient by the participants than a global and more general climate instrument, the OCM (the original version). The additional organizational practices and work characteristics captured by the PPS included a concern with present knowledge,



competence, skills and experience of employees, an emphasis on clearly defined roles and responsibilities, leadership at all levels focused on both tasks and relationships, and a concern with project objectives such as time, cost, quality, and HSE. On the other hand, the results also suggested that the OCM covered salient climate dimensions that were not sufficiently captured by the PPS. In brief, the study suggested that a combination of situation-specific and general survey instruments, as well as inductive qualitative analyses, is necessary to capture the climate dimensions perceived as salient to project success in large-scale oil and gas projects. Based on these findings we developed a situation-specific model of organizational climate, the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP).

Third, the findings in Paper IV indicated that the OCM (the original version), a global and general model of organizational climate, to a large extent captured climate dimensions perceived as central to police investigation performance. However, the findings also illustrated the value of developing situation-specific dimensions based on the general dimensions in this setting. The analyses revealed for example that the general climate dimension integration (the extent of interdepartmental trust and cooperation) comprised both internal cooperation between units within the police districts and external cooperation between police districts and between police districts and other partners.

How do these findings together elucidate the first research aim of the thesis? Most importantly, the findings provide support for the relevance of situation-specific survey instruments and models in two knowledge work settings, the university setting, and in large-scale projects in the oil and gas industry. There is also some support for the value of a situation-specific approach in the police investigative work setting. Taken together, the findings therefore suggest that general survey instruments and models do not sufficiently cover salient organizational practices and work characteristics in these three particular knowledge work settings. Specifically, the findings suggest that situation-specific models provide a more holistic view of the work system in these settings, as they include both salient features of the broader environment, as well as more of the HRM practices and social characteristics that are perceived as central. The findings also imply that the additional explanatory power of the situation-specific instruments and models vary across the different settings. Specifically, the situation-specific clearly increase the explanatory power in the university setting, while the situation-specific and the general models of climate both capture unique dimensions of organizational climate in the large-scale project work setting.

The findings are in line with models proposing that knowledge work have unique

characteristics which makes it different from other types of work, and that these characteristics have implications for which organizational practices and work characteristics that are salient (e.g. Kelloway & Barling, 2000). I will discuss these findings in more detail later in the discussion of the second research aim of the thesis. On a more general level, the findings are also consistent with researchers who have advocated a situation-specific approach to understand work. These researchers have criticized the dominant models of work for being too static and context-insensitive and for not taking into account the social and contextual include characteristics of work, and suggested that they therefore do not capture the complexity of knowledge work (Bakker & Demerouti, 2014; Cordery & Parker, 2012; Fried et al., 2008; Grant et al., 2011; Morgeson & Humphrey, 2006, 2008; Parker et al., 2001). The situation-specific approach has been empirically supported by a small number of studies using both qualitative open-ended approaches (for a review, see Mazzola et al., 2011) and quantitative survey designs (McClenahan, Giles, & Mallett, 2007; Sparks & Cooper, 1999). However, the findings from this thesis add to existing research as we investigated the relevance of situation-specific and general survey instruments and models in three specific knowledge work settings, rather than using inductive approaches to identify central themes in a broad range of different occupations or investigating the same general model across broad industries.

To summarize, our findings show that situation-specific models increase the explanatory power in three particular knowledge work settings. As such, they serve as an important premise for the relevance of the second research aim in the thesis: Theory development concerning the salient organizational practices and work characteristics in these settings.

**5.1.2. Salient organizational practices and work characteristics in three knowledge work settings.** In the following discussion of the second research aim I elaborate on how the findings from the four papers add to our knowledge about each specific setting. Finally, I discuss some common features across the three knowledge work settings.

First, the findings in Paper I and II suggest that the organizational practices and work characteristics experienced as salient in the university setting are a) the broader environment which included a market-oriented governance system and economic resources, b) the contextual characteristics management and leadership and HRM practices, c) the task characteristics workload and autonomy, and d) the social characteristics within-group and intergroup cooperation and community. Previous studies of academic work have primarily

focused on management, task characteristics such as autonomy and work demands, and to some extent certain HRM practices (e.g. Kinman et al., 2006; Teichler et al., 2013). Consequently, the perceived salience of the social characteristics within-group and intergroup cooperation extends current knowledge and is an important contribution to our understanding of the university work setting.

In Paper II we also elucidate a complex interplay between the broader environment and the work system in the university setting. Specifically, a market-oriented governance system is perceived to have both negative effects in terms of a stronger management, reduced job security and autonomy, increased workload, and exacerbated intergroup relations, but also positive effects including enhanced interdependence, feedback, and support within the research groups. As such, the market-oriented governance system is experienced to have negative effects on the work system as it is perceived to diminish key components in high-commitment work systems. A few recent studies have suggested that high-commitment work systems are positively associated with organizational performance in university settings (Edgar & Geare, 2013; Teichler et al., 2013). Hence, the study makes an important contribution by identifying and describing potential mechanisms in this relationship.

Second, the findings from paper III indicate that the organizational practices and work characteristics experienced as important in large-scale projects in the oil and gas industry primarily belong within two quadrants in the Competing Values Framework (Quinn & Rohrbaugh, 1983): The human relations model (flexibility and internal focus) which emphasizes cohesion and morale as means and human resource development as an end, and the open systems model (flexibility and external focus) which emphasizes flexibility and readiness as means, and growth, resource acquisition, and external support as ends. In particular, a climate characterized by cooperation and communication with actors in the external environment such as vendors (the open systems model), as well as internal cooperation and communication with other projects and with the line organization in the company (the human relations model) is perceived as critical to project success.

The importance of a climate characterized by external and internal cooperation is a vital contribution to our understanding of work in large-scale projects in the oil and gas industry. There is scarce research on climate for cooperation in this setting (see Olsen et al., 2005 for an exception), but previous studies have found external and internal cooperation to be important to project success in other sectors, such construction projects and information systems projects (Eriksson & Westerberg, 2011; Yen, Li, & Niehoff, 2008). A possible explanation for this finding can be found in the HRM research literature. For instance, a study

by Collins & Smith (2006) previously discussed in this thesis showed that a climate for cooperation is positively related to employees' abilities and motivation to exchange knowledge and combination, which in turn predicted firm revenue from new products and services and firm sales growth. Based on these findings we developed a situation-specific model of climate called the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP). The model consists of totally 20 climate dimensions organized on the four quadrants in the CVF (see Table 2 in the Methods and Results section).

Third, the findings in Paper IV suggest that the organizational practices and work characteristics perceived as salient in police investigative work can be organized in two types of organizational climate drawn from the Competing Values Framework: Human Relations climate and Rational Goal climate. A Human Relations climate in this setting seem to consist of three dimensions of organizational climate; Human resources planning and development, internal cooperation, and external cooperation. Specifically, a Human Relations climate in this setting is characterized by an emphasis on systematic development of human resources, centralized cooperation and coordination of resources within the district, and on external cooperation and coordination with other police districts, specialty agencies, and governmental agencies through collaborative projects. Additionally, the findings indicate that a Rational Goal Climate consists of two climate dimensions; investigation management and emphasis on investigation. Specifically, a Rational Goal climate in this setting is characterized by an emphasis on active investigation management distributing, planning and prioritizing cases, and through an emphasis on investigative work rather than focusing exclusively on uniformed police work.

Furthermore, we also elucidated potential mechanisms of the relationship between organizational climate and investigation performance: We propose that a Human Relations climate increase investigation performance by enhancing collective human capital in the district and by stimulating cooperation and coordination of resources both between units within and between districts. The present study is the first to specifically examine the relationship between organizational climate and investigation performance. However, our proposition is line with a small number of recent studies which have found a positive relationship between a supportive organizational climate and performance, as well as a positive relationship between Human Relations climate and attitudinal outcomes such as job satisfaction, commitment, well-being, and work engagement in other types of police work (Davey, Obst, & Sheehan, 2001; Hart & Cotton, 2002; Nalla, Rydberg, & Meško, 2011; Nima,

Moradi, Archer, Garcia, & Andersson Arntén, 2014). We also propose that a Rational Goal climate enhance investigation performance by increasing behaviors such as planning, goal-setting, as well as task focus on investigation. There is scarce research on Rational Goal climate in the police setting, but a few studies from a broad range of work settings provide some support for our proposal, suggesting that that Rational Goal climate is positively related to global departmental performance and firm productivity (Kuenzi, 2008; Patterson, Warr, & West, 2004).

The four papers in the thesis identify several salient organizational practices and work characteristics in three specific knowledge work settings. Interestingly, two categories of organizational practices and work characteristics seem to be salient across the three settings: a) organizational climate dimensions and social characteristics related to within-group and intergroup cooperation, and b) practices of high-commitment HRM systems. The significance of climate dimensions and social characteristics concerned with cooperation is in line with the five research streams reviewed previously in the thesis. Research within the HRM field suggests that a climate for cooperation play an important role in knowledge work because new knowledge is created within organizations through the knowledge exchange and combination among employees. More specifically, a cooperation climate seems to facilitate these processes by motivating employees to focus on the larger community of the organization rather than on their individual interests (Collins & Smith, 2006; Kelloway & Barling, 2000). In addition, work design research suggest that knowledge work often is organized in self-managing teams to transform individual knowledge into intellectual capital and competitive advantage for the organization. Knowledge work is therefore often described as being highly interdependent and embedded in interpersonal relationships (Chuang et al., 2016; Grant et al., 2011; Morgeson & Humphrey, 2008). As such, the importance of a climate for cooperation in knowledge work is hardly surprising. However, changes in the landscapes of work could further enhance its importance. Leading researchers emphasize that work is becoming increasingly distributed, and that employees in knowledge work need to collaborate although they often work at different physical places, at different times, on different contracts (freelance, temporary, etc.), and even in different legal entities (e.g, networks, alliances, partnerships) (Cordery & Parker, 2012). Hence, a climate for cooperation seems to be a vital organizational foundation for collaboration and coordination in such increasingly complex settings.

Furthermore, our findings are also consistent with researchers proposing that the growth in knowledge work is likely to create a stronger emphasis on the HRM system in

organizations (Kelloway & Barling, 2000). Specifically, high-commitment HRM systems and practices (see e.g. Jiang et al., 2013), are likely to be particularly important in knowledge work settings. As discussed in the introduction of the thesis, studies indicate that high-commitment HRM practices enhance organizational performance a) through their effects on employees' ability, motivation, and opportunity to perform, b) by fostering organizational climates that stimulate knowledge exchange, and c) by supporting knowledge-intensive team work activities (Chuang et al., 2016; Collins & Smith, 2006; Jiang et al., 2013). Hence, an organizational climate for cooperation and high-commitment HRM practices are closely linked phenomena.

Taken together, the four studies in the thesis a) support the value of situation-specific instruments and models in three particular knowledge work settings, b) enhance our understanding of the central work characteristics in three particular knowledge work settings, and c) provide insight into knowledge work more generally, as they highlight that high-commitment HRM systems and an organizational climate for cooperation are experienced as salient in all three settings.

## **5.2. Implications**

The landscapes of work and organizations in developed economies have changed dramatically in recent decades, with the growth in knowledge work as of one of the most prominent changes. However, several researchers have argued that dominant theories about the nature of work have not kept pace with these changes and do not sufficiently capture central characteristics of knowledge work (Cordery & Parker, 2012; Fried et al., 2008; Grant et al., 2011; Morgeson & Humphrey, 2006; 2008; Parker et al., 2001). If these claims are valid they have important academic and practical implications: From an academic perspective this criticism implies that researchers do not fully capture the reality and complexity of knowledge work, and are not capable of understanding and predicting how organizational practices and work characteristics influence individual attitudes and behavior in knowledge work settings. From a practical perspective, it implies that managers in organizations in knowledge work settings would benefit from increased knowledge about the salient organizational practices and work characteristics that could enhance outcomes such as motivation, well-being, creativity, and work performance. Consequently, leading scholars have called for studies to explore questions such as: To what extent are the salient organizational practices and work characteristics in knowledge work captured by existing theories and models? What are the salient organizational practices and characteristics in

knowledge work settings? (Cabrera & Cabrera, 2005; Cordery & Parker, 2012; Fried et al., 2008; Gagne, 2009; Grant et al., 2011, 2011; Kelloway & Barling, 2000; Morgeson & Humphrey, 2008; Parker et al., 2001).

In this thesis I have investigated these questions by taking a situation-specific approach to knowledge work, based on the assumption that the relevance of organizational practices and work characteristics varies across different jobs and work settings (e.g. Bakker & Demerouti, 2007; Parker et al., 2001; Sparks & Cooper, 1999). Specifically, I have examined the value of situation-specific and general models of work and developed and theory of salient organizational practices and work characteristics in three particular knowledge work settings; the university setting (Paper I and II), large-scale projects in the oil and gas industry (Paper III), and police investigative work (Paper IV).

First, the findings from Papers I, II, and III generally support the value of situation-specific survey instruments and models in the university setting and in large-scale projects in the oil and gas industry, respectively. Accordingly, general models and survey instruments do not appear to provide an accurate understanding of salient organizational practices and work characteristics in these settings, and the results from these instruments may be insufficient for designing effective organizational development interventions. Both researchers and practitioners are likely to benefit from using the situation-specific models in Paper II and III to develop situation-specific survey instruments for these settings. This is consistent with the approach described by Bakker and colleagues (2007), who have developed a two-stage process that include a) using explorative interviews to identify salient work characteristics, and b) developing a tailor-made survey that assess these work characteristics. The situation-specific survey instruments could be used for further research studies as well as for organizational development purposes. Organizations that do not have the necessary competence or resources to develop reliable and valid situation-specific survey instruments could alternatively use a combination of research-based general survey instruments and qualitative open-ended interviews or focus groups methods.

Second, the findings identify and describe organizational practices and work characteristics experienced as salient in three particular knowledge work settings. The overall research aim was to contribute to theory development in these settings. The findings therefore need further empirical investigation by research designs suitable for theory testing, and their practical implications should be interpreted with caution (see also “Limitations” below). In the university setting, the salient work characteristics include intergroup cooperation and community, but also a market-oriented governance system, management and leadership, high-

commitment HRM practices, as well as autonomy and workload. An important finding is that there seems to be a complex interplay between the market-oriented governance system and the work system that potentially could have serious negative consequences for the effectiveness of the work system. Consequently, taking a systems perspective which includes the broader environment seems to be essential in both assessment of the work environment and in organizational development processes in this setting.

In large-scale oil and gas projects a climate characterized by internal and external communication and cooperation is experienced as critical to project success. These climate dimensions should therefore be assessed regularly, for instance at the start of different project phases. In addition, project managers should be trained to facilitate this type of climate by developing cohesive teams and solving conflicts, and by building external partnerships through involvement of customers and vendors (Cameron & Quinn, 2011; Gillard & Price, 2005; Müller & Turner, 2010).

In the police investigative work setting two types of climate are perceived as salient to investigation performance: Human Relations climate and Rational Goal climate. Put briefly, the findings indicate that a concern with development of human resources and cooperation, combined with a strong emphasis on investigation and investigation management stimulate cooperation, planning, goal-setting and task focus, and that these strategic behaviors could enhance investigation performance. Hence, the findings indicate that the Norwegian police districts could benefit from developing a survey instrument to systematically assess these climate types. Moreover, organizational development initiatives that stimulate these climates in the police districts, for instance implementing high-commitment HRM practices (e.g. Collins & Smith, 2006) or tailor-made leadership development initiatives based on research in this setting (e.g. Gottschalk, 2007) could be feasible approaches to increase investigation performance.

Finally, two categories of organizational practices and work characteristics seem to be salient across the three settings: organizational climate dimensions and social characteristics related to within-group and intergroup cooperation and practices of high-commitment HRM systems. Hence, the nature and relevance of these phenomena should be further examined in other knowledge work settings (see “Directions for Future Research”).

To summarize, the four studies in the thesis enhance our understanding of the central organizational practices and work characteristics in three particular knowledge work settings and in knowledge work more generally. The studies also suggest that situation-specific approaches such as situation-specific surveys or qualitative open-ended interviews should be



used to assess central organizational practices and work characteristics in these three knowledge work settings. Finally, the studies highlight several organizational development initiatives that could potentially be beneficial in each of the work settings.

In the following section I will discuss the limitations of the studies in the thesis that could influence and constrain the interpretation of the findings.

### **5.3. Limitations**

The first set of limitations of the studies in the thesis is related to the sampling procedure and the constraints on the generalizability of the findings. The second set is concerned with the reliability of the analyses, whereas the third set is related to the validity of the analyses.

First, in all four papers in the thesis the selection of participants was at least partly left to the discretion of the management in the organizations. The involvement of the management in the selection was due to our choice of a purposive sampling strategy. A purposive sampling strategy involves the selection of participants that could provide rich and relevant data that makes it possible to uncover the nuances and complexities of the particular setting (Pratt, 2009). As such, it requires the identification of participants that are “reflective, willing, and able” to give detailed accounts of the phenomena of interest (Morse, 2007, p. 231). Thus, we argue that the management in these organizations was in a good position to identify participants motivated to share their reflections and possessing a broad range of different perspectives on the work characteristics and organizational practices in the specific settings. Yet, it is possible that these samples mainly included participants with positive views of the work environment, or employees known to have particularly strong opinions about the work environment. However, there were no clear signs of these potential biases in the data as the interviews uncovered a broad range of different positive and negative experiences of different organizational practices and work characteristics.

A related limitation is that all the data was collected in the Norwegian work setting. The organization of work in Scandinavian countries is generally characterized by high autonomy, opportunities for development, and representative systems in which the employees can influence work conditions (Gallie, 2007; Gustavsen, 2011). This calls into question whether the findings from the papers in the thesis can be generalized to other countries. In particular, this is a limitation in Paper II, in which we study the relationship between the broader environment, including the governance model, and the work system in the university setting. A market-oriented model of governance has not been implemented to the same extent

in Norway as in other countries (Vabø, 2011), and academic work in Norway has been characterized as a “high-satisfaction, low-stress” setting by scholars (Shin & Jung, 2014). This implies that the broader environment could have stronger and possibly different effects on the work system in other national settings. Although there are constraints on generalizability of the findings in both this paper and the other papers in the thesis, our findings concerning the centrality of specific organizational practices and work characteristics in the three work settings are generally in line with existing research studies in other countries. Nevertheless, additional research in other national and cultural settings is clearly needed.

The second set of limitations is concerned with the inter-rater reliability of the content analyses and thematic analyses in the papers. Inter-rater reliability is considered as vital particularly in content analysis but also in thematic analysis, and an acceptable level of inter-rater reliability is viewed as a necessary, although not sufficient, criterion for validity in studies using these methods (Mazzola et al., 2011; Neuendorf, 2002; Ryan & Bernard, 2003). As discussed earlier in this thesis, we have generally followed the recommendations by Neuendorf (2002) for the systematic assessment of inter-rater reliability in content analysis. Put briefly, these include: a) selecting an appropriate inter-rater reliability that accounts for chance agreement (e.g. Cohen’s Kappa), b) deciding what constitutes a minimum acceptable level of inter-rater reliability, c) testing and revising the coding scheme until sufficient inter-rater reliability is achieved, and d) assessing the final inter-rater reliability on a representative sample of the coded text (minimum 10 %). However, the procedures in Paper I and Paper III depart from these recommendations in two ways:

First, in Paper I we only assessed the inter-rater reliability of the coding on two of the five instruments. Thus, the inter-rater reliability for the remaining three instruments is unknown, and this is clearly a weakness of this study. In addition, the low inter-rater reliability of the coding on the scales of the OCM limits the conclusions that can be drawn from the study, as we cannot exclude the possibility that differences between the general and situation-specific instruments were due to biased coding of the three general instruments. Hence, the findings from this paper concerning which organizational practices and work characteristics that seem to be particularly salient in a university setting should be interpreted with caution.

Second, in Paper I we assessed the inter-rater reliability of the SOQ in two randomly chosen interviews, and in Paper III we assessed the inter-reliability of the OCM and PPS in one randomly chosen interview for each instrument. As such, although the coders had been extensively trained and the coding scheme had been thoroughly tested before the coding was

conducted, it is uncertain whether these reliability estimates were representative of the coded texts as a whole. In Paper II and IV we systematically assessed the inter-rater reliability for all models, used representative samples of the coded texts, and calculated the inter-rater reliability for the sub-categories on the models. As such, these papers show the methodological development that occurred during this PhD project and in our research group concerning inter-rater reliability analyses. Taken together, the findings from Paper I and III should be treated with some caution, while the analyses from Paper II and IV seem to have acceptable levels of reliability, and could therefore be used to draw more definite conclusions.

The third set of limitations concerns the validity of the content analyses and the thematic analyses. First, in all four papers we investigated the perceived salience of different organizational practices and work characteristics by using frequency as a measure of centrality. Specifically, the analyses aimed to identify organizational practices and work characteristics perceived as salient for the work environment in the university setting, experiences as important for project success in large-scale oil and gas projects, and perceived as central to investigation performance in Norwegian police districts, respectively. Hence, our analyses were based on the common assumption in content analysis that frequently mentioned themes are experienced important by the informants (Duriiau, Reger, & Pfarrer, 2007), and therefore likely to be related to outcomes such as work motivation, well-being, job performance, and ultimately organizational level outcomes such as project success and organizational effectiveness. We did not systematically test these hypothesized relationships by collecting independent attitudinal and behavioral data. However, the findings in all four papers were at least to some extent corroborated by both other data sources from the organizations as well as previous research studies in similar settings. In Papers I and II, our findings concerning the broader environment and a market-oriented governance system are supported by data from national evaluation studies of the reforms in the Norwegian university and college sector (Michelsen & Aamodt, 2007). Furthermore, the findings in Paper III are to some extent consistent with previous research in the project management literature, while the results from Paper IV are corroborated by a comprehensive study of the Norwegian police initiated by the Norwegian government (the so-called “Police Analysis,” see Justis- og beredskapsdepartementet, 2013). Yet, future studies are needed to investigate both whether the organizational practices and work characteristics experienced as important in these settings are related to central attitudinal and behavioral work outcomes, as well as the nature and strength of these potential relationships.

Second, in Paper II we investigated the interplay between the broader social and

economic environment and the work system in a university setting, while we in Paper IV sought to elucidate the relationship between organizational climate, certain mediating mechanisms, and investigation performance in police districts. However, the inductive models developed in these two papers are entirely based on the perceptions of the participants, and cannot be used to draw conclusions about causality. Although both existing theory and studies provide some support for the models, the purpose was theory development and theory elaboration. Consequently, the hypothesized relationships and mechanisms in these models should be empirically investigated in future studies using research designs suitable for testing specific research hypotheses.

I have now discussed the main findings, implications and potential limitations of the studies in the thesis. In the following section I identify and discuss promising avenues for future research in knowledge work settings.

#### **5.4. Directions for Future Research**

In the following I outline three sets of recommendations for future research on knowledge work. The recommendations are based on the findings and methodological limitations of the studies in this thesis.

First, future research studies should use research designs suitable for theory testing to examine the validity of our findings. For the studies in the university setting (papers I and II) this implies testing to what extent the organizational practices and work characteristics perceived as salient in the university setting are related to central work-related outcomes such as work motivation, organizational commitment, well-being, and job performance. Furthermore, the model of the interplay between the broader environment and the work system in the university setting proposed in paper II needs further empirical testing. Specifically, studies should test the identified mechanisms through which market-oriented models affect different subsystems of the work system (HRM practices, leadership, task and social characteristics). Two potentially fruitful research designs for this purpose are longitudinal survey methods within a national setting during changes in the governance and funding system and comparative studies across different countries (see e.g. Teichler et al., 2013). In addition, studies should investigate potential implications of the broader environment for the effectiveness of the overall work system in the university setting. This line of research implies exploring questions such as: “What type of work system configuration results from the interplay with market-oriented governance models? and “To what extent is this an effective work system in this setting?”

In large-scale oil and gas projects, future research should examine to what extent the proposed situation-specific model of organizational climate is related to project success in oil and gas projects. Specifically, this research should investigate to what extent a climate characterized by a strong focus on a) communication and cooperation with actors in the external environment such as vendors, and b) internal cooperation and communication with other projects and with the line organization is positively associated with a broad range of indicators of project success, such as employee motivation, organizational learning, cost, time, quality, customer satisfaction, and overall project performance. Moreover, studies should examine whether it is possible to enhance project success in this setting by stimulating this type of climate through systematic development of management competencies related to managing teams (facilitating effective, cohesive teams), interpersonal relationships (supportive feedback, listening, solving conflicts), and managing customer service (encouraging external partnerships through involvement of customers and vendors) (Cameron & Quinn, 2011).

In the police investigative work setting, future research should test our proposed model of the relationship between two climate types (Human Relations climate and Rational Goal climate), human capital and behavior, and investigation performance in police districts. Furthermore, future research should investigate the two types of climate simultaneously, in order to elucidate possible additive and interactive effects on performance. Recent theorizing and studies in the organizational climate research literature suggest that different climate types interact with each other and therefore that the configuration of multiple climates matters for performance outcomes (e.g. Schulte, Ostroff, Shmulyian, & Kinicki, 2009). In addition, studies of the antecedents of the Human Relations and Rational Goal climates in this setting are needed to provide insight into how these climates form and develop. A few recent studies have suggested that a high-commitment HRM system is an important antecedent for Human Relations climate (Aryee, Walumbwa, Seidu, & Otaye, 2012; Chuang & Liao, 2010; Collins & Smith, 2006; Takeuchi, Chen, & Lepak, 2009), and that managerial emphasis and behavior generally is an important antecedent for organizational climate (Kuenzi & Schminke, 2009).

A second set of recommendations for future research concerns the development and validation of situation-specific survey instruments. In the university setting, my colleagues have developed a version of the Organizational Climate Measure (OCM) adapted to the Norwegian university and college sector (NOCM\_UH). The development of this situation-specific survey instrument is partly based on analyses included in Paper I and II. Preliminary analyses suggest that the dimensions in the instrument have acceptable levels of reliability and

are factorially distinct. However, there is a need for additional validation studies concerning both the discriminant validity as well as the concurrent and predictive validity of the instrument (Nordgård, 2011). In large-scale projects in oil and gas sector the findings from the model of organizational climate in Paper III could be used as a basis for development and validation of a survey instrument. In the police investigative work setting, the findings from paper IV are currently being used as a foundation for the development and validation of a new survey instrument for organizational climate in the Norwegian police setting. The results indicate preliminary support for the instrument concerning both the reliability of the scales as well as its factor structure. However, the development of the instrument is still in an early phase, and there are still some issues related to the psychometric properties of specific scales. Thus, additional research is needed to further refine the instrument (Koritzinsky, 2015).

The third and final set of recommendations for future research concerns the need for further theory development in both established and in new and emerging knowledge work settings. First, our findings suggest that an organizational climate for cooperation as well as practices of high-commitment HRM systems are perceived as central across the three knowledge work settings. Broadly speaking, our findings suggest that an organizational climate for cooperation is perceived to encourage individual employees and groups to focus on the larger community of the organization rather than on their own best interests. Further studies of how these phenomena affect different individual and organizational outcomes in knowledge work settings are therefore needed. Although there are interesting similarities between the climates for cooperation in the three settings, the characteristics of an organizational climate for cooperation are likely to vary with the features of the environment in different work settings, such as the conditions of the industry (Collins & Smith, 2006). For instance, the broader environment of university departments and faculties is quite different from the environment for large-scale oil and gas projects. As such, researchers should strive to identify the particular climates for cooperation that are important for organizations in different knowledge work settings (Collins & Smith, 2006). The study by Collins and Smith (2006) serves as an excellent example of a suitable research design for this purpose.

Second, scholars have recently described how a broad range of controlling organizational practices have been introduced in knowledge work settings such as hospitals and schools to achieve consistency and cost efficiency, and suggest that these practices are likely to have negative consequences for motivation and creativity (Davis, 2010; Oldham & Hackman, 2010; Parker, 2014). In a similar vein, researchers have argued that there are similarities between the market-oriented models of governance implemented in the higher

education sector and the reforms introduced in the health sector (Kirkpatrick, Ackroyd, and Walker, 2005). Consequently, hospitals and schools seem to represent two promising and potentially fruitful settings for further research. The systems approach used in Paper II in this thesis could be a suitable approach to identify the salient organizational practices and work characteristics in these settings as well as to elucidate the interplay between the alleged introduction of controlling organizational practices and the other subsystems in the work system. This is in line with recent methodological recommendations made by prominent work design researchers (Morgeson & Humphrey, 2008; Parker, 2014).

Finally, there is also strong need for studies of new and emerging knowledge work settings and jobs. Specifically, researchers should study knowledge work in new settings such as virtual teams and projects (e.g. Hoch & Kozlowski, 2014), cross-organizational relationships (e.g. networks, alliances, partnerships) and in settings characterized by emerging forms of work contracts such as freelance and temporary on-demand project work (Cordery & Parker, 2012). In addition, new studies should investigate emerging jobs within knowledge-intensive settings such as management and business (e.g. financial quantitative analysts), education (e.g. instructional designers and technologists), health care (e.g. neurodiagnostic and cybogenic technologists), computer, engineering and science (e.g. geospatial information scientists and technologists), and the “green economy” (e.g. Chief Sustainability Officers) (see e.g. The National Center for O\*NET Development, 2009; U.S. Bureau of Labor Statistics, 2015).

## **6. Conclusions**

### **Paper I**

In the first study in the thesis we tested the value of situation-specific and general instruments of the work environment in a Norwegian university setting. The findings indicated that the situation-specific instruments KEYS and OCM (adapted version for the Norwegian university setting) captured more of the employees' interview statements about their work environment than the general instruments QPSNordic and JDS. The findings indicate that situation-specific instruments add explanatory power, and therefore support the relevance of situation-specific instruments in this setting.

### **Paper II**

In the second study we investigated the interplay between the broader social and economic environment and the work system in a university setting. The findings indicate that a market-oriented model of governance is perceived to have both negative (stronger management, reduced job security and autonomy, increased demands, and exacerbated intergroup relations) and positive consequences (enhanced intra-group interdependence, feedback, and support) for the work system. Hence, the broader environment seems to diminish motivational and high-commitment work systems and could potentially have negative implications for motivation and performance. The study also illustrates how including a systems approach in the research design increase our understanding of this work setting.

### **Paper III**

In the third study we identified central dimensions and developed a model of organizational climate in large-scale project organizations in the oil and gas industry. The findings suggest that a climate characterized by a strong focus on a) communication and cooperation with actors in the external environment such as vendors, and b) internal cooperation and communication with other projects and with the line organization is perceived as critical to project success. We used these findings to develop a situation-specific model of organizational climate for this setting called the Organizational Climate Measure for Large-Scale Project Organizations in the Oil and Gas Industry (OCMP).



## **Paper IV**

In the fourth study we identified organizational climate dimensions perceived as salient for police investigation performance, and elucidated potential mechanisms of the relationship between organizational climate and investigation performance. The findings indicate that two types of climate, Human Relations climate and Rational Goal climate are perceived to enhance police investigation performance. A Human Relations climate is perceived to enhance investigation performance by developing collective human, capital, and by supporting internal and external cooperation and coordination of resources; a Rational Goal climate is experienced to increase investigation performance by encouraging planning, goal-setting, and task focus.

### **In sum**

The findings from this thesis generally support the value of situation-specific survey instruments and models in the university setting, in large-scale projects in the oil and gas industry, and to some extent also in police investigative work. General models and survey instruments do not seem to sufficiently capture the salient organizational practices and work characteristics in these particular knowledge work settings. Hence, researchers and practitioners are likely to benefit from using the situation-specific models developed in Paper II and III as a foundation for both further research studies as well as organizational assessment and development processes. Moreover, the papers in the thesis identify and describe organizational practices and work characteristics experienced as salient in universities, large-scale projects in the oil and gas sector, and police investigative work, respectively. Taken together, the findings highlight particularly two categories of organizational practices and work characteristics across the three knowledge work settings: a) organizational climate dimensions and social characteristics related to within-group and intergroup cooperation, and b) practices of high-commitment HRM systems. Finally, I outline three promising avenues for future research based on the findings from the papers in the thesis: a) Further testing and validation of the findings in specific work settings using quantitative research designs, b) the development and validation of situation-specific survey instruments for the three work settings, and c) additional studies and development of situation-specific models in both established knowledge settings that are undergoing changes and in new and emerging knowledge work settings and jobs.

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## **8. Papers I-IV**