*Preface*

This thesis concludes my Master of Science education in Work- and Organisational Psychology at the Norwegian University of Science and Technology (NTNU) in Trondheim. The thesis was performed throughout my 4th semester in the spring of 2014, at the Department of Psychology, in collaboration with a Norwegian oil and gas company. The concept of work engagement and how employees maintain engaged in their work has always interested me and lead me to organisational psychology in the first place. That is the main reason why I decided to explore the dimension of work engagement further and to examine novel parts of the field. The work involved in this master thesis has been both educational and inspiring, though demanding. At the completion of the master thesis there are several people that should be thanked. I would like to thank my supervisor for this master thesis, professor Per Øystein Saksvik. I am extremely grateful for his kindness in sharing his academic knowledge with me and making himself available to answer my questions and provide guidance throughout the process. Dr. Helene Nissen-Lie's valuable ideas and comments were also a significant help, for which I am very grateful. Without this support, it is fair to say that this thesis could not have been completed. In addition, I wish to thank my friend, and fellow student in the development of the questionnaire and the collection of the data, Marielle Paulsen, whose sharing of ideas and help when challenges presented themselves made our tasks achievable. Further, I would like to thank Kyrre Svarva for his assistance solving various technical problems that we encountered.

Finally, I wish to thank the company management and all the respondents who took the survey, thus making this study possible. Finally, thanks to friends and family for their support, critical input and interest in my work.

Mille Myhre,
Trondheim, 2014.
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Abstract

Concerned with novel problems related to the increasingly stressful work conditions it is crucial to focus on the positive work-life resources that can increase employees' ability to cope with work-related demands. The purpose of this study is to investigate the effects of personal resources on employees' perceived amount of work engagement based on the theoretical foundation of the *Job Demands-Resources model*. It was hypothesised that self-efficacy and optimism would elevate levels of work engagement, as personal resources are associated with individual's ability to successfully control and impact their environment. Hypotheses were tested among 142 engineering employees. The study was conducted with a quantitative survey between two departments at a Norwegian Oil- and Gas company. To estimate how much of the total variance in the outcome variable could be explained by personal resources when controlling for other groups of explanatory variables, a hierarchical multiple regression was conducted for work engagement. The results of the study indicate that engineering employees' perceive job demands, organisational culture and self-efficacy as significant positive effects on work engagement. Overall, the findings of this study illustrate the need for challenging and resourceful working conditions, where employees share collective values, and believe in the ability to complete tasks and reach goals to flourish at work. Future studies should further explore personal resources by including other psychological constructs such as resilience and hope.

*Keywords:* work engagement, work characteristics, job demands, job control, social support, job resources, leadership, organisational culture, trust, personal resources, self-efficacy, optimism, engineering employees, age differences.

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The effects of personal resources:

A cross-sectional study of job demands, job resources and work engagement among engineering employees.

Nordic countries are confronted with new challenges associated to the consequences of competition in a progressively globalised economy. The dynamics of a globalised economy have contributed to an increase in the work related demands, and the frequency of organisational reorganisations has increased job insecurity (Christensen, Borg, Hakanen, & Aronsson, 2009). The competitive pressure of a globalised economy and a movement towards increased worker autonomy in the production development put a greater pressure on employees (Esping Anderesen, 2002; Wrzesniewski & Dutton, 2001). Evidently, this direction of movement will have an impact on the employees' well-being in the modern labour market. Accordingly, in order to comprehend the increasingly stressful conditions of the modern work life (Ferrie et al., 2001) it is important to focus on the development of positive work-life resources that can increase employees' abilities to cope and adapt with work-related demands.

According to the government, about 40 000 employees and more than 200 000 jobs are in the oil and gas industry in Norway. The oil and gas sector is Norway's largest industry and accounts for about 22 % of national value creation (Konjunktrapport, 2013). Furthermore, the oil and gas industry has been operating in some of the world's most delicate environments for more than a 100 years. Although the industry's record has not been ideal, it is considered a pioneer in developing and using new technology and in implementing management systems to reduce the environmental impact of its operations. Needless to say, many demands and requirements are put on employees in these working conditions.

Influenced by dominant psychological models, like Karasek's (1979) "*Demand-Control model*", the "*Job Demands-Resources*" or JD-R model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) associate employees' well-being to the characteristics of the work environment. The Job Demands-Resources model is a theoretical framework with underlying predictions indicating that job demands are the main factors predicting negative job strain (Bakker, Demerouti, Taris, Schaufeli, & Schreurs,

2003c; Bakker, Demeruti, & Verbeke, 2004), whereas job resources are the strongest predictors of work engagement (Hakanen, Bakker, & Schaufeli, 2006).

The Job Demands-Resources model attempts to integrate two rather independent research traditions, namely *the stress research tradition* and *the motivation research tradition* (Demerouti & Bakker, 2011). The model suggests that job demands initiate a health impairment process, while job resources initiate a motivational process. Moreover, the JD-R model determines how demands and resources interact, and predict vital organisational outcomes. Previous research has demonstrated that the assumptions of the model support both self-reports and objective data (Demerouti et al., 2001; Schaufeli & Bakker, 2004). However, there are still several unanswered questions. For instance, the model has been criticised for being restricted to working characteristics, and for neglecting the role of employees' "*personal resources*", which can be essential determinants of their adaption to the work environment (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007a).

Modern organisations need energetic and dedicated employees - people who are engaged with their work. These organisations expect proactivity, initiative, and responsibility for personal development from their employees. Studies have demonstrated that the JD-R model can predict experience of burnout and of work engagement (e.g., Demerouti et al., 2001), processes that are postulated in the model. Nowadays, there are two different perspectives with regard to the definition of work engagement. Maslach and Leiter (1997) argue that a continuous sequence exists with burnout and engagement as two opposite poles. The second line of thought defines engagement in its own right, as the positive antipode of burnout (Schaufeli & Bakker, 2004). According to the latter approach, work engagement is defined as 'a positive, fulfilling, and work-related state of mind that is characterised by vigour, dedication, and absorption'. In the face of today's turbulent environment, characterised by organisational downsizing and rapidly escalating technology advancement and innovation, employees are expected to adapt to new environments with greater demands and fewer resources. Employee engagement is being challenged in contemporary organisations, and one way to better understand these challenges of work engagement is to closer examine the role of personal resources. It is possible that personal resources could increase work engagement, which is important to investigate to ensure employees' health and well-being.

The purpose of this study is to examine how personal resources operate on work engagement in relation to the JD-R model's processes, based on Demerouti and Bakker's (2011) suggestion of expanding the model by including personal resources. To investigate

the role of personal resources in the JD-R model, insight from the *Conservation of Resources (COR)* theory will be presented (Hobfoll, 1989; 2002), along with the work on *"Psychological Capital"* (Luthans, Avey, Avolio, Norman, & Combs, 2006) to better understand the processes and to meet the challenges of employees' engagement in today's organisations. The thesis will start with an introduction to the JD-R model, with a detailed description of the psychological processes incorporated. Followed by a description of the relationship between personal resources and the JD-R model found in the literature. Further, the construct of work engagement will be presented, because this dimension is being defined and presented differently across empirical research. Thereafter, a demonstration of the method and the selected analyses, along with the results will be presented and interpreted. Finally, the results will be discussed in light of theory and practise, together with the study's methodological concerns. The study will address both psychological and demographic determinants. Research questions this paper will examine:

1. Which psychological and organisational factors may contribute in predicting work engagement among engineering employees?
2. Can personal resources contribute in explaining the concept of work engagement, and how can they be incorporated in the JD-R model?
3. What is the function of job demands and job resources in the JD-R model?

## Theoretical framework

This section presents the theoretical framework behind the current study based on empirical evidence about job demands, job resources, personal resources, and other factors that are considered to influence work engagement. The current study included engineers, as few studies do, to provide greater insight to a work group that are important in the future work marked. The Job Demands-Resources model will be used as the theoretical framework because it incorporates a broad range of working conditions into the analyses of organisations and employees.

### The Job Demands-Resources model

The main assumption of the *Job Demand-Resources model* (Bakker & Demerouti, 2007; Bakker, Demerouti, De Boer & Schaufeli, 2003a; Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003c; Demerouti et al., 2001) is that every occupation has separate risk factors associated with job related stress, thus proposing a general model that may be applied to various occupational settings, regardless of the specific demands and resources involved (Demerouti & Bakker, 2011). According to the JD-R model these factors can be divided into two general categories; job demands and job resources, which integrate different specific demands and resources, controlled by the context under study.

### *Job demands*

Job demands refer to all 'the physical, psychological, social or organisational features of the job that involve sustained physical and/or psychological (emotional and cognitive) effort or expertise, and are therefore associated with certain physiological and/or psychological costs' (Bakker & Demerouti, 2007). Examples could be irregular working hours, organisational change and damaging work environment. However, job demands are not necessarily damaging, but they can turn into work stressors when meeting those demands require high effort from which the employee unsuccessfully recover adequately from (Meijman & Mulder, 1998).

### *Job resources*

Job resources refer to 'those physical, psychological, social, or organisational aspects of the job that are either/or: 1) functional in achieving work goals, 2) reduce job demands and the associated physiological and psychological costs, and 3) stimulate personal growth, learning, and development' (Bakker & Demerouti, 2007). Thus, resources are not only important to meet job demands, they are also necessary for human motivation. This is in line with Hackman and Oldham's (1980) "*Job characteristics model*" that highlights the motivational potential of job resources at the task level, along with feedback, autonomy, and task

significance. Furthermore, this conforms on a more general level with *the conservation of resources theory* (Hobfoll, 2001) that describes that the prime human motivation is aimed towards the conservation and growth of resources. Correspondingly, resources are valued because they are means to accomplish or protect other valued resources. Job resources may be placed at the macro, organisational level (e.g., career development, job security, income), the interpersonal level (e.g., support from colleagues, leadership, teamwork), the particular job position (e.g., taking part in decision making, clarification of roles), and at the level of the task (e.g., skill diversity, task identity, task meaning, autonomy, and performance feedback).

**Conservation of Resources (COR) theory**

Hobfoll (1989) proposed the *Conservation of Resources theory* and defined resources as: "those entities that either are centrally valued in their own right, or act as means to obtain centrally valued end" (Hobfoll, 2002, p. 307). As claimed by the COR theory, people endeavour to acquire, sustain and secure their personal resources. This entails that people must invest in their resources in order to guards against resource loss, regain from losses, and retrieve resources. Resources can be classified into four types: objects, energies, conditions, and personal characteristics. However, the two main assumptions of the COR theory will be of focus in this paper, namely the two latter. Firstly, individual invest their resources in order to meet difficult conditions and prevent themselves from negative outcomes (Hobfoll, 1989). Secondly, individuals strive to protect and accumulate these resources, which tend to generate other resources. In turn, this may lead to positive outcomes such as better coping strategies and well-being (Hobfoll, 2002). Taking these assumptions together, there are some similarities between the COR theory and the JD-R model. In both theories, resources play a moderating role in the relationship between demanding conditions and negative outcomes. Moreover, implementing the second assumption of the COR theory in the motivational process of the JD-R model, would suggest that the availability of resources would lead to an accumulation of resources, resulting in more positive outcomes. For example, Llorens, Schaufeli, Bakker, and Salanova (2007) showed that task resources increased efficacy beliefs, which resulted in higher levels of work engagement. In summary, based on these two main assumptions of the COR theory, this paper will examine whether personal resources, such as self-efficacy and optimism, play important roles in the JD-R model.

**Dual routes in the JD-R model**

Another assumption behind the JD-R model is that two different underlying psychological processes are essential in the development of job-related motivation and stress. The first process is a *health impairment route*, which suggests that high demanding jobs or jobs with constant job demands may exhaust employees mental and physical resources and lead to energy depletion and health problems (Bakker, Demerouti, & Schaufeli, 2003b; Demerouti et al., 2000, 2001; Leiter, 1993). According to Hockey (1993), under the influence of environmental demands individuals practice performance-protection strategies. Such strategies are the activation of sympathetic stimulation (autonomic), which enhance subjective effort (use of active control in information processing). Although the use of these strategies may not decrease performance in primary tasks, Hockey's theory argues that an indirect decline in performance may be found. This decline can result in strategy adjustments such as narrowing of attention, increased selectivity or reorganisation of task requirements. Individuals may further experience fatigue after-effects including high levels of subjective fatigue and taking risky choices. The long-term effects of such compensatory strategies may be exhausting individuals, which could eventually result in burnout.

In accordance with the *motivational process*, by contrast, the availability of job resources has motivational factor and leads to organisational commitment and work engagement. Job resources may be intrinsic and extrinsic in their motivational potential because they foster employees to meet their goals (Deci & Ryan, 1985), and promote employees' progress, learning and development. Intrinsic job resources motivate feelings of competence (White, 1959), autonomy (DeCharms, 1986) and relatedness (Ryan & Deci, 2000). For example, proper feedback promotes learning, which in turn increases job competencies, whereas decision-making and social support assure the need for autonomy and the need to belong (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Job resources may also play an external motivational role, because, employees derive fulfilment from the job and become more committed to work. According to Meijman and Mulder's *effort-recovery model*, work environments offering resources foster the motivations to attain work goals and successfully complete work tasks. For instance, supportive colleagues and correct feedback from superiors increase the probability of being successful in achieving working goals. Either through the fulfilment of basic needs or through the accomplishment of work goals. Thus, the presence of job resources result in work engagement, whereas their

absence elicit a cynical attitude towards work (Demerouti et al., 2001; Lewig, Xanthopoulou, Bakker, Dollard, & Metzer, 2007; Schaufeli, Bakker, & Van Rhenen, 2009).

**Interactions between job demands and job resources**

The JD-R model proposes, next to the suggested main effects of job demands and resources that the *interaction* between job demands and resources are significant for the occurrence of job strain and motivation. Incorporated in the characteristics of job resources is the expectation that these resources may *buffer* the effect of job demands on job strain, burnout included (Bakker et al., 2005; Bakker et al., 2003b; Xanthopoulou et al., 2007b). The buffering role of job resources is in accordance with the Demand Control Model (DCM; Karasek, 1998) and the Effort-Reward Imbalance Model (ERIM; Siegriest, 1996). Whereas the DCM argues that control over the execution of task (autonomy) may buffer the impact of work overload on job strain, and the ERIM argues that rewards may reduce the unfavourable impacts of effort spent, the JD-R model expands these aspects and claims that *different* types of job demands and job resources should be interacted when predicting job strain. Exactly which job demands and resources influence differently in an organisation depend upon the specific work characteristics or job function.

The *buffering* hypothesis is in line with Kahn and Byosiere (1992) who argues that the buffering or interaction effect can appear between any pair of variables in the stress-strain process. They argue that properties of the work situation as well as features of the individual can buffer the effects of a stressor. The buffering variable can diminish the tendency of organisational properties to provoke specific stressors, alter the perceptions and cognition generated by such stressors, moderate responses that follow the appraisal process, or minimise the health-damaging consequences of these responses (Kahn & Byosiere, 1992, p. 622).

A more recent, and final, suggestion of the JD-R model is that job resources especially affect motivation or work engagement when meeting high job demands. This illustrates the so-called *coping hypothesis* (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, Van Veldhoven, & Xanthopoulou, 2010b; Hakanen, Bakker & Demerouti, 2005). To demonstrate, Bakker et al. (2007) tested this hypothesis in a sample of Finnish teachers. The study predicted and found that job resources are most valuable in maintaining work engagement under conditions of high job demands (e.g., student misbehaviour). For instance, novelty, appreciation, and positive organisational environment improved work engagement particularly when student misbehaviour was high. Likewise, Bakker, Van Emmerik, Demerouti, & Geurts  (2010a) examined in a large heterogeneous group of

employees whether work attitudes (organisational commitment and task enjoyment) were most beneficial when job demands and job resources were both high. The moderated structural equation model found, from analyses, strong evidence for 15 of the 16 hypotheses postulated. The majorities demonstrated significant interactions for task enjoyment and organisational commitment. Particularly, under conditions of high job demands, job resources (skill opportunities, autonomy, learning development, autonomy, social support, feedback of performance, and participation in decision-making) predicted work enjoyment and organisational commitment (Bakker et al., 2010a). This could mean that resources are most salient under conditions that are demanding or threatening. Therefore, employees need challenges at the workplace for job resources to turn into work engagement and task enjoyment. This is similar to Hobfoll's (2002) argument that suggesting 'gaining resources' only occur in the context of resource loss. Therefore, it is not unreasonable to imply that high job demands are salient for job resources to reach their motivational potential. Ultimately, in line with the *coping hypothesis*, this new suggestion for the JD-R model theorises that, under demanding conditions, individuals will be more disposed to use resources as a stress-reducing mechanism or coping strategy.

**Personal Resources in the JD-R model**

The central aim of this study is to investigate whether *personal resources* can explain more of the relationship between environmental factors and organisational outcomes. Hobfoll, Johnson, Ennis, & Jackson (2003) defined personal resources as aspects of the self that are associated with individuals' resilience and refer to the ability to influence and successfully control their environment. This study includes two typical personal resources namely, self-efficacy (Bandura, 1989) and optimism (Scheier & Carver, 1985), which have been considered as fundamental components of individual adaptability (Hobfoll, 2002). Instead of focusing on situation specific self-efficacy, this paper explores a more extensive dimension, which refers to individuals' understanding of their potential to meet demands in a broad array of contexts (Chen, Gully, & Eden, 2001). General self-efficacy increases from persistent positive experiences and the accumulation of successes (Chen et al., 2001). For instance, Yeo and Neal (2006) found that generalised and specific efficacy beliefs were related and that the general tendency to feel efficacious also affected specific situations. The other personal resource explored, called optimism, can be described as the tendency to believe that you will generally experience positive outcomes in life (Scheier & Carter, 1985), which increases the probability to take action and deal with damaging conditions (Aspinwall & Taylor, 1997). In accordance with *the core self-evaluations theory* (Judge, Locke, &

Durham, 1997), it is suggested that these two personal resources become a unitary resiliency dimension that plays an essential role in employees' functioning at work. Earlier research has found that self-efficacy and optimism are related to stress resilience and have positive effects on physical and emotional well-being (e.g., Chen et al., 2001; Scheier & Carver, 1992). Even though individuals' perception of and adaption to the environment are diverse, depending on their levels of personal resources, these resource levels are sophisticated by environmental factors (Bandura, 2000). Put simply, personal resources may determine the way people perceive the environment, compose it, and respond to it (Judge et al., 1997).

Previous researchers have also investigated the role of personal resources as moderators and have mainly focused on the relationship between negative work characteristics and unfavourable outcomes. For instance, Van Yperen and Snijders (2000) showed that general self-efficacy moderates the association between job demands and mental health problems. Furthermore, in relation to optimism, under demanding work conditions (i.e., time pressure, job insecurity, and negative working climate), optimistic workers reported lower levels of mental distress compared to their less optimistic colleagues (Mäkikangas & Kinnunen, 2003). Taken together, these findings suggest that employees with high levels of personal resources are dealing with demanding conditions more efficiently, and in turn inhibit negative outcomes (i.e., burnout). The combination of the COR theory (Hobfoll, 2002) and *the buffer hypothesis* of the JD-R model (Bakker, Demerouti, & Euwema, 2005) suggests a potential moderating role of personal resources on the model's health impairment process.

In relation to the mediating role of personal resources, previous studies have found that individuals draw inferences between their experiences at work to their private life situation (Kohn & Schooler, 1982). For instance, Kohn and Schooler showed that *structural imperatives of work* (e.g., responsibility) regulate individuals' personality features (e.g., self-determination). Furthermore, Feldt, Kinnunen, and Mauno (2000) found that a sense of coherence (a close concept to optimism) mediates the relationship between organisational climate and job security, as well as occupational well-being. In a similar vein, Luthans et al. (2006) found that a resourceful work environment fosters employees' *"Psychological Capital"* (i.e., efficacy, optimism, hope, and resiliency growth), which in turn may increase productivity and bring financial profit. Taken these results together, this may suggest that environmental job resources activate personal resources, which, in turn, may result in positive psychological and organisational outcomes. Regarding the motivational process of the JD-R model, it is hypothesised that job resources, such as control over work tasks and

pace, as well as opportunities for professional development will provoke a feeling of importance to employees. Thus, employees with adequate job resources will appear efficacious, valuable to the organisation, optimistic about their future, and, therefore, stay engaged in their work.

The current study applies the JD-R model as a theoretical foundation, and thus, primarily focuses on work characteristics as *antecedents* of personal resources and work engagement; however, it is reasonable to expect the reverse too. Namely, that personal resources may be fundamental for job demands and resources, and their various outcomes (Judge et al., 1997). Researchers have suggested that job- and personal resources are complementary, since individuals, through learning experiences, can form strong positive evaluations about themselves and in turn, promote more resourceful work environments (Kohn & Schooler, 1982). Put differently, personal resources may not only be promoted by a manageable and comprehensive environment, but how individual's react to it too (Judge, Bono, & Locke, 2000; Judge et al., 1997). Therefore, it is anticipated that self-efficacious or optimistic employees will attend more to job resources compared to job demands, and as a consequence, perceive higher levels of work engagement.

 **The concept of Work engagement**

The emerging positive psychology proposes a shift from the traditional focus on weaknesses and malfunctioning towards human strengths and optimal functioning when investigating well-being (Seligman & Csikszentmihalyi, 2000). Positive states have not been popular in psychology, but recently, Maslach, Schaufeli, and Leiter (2001) suggested a similar switch from burnout towards its opposite- engagement. Work engagement is assumed to be the positive antipode of burnout or: " energy, involvement, and efficacy- these are the direct opposites of the three dimensions of burnout", according to Maslach and Leiter (1997, p.34). They argued that burnout is an erosion of engagement, whereby "energy turns into exhaustion, involvement turns into cynicism, and efficacy turns into ineffectiveness" (p. 24). However, research has suggested that instead of being two contradictory constructs, burnout and engagement are independent, yet negatively related states of mind (Schaufeli & Bakker, 2004). Contrary to Maslach and Leiter (1997) this paper suggests that the opposite scores of burnout do not adequately measure engagement since this implies that both concepts are each other's complements. Instead, this study focuses on measuring engagement independently. To demonstrate, feeling emotionally drained from work during the week does not necessarily imply that in the same week one cannot be  filled with energy.

Adapting this perspective, instead of perfectly complementary and mutually exclusive states, burnout and engagement are independent dimensions.

Engagement can be described as a persistent or a pervasive affective-cognitive state that is not concerned with any particular object, event, individual or behaviour and has been classified into three dimensions: *Vigour* is defined by mental resilience and high energy levels while working, the willingness to invest effort into work, and showing persistence through difficulties. *Dedication* is characterised by a feeling of importance, enthusiasm, inspiration, pride and challenge. The third dimensions, *absorption*, is characterised by being fully concentrated and happily engrossed in work tasks, whereby time passes quickly and it can be difficult to detach oneself from work. Engagement can be measured with the Utrecht Work Engagement Scale (UWES), a self-report instrument that includes the three dimensions described above. Recently, two studies testing the confirmative factor estimates demonstrated the factorial validity of UWES (Schaufeli, Gonzalez-Roma, & Bakker, 2002a; Schaufeli, Martinez, Marques Pinot, Salanova, & Bakker 2002b).

Work engagement has previously been studied in context of the JD-R model, and studies have shown that job resources are positively related with work engagement, even in the long run (Hakanen, Schaufeli, & Ahola, 2008). Engaged employees have a feeling of energetic and effective association with their work activities and regard themselves as capable to deal with the demands of their job. Based on theoretical analyses by Schaufeli and Bakker (2001), two underlying dimensions have been identified to work-related well-being: (1) activation, extending from exhaustion to vigour, and (2) identification, extending from cynicism to dedication. Engagement is distinguished by vigour (high activation) and dedication (high identification), whereas burnout is distinguished by a unitary construct of exhaustion (low activation) and cynicism (low identification). On this note, the current paper has chosen to examine work engagement predicted by the JD-R model. This study goes one step beyond the traditional JD-R model by including personal resources as potential contributors of work engagement. By considering burnout and engagement to be opposite dimensions that should be measured independently with different instruments, work engagement is assessed with the Utrecht Work Engagement Scale.

**Hypotheses**

Based on the theoretical focus and the magnitude of this study, not all factors that have demonstrated relations with the outcome variable will be used in this study. This is primarily done to provide a more solid insight of work engagement within the organisation and to test the Job Demands-Resources model. The basic argument of the current study is that personal resources will contribute significantly to employees perceived level of work engagement with the traditional JD-R model as theoretical basis. However, insight from the COR theory and two personal resources from the psychological capital concept will also be included. On this note, tree main hypotheses are postulated:

Job demands, job resources, and social support have been found to be related to work engagement so therefore the current study postulate that:

**H1:** Job demands, job resources, and social support will be positively related to work engagement. Job demands are predicted positively associated based on the recent suggestion of the JD-R model (Bakker et al., 2007). Increased levels of the respective variables are expected to elevate work engagement levels.

**H2:** Personal resources (self-efficacy and optimism) will be positively related to work engagement. Increased levels of personal resources are likely to increase levels of work engagement.

**H3:** Personal resources will contribute to the explained variance in the JD-R model, and will significantly predict work engagement. Employees with high levels of self-efficacy and optimism will have higher levels of work engagement.

## Method

The next section will present the methodology of the current study. Firstly, information regarding the organisation under study will be introduced along with the sample and procedure of the data collection. Secondly, the design of the study, measurement instruments, and variables under study will be presented along with their validity and reliability estimates. Finally, a summary of the section together with the description of the statistical analyses, procedure and research ethics will be presented.

**Background**

The purpose of this study was to examine which factors can contribute to work engagement, particularly whether including personal resources such as self-efficacy and optimism in the Job Demand-Resources model can explain more variance than the traditional factors of the outcome variable (Xanthopoulou et al., 2007). This study will examine the following factors: *job demands*, *job control*, *social support*, *leadership*, *trust*, *organisational culture*, *self-efficacy*, and *optimism*. The theoretical implications are largely based on the original framework of the *JD-R theory* (Bakker et al., 2003a; Demerouti et al., 2001), but other theories such as *the Conservation of Resources* (COR) theory and the concept of Sweetman and Luthans' *"Psychological Capital"* is explored to the better understand the complex constructs behind work engagement – the dependent variable (Schaufeli & Bakker, 2004).

**Information about the organisation**

This study was conducted in collaboration with the HSE (Health and Safety Executive) unit at a company consisting of 800 engineers, located in Oslo. The company is a global provider of products and services in engineering construction, maintenance and the operation of new and existing oil and gas fields, both onshore and offshore. The organisation provides innovative studies and new technology, along with environmentally friendly way of exploiting the oil and gas reserves (www.norskoljeoggass.no). According to the HSE management, the company is a leading technical consultancy, has both permanent based employees and project-based consultants providing project management services. Because of this dividing of employment types, the organisation requires a hierarchical leadership and management structure.

**Sample**

The HSE management, on the basis of convenience, selected the sample as a result of time pressured schedules and ongoing projects in the company (see *procedure* for more details on recruitment). The study collected a total of 196 dataset, whereas 142 were accepted for analysis. The descriptive statistics for the sample are found in table 1. The sample was primarily male (72.5 %), with a mean age of 30-39 years (SD= 1.24), the average respondent had a master, and 35 % had worked for this organisation 10 or more years. Average years of working in this company were 5-10 years (SD= 1.35), and respondents had a work experience of 20 years or more (SD= 1.12). The oil industry has an average female distribution of 24 % in companies larger than 100 employees (Lotherington, Alteren, Bye, & Moilanen, 2006). This sample (27 %) is somewhat above the mean and representative for the equality. Respondents came from two different departments with about half of the employees from each unit. The respondents consist of both permanently based employment (27 %), and project-based employment (73 %).

*Table 1:* Descriptive Statistics for Sample

| Variables | Categories | Frequency (percentage) |
|---|---|---|
| Gender | Male | 103 (73 %) |
| | Female | 38 (27 %) |
| Age | Under 30 | 17 (12 %) |
| | 30-39 | 39 (28 %) |
| | 40-49 | 38 (27 %) |
| | 50-59 | 26 (18 %) |
| | Over 60 | 21 (15 %) |
| Education | Bachelor | 43 (30 %) |
| | Master | 82 (58 %) |
| | PhD | 9 (6 %) |
| | Other | 8 (6 %) |
| Work experience | <1 | 2 (1 %) |
| | 1-5 | 19 (13 %) |
| | 5-10 | 22 (16 %) |
| | 10-15 | 37 (26 %) |
| | >20 | 62 (44 %) |
| Position type | Project-based | 104 (73 %) |
| | Permanently-based | 38 (27 %) |

*Note:* The values are in frequency, with percentage in parentheses (N= 142)

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**Procedure**

The current study was designed and conducted in January 2013, with Marielle Paulsen, a fellow master student. Before deciding which variables to include, informal conversations were held with the HSE unit to ensure accurate outcomes of the study. Following these conversations, designing the questionnaire based on the theoretical framework and the organisation's criterion was performed.

**Pilot**

The questionnaire was tested on five people before it was distributed to the sample of employees. We got two engineering students from Gløshaugen, NTNU, and three people from the company management. The pilot subjects took about 10 minute to complete the pilot test, which met the time criterion. The questionnaire required some adjustments concerning language and formulation after receiving feedback, but otherwise the questionnaire operated as planned. The questionnaire was largely based on the QPS Nordic, which has been tested on many people, for instance by validation done by STAMI (Skogstad et al., 2001).

Considering that the sample consists of engineering staff with tight schedules, the management emphasised that we constructed a comprehensive, but short, survey.

The questionnaire was distributed by email to all the employees by the management after receiving approval from the organisation and the Norwegian Social Science Data Services (see Appendix B). Enclosed in the email was a short information letter and a link to the questionnaire. The participants were informed about the purpose of the study and, as informed, agreed to confidentially and voluntarily participate by completing the questionnaire. The respondents were also informed that they could withdraw from the study at any point. The data was collected during one week in the fall of 2013. Overall response rate was 51%, which is considered a good response rate for mailed questionnaires (Grady & Wallston, 1988).

**Materials**

In the development of this questionnaire, the emphasis was on social and organisational factors at work that might help maintain and promote health in the form of work engagement, and to formulate questions in positive or neutral terms. The participants were asked to complete a questionnaire containing 36 questions, where the last question is an open-ended square where the employees could comment the survey. A diversity of variables was included since we were two students using the same datasets. This resulted in a questionnaire containing 18 different variables: *personal background variables*, *working*

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*characteristics* (i.e., formal education, department of employment, work experience, and position in company), *job demands*, *job control*, *social support*, *leadership*, *organisational culture*, *organisational commitment*, *role expectation*, *mastery of work*, *work motives* (Skogstad et al., 2001, QPS Nordic), *trust* (Christensen et al., 2012; Skogstad et al., 2001) *work engagement* (Schaufeli & Bakker, 2004) *self-efficacy* (Schwarzer & Jerusalem, 1995), *optimism* (Scheier, Carver & Bridges, 1994), *job satisfaction* (Hackman & Oldham, 1975), *turnover* (Rooth, 2004) and *general health* (Christensen et al., 2009; Aronsson & Lindh, 2004).

Keep in mind some of the indexes existed only in Norwegian, we got two students to translate these into English, and two other to translate them back to Norwegian again and compared to reveal potential discrepancy. When the translations corresponded back to the original sentence, we considered us satisfied with the translation.

**The measurement instruments**

The measurement instruments were constructed by different validated variables. The General Nordic questionnaire for psychological and social factors at work (QPS Nordic) is thoroughly psychometrically tested and tried in many organisations (Skogstad et al., 2001). This instrument is the core of the study. Some questions in the QPS Nordic were excluded in the questionnaire, and some novel parts were included. This was primarily done to include and explore positive factors that have shown to explain some of the variances in the Nordic project (Christensen et al., 2009). The study also included factors from more recent instruments such as SINTEF's survey concerning health, safety and work environment, known as the Survey for Workplace Health Promotion (SHEFA) (Bakken & Torp, 2012; Torp & Grimsmo, 2008), and questions from the Nordic Project: '*Positive factors at work'* (Christensen et al., 2009). However, not all measured variables were used in the current study since we were two students using the same data set (see Appendix A for full questionnaire). The variables that were included in the study are described below and mean scores across items were calculated for all respondents.

**Background variables**

The demographic variables included was gender (men= 0, women= 1), age divided into five categories of "under 30", "30-39", "40-49", "50-59", "over 60", and number of years in the organisation in the five categories "under a year", "1-5", "5-10", "10-20", "20 years or more". Age and gender were considered control variables since previous research had shown some of them to be related to the outcome variables (e.g., Matthiesen, 2000).

**Independent variables**

**Job demands.** Job demands were measured with the QPS Nordic job demands scale (Skogstad et al., 2001), which consisted of seven items concerning subjective experience of demands in the work environment. Questions could be: ""Does your work require quick decisions?" and respondents were asked to rate how much quantitative demands, decision demands and learning demands they experienced on a five-point Likert scale ranging from from (1) "very seldom or never" to (5) "very often or always". The Cronbach's alpha for demands was .77 in the current study, exceeding that of Skogstad et al. (2001) of .67.

**Job control.** To measure job control, a five-item index from QPS Nordic covering positive challenges at work, control over decision-making and work phase was used. Example from the questionnaire could be: "Can you set your own work pace?". The response categories were identical to the one for job demands. Skogstad et al. (2001) found a scale reliability of .78, whereas the Cronbach's alpha in the current study was .76.

**Social support.** Social support was measured on a four-item index consisting of questions from QPS Nordic concerning support from supervisor, co-workers as well as friends and family. Questions included could be: "If needed, can you get support and help with your work from your co-workers?". Response categories were given on a five-point Likert scale, ranging from "very seldom or never" to "very often or always". Cronbach's alpha for social support was .79 in Skogstad et al. (2001) study, while scale reliability in the current study was .73.

**Leadership.** Leadership was measured using questions from the QPS Nordic concerning empowered leadership and the idea of an unbiased leadership. Respondents were asked to indicate how often each of the eight items presented describe the organisations leadership (e.g., 'Does your day to day superior encourage you to participate in important decision?') on a five-point Likert scale ranging from "very seldom or never" to "very often or always". Cronbach's alpha for the leadership scale has been found to be .81 (Skogstad et al., 2001), and was .79 in the current study.

**Organisational culture.** To measure organisational culture a five-item index from the QPS Nordic was used. Measures of organisational culture were captured by questions concerning innovative climate and the work of human resources. Question covering these areas could be: "Are employees encouraged to think of ways to do things better at your workplace?" with answer categories ranging from (1) "very seldom or never" to (5) "very often or always" along a five-point Likert Scale. In the current study organisational culture had a Cronbach's alpha of .84, which is above Skogstad et al. (2001) reliability of .75.

**Trust.** In order to measure trust, QPS Nordic provided one validated question, and one question from Christensen et al. (2012) was used to determine how employees experience management abilities to provide trustworthy information. The QPS Nordic was: "Do you trust the ability of the management to look after the future? " with response categories from "very little" to "very much". Christensen et al. provided the question: " Can you rely on information provided by your day to day superior?" with answer categories "very seldom or never" to "very often or always" along a five-point Likert Scale. Internal consistency was .80 for the two items.

**Personal resources**

Personal resources include several various variables, witch together accounts for individual resilience (Hobfoll et al., 2003). This study has chosen to examine two of them closer: self-efficacy and optimism. Adding personal resources can mean that over time employees will generate self-efficacy and optimism in order to feel engaged about their work. Personal resources are linked to personality traits. For example, people who are high on extraversion are more likely to think optimistically than people who are low on extraversion. However, regardless of traits, it is possible to develop optimistic explanatory styles (Seligman, 1991).

**Self-efficacy**. Self-efficacy was assessed with the General Self-Efficacy scale (GSE) (Schwarzer & Jerusalem, 1995), which consisted of ten items concerning a sense of perceived self-efficacy. Respondents were asked to rate how they reflect an optimistic self-belief with items such as: "I can always manage to solve difficult problems if I try hard enough". Items were scored on a four-point scale, ranging from (0) "Not at all" to (4) "Exactly true". Although the use of subjective measures of self-efficacy has been claimed to have some limitations, Schwarzer and Jerusalem (1995) claim that an individual's perception of self-efficacy is the most crucial for predicting coping and adaption. The General Self-Efficacy scale has a good internal consistency, with a Cronbach's alpha coefficient reported in the majority of studies above .80. In the current study, the Cronbach's alpha coefficient was .85.

**Optimism.** Optimism was measured using three items from The Life Orientation Test-Revised (Scheier, Carver & Bridges, 1994) to assess individual differences in generalised optimism versus pessimism. The LOT-R is a 6-coded item, 3 framed in each direction. The scale included items such as: "I am always optimistic about my future", and respondents indicated their agreement from (1) "Strongly disagree" to (5) "Strongly agree". Three suitable statements were selected on the basis of positively worded items, so a high

score on optimism indicate a more optimistic belief. Scale reliability in the current study was .83, while Scheier et al. (1994) reported a Cronbach's alpha of .78.

**Dependent variable**

The definition of engagement has been discussed by many practitioners, as there is not a mutual agreement whether it is the opposite of burnout or an independent dimension. However, the current study decided to follow Bakker and Demerouti (2007) in that work engagement operationalised in its own right as the positive antipode of burnout. Defined as the: '*positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption*' (Schaufeli, Salanove, González-Romá, & Bakker, 2002, p. 74). Work engagement was measured with the short version of the Utrecht Work Engagement Scale (UWES) (Schaufeli, Bakker, & Salanova, 2006). The instrument includes three statements that respondents were asked to decide upon, on a seven-point scale ranging from (1) "Never" to (7) "always". However, the original scale has nine statements that are distributed along three dimensions: vigour, dedication and absorption, but due to time limitations this study only included one statement from the three dimensions (e.g., At my job, I feel strong and vigorous). As such, work engagement is a positive evaluative judgment individuals make about their job, reflecting people's responses to the benefits, challenges, and characterises of the work in which they are engaged. Usually values of Cronbach's alpha for the scales range between .80 and .90 (Demerouti et al., 2001; Montgomery, Peeters, Schaufeli & Den Ouden, 2003; Schaufeli & Bakker, 2004). In the current study, the Cronbach's alpha was .80.

**Statistical Analysis**

Quantitative analyses were conducted with the standard SPSS (version 21.0) software program. All variables were described in terms of descriptive analyses, correlation coefficients and Cronbach's alpha reliabilities. For each of the eleven explanatory and outcome variables (excluding background variables), higher values correspond to higher degrees of the construct being measured. Finally, multiple regression analyses were conducted.

**Missing**

The current study allowed for missing items when more than half of a variable was completed. For instance, at least 4 out of 7 items in job demands index required completion by the respondent to qualify as valid. The missing values of the continuous items were replaced with the serial mean calculated from the non-missing values of each respondent. Respondents who did not complete the questionnaire (N=54) were excluded from the

analyses. The lack of responses to some of the included indexes did not show any patterns in the overall data, therefore, the removal of these responses will unlikely impact further analysis.

**Validity and reliability**

It was decided to estimate the reliabilities of the different measures using Cronbach's (1951) coefficient alpha, which is the most popular measure, and to ignore other reliability estimation techniques, which tend to operate under different mathematical assumptions. Moreover, coefficient alpha seems to be most preferable because, unlike other measures (e.g., Spearman-Brown), it takes into account the effect of each item in estimating the overall reliability. According to Fields (2009) internal consistency reliability should be above .70. All the variables met this demand, thus indicated good internal consistency across multi-item scales (Chronbach, 1951).

**Linear multiple regression analyses**

To examine how much of the independent variables could predict levels on the dependent variable, multiple regression analyses were conducted (Field, 2009). A hierarchical blockwise entry was conducted to examine whether personal resources would account for additional variance when controlling for other groups of explanatory variables. This is usually done to test a theoretical model, which in this case is to see if including personal resources in the JD-R model would predict work engagement.

Several assumptions of the multiple regressions should be examined to ensure trustworthy information. A normally distributed sample size of 142 met the requirement of N>50+8k (predictors) (Field, 2009) and a ratio of 10 to 1 (Howell, 2010). This is crucial considering that the estimate of the R square (explained variance of the model) in the regression analyses depends on the sample size and number of predictors. Also, multicollineraty (when IVs are very highly correlated, .90 or greater, thus measuring the same construct), homoscedasticity (the variability in scores for IVs are approximately equal for predicted DV score), and linearity (that there is a straight line relationship between IVs and DV) all met their requirements before conducting the analyses. Control variables, age and gender, were entered in the first step, followed by the work characteristics: *job demands*, *job control*, and *social support*, which are traditional predictors in the JD-R model. Furthermore, in step three the job resources *leadership, trus*t, and *organisational culture* were added. Finally, the personal resources, *self-efficacy* and *optimism,* were added in the last step of the hierarchical multiple regression.

**Research ethics**

The project was reported to and approved by "Personvernombudet for forskning", The Norwegian Social Science Data Services (NSD). Their approval letter is attached in Appendix B. The data collected that could have been traced back to the respondents through their IP-addresses, were deleted right after they had been analysed. That means that there were not possible to trace identification after the 1st of December 2013.

## Result

In the next section the descriptive statistics for the data, including the correlation coefficients and the Cronbach's alpha values, will be presented. After, the results of the multiple regression analyses will be presented along with a summary. The regression analyses include all the independent variables described above and work engagement operated as the dependent variable.

### Descriptive statistics

Overall, the general perception of the descriptive statistics indicated that variables were ranging from the middle of the index towards the higher end of it. Table 2 showed that age had a sample mean of 2.96 (SD= 1.24) meaning that the average age for respondents were in the category "30-39" years of age. Gender had a sample mean of 1.73 (SD= .45), which means that the majority of the sample was male. Work engagement had a sample mean above scale (M= 4.96, SD= .85), suggesting that respondents rather often feel engaged in their work. Schaufeli and Bakker (2004) have provided norm means for the subgroup 'white collar workers' (M= 3.97, SD= 1.12) regarding work engagement, our sample mean was above the norm mean value implying that the current sample rated themselves towards the higher end of the index. For job demands, the mean sample was 3.92 (SD= .51), with a scale mean of 2.5, which means that the current sample was above average in job demands considering that the scale ranged from one to five. This implies that the average respondents experience high job demands rather often. Respondents had a scale mean above average for job control (M= 3.45, SD= .63), suggesting that respondents consider themselves with high levels of autonomy in their job. All respondents scored rather high on the item concerning 'social support', with a score over scale mean of 4.25 (SD= .64), indicating that respondents experience social support from superiors, co-workers, family and friends. Leadership (M= 3.74, SD= .58), organisational culture (M= 3.84, SD= .62), and trust (M= 4.45, SD= .62) all demonstrated high values above mean scales indicating that respondents were satisfied with the management, trust the company, and experience an innovative work climate. The personal resources, self–efficacy (M= 3.21, SD= .35) and optimism (M= 3.83, SD= .63) were found to be somewhat high, which suggests that respondents generally have an optimistic belief and a moderately perceived self-efficacy towards work tasks. The descriptive statistics and Cronbach's alpha are presented in table 3.

*Table 2:* Descriptive statistics of independent variables

| Variable | N | Mean | SD | Min | Max | Range | a |
|---|---|---|---|---|---|---|---|
| 1. Age | 142 | 2.96 | 1.24 | 1,00 | 5,00 | 4,00 | |
| 2. Gender | 141 | 1.73 | .45 | 1,00 | 2,00 | 1,00 | |
| 3. Work engagement | 142 | 4.96 | .85 | 3,00 | 7,00 | 4,00 | .79 |
| 4. Job Demands | 142 | 3.92 | .51 | 2,43 | 5,00 | 2,57 | .77 |
| 5. Job Control | 142 | 3.45 | .63 | 1,20 | 5,00 | 3,80 | .76 |
| 6. Social Support | 141 | 4.25 | .64 | 1,00 | 5,00 | 4,00 | .73 |
| 7. Leadership | 142 | 3.76 | .56 | 1,22 | 5,00 | 3,78 | .78 |
| 8. Trust | 141 | 4.45 | .67 | 1,00 | 5,00 | 4,00 | .74 |
| 9. Organisational Culture | 142 | 3.84 | .62 | 1,40 | 5,00 | 3,60 | .84 |
| 10. Self- efficacy | 142 | 3.21 | .35 | 2,10 | 4,00 | 1,90 | .86 |
| 11. Optimism | 142 | 3.83 | .63 | 2,00 | 5,00 | 3,00 | .83 |

*Notes: a=* Cronbach´s alpha value, *Min=* lowest value of index, *Max=* highest value of index *Range=* the difference between the largest and smallest value.

**Correlation Coefficient**

The correlations in this study were examined by Pearsons product-moment correlation, which is the most used form of correlation (Field, 2009). All correlations are found in Table 3. The correlation between the explanatory variables and the outcome variable indicated the following relationships: Work engagement showed a significant relationship with all the independent variables except age. Further, work engagement demonstrated the strongest correlation with job demands ($r= .53$, $p< .01$), followed by organisational culture ($r= .49$, $p< .01$), leadership ($r= .46$, $p< .01$), and self-efficacy ($r= .40$, $p< .01$), indicating that high levels of the respective variables increases work engagement. Job control, optimism, trust and social support demonstrated relatively moderate correlations with work engagement, the highest being social support ($r= .38$, $p< .01$). Based on previous research there is somewhat surprising that job demands was the strongest correlation with work engagement, demonstrating not only the importance of job demands, but also that demands are necessary to keep engaged in ones work.

*Table 3:* Intercorrelations between all variables

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Work engagement | 1 | | | | | | | | | | |
| 2. Age | .12 | 1 | | | | | | | | | |
| 3. Gender | -.17* | .25** | 1 | | | | | | | | |
| 4. Job Demands | .53** | .18* | -.14 | 1 | | | | | | | |
| 5. Job Control | .27** | -.18* | -.07 | .13 | 1 | | | | | | |
| 6. Social Support | .38** | -.03 | -.20* | .19* | .37** | 1 | | | | | |
| 7. Leadership | .46** | .08 | -.22** | .40** | .38** | .59** | 1 | | | | |
| 8. Trust | .36** | .18* | -.18* | .19* | .29** | .62** | .58** | 1 | | | |
| 9. Organisational Culture | .49** | .12 | -.20* | .36** | .43** | .54** | .77** | .52** | 1 | | |
| 10. Self- efficacy | .40** | -.03 | -.16 | .21* | .32** | .21* | .24** | .13 | .22** | 1 | |
| 11. Optimism | .34** | .04 | -.17* | .36** | -.01 | .08 | .32** | .12 | .21* | .28** | 1 |

*Note:* (N=142). *p<.05, **p<0.01 (2-tailed)

**Multiple Regression Analyses**

To examine the extent to which independent variables could predict levels of the dependent variable, a stepwise hierarchical multiple regression analyses were conducted (Field, 2009).

**Multiple Regression Analyses for Work Engagement**

To examine the unique contribution of personal resources in the explanation of work engagement, besides the well-established work characteristics and job resources, variables predicting work engagement were entered in four steps. The results are displayed in Table 4. In total, the hierarchical regression model accounted for 44 % of the explained variance of work engagement. The control variables, *gender* ($\beta$= -.21, p< .05) and *age* ($\beta$= .18, p< .05), entered in step 1, accounted for 4 % of the variance in the first model, $F_{(2, 136)}$= 4.20, p< .05, and were both significantly related to work engagement. The first step showed that age is important in how respondents consider their subjective work engagement. Higher age is related to higher levels of work engagement. Gender was also significantly related to work engagement. A negative beta suggested that men have higher levels of work engagement than women. However, gender is somewhat biased in that there is an overrepresentation of males. In step 2, the well-established job characteristics such as *job demands*, *job control*, and *social support* accounted for 32 % additional variance (and a total of 36 % variance in the model), $F_{(3,133)}$= 23.08, p<.001. All explanatory variables were positively related to work engagement; *job demands* ($\beta$= .44, p< .001) and *social support* ($\beta$= .23, p< .01) were significant contributors, whereas *job control* fell below significance. This indicated that respondents scoring high on job demands rated themselves as having higher levels of work engagement, while social support was important for respondents to feel engaged at work. Upon the inclusion of job resources in step 3, an additional variance of 4 % was accounted for ($F_{(3,130)}$= 2.87, p<05), and a total of 38 % variance was explained by including three new variables. *Social support* became non-significant at this point; however, *job demands* remained significant ($\beta$= .40, p< .001). *Organisational culture* ($\beta$= .26, p< .05) was significantly related to work engagement suggesting that respondents who share the values and behaviours that contribute to a unique psychosocial environment were likely to have higher levels of work engagement. Furthermore, *leadership* ($\beta$= -.04) was negatively related to work engagement indicating that greater leadership decreases work engagement. In the final step of the regression analyses, the personal resources, *self-efficacy* and *optimism*, were added. Upon the inclusion of *self-efficacy* and *optimism* both *job demands* ($\beta$= .34, p< .001)

and *organisational culture* (β= .26, p< .05) remained significant. Further, personal resources contributed with an additional 6 % variance in the overall model F(2, 128)= 7.40, p< .01, however only *self-efficacy* (β= .22, p< .01) significantly predicted work engagement

Based on the previous hypotheses postulated, two were supported while one was partially supported. Hypothesis H1 was supported, stating that *job demands*, *job control* and *social support* would be positively related to work engagement. *Job demands* showed significant contributions in all four steps of the model when controlling for other variables. *Social support* fell below significance in step 3, but remained positively related to work engagement. However, leadership became negatively related to work engagement in step three, which is noteworthy since management-structure has previously shown to be positively associated with the outcome variable. Hypothesis H2 was supported, stating that self-efficacy and optimism were positively related to work engagement. The regression analyses did partially support hypothesis H3, stating that personal resources will explain more of the variance in the JD-R model and significantly predict work engagement. Optimism and self-efficacy were both positively related and accounted for 6 % additional variance. However, only self-efficacy significantly predicted work engagement. The regression model did not yield significant contributions from the variables *job control*, *social support*, *leadership*, *trust*, and *optimism*.

*Table 4:* Hierarchical Regression Analysis for Variables predicting Work Engagement (N= 142)

| Independent variable | Model 1 $\beta$ | Model 1 $t$ | Model 2 $\beta$ | Model 2 $t$ | Model 3 $\beta$ | Model 3 $t$ | Model 4 $\beta$ | Model 4 $t$ |
|---|---|---|---|---|---|---|---|---|
| 1. Age | .18 | 2.05* | .10 | 1.28 | .03 | .38 | .03 | .39 |
| 2. Gender | -.21 | -2.49* | -.07 | -1.01 | -.03 | -.45 | .01 | .09 |
| 3. Job Demands | | | .44 | 6.10*** | .40 | 5.36*** | .34 | 4.56*** |
| 4. Job Control | | | .13 | 1.78 | .05 | .65 | .01 | .06 |
| 5. Social Support | | | .23 | 3.04** | .09 | .92 | .09 | .98 |
| 6. Leadership | | | | | -.04 | -.32 | -.08 | -.39 |
| 7. Organisational Culture | | | | | .26 | 2.29* | .26 | 2.44* |
| 8. Trust | | | | | .10 | 1.01 | .11 | 1.19 |
| 9. Self- efficacy | | | | | | | .22 | 3.13** |
| 10. Optimism | | | | | | | .12 | 1.44 |
| Adj $R^2$ | .04 | | .36 | | .38 | | .44 | |
| $\Delta R^2$ | .06 | | .32 | | .04 | | .06 | |
| *F Change* | 4.20* | | 23.08*** | | 2.87* | | 7.40** | |

*Note:* *p < .05 **p < .01 ***p < .001

**Summary**

To summarise, by including personal resources in the JD-R model, additional variance was accounted for in the overall model. *Self-efficacy* showed a significant contribution in explaining the variance in employee's levels of work engagement. *Optimism* fell below significance in the model. Furthermore, both *job demands* and *organisational culture* were also significant predictors of the outcome variable. Finally, *leadership* was negatively related to work engagement, though not significant, but still indicated that a strong influence from the management decreased levels of work engagement among engineering employees.

**Discussion**

This next part consists of three sections. Firstly, the findings of the current study will be presented based on the research questions postulated above; these will be discussed in relations to theory and empirical research. Secondly, methodological strength and limitations are discussed, and the practical implications this analysis will have on the organisation under study. Finally, this chapter will present future research on the JD-R model and how integrating personal resources in the model will provide a better understanding of the complex structure of work engagement.

The purpose of the present study was to investigate whether expanding the JD-R model (Demerouti et al., 2001; Schaufeli & Bakker, 2004) by including personal resources with respect to the model's basic assumptions would predict work engagement. It was hypothesised that self-efficacy and optimism would be positively associated with and significantly predict work engagement. In doing do, this paper sought to contribute to what is currently known as positive psychology (Seligman & Csikszentmihalyi, 2000). Previous studies have largely focused on exhaustion as an important variable. This was excluded since the main focus was what contributes to employees' engagement at work. The study makes a significant contribution to the theoretical development of the JD-R model because it confirms its central hypotheses, but most importantly expand the model, by specifying, the various functions of personal resources within its framework.

Based on the assumptions of the JD-R model the main hierarchical multiple regression analysis suggested that *job demands*, *organisational culture*, and *self-efficacy* were the main factors predicting work engagement in the current organisation. Considering the main research question, *self-efficacy* was the only personal resource with significant association with work engagement. The variable *optimism* showed to be non-related to the construct under study, which is surprising compared to previous findings (Schaufeli and Bakker, 2004). Particularly, because the sample mean was above mean suggesting higher levels of optimistic beliefs than average. However, this result may be to the fact that there were fewer items in the index than recommended due to time restrictions (Scheier et al., 1994). Together these predictors account for 48 % of the variance in the dependent variable.

**Personal Resources and Work Engagement**

The results confirmed that only the personal resource, self-efficacy, in the relationship between job resources and work engagement significantly contributes in explaining the underlying psychological mechanisms of the motivational process of the JD-R model. Job resources have previously been instrumental for employees to fulfill their work

tasks, which in turns keeps employees interested and engaged in their work (Hakanen et al., 2006; Schaufeli & Bakker, 2004). This study took it one step further by showing that providing job resources (in this case organisational culture) for employees may contribute to feeling more competent of controlling their work environment, and thus activates self-efficacy (Luthans Avey, Avolio, Norman, & Combs, 2006). As a result, they are probably more confident and proud of their work, find meaning in it, and, in turn stay engaged (Hackman & Oldman, 1975; 1980). Furthermore, these findings suggest that job resources are important in the prevention of exhaustion, since the activation of employees' self-efficacy beliefs can lead to more positive appraisals of stressful conditions. Put differently, an employee, who works in a resourceful environment feel more capable to perform their task without investing harmful effort, resulting in employees who are less likely to become fatigued.

**Personal Resources as Antecedents**

Judgde et al. (1997) argued in *the core self-evaluations theory*, that personal resources might be the best predictor of employees' adaption to the environment. Empirical evidence has supported a reciprocal effect between work characteristics and personal resources (Kohn & Schooler, 1982). In these lines, the results here revealed that employees who dispose of the personal resource self-efficacy are self-confident about their competences, and thus may recognise and develop aspects of their environment that facilitate goal achievement. This ability contributes to goal confrontation and, as a consequence, to work engagement. In contrast to the dominant perception, these results found that employees who hold personal resources do not experience fewer job demands. Job demands were the strongest predictor of work engagement, suggesting that job demands might be an important factor in the concept of work engagement. Particularly, job demands were interesting by demonstrating the need for various requirements to feel engaged in one's work. This shows in many ways the complexity of the construct work engagement, and that is not simply the other dimension of burnout, but an independent dimension. Finally, personal resources have also demonstrated a negative relationship with exhaustion suggesting that employees with an optimistic and self-efficacious beliefs report lower levels of severe fatigue, which can mean that they might be more resistant than employees with low levels of these constructs, especially under unfavourable conditions (Hobfoll, 1989, 2002). Together with *job demands* and the job resource *organisational culture*, *self-efficacy* contributed in explaining variance in the model predicting work engagement. These findings are similar to *the learning generalisation model* (Kohn & Schooler, 1982), which states that the effects of job

conditions affect personal characteristics, and these characteristics may have important consequences for individuals' perception of the work environment.

**Job demands and Work Engagement**

Job demands are described as features of work that involve effort and, therefore, are associated with costs. Even though this definition does not indicate that demands are necessarily negative, within the JD-R model the central role of demands is seen in the health impairment process. In recent times, LePine, Podsakoff and LePine (2005) and Podsakoff, LePine, and LePine (2007) made a distinction between challenge stressors and hindrance stressors. Hindrance job stressors are defined as '*job demands or work circumstances that involve excessive or undesirable constraints that interfere with or inhibit an individual's ability to achieve valued goals*' (Podsakoff et al., 2007). This characterisation is similar to the definition of job demands within the JD-R model. Hindrance job demands are for instance, role conflict, role overload, or role ambiguity. These job stressors may be harmful. However, stressors are also defined as challenging when developing personal growth and accomplishment is possible for employees (Podsakoff et al., 2007), which corresponds similarly to the definition of job resources as described in the JD-R model. Challenging stressors can be high levels of responsibility, short deadlines, and workload (McCauley, Ruderman, Ohlott, & Marrow, 1994), which illustrate examples of job demands within the JD-R model. These demands have the possibility to be considered as rewarding work experiences well worth the displeasure entailed, and are therefore recognised as positive stressors. Compared to the present study, it might be the case that the engineers under study consider their job demands as challenging stressors, thus experiencing them as rewarding rather than demanding, particularly when possessing higher levels of personal resources. Van den Broeck et al., (2010), for example, integrated the distinction between job challenges and job hindrances in the JD-R model. The confirmatory factor analyses demonstrated support for the distinction between two kinds of demands and job resources in two samples (N1= 261 and N2= 441). Moreover, structural equation modelling supported the hypotheses that hindrance stressors correlate positively with exhaustion and negatively with robustness. Job resources showed the opposite order of relations. Job challenges were independent to exhaustion and positively correlated to robustness.

Whether the distinction between challenge and hindrance demands is accurate is still unclear as there is not adequate empirical evidence on this matter. Furthermore, whether the distinction between these two types of demands is accurate for every job is also an ambiguous issue. It is, for example, likely that high cognitive task is motivating for an

academic job but demanding for a designer. For that reason, more research is needed to define the role of the particular demands within the JD-R. To examine this question, it seems important to explore different jobs, applying various measurement apparatus for the demands and several measurement points.

**Job recourses and Work Engagement**

Previous research (e.g., Bakker & Bal, 2010; Demerouti & Cropanzano) has shown that high levels of job demands concur with low levels of job resources and vice versa. This makes sense because job resources have been defined as 'those aspects of the job that may reduce job demands' (Schaufeli & Bakker, 2004). So when resources are lacking, demands are not likely to be diminished and will remain high. This indicates that organisations should offer their employees sufficient job resources, such as social support, performance feedback, and skill diversity (Demerouti et al., 2001).

An important expansion of the JD-R model, with respect to the motivational process, is the incorporation of personal resources. Xanthopoulou et al. (2007) investigated the role of three personal resources (self-efficacy, organisational-based self-esteem and optimism) in predicting exhaustion and work engagement. The results showed that personal resources did *not* manage to counterbalance the relationship between job demands and exhaustion. By contrast, personal resources demonstrated to partly mediate the relationship between job resources and work engagement, implying that job resources foster the development of personal resources. Job resources, such as social support and job control, have found to be positively related with work engagement. These resources are valuable in decreasing the impact of job demands on work strain, but they are also essential in achieving work goals, stimulate learning, and promoting personal growth (Bakker & Demerouti, 2008). The current study did not find similar relationships. Social support and job control had a weak associated with work engagement. The engineering employees and their organisational culture may be some of the explanation for the uncommon findings, however, this study found different predictors of work engagement compared to previous research. Organisational culture was the only job resource significantly related to work engagement, which may suggest that engineers share and value their unique culture. On this note, it is not unreasonable to suggest that job resources eventually develop into personal resources. For example, a longitudinal study by Xanthopoulou, Bakker, Demerouti, & Schaufeli (2009a) suggested that, over time, personal recourses becomes complementary with job resources and work engagement. Meaning that job resources foster personal resources and work engagement, and personal resources and work engagement, in turn, facilitate job resources.

**Work Engagement as a construct**

It seemed that- in terms of explained variance- a motivational process is driven by the availability of job resources and personal resources to predict work engagement. Probably the most innovative theoretical contribution made by this study is that it showed that job demands are particularly relevant to become engaged at work. This suggests that engineering employees demonstrate greater job performance in challenging, resourceful work environments because such environments facilitate work engagement. Self-efficacy was positively related with work engagement, whereby it seemed that self-efficacy might precede engagement. However, it should be mentioned that it might also follow engagement. This could mean that self-efficacy breeds engagement, which in turn, increases self-efficacy beliefs.

On a more general level, this study illustrates that positive psychological states (i.e., engagement) plays an important role in the motivational process that is driven by available resources that might lead to organisational attachment (i.e., low turnover rate). Hence, including a positive psychological state increases our understanding of employee functioning in complex organisations. However, it is also crucial to consider that working conditions and reactions to them may alter on a daily basis (Butler, Grzywacz, Bass, & Linney, 2005). Such variations may explain why employees who are usually engaged in their jobs sometimes have 'bad days', or why employees who are generally exhausted feel satisfied on particular days. Including diary studies enable us to examine whether there are situational features that have to be present, in addition to general predictors specified in the JD-R model (Demerouti *et al.,* 2001; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009b). Taken together, these findings suggest that job resources especially influence motivation or work engagement when job demands are high. This confirms the *coping hypothesis* (Bakker et al., 2007), which states that under conditions of high job demands, resources predicts work engagement. This further illustrates that resources are most salient under demanding conditions, meaning that employees need challenges at the workplace for resources to turn into engagement.

Finally, research on the JD-R model has been particular restricted to the individual level, there are a few studies that integrate other levels into the analyses. Demerouti et al. (2001) tested the assumption of the JD-R model using self-report data on the individual level and observer ratings for job demands and resources at the job function level and averaged scores (at group level) for burnout. Findings demonstrated a similar relationship both for the individual and the group level. Such studies should be conducted on work engagement as

well, to explore if the same is true when work engagement is considered an independent dimension. Encouraging researchers to integrate multiple levels in their studies using the JD-R model can be achieved by incorporating predictors or outcomes from another level in the model, but also by exploring whether constructs maintain their context across levels of analysis (i.e. isomorphic variables). From a theoretical standpoint, multilevel constructs result in a greater comprehension of psychological dimensions developing within organisations. From a practical standpoint, information collected by following a multilevel approach can contribute in guiding the development of more effective interventions. For example, establishing similarities or differences in the meaning of performance across levels of analysis can allow organisations to develop similar or different strategies for managing performance at the individual, group or organisational level.

**Implications for theory and practise**

The current study was unique in that an equal study has not been done on a Norwegian engineering sample earlier. Insight into the Norwegian oil- and gas industry was offered, which can be compared with international findings due to standardised measurement instruments. However, given the empirical evidence from this study, there are some practical implications that need to be highlighted for the organisations to improve the psychosocial work environment. The organisations leadership should highlight work attitudes and increase them in a way that maintains the organisations values and structure. Further, employees can become more committed to their job and their role in the organisation if they experience a meaningful work life and derive fulfilment from it (Hackman & Oldham, 1980). Therefore, it is important to allow for a balanced work and private life. Having open dialogs with the employees and tailor jobs according to specific needs can achieve this. Employees who are dedicated and enthusiastic about their jobs are more likely to engage in proactive behaviours to keep those positive work situations and further improve them (Sonnentag, 2003).

Findings of the present study suggest the fact that the mobilisation of job resources may be of value for employees to thrive. However, the initial merit of organisations should still be the avoidance of overwhelming job demands, since these are the main predictors of exhaustion, and can also lead to potential negative organisational outcomes such as the intention to leave the organisation, thus reducing demands seems to be warranted. Many preventive organisational-based strategies exist to tackle high job demands, such as job reorganisation, flexible work hours, and goal setting (Quick, Quick, Nelson, & Hurrell, 1997)

Additionally, empowering of employees' personal resources may also be beneficial. In similar lines, Seligman (1991) argued that employees who learned how to respond to adverse situations with optimism had greater persistence, a requirement for successful adaptation. Increasing job resources (e.g., through participative management, increasing social support, and team building) will eventually lead to higher levels of engagement and dedication at the job. To conclude, the present study is of importance for the development of job interventions that aim at increasing engagement and reducing maladaptive exhaustion, encouraging the development of a successful and healthy work environment. For example, Kompier and Cooper (1999) identified, from an in-depth analyses of 11 case studies, a combination of work-directed and worker-directed measures as one of the five essential success factors for the prevention of job strain in organisations.

**Methodological concerns**

The present study has certain limitations and strengths that need to be acknowledged. Theoretically speaking, the study only included factors that have been identified to influence work engagement in previous literature, thus limiting the possibility to explore new factors. This could be avoided by interviewing key employees before conducting the study, which could have provided a better basis of selection of factors. The representativeness of this study may be somewhat limited due to exclusion of some employees. This was done by the HR- department to protect the most pressured employees, who works on major projects and overseas.

Longitudinal designs are necessary in order to validate the findings over time, and in order to provide insights regarding causality. So far, few longitudinal studies on engagement have been carried out (Dikkers, Jansen, de Lange, Vinkenburg, & Kooij, 2010). Furthermore, the current study was entirely based on self-report measures that might lead to common method variance difficulties. For instance, the motivational process includes behavioural indicators that may be measured more objectively by using company files (e.g., regarding actual performance). Until now, studies on engagement that include such objectively measured behavioural indicators are lacking. However, it can be challenged that such constructs as personal resources and work engagement are almost impossible to measure in any other way than by self-reports (Mäkikangas, Kinnunen, & Feldt 2004). In order to make an even more convincing case for the discriminant validity of engagement, it follows that future research should include other resources that are more distant from job demands (e.g., career development, skill variation, and learning opportunities) as well as other outcomes that have minimal conceptual overlap with burnout (e.g., job performance).

Finally, the study was conducted using a homogeneous sample of highly educated experts working in the same company. Therefore, it is important to further test the external validity of the findings for other working populations. There is also a need for replication in other samples using different types of indicators for job demands and job resources as well as for different types of individual and organisational outcomes.

This study contributed to the field by being the first study conducted on engineers, which included the personal resources self-efficacy and optimism in the traditional JD-R model to predict work engagement. Even though only self-efficacy showed predictive ability to the explained variance of work engagement, the optimism variable indicated a moderate positive relationship with the outcome variable. In terms of the JD-R model, including personal resources demonstrated useful in providing new insight into the study of work engagement amongst employees in the engineering field. The *COR theory* and the *Psychological Capital* concept should therefore be further studied within the JD-R model to reveal new and important organisational outcomes.

**Future research**

The logical next step would be to further explore the relationship of engagement with other job-or study-associated variables in a similar fashion as has been conducted with burnout (Lee & Ashforth, 1996; Schaufeli & Enzmann, 1998). An intriguing question is whether the antecedents and consequences of engagement are universal across countries, regardless of cultural differences to those that has been identified for burnout or that the engagement construct has unique consequences and antecedents.

Personal resources have also proven important in the field of stress research. For instance, Lazarus and Folkman (1984) claimed that individuals experience stress when they think they lack the recourses to deal with demanding events. They further recognised the complex interaction between people and their environment and highlighted the feature of cognitive mechanisms and individual characteristics (such as appraisal and coping) that may affect the outcome of potentially harmful situations. Riolli and Savicki (2003) explored this hypothesis among a sample of information service workers. Results showed that personal resources like optimism were especially important when work resources were low. The current sample rated themselves as having higher job resources than average, which might make personal resources less important in this sample. This may be another reason why optimism did not predict work engagement. Taken together, psychological functions (i.e. the personal resources of optimism, self-efficacy, resilience and hope) might be essential to understand the variation in perceived symptoms of stress, including the intentions to quit and

job search behaviours, better. Future research should, therefore, also investigate whether the complex interaction of individual resources with the work environment may qualify a three-way interaction between job demands, job resources, and personal resources. This would mean that personal resources would form a two-way interaction between job demands and job resources. Along these lines, it would be interesting to explore other resources, such as resilience and hope, as well. For example, whether employees may be bursting with engagement and blossom at work if job demands and job resources are high *and* if their personal resources are high as well.

Finally, as academics acknowledge, organisations are complex systems consisting of various structural, functional or hierarchical levels, it is not unforeseen that organisational scientists can conceptualise different multilevel constructs, particularly constructs that are important across multiple levels of analysis. For example, Lindsley, Brass and Thomas (1995) have discovered *efficacy beliefs* at the individual, group and organisational level and argued that efficacy beliefs and performance are correlated in the same way across levels. Advantages of incorporating multilevel construct in research are that they can contribute to understanding the complexity of organisational development and foster more advanced theoretical models.

### *Conclusion*

Confronted with new challenges related to the increasingly stressful work conditions it is important to focus on the positive work-life resources that can increase employees' ability to cope with work-related demands. The aim of this study was to examine the possible work-related predictors based on previous literature to determine work engagement. Particularly, the present study proposed whether including the personal resources, self-efficacy and optimism, in the *Job Demands-Resources model* would contribute in explaining variance in work engagement. The JD-R model operationalised as the theoretical cornerstone, but insight from the "COR theory" and the "psychological capital" concept was included to specify the various factors of engagement. The results showed that the strongest predictors of work engagement in this sample was job demands, organisational culture, and self-efficacy, and accounted for 44 % of the variance in the model. This proposes that the personal resource, self-efficacy, is an important factor the JD-R model since, together with job demands and job resources, they predict higher levels of work engagement. This study shows that work engagement is an essential concept because it predicts significant outcomes for individual employees and for organisations at large. Directions for further research advise practitioners to explore whether engagement also is associated with health, low absenteeism and good job performance in cross-sectional samples across different occupations. Such research might help us to rephrase questions like 'How do we prevent burnout?' into 'How do we promote engagement at work?'

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**Appendix A: The questionnaire**

**ONTNU**
Kunnskap for en bedre verden

## Questionnaire exploring psychosocial work environment

Page 1 of 8

Request for participation in the research project
Questionnaire for all employees working for Aker Engineering & Technology

Purpose
The purpose of this survey is to study factors that may contribute to reduce the number of people being on sick leave at any given time. We are particularly interested in the psychosocial work environment of the company and how employees experience the impact of such factors on everyday work. Results from the survey will be used in our master's theses at the Norwegian University of Science and Technology (NTNU) and they will be made available to the company. The company's name will be anonymised. The survey is supported by the company.

Participation and information
Participation is voluntary. All information will be treated confidentially. During the data collection phase, your answers will be linked to your computer's IP address, but all data will be anonymised completely when the data collection is completed, no later than by the end of november 2013. You give your consent to participate in the study by completing the survey. When you have submitted your answers, it is no longer possible to withdraw from the study. The Data Protection Official for Research, Norwegian Social Science Data Services (NSD AS) has been notified of the project.

Survey Design
The survey consists of questions and statements about your work and the organization where you work. Answering the questions takes 10 minutes.

If you have any questions you may contact us by phone 922 14 737.

Thank you for participating in the study,

Mille Myhre and Marielle Paulsen
Master's Degree Students in work and organizational psychology

Per Øystein Saksvik
Professor, Academic Advisor

Neste     Avbryt

**1. Personal Background**

Age
- Under 30
- 30-39
- 40-49
- 50-59
- Over 60

**2.** Sex
- Female
- Male

**3.** Formal education
- Bachelor degree
- Master degree
- PhD
- Others

**4.** How long have you worked for this organization?
- Under a year
- 1-5 years
- 5-10 years
- 10-20 years
- 20 years or more

**5.** How long is your total work experience?
- Under a year
- 1-5 years
- 5-10 years
- 10-20 years
- 20 years or more

**6.** In what business unit is your employment?
- Front end
- Engineering Oslo
- Others

**7.** Indicate your employment
- Permanent
- Temporary/consultant

**8.** From day to day, do you work projectbased or base?
- Projectbased
- Base

**9.** Is your position
- Management in base organization with personnel responsibility
- Management in base organization without personnel responsibility
- Position in base organization without management responsibility
- Management in project with personnel responsibility
- Management in project without personnel responsibility
- Position in project without management responsibility

**10. Job Demands**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Does your work require quick decisions? | ○ | ○ | ○ | ○ | ○ |
| Is it necessary to work at a rapid pace? | ○ | ○ | ○ | ○ | ○ |
| Does your work require complex decisions? | ○ | ○ | ○ | ○ | ○ |
| Are your skills and knowledge useful in your work? | ○ | ○ | ○ | ○ | ○ |
| Is your work challenging in a positive way? | ○ | ○ | ○ | ○ | ○ |
| Do you consider your work meaningful? | ○ | ○ | ○ | ○ | ○ |
| Does your job require that you acquire new knowledge and new skills? | ○ | ○ | ○ | ○ | ○ |

**11. Control at work**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| If there are alternative methods for doing your work, can you choose which method to use? | ○ | ○ | ○ | ○ | ○ |
| Can you influence the amount of work assigned to you? | ○ | ○ | ○ | ○ | ○ |
| Can you set your own work pace? | ○ | ○ | ○ | ○ | ○ |
| Do you experience that you have flexible hours? | ○ | ○ | ○ | ○ | ○ |
| Can you influence decisions that are important for your work? | ○ | ○ | ○ | ○ | ○ |

**12. Mastery of Work**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Are you content with the quality of the work you do? | ○ | ○ | ○ | ○ | ○ |
| Are you content with your ability to solve problems at work? | ○ | ○ | ○ | ○ | ○ |
| Are you content with the amount of work you get done? | ○ | ○ | ○ | ○ | ○ |

## 13. Leadership

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Does your day to day superior encourage you to participate in important decision? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior encourage you to speak up, when you have different opinions? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior help you develop your skills? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior tackle problems as soon as they surface? | ○ | ○ | ○ | ○ | ○ |
| Is the relationship between you and your day to day superior a source of stress to you? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior provide feedback on your work performance? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior distribute the work fairly and impartially? | ○ | ○ | ○ | ○ | ○ |
| Does your day to day superior treat the workers fairly and equally? | ○ | ○ | ○ | ○ | ○ |

## 14. Work motives

How important are the following considerations in relation to your ideal job:

| | Unimportant | Not so important | Rather important | Very important | Absolutely necessary |
|---|---|---|---|---|---|
| To have good pay and material benefits | ○ | ○ | ○ | ○ | ○ |
| To get a sense of accomplishing something worthwhile | ○ | ○ | ○ | ○ | ○ |
| That the work is secure and provides regular income | ○ | ○ | ○ | ○ | ○ |
| To have a safe and healthy physical work environment | ○ | ○ | ○ | ○ | ○ |
| To achieve personal development | ○ | ○ | ○ | ○ | ○ |
| To be able to put my imagination and creativity to good use at work | ○ | ○ | ○ | ○ | ○ |

**15. Self-efficacy**

| | Not at all true | Hardly true | Moderately true | Exactly true |
|---|---|---|---|---|
| I can always manage to solve difficult problems if I try hard enough. | o | o | o | o |
| If someone opposes me, I can find the means and ways to get what I want. | o | o | o | o |
| It is easy for me to stick to my aims and accomplish my goals. | o | o | o | o |
| I am confident that I could deal efficiently with unexpected events. | o | o | o | o |
| Thanks to my resourcefulness, I know how to handle unforeseen situations. | o | o | o | o |
| I can solve most problems if I invest the necessary effort. | o | o | o | o |
| I can remain calm when facing difficulties because I can rely on my coping abilities. | o | o | o | o |
| When I am confronted with a problem, I can usually find several solutions. | o | o | o | o |
| If I am in trouble, I can usually think of a solution. | o | o | o | o |
| I can usually handle whatever comes my way. | o | o | o | o |

**16. Optimism**

| | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| In uncertain times, I usually expect the best | o | o | o | o | o |
| I am always optimistic about my future | o | o | o | o | o |
| Overall, I expect more good things to happen to me than bad | o | o | o | o | o |

**17. Work engagement**

| | Never | Almost never | Rarely | Sometimes | Often | Very often | Always |
|---|---|---|---|---|---|---|---|
| At my job, I feel strong and vigorous | o | o | o | o | o | o | o |
| I am enthusiastic about my job | o | o | o | o | o | o | o |
| I get carried away when I'm working | o | o | o | o | o | o | o |

**18. Health**

During the past 12 months, how many days have you been absent due to sickness?

- Never
- 1 day
- 2-5 days
- 5 days or more

**19.** During the past 12 months, have you attended work despite being sick?
- Never
- 1 day
- 2-5 days
- 5 days or more

**20.**

| | To no degree | To some degree | To a great extension |
|---|---|---|---|
| In this organization, do you consider it to be acceptable to attend work despite being sick? | ○ | ○ | ○ |

**21.**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Do you attend work despite not feeling your best? | ○ | ○ | ○ | ○ | ○ |

**22.**

| | Very Good | Good | Neutral | Bad | Very Bad |
|---|---|---|---|---|---|
| Overall, how do you consider your own health in general? | ○ | ○ | ○ | ○ | ○ |

**23. Occupational health service**

| | Yes | No | I don't know |
|---|---|---|---|
| Is your workplace in use of/connected to an occupational health service? | ○ | ○ | ○ |
| Does this contribute to a better work environment? | ○ | ○ | ○ |
| Have you been in use of a service through the occupational health service? | ○ | ○ | ○ |

**24. Role expectations**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Do you know what your responsibilities are? | ○ | ○ | ○ | ○ | ○ |
| Do you know exactly what is expected of you at work? | ○ | ○ | ○ | ○ | ○ |
| Are you given assignments without adequate resources to complete them? | ○ | ○ | ○ | ○ | ○ |
| Do you receive incompatible requests from two or more people? | ○ | ○ | ○ | ○ | ○ |

**25. Social interactions and support**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| If needed, are your co-workers willing to listen to your work-related problems? | ○ | ○ | ○ | ○ | ○ |
| If needed, can you get support and help with your work from your co-workers? | ○ | ○ | ○ | ○ | ○ |
| If needed, is your day to day superior willing to listen to your work-related problems? | ○ | ○ | ○ | ○ | ○ |

**26.**

| | Very little not at all | Rather little | Somewhat | Rather much | Very much |
|---|---|---|---|---|---|
| Do you feel that your friends/family can be relied on for support when things get tough at work? | ○ | ○ | ○ | ○ | ○ |

**27. Oranizational culture**

| | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Are employees encouraged to think of ways to do things better at your workplace? | ○ | ○ | ○ | ○ | ○ |
| Is there sufficient communication in your department? | ○ | ○ | ○ | ○ | ○ |
| Is there sufficient communication in your project? | ○ | ○ | ○ | ○ | ○ |

**28.**

|  | Very little not at all | Rather little | Somewhat | Rather much | Very much |
|---|---|---|---|---|---|
| Are employees well taken care of in your organization? | ○ | ○ | ○ | ○ | ○ |
| To what extent is the management of your organization interested in the health and well-being of the employees? | ○ | ○ | ○ | ○ | ○ |

**29. Trust and commitment**

|  | Very seldom or never | Rather seldom | Sometimes | Rather often | Very often or always |
|---|---|---|---|---|---|
| Can you rely on information provided by your day to day superior? | ○ | ○ | ○ | ○ | ○ |

**30.**

|  | Very little not at all | Rather little | Somewhat | Rather much | Very much |
|---|---|---|---|---|---|
| Do you trust the ability of the management to look after the future of the company? | ○ | ○ | ○ | ○ | ○ |

**31.**

|  | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| To my friends I praise this organization as a great place to work | ○ | ○ | ○ | ○ | ○ |
| My values are very similar to the company values | ○ | ○ | ○ | ○ | ○ |
| This organization really inspires me to give my very best job performance | ○ | ○ | ○ | ○ | ○ |

**32.** During the last 9 months...

| | Never | Almost never | Sometimes | Almost always | Always |
|---|---|---|---|---|---|
| How often have you considered leaving the company? | ○ | ○ | ○ | ○ | ○ |
| How often are you frustrated when not given the opportunity at work to achieve your personal work-related goals? | ○ | ○ | ○ | ○ | ○ |
| How often do you look forward to another day at work? | ○ | ○ | ○ | ○ | ○ |

**33.**

| | Totally disagree | Disagree | Somewhat disagree | Neither agree or disagree | Somewhat agree | Agree | Totally agree |
|---|---|---|---|---|---|---|---|
| I think I will be working in this organization five years from now. | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I rarley think about applying for a new/different position within the organization? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I rarely think about applying for a new job in a different company? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**34. Job satisfaction**

| | Very dissatisfied | Dissatisfied | Neutral | Satisfied | Very Satisfied |
|---|---|---|---|---|---|
| Overall, how satisfied are you with your work situation? | ○ | ○ | ○ | ○ | ○ |

**35.**

| | Yes | Without hesitation | Would think twice | No |
|---|---|---|---|---|
| With your present knowledge about the company, would you consider taking this job today? | ○ | ○ | ○ | ○ |
| Would you recommend this job to others? | ○ | ○ | ○ | ○ |

**36.** If you have any comments or questions please comment below.

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Per Øystein Saksvik
Psykologisk institutt NTNU

7491 TRONDHEIM

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel. +47-55 58 21 17
Fax +47-55 58 96 50
nsd@nsd.uio.no
www.nsd.uib.no
Org.nr. 985 321 884

Vår dato: 04.10.2013          Vår ref: 35407 / 2 / HIT          Deres dato:          Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 09.09.2013. All nødvendig
informasjon om prosjektet forelå i sin helhet 27.09.2013. Meldingen gjelder prosjektet:

| | |
|---|---|
| 35407 | *Nærværsfaktorer i en organisasjon med 800 ansatte* |
| *Behandlingsansvarlig* | *NTNU, ved institusjonens øverste leder* |
| *Daglig ansvarlig* | *Per Øystein Saksvik* |
| *Student* | *Marielle Paulsen* |

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er
meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i
personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i
meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og
helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de
opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget
skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år
dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database,
http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 15.05.2014, rette en henvendelse angående status for
behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Hildur Thorarensen

Kontaktperson: Hildur Thorarensen tlf: 55 58 26 54
Vedlegg: Prosjektvurdering
Kopi: Marielle Paulsen Dyre Halsesgate 11 7042  TRONDHEIM
*Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

Avdelingskontorer / District Offices
OSLO NSD. Universitetet i Oslo, Postboks 1055 Blindern, 0316 Oslo. Tel: +47-22 85 52 11. nsd@uio.no
TRONDHEIM: NSD. Norges teknisk-naturvitenskapelige universitet, 7491 Trondheim. Tel +47-73 59 19 07. kyrre.svarva@svt.ntnu.no
TROMSØ NSD. SVF, Universitetet i Tromsø, 9037 Tromsø. Tel: +47-77 64 43 36. nsdmaa@sv.uit.no

# Personvernombudet for forskning

## Prosjektvurdering - Kommentar

Prosjektnr: 35407

Ifølge prosjektmeldingen skal det innhentes skriftlig samtykke basert på muntlig og skriftlig informasjon om prosjektet og behandling av personopplysninger. Personvernombudet finner informasjonsskriv mottatt 27.09.2013 tilfredsstillende utformet i henhold til personopplysningslovens vilkår, såfremt dato for anonymisering endres til 15.05.2014, jf. meldeskjema og epost.

Questback. er databehandler for prosjektet. Personvernombudet forutsetter at det foreligger en databehandleravtale mellom Questback. og NTNU for den behandling av data som finner sted, jf. personopplysningsloven § 15. For råd om hva databehandleravtalen bør inneholde, se Datatilsynets veileder på denne siden: http://datatilsynet.no/verktoy-skjema/Skjema-maler/Databehandleravtale---mal/

Innsamlede opplysninger registreres på privat pc. Personvernombudet legger til grunn at veileder og student setter seg inn i og etterfølger NTNU sine interne rutiner for datasikkerhet, spesielt med tanke på bruk av privat pc til oppbevaring av personidentifiserende data.

Prosjektet skal avsluttes 15.05.2014 og innsamlede opplysninger skal da anonymiseres. Anonymisering innebærer at direkte personidentifiserende opplysninger som navn/koblingsnøkkel slettes, og at indirekte personidentifiserende opplysninger (sammenstilling av bakgrunnsopplysninger som f.eks. yrke, alder, kjønn) fjernes eller grovkategoriseres slik at ingen enkeltpersoner kan gjenkjennes i materialet.