



Are knowledge workers more intrinsically motivated than manual workers?

An explanatory study on work motivation in Odfjell Drilling.

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NORGES HANDELSHØYSKOLE

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Abstract

During the last couple of decades researchers have made progress in understanding what motivates knowledge workers and how they differ from traditional, manual workers. The purpose of this thesis is to further explore what motivates the different types of workers, with a special focus on knowledge workers and the intrinsic or extrinsic nature of their motivation. The paper brings knowledge worker theory into the oil and gas industry for the first time; collecting primary data at Odfjell Drilling through an in depth interview and a survey distributed to workers in Norway. We show that there is a relationship between intrinsic motivation and knowledge workers and that these workers are more intrinsically motivated than manual workers. Based on the findings, specific HR policies are suggested for knowledge workers in order to improve their motivation, job satisfaction and labor turnover.

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1 Introduction

1.1 Introduction to the topic

In a world with globalization and increasing universal access to higher education the workforce is constantly changing. A growing part of the workforce is highly qualified and educated, they move internationally following their career goals and developing relevant skills. The idea of so-called knowledge workers was introduced in 1959 by Drucker (1989) as individuals who carry knowledge as a powerful resource. This concept was later extended by Alvesson (2000) defining the knowledge worker as one of intellectual rather than physical nature. Vogt (1995) specified that this kind of worker has the motivation and capacity to co-create new insights and the ability to communicate, coach and facilitate the implementation of new ideas. But how can employers incentivize these workers? The classical literature and theory on employee motivation was written for another workforce generation as well as different job environments and duties. There is a large body of literature discussing how to motivate workers through rewards, piece rates, work division or monitoring. Great part of this literature focuses on factory workers, like Taylor's (1947) early studies into scientific management (Yan, Peng, & Francesco, 2011). Knowledge workers are required to think, analyze and create rather than just do. Therefore, the traditional command-control methods seem not well suited for these employees. It is the purpose of this paper to analyze the needs of these new kinds of workers in comparison with the traditional, manual ones, focusing on their motivations in the workplace. We will provide evidence suggesting knowledge workers are more intrinsically motivated than manual workers. As a consequence differentiated motivational policies are suggested for the different types of workers. In this paper knowledge workers (KWs) are defined as employees with 3 years or more of formal, higher education and who rarely or never use physical strength in their work. The rest of the employees in the sample are defined as manual workers (MWs).

1.2 Introduction to the industry

Our research is based on a questionnaire survey carried out in Odfjell Drilling, a Norwegian based drilling service company operating internationally. Many studies have been performed previously on work motivation in several knowledge-intensive

industries such as consulting, academia and engineering. However, there has not been done research on KWs in the oil and gas industry. Our research therefor contributes to a wider understanding of KWs that is important not only in a Norwegian but international perspective.

The oil and gas industry represents an important part of the Norwegian GDP and at the same time it is fundamental for the well-being of the international economy. In a world with growing energy needs, many industries are dependent on the performance of this sector. Together with the strategic importance of human resources in any firm, these fundamentals makes this study important not only for the oil industry but for all knowledge intensive industries. In order to fully comprehend our results, it is essential to mention the special nature of the oil industry and its working conditions. The oil and gas sector constitutes a challenging and highly technical environment for its workers and the workers are usually very specialized and highly skilled even if they don't have a formal education. Therefore, the MWs in the oil industry differ from the typical MWs in other industries. For example workers in the service industry or working an assembly line do not need highly technical skills contradictory to MWs in the oil and gas sector. In addition to finding themselves in a highly technological milieu, the MWs also find themselves in a risky environment. More specifically the drilling business is aimed to build and operate both fixed and mobile drilling facilities. As in the case of Odfjell Drilling, the industry mostly consists of specialized companies working internationally and acts as suppliers for energy companies such as Shell or Statoil.

The business is characterized by a clear division between onshore and offshore work. Both of which have very different work characteristics and the employee qualifications differ significantly. Most of the workers onshore have formal higher education and can be classified as KWs as their job profiles includes corporate lawyers, accountants and so forth, while most of the offshore workers are MWs as they conduct tasks like operating drilling installations, vessel crew duties, mechanical work, electrical tasks and so forth. In the case of the offshore workers the working conditions are special as they work in shifts. They spend up to several weeks on site, not being able to leave the work place between shifts and need to cohabite with their colleagues. It is also an environment with high risk meaning the workers have to be very safety conscious and that rules and hierarchies are strictly defined.

1.3 Research question

The goal of this study is to analyze three related questions as well as recommending which human resource policies have best effects. We aim to examine whether MWs and KWs are motivated differently and moreover whether KWs are more intrinsically motivated than MWs. From the different motivational needs of both kinds of workers we also want to deduct if different motivational policies are needed for KWs rather than MWs. Thus we defined a hypothesis for each research question:

Research Question 1: Is there a relationship between the type of worker and intrinsic motivation?

Hypothesis 1: Knowledge workers and manual workers are not equally intrinsically motivated.

Research Question 2: Are knowledge workers more intrinsically motivated than manual workers?

Hypothesis 2: Knowledge workers are more intrinsically than extrinsically motivated in comparison to manual workers.

Research Question 3: Are different motivational policies needed for knowledge workers and manual workers?

Hypothesis 3: Knowledge workers are motivated by different motivational policies than manual workers are.

To answer these questions, we surveyed KWs and MWs as well as interviewing a human resource manager from a Norwegian drilling company. We used modern econometric techniques to analyze the differences between the two types of workers.

2 Literature Review

2.1 Motivation

The word motivation derives from the Latin word *movere*, which means “to move” (Luthans, 2008, p. 158). Motivation has been defined by numerous authors including Ryan & Deci (2000, p. 54) whom defines being motivated “to be moved to do something.” Luthans (2008, p. 158) defines motivation in a more comprehensive way as a “process that starts with a physiological or psychological deficiency or need that activates a behavior or a drive that is aimed at a goal or incentive.” The key words are needs, drives and incentives and how they interact. Needs occur when there is either a physiological or psychological discrepancy; for example the need to sleep if you are deprived of it or the need for companionship if you are secluded. When deprived of sleep or companionship the needs turn into drives to satisfy them, in this case the drive to sleep or to socialize. In the end the incentives, in this case sleep and companionship, will relieve the need, lessen the drive and in turn restore the balance (Luthans, 2008).

Motivations are often categorized as primary, secondary or general. Physiological needs like hunger, thirst and sleep are considered natural and defined as primary needs and traditionally regarded as the most important motivations. Secondary motivations like the need for power, security, success, social recognition and status are learned. In today’s economically developed society these motives are undoubtedly the most important when studying human behavior in organizations as hunger and thirst no longer are a threat to most people. Some motives can neither be characterized as primary nor secondary and are categorized as general motives. They exist in the grey area between primary and secondary motives and include curiosity, manipulation and action. These general motives are also important when studying human behavior in organizations. Some motivations, like affection, cut across all categories and have a primary, a secondary and a general motive (Luthans, 2008, pp. 158-161).

Motivation is a highly diverse phenomenon and people have both different types of motivation as well as different amounts of it. Two people conducting the same task at work, while exerting the same amount of effort, might have very different motivations for doing so. One of them can be motivated by the desire to get approval from her supervisor while the other is motivated because he finds the task challenging and

interesting (Ryan & Deci, 2000, p. 54). When we discuss motivation in this thesis we are talking about work motivation and according to Latham & Pinder (2005) work motivation is defined as “a set of energetic forces that originate both within as well as beyond an individual’s being, to initiate work-related behavior and to determine its form, direction, intensity and duration.”

Self-Determination Theory (SDT) is a formal theory developed to explain human behavior and motivation based on psychological needs, where specifically the need for competence, relatedness and autonomy are considered essential (Deci & Ryan, 2000, p. 228). SDT differentiate between the different types of motivation based on what reason a person has to act where the main distinction is the differences between intrinsic and extrinsic motivation (Ryan & Deci, 2000, p. 55).

2.1.1 Extrinsic and Intrinsic Motivation

Basic economic theory assumes that human beings are rational and are motivated solely by their own self-interest. This entails that people are motivated by monetary rewards like wages, bonuses or other perks, or they can be motivated by social recognition through how they are perceived by co-workers or others (Brochs-Haukedal, p. 154). This type of motivation is defined as extrinsic motivation and it entails that an activity is done to obtain some separable outcome like money or recognition (Ryan & Deci, 2000, p. 60).

Extrinsic motivation can vary in its degree of autonomy and in 1985 Ryan & Deci (2000, p. 61) introduced a sub-theory to SDT referred to as Organismic Integration Theory (OIT). In this theoretical framework extrinsic motivation is divided into four categories according to their different degrees of self-determination or autonomy. The least autonomous form of motivation is called external regulation. This includes behavior that occurs to satisfy an external demand or to obtain a reward. For example the telemarketer making a certain amount of telephone calls every day to satisfy the quota set by the manager or to reach a set number of sales to receive a bonus. In the other end of the scale we find integrated regulation, where the regulations have been fully integrated with the persons own values and needs. A person working for the Red Cross, not as a volunteer, may for example have values fully integrated with the organizations values and derive motivation from this (Ryan & Deci, 2000, pp. 61-62).

In the seventies the cognitive psychology school introduced the term intrinsic motivation. They claimed that an activity can have motivation on its own merits completely independent of any reward (Gneezy & Rustichini, p. 792). Since the seventies there has been conducted a lot of research that shows that human-beings are not solely motivated by their own self-interest. Fehr & Falk (2002) for example introduces three important intrinsic human motivations. The first motive is linked to the nature of the task as some people are motivated by the enjoyment of working on interesting and challenging tasks, even in the absence of economic incentives. The last two motivations are considered social in nature. First the need for social approval through doing the “right” thing, like for example donating blood or doing charity works, second the desire to reciprocate. People have a clear tendency to respond to a friendly or hostile action by others in the same manner, a statement supported by several experiments and research like for example Fehr & Falk’s (2002) gift-exchange experiment in 1997. A principal (an employer) made a job offer to an agent with a binding wage and desired effort level. There were more agents than principals to encourage competition between the workers and the agent chose to either accept, and in turn determine the actual effort level, or decline the offer. This experiment clearly showed a causal relationship between the generosity of the offer and the agent’s willingness to exert extra effort. On average the workers actual effort level was increasingly higher the higher wages they were offered; i.e. the workers responded reciprocally to the offers (Fehr & Falk, 2002, p. 691).

In some cases the introduction of monetary reward can actually reduce the overall motivation; this is what is called the crowding out theory. In 1971 Deci (1972) led one of the first experimental studies into this theory. The experiment had three phases and there was one control group and one treatment group. Both groups were asked to solve interesting puzzles in all three phases within a time-frame of 13 minutes. In 8 out of the 13 minutes they could choose to solve puzzles, read magazines or do whatever they pleased as Deci left the room observing them through a one-way mirror. In the control group no payment was offered in any of the phases, while the treatment group was offered \$1 per solved puzzle in the second phase. The time spent solving puzzles during the 8 minutes no one was present to observe was taken as a measure of intrinsic motivation. The results showed that the treatment group spent 50 seconds less on solving puzzles in phase three than in phase one, while the control group actually spent

28 seconds more in the last phase than the first. These results have been taken as evidence that monetary rewards in some cases actually undermine intrinsic motivation, without going into some of the other possible explanations for these results (Fehr & Falk, 2002, p. 715). Several other experiments have been conducted over the years into the crowding out of intrinsic motivation. Gneezy & Rustichini (2000) conducted two experiments in Israel and their results show that the classic prediction that a higher compensation yields a higher performance actually holds when a reward is in fact offered. But their main conclusion was that the performance may very well be lower as a direct result of the introduction of a reward. Especially monetary rewards had a negative effect on intrinsic motivation when introduced (Gneezy & Rustichini, 2000).

2.2 Definition of knowledge worker

The concept of KWs was introduced by Peter Drucker back in 1959 when he identified the change that was taking part in the modern organizations where manual work was no longer the norm; instead the center of gravity of the organization had shifted to knowledge work. Drucker defined a knowledge worker (KW) as the one that “puts to work what he has between his ears rather than brawn of his muscle or the skill of his hands” (Drucker, 2007, p. 3). The KWs are thus those who carry out the “knowledge work”, one of intellectual nature rather than physical nature (Alvesson, 2000). Opposed to the manual worker (MW), the KW does not produce a physical product but knowledge, ideas and information. Olomolaiye & Egbu (2004) describe KWs as those who receive information, assimilate it, decide what to do and execute the relevant decisions. They are problem solvers that rely on their intellect rather than on manual skills (Muo, 2013).

2.3 Characteristics of the knowledge worker

The differentiation therefore between KWs and MWs arises mainly from the different nature of the work they perform. However, because of the differences in their activities, their characteristics differ. There are several characteristics that are used when describing the KWs and Andreeva et al. (2006) have emphasized the following four as being the most important ones used by researchers today.

1. A dominating share of mental work in the work process. Meaning work where intellectual effort is more important than physical.

2. Capability to create new knowledge. Meaning KWs use their knowledge, skills and their creativity to further develop their place of work.
3. High level of education. This criterion is very often used in empirical research to distinguish KWs from MWs as it is easy to measure.
4. The ability to process and analyze information in their work.

Because their work is of an intellectual nature and because their knowledge is the main asset they provide, it is safe to say that KWs are, in the majority of cases, highly educated people that invest a lot in their education previous to their career instead of acquiring knowledge by in-job training activities like MWs.

Alvesson (2000) studied the management of knowledge intensive firms and analyzed the characteristics of the workers in those companies. He found that in most cases the KWs had a college education. His explanation for this was that the companies used college education as a guarantee or indicator of competence in the recruitment process as well as formal education being a useful source to determine the abilities and competences needed to perform “knowledge work” (Alvesson, 2004, pp. 17-19). On the other hand, the nature of the knowledge work, its observability and difficulty to standardize make the relationships of KWs with other colleagues and supervisors substantially different. According to Drucker (2007) the KW cannot be supervised closely or in detail, he can only be helped. A MW might benefit from having clearly defined tasks with a supervisor monitoring his work to some degree while a KW however might benefit from organizing her own workday. A need for independence and autonomy are very characteristic of the KWs and therefore their work cannot be directed and controlled in the same way as that of MWs. However, the KWs also demands more time from her supervisor and co-workers. This is due to the fact that the work of a KW is not measured as easily as the work of a MW. This makes it more difficult for management to determine what work has been done, if the KW is doing a good job or explain to the KW what work needs to be done. Alvesson (2004) found that KWs want recognition and respect for themselves and their work and they appreciate variety and challenge in their daily work in order to stimulate innovation.

2.4 Motivation of knowledge workers

The different characteristics of KWs compared to MWs make it likely that their motivations in the workplace and the way managers can affect their work motivation also differ. The management of KWs should therefore be approached in a different way than the management of MWs in order for it to be successful. The nature of the knowledge work itself suggests that KWs cannot be managed the traditional way. According to Andreeva et al. (2006, p. 10) there are two reasons why managing KWs are different from managing MWs. The first one is the fact that KWs are believed to be more intrinsically motivated than MWs especially when it comes to self-actualization and self-expression. The second reason stated by Andreeva et al. (2006, p. 11) is that there are difficulties in measuring KWs productivity due to the nature of their work. Because it is difficult to observe and measure the performance of KWs, control and reward policies need to be different from the strict traditional compensation systems and the job design needs to differ from Taylor's scientific management model with standardization and routine (Yan, Peng, & Francesco, 2011, p. 407). The previous literature on motivation of KWs supports this idea, like Horwitz et al.'s (2003) exploratory study on effective HR strategies for attracting, motivating and retaining knowledge workers in Singapore. Within motivational strategies, the most effective ones proved to be intrinsically motivational such as freedom and challenging work. These results come to confirm Drucker's (2007) finding of KWs preference for independence. As displayed in table 1 Horwitz et al. (2003) found that among the top five highly effective strategies, four are intrinsically motivational and can be a sign that different motivational factors are needed for KWs compared to MWs. However the least effective strategy as displayed in table 2, flexible work practices, can also be classified as intrinsically motivational which leads us to think that even if intrinsically motivational strategies seem to be more successful, not every strategy is suitable and the specific characteristics of the group of KWs should be considered.

Attraction strategies		Motivation Strategies		Retention Strategies	
Strategy type	Rank	Strategy type	Rank	Strategy type	Rank
Very competitive total package in upper quartile of market	1	Freedom to plan work	1	Challenging work	1
Internal talent development	2	Challenging work	2	Highly competitive pay package	2
Reputation as employer of choice	3	Access to leading-edge technology/products	3	Having performance incentives/bonuses	3
Use proactive recruitment initiatives	4	Top management support	4	Opportunities to develop in a specialist field	4
Advertised jobs	5	Ensuring fulfilling work	5	Top management support	5
*The above ranking is based on the number of responses that were marked as highly effective in attracting, motivating and retaining knowledge workers. Total number of responses for the top five attracting strategies is 49 out of a total of 93 such strategies (52,6 per cent) The number of motivating strategies is 89 out of 200 (22,5 per cent) and for retention strategies is 89 out of 194 responses (45,4 per cent)					

Table 1: Horwitz et al. (2003, p. 32): Highly effective strategies

Attraction strategies		Motivation Strategies		Retention Strategies	
Strategy type	Rank	Strategy type	Rank	Strategy type	Rank
Online web recruitment	1	Flexible work practices	1	Flexible work practices	1
Advertised jobs	2	Employ large group of knowledge workers	2	Have a critical mass of knowledge workers	2
Headhunters	3	Generous funding for conferences/studies	3	Transparent pay and benefit decisions	3
Recruitment fairs	4	Cash award for innovations	4	Workplace fun and informal	4
Planned recruitment visits/student interviews	5	Seek recruits who fit culture	5	Generous funding for conferences/studies	5
*The above ranking is based on the number of responses that were marked as ineffective in attracting, motivating and retaining knowledge workers. Total number of responses that were entered as ineffective is 22 out of 35 attracting strategies (62,9 per cent); for motivating strategies it was 12 out of 27 (51,8 per cent) and for retention strategies 11 out of 16 (68,7 per cent)					

Table 2: Horwitz et al. (2003, p. 32): Least effective strategies

Petroni & Colacino (2008) also concludes that KWs need to have opportunities and challenges to receive the proper incentives to be motivated. This is especially important for the KWs after they have worked for some years in the same firm. Their study focuses on a special type of KWs, engineers, who because of their technical specifics need special recognition and adequate placement. Responsibility, achievement and contribution are very important elements of motivational mechanisms for engineers. At the same time open communication, integrity and positive reinforcement of company and professional values are key elements for these types of workers. Salary is very important to them, not as a motivational tool in itself, but due to how they are perceived by others and for being recognized for personal development efforts. Petroni & Colacino (2008) conclude that special measures are necessary when managing engineers different from the traditional managerial practices. For instance they found that professional enrichment programs, diversity and appropriate job design that provide a challenging environment and achievement feelings are important. As KWs tend to show

less loyalty to the firm and have higher work turnover rates, they therefore suggest that companies should for example offer continued education, retraining, sabbatical leaves, rotation programs, job transfers or redesign to ensure higher loyalty. According to Petroni & Colacino (2008, p. 28), the task itself is in fact the primary source of motivation for a KW and the lack of task-intrinsic motivation provided by the firm can be detrimental to motivating KWs. Petroni & Colacino (2008) explains the importance of the task itself by the fact that it provides the necessary excitement to the individuals. The motivations can be monitored by managers by redesigning the task or adjust the workers involvement by providing adequate elements of challenge, ingenuity, make room for creativity and flexibility and professional achievement.

2.4.1 Importance of job design

As we have discussed before, job design is identified as a key element in the motivation and retention of KWs by the main authors in the field. In addition, Thompson & Heron (2002) discuss the changing of the psychological contract, which consist of the mutual obligations between employee and employer that are not recorded in the formal employment contract. It is a psychological bond between the employees and their organization, based on a pattern of expectations about what the organization should offer them and what it is obligated to provide them with (Rousseau, 1995). Thompson & Heron (2002) describe the need for specific job design and HR practices that fulfill the new psychological contract and the change in expectations that it implies in order to retain KWs and increase loyalty. Baron & Hannan (2002) also propose job design as a basis for attachment. This idea is supported by Horwitz et al. (2003) and their findings on the importance on job design as a retention strategy. The intrinsic qualities of the work process drive organizational and occupational loyalty. Alvesson (2004) also concluded that appealing work task and development possibilities are often crucial to the ways in which choices around voluntary turnover and loyalty emerges for KWs. Loyalty and especially labor turnover are important for the knowledge work. When knowledge is the main asset, it becomes costly to replace individuals as they hold precious knowledge about the organization. This is also why loyalty is crucial to the organization as the information these employees hold can be sensitive for the business and appreciated by the competitors (Alvesson, 2000). The career paths of KWs are typically not built within the same organization but rather across them, and even across geographical areas. These workers are highly mobile so it is not surprising that previous

studies show higher rates of voluntary labor turnover among KWs (Horwitz, Heng, & Quazi, 2003).

Yan et al. (2011) conducted a quasi-experimental field study regarding job design in a Chinese company comparing the effects of job enrichment on job satisfaction and task performance for both KWs and MWs. Their findings indicate that a different managerial approach is necessary for each kind of worker as the results were different among the two groups of workers. In the case of the KWs they found a positive relationship between job enrichment, job satisfaction and task performance which indicates that this is a suitable measure for this type of workers as they are positively motivated by it. On the other hand, for MWs' the relationship was found to be negative. Their findings suggest that an approach closer to Taylor's scientific management model would be more adequate for MWs and should not be totally abandoned in the current managerial practices. Yan et al.'s (2011) study supports the idea that MWs and KWs management approach should be different. At the same time, as job enrichment is considered an intrinsic way of motivation, the success of the measure found among KWs in addition to the ineffectiveness of job enrichment on MWs suggest that KWs are more intrinsically motivated than MWs. This is because both KWs' job satisfaction and task performance was higher than those of the MWs as a result of job enrichment. These findings support the idea that KWs are mostly intrinsically motivated. Job design is described as not successful with MWs which means that MWs do not benefit from intrinsically motivational strategies such as job enrichment.

2.4.2 Monetary rewards

Adequate compensation systems have traditionally been identified with employee motivation and the notion that an increase in economic incentives will increase the performance level, which in many cases it does (Gneezy & Rustichini, 2000). Most of the previously mentioned authors found monetary rewards as relevant in several cases concerning KWs. Petroni & Colacino (2008) found that the compensation level is very important for engineers as a way to establish status and feel recognized as valuable assets in the company. The right level of compensation is a requirement more than a motivational tool. Similar results were obtained by Horwitz et al. (2003) who identified salary as an important variable in order to attract KWs to the company but not as relevant when motivating employees. However, in order to get a better understanding of

the topic we look into a specific study about monetary rewards. Markova et al. (2011) looked at motivation, rewards and performance of 288 research and development employees in 30 large Fortune 500 companies. They took longer working hours and individual productivity as a sign of intrinsic motivation as intrinsically motivated workers will be willing to allocate more time to work activities. From their point of view, monetary rewards are not suitable for KWs as their jobs are complex and difficult to observe and measure, the task and behaviors such as thinking are difficult to codify, leaving the amount of time and effort they put into their work to the employees discretion. These arguments are strong and suggest that monetary rewards should not be found as relevant for KWs motivation. Their focus also looks at the relationship between employee compensation and intrinsic motivation, based on the crowding out theory (Deci, 1972). This theory supports the notion that external rewards can be unsuccessful in motivating workers as well as lessen their intrinsic motivation, thus extrinsic and intrinsic motivation could affect one another. Markova et al. (2011) hypothesis is that external rewards will diminish interest in a task and lower intrinsic motivation. Meaning that monetary rewards will lessen the workers intrinsic motivation in addition to not working as an extrinsic motivator for KWs. Intrinsically motivated employees appear willing to allocate more time to job activities which corresponds with better performance and innovation. Employees who received non-monetary rewards reported working longer hours. Thus not all external rewards have the same effect. This was a testing of the crowding out theory on KWs resulting in its rejection as not all the external rewards turns out to be detrimental for intrinsic motivation and working hours.

3 Method and Research Design

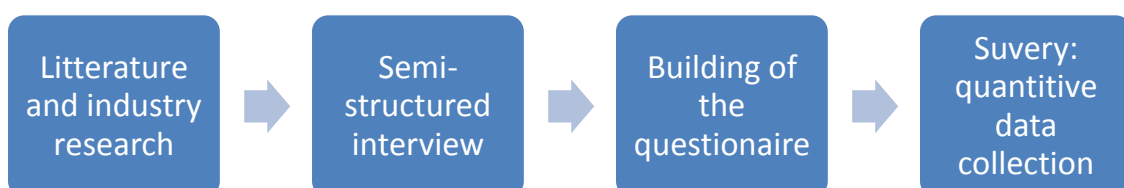
3.1 Research Design

According to Saunders et al. (2009), the research design describes the general plan on how the research questions are answered. Our object is to describe the relationship between different motivational policies within the company and how the different workers react to these policies. We are aiming to portray the actual behavior of the employees and in turn make suggestions to Odfjell Drilling on which policies are more effective for the KWs and MWs. It is therefore natural to define this study as a descripto-explanatory study, meaning a combination of descriptive and explanatory research (Saunders, 2009, p. 140). Our approach is classified as deductive as we are testing three hypotheses on the background of existing theory. The hypotheses will in turn either be rejected or supported by our research.

We have chosen to collect primary data through a survey which allows us to gather quantitative data which in turn will be analyzed quantitatively through descriptive and inferential statistics. It is an effective way of collecting objective data from a large pool of people and be able to generalize. Before conducting the survey we held a semi-structured in depth interview with one of the Vice Presidents in Human Resources to get a better understanding of what motivational policies exists in the company and what kind of workers they employ. The interview gave us valuable information and the questionnaire design is partly based on this information. The study is cross-sectional due to time constraints, meaning all data are collected at a particular time.

3.2 Data collection

As the type of data needed for this analysis is very specific, we collected primary data ourselves. It is however challenging to collect data in a correct and unbiased way. The process we followed was carefully designed to include all the important information, even if it only was relevant for our specific industry and not the existing literature.



Although there is a large body of literature discussing KWs and how to incentivize them the oil and gas sector has not been studied yet. We therefore had no previous study, within the industry, to consult in order to complete the design of the survey questionnaire. This lack of information is the main reason why qualitative data was needed first in order to build the questionnaire and obtain the right quantitative data needed to perform the analysis.

3.2.1 Introduction to the company

The company in which we gathered our data is Odfjell Drilling, a Norwegian company with 3100 employees operating internationally. For the special characteristics of the business where Odfjell Drilling operates, the results we obtain are very industry specific. Odfjell originally developed its business around transportation of chemicals and liquid gases. From the 70s Odfjell expanded into the drilling industry and in 1973 Odfjell drilling was formed, growing intensively ever since and internationalizing its activities. Nowadays, it operates in more than 20 countries and has developed an impressive reputation in the industry. The size of the company, in addition to the technologically advanced environment, entails the presence of highly educated personnel as well as a lower educated workforce. Thus we can find both KWs and MWs in Odfjell Drilling. This allows us to gather comparable information from both kinds of workers. Odfjell Drilling focuses on being known for its wide experience and expertise; it has clear stated values that constitute fundamental part of the corporate culture. Odfjell Drilling aims to attract workers that are:

- Committed
- Safety conscious
- Creative
- Result Oriented

These values are strongly reinforced from the top management as they try to make them part of the everyday work environment. The values are present in annual summits and meetings and managers are encouraged to transmit these values to their employees. The company has three business units: Mobile Offshore Drilling Units (MODU), Drilling & Technology and Well Services. MODU is the fastest growing business unit in Odfjell Drilling with 1300 employees, the majority of them working offshore. Offshore work is

characterized by a strict structure and several safety regulations. The offshore workers live in small spaces far out at sea when they are working, where they not only work but also spend their free time and cohabit with coworkers instead of their family. All of this results in a very specific work environment and motivational issues.

3.2.2 In depth interview

We conducted a semi-structured in depth interview with the HR manager of MODU in order to get insight into the organizations procedures, a better understanding of the workers and their environment as well as a deeper understanding of the industry as a whole. The interview lasted about 1 hour and 30 minutes; it was performed face-to-face to establish a personal contact, recorded using a phone and conducted at the company's headquarters. This location was chosen out of convenience and to make the interviewee feel comfortable during the process (Saunders, 2009, p. 329). The main advantage of a semi-structured interview is the flexibility to adapt the questions as the interview progresses. In preparation for the interview an interview guide was written to ensure all the important issues was covered during the interview.¹ First, we wanted to establish what kind of workers we could expect to encounter during the survey and if they easily could be differentiated in KWs and MWs. Second we focused our attention to their HR procedures, both standard and informal. Finally we asked about the corporate culture, communication and work environment. As a result of the interview we got an idea of the organizational structure, the work environment, the corporate culture and so forth. We learned that the extensive workforce could easily be categorized in KWs and MWs in accordance with the definition of KWs. Due to the highly technical nature of the work offshore there is high skill requirements for both type of workers which led us to believe our findings might differ from previous studies in other industries.

Odfjell Drilling has employees all over the world but due to large geographical procedural differences our research was focused on workers employed in Norway. The HR procedures in Odfjell Drilling are almost identical for all workers employed in Norway with minor differences between onshore and offshore workers in bonuses and fringe benefit packages. This allows us to measure whether the different procedures are equally successful on both types of workers. Every decision in the organization is limited and controlled by the very strict industry regulations of offshore work which in

¹ The interview guide can be found in appendix I.

turn can differ depending on geographical location. Safety and legal requirements limits the company in managing work shifts, promotions, fringe benefits and vacation periods. Thus the HR policies we establish as most successful could in reality be impossible to put into practice. The most interesting and valuable data we obtained during the interview referred to the company structure and work environment. Even if there is not a differentiation between KWs and MWs within the firm, there is indeed a structural differentiation between offshore and onshore workers. Offshore work is highly structured and organized with clear procedures to follow and goals to achieve. The hierarchy is also very important to get well-functioning maritime and drilling crews. Everybody is aware of their position in the chain of command; they know their responsibilities and their superiors. Therefore, career ladders are obvious for everyone. Working hours are set with little space for flexibility. Onshore workers on the other hand, enjoy more flexibility and flatter hierarchies. Their everyday duties are less planned and more open to innovative solutions. Constant improvement is a requirement for everyone in the organization. The great mobility and variety of projects offered in the company constitute an alternative for a traditional career ladder offering people the opportunity to take on new challenges if desired. Training is also great part of the everyday life for Odfjell workers, technology updates and upcoming new legal certification requirements constitute a need for constant training and competence development. The on the job training is especially important for offshore workers while there are less training programs for onshore personnel. Training programs onshore are focused on leadership, management and ethics though it varies from department to department. Odfjell Drilling recently implemented a training program for managers and leaders in the organization called Leadership in Odfjell Drilling.

As a supplement to annual wages Odfjell Drilling has a bonus system focused on reducing turnover. Onshore workers will get an extra month of pay if they stay for six months and they haven't resigned before the payment due date. They are accrued another month of pay if they stay for another six months and so forth every six months. This entails a two month bonus each year for loyal employees. The bonus system for the offshore personnel is very similar.

We used the information we gathered in this interview actively when developing the questionnaire for the survey that were to be distributed among the employees.

3.2.3 Survey

In order to test our hypotheses we conducted a survey among roughly a 1000 Odfjell Drilling employees in Norway, working both on- and offshore. We received 459 completed questionnaires, resulting in a response rate of approximately 46%. When performing a survey one needs to ensure validity and reliability. First in order for the questionnaire to be valid it needs to collect the accurate data and second the data collection must be consistent to be reliable (Saunders, 2009, p. 371). The questionnaire design was based on what was learned in the in depth interview, previous studies on the topic and our specific research questions. In order to keep our respondents attention, the survey was designed to take a maximum of ten minutes. The questionnaire included some basic biographical questions about the surveyed employees' education, whether they work on- or offshore and whether they use physical strength in their work, all in order to separate the MWs from the KWs. We also added questions about age, gender, marital status, whether they have children and whether they have a managerial position in order to see if, and possibly how, these factors affect the work motivation. All of this allowed us to get a better understanding of our respondents and perform a thoughtful analysis. The main part of the survey was the section on motivation. This was divided into two parts (Q1 and Q2) in order to see if the respondents were answering consistently. In the first part (Q1) the respondents were asked to rank four established motivational factors, two who were intrinsic and two who were extrinsic. In the second and most comprehensive part (Q2), the respondents were asked to consider several statements and let us know to what extent they agreed or disagreed. The statements represented different intrinsic and extrinsic motivations and could be related to different HR policies. We ran a pilot study to test the comprehensibility of the questions. Our test pool consisted of students and full-time employees both outside and within the oil and gas industry, but not working with Odfjell Drilling. The feedback from the pilot study was used to make the necessary alterations and thereby minimizing the risk for wrongful interpretation. Our test-subjects spent an average of 6.5 minutes on the survey. The final questionnaire was in addition slightly revised by Odfjell Drilling. Most importantly, we were suggested to distribute the survey in Norwegian in order to increase the response rate. The survey was developed in Qualtrics, an internet survey tool. The advantage with an online survey is that the survey easily can be distributed to a large amount of employees through their email and be kept completely anonymous.

The survey was distributed at the beginning of April 2014 and was closed within two weeks after it was launched.

3.2.4 Demographics

As mentioned we got access to a total of 1000 employees both onshore and offshore out of the 3100 that work in the company whereas 459 finished the survey and were considered in our research.

The oil and gas industry is clearly male dominated, though there is an increasing share of women, with around 80% men in 2012 (SSB Report, p. 14). The demographics of our respondents are consistent with the industry as most of our respondents, 85% are male. According to the SSB Report (p. 18) the oil and gas industry has an increasing share of work immigrants, mostly from Western- Europe. In 2003 only 5.5% were immigrants while the number had increased to 12% in 2012 (SSB Report, p. 18). In our sample almost all of them, 97%, were Norwegians, while the last 3% were European without us knowing if they are Western or Eastern Europeans.²

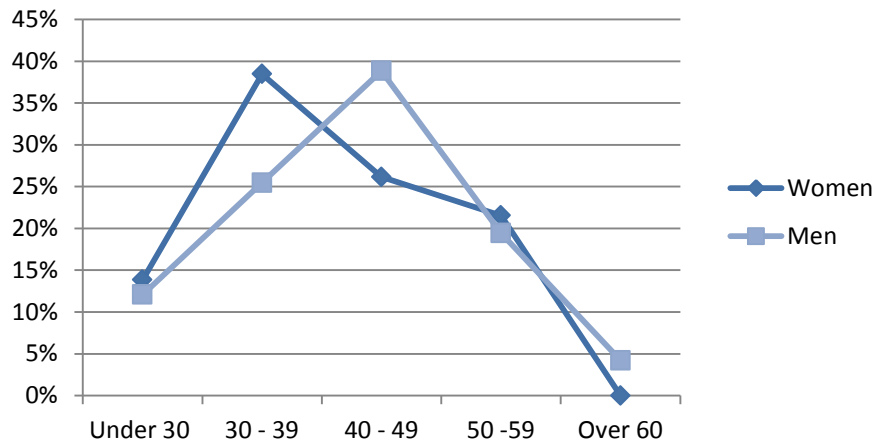
Answer	Response	%
Under 30	55	12%
30 - 39	122	27%
40 - 49	166	37%
50 - 59	89	20%
Over 60	16	4%
Total	448	100%

Table 3: Age distribution

Table 3 shows the age distribution of the respondents in Odfjell Drilling. Compared to the industry in 2012 (SSB Report, p. 15) the numbers are very similar, especially for the age groups 30-39 and everyone above 50. We do see some differences from the industry for employees below 30 and employees between 40 and 49. In our sample only 12% are under the age of 30, 14% of the women and 12% of the men, while the industry has seen an increasing amount of young employees, 17.2% women and 16.3% men (SSB Report, p. 15). In Odfjell Drilling there are 37% employees between 40 and 49, 26% women and 39% men. The industry on the other hand has seen a decreasing number of

² They survey was distributed in Norwegian which might explain the low percentage of non-Norwegians.

male employees between 40 and 49, only 28.6% in 2012, while the share of women is higher than our sample at 32.3% (SSB Report, p. 15). Graph 1 show that the responding women in our sample are younger than the men, which is consistent with the industry as a whole.



Graph 1: Age distribution by gender

The most important biographical data for our study is the years of completed education that helped us classify the respondents in KWs and MWs. Table 4 shows that only 15% of them have 5 years or more of higher education while more than 40 % have high school diploma or less.

Answer	Response	%
Primary School	15	3%
High School	172	38%
1-2 years of higher education	107	24%
3 years of higher education	89	20%
5 years of higher education	65	15%
Total	448	100%

Table 4: Level of education distribution

Another important data in our sample is that 53% of our respondents work offshore and therefore their special characteristics and work environment need to be carefully considered. Table 5 shows we also got mixed responses of people holding management positions with 42% respondents having a mid or top management position.

Answer	Response	%
Not management position	297	58%
Top Management	25	5%
Medium management	190	37%
Total	512	100%

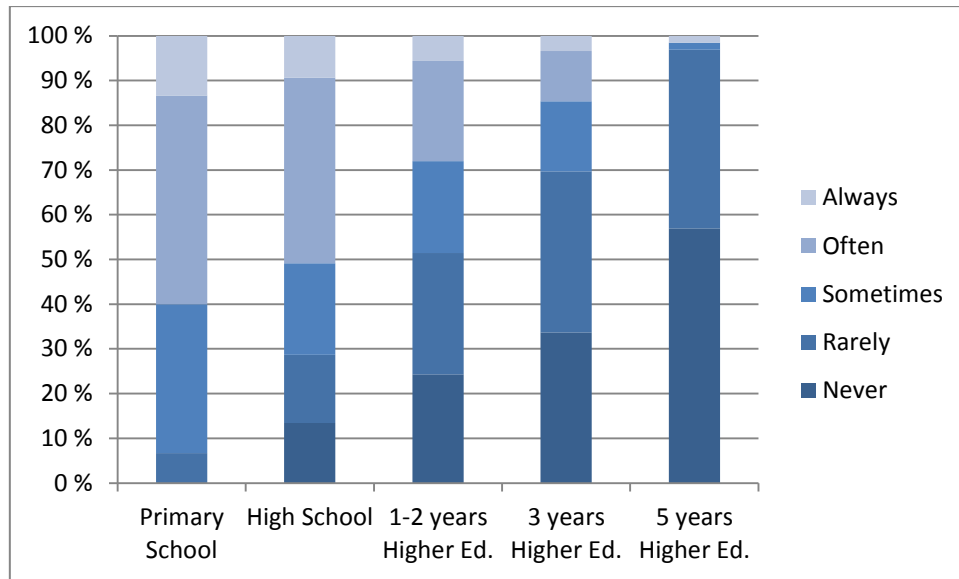
Table 5: Managerial positions distribution

3.3 Data analyses

The primary data collected through the survey is of quantitative nature. The qualitative data gathered through the in depth interview was used entirely for building the right questionnaire for our participants, taking into account the company policies and industry specifics. Our analysis and findings are therefore based on the survey and not the interview. We used the data gathered in the survey to test our hypotheses. In order to do that we had to create new variables from the existing data, test for statistical significance and perform regressions. We used Stata 12 software and the data set obtained from Qualtrics to perform our analysis.

First of all, we needed to classify our respondents in KWs and MWs for which we used their level of completed education and frequency of physical strength in their work. As we have discussed before, KWs are those who perform “knowledge” work rather than physical work (Alvesson, 2000). However, it is very difficult to measure who perform “knowledge” work, everyone who performs a task needs some form of knowledge to do so. We decided to use number of years of education as one of the criteria for classification of a KW, as this is the most common criteria used by researchers (Andreeva, Yuraitkin, & Soltitskaya, 2006). We included a question in the survey asking how frequently they use physical strength in their daily work. This answer alone could have served as a criterion for identifying KWs as it reveals the nature of the work performed by each individual. However, there were several reasons to also consider the level of completed education. First, one of KWs most clear characteristics as we mentioned before is their high level of formal education. Thus it is necessary to consider this in our criteria for classifying KWs. Second; the answer provided about use of physical strength may be subjective to each individual’s consideration of physical strength and frequency. Therefore two workers performing the same tasks could be

answering differently. This introduces a possible bias in our research that can be overcome with the level of education as it is objective data.



Graph 2: Use of physical strength and completed education

As can be seen in Graph 2, there is a clear negative relationship between years of education and frequency of use of physical strength. This is consistent with the KW theory. However, it can also be seen that some respondents do not use physical strength often even though they have a very low level of education and others that do use it often although they have higher education. Thus, the identification of KWs cannot be complete with only one of the variables and by using both we reduce the bias risk. We defined KWs as all respondents that have completed at least three years of higher education and use physical strength rarely or never in their work. The use of physical strength in the higher levels of education could be explained by the nature of offshore work that will be discussed under 4.5. After defining the KW variable we created new variables to measure the intrinsic or extrinsic nature of each individual's motivation. We measured the degree of intrinsic and extrinsic motivation in two parts of the survey so that we were able to test the consistency of the answers and therefore we created two different variables for each individual. In Q1 we created a dummy variable defining if the individual was mostly intrinsically motivated or not according to their ranking of the variables, we called the variable *IntrinsicQ1*. In Q2 the questions were more comprehensive including 22 statements that the respondents should agree or disagree to on five different levels. The statements included both intrinsic and extrinsic variables

and were presented in random order.³ This gave us the opportunity to actually measure the degree of extrinsic and intrinsic motivation of each respondent. We created two different variables for the questions in Q2. We measured the average answer for each individual and calculated separate averages for the extrinsic and intrinsic motivational statements in Q2. We chose to use an average as some of the answers were incomplete and this let us control for the missing values. In addition, we calculated a variable similar to IntrinsicQ1 defining each respondent as mostly intrinsically motivated or not and named it IntrinsicQ2. We did this comparing the average answers that we previously calculated. However, we found that in some statements the overall answers were pretty similar for all the respondents. This was possibly due to the language used in those statements as it could have been perceived to abrupt inspiring rejection from all the respondents. For example the statement “My paycheck is why I wake up in the morning” got mostly disagree and completely disagree answers. Another statement that got strong disagreement was “I work hard in order to get promoted”. This might not seem as such an extreme statement but it is understandable when taking into account the cultural context. This possible language bias will be confronted in chapter 4.3.1. Although the language bias could be present in several of the statement it seemed clear for these two questions. We therefore performed two separate analyses, one including all statements and one where we dropped statement 1 and 5 to see how they affected the results. In addition to testing our hypotheses we also performed several analyses in order to get a deeper understanding of the data.

3.4 Validity and reliability

Internal validity refers to what extent the findings can be attributed to interventions rather than any flaws in your research design (Saunders, 2009, p. 593). In terms of the interview performed with the HR manager of MODU this means asking the right questions and receiving truthful and valid information. As in every interview, personal opinions may disturb the truth, but the chances of distortions were minimal as the questions were mainly regarding policies directly controlled by the HR department. To ensure internal validity we wrote an interview guide to make sure all important questions needed answered to study the research questions were included. The survey questionnaire was then built on these answers together with previous research into

³ See Appendix II for the complete questionnaire.

motivation of KWs as a way to ensure content validity. To further ensure internal validity the survey was then pilot tested. We made sure that the questions were clear enough, attractive and doable within a reasonable time. We also checked that the software worked properly. Our survey questionnaire design is supported by previous studies as we based the design of our questions on these earlier questionnaires. Therefore we assured the construct validity of our questionnaire and made sure it measured what motivates workers and therefore answered our research question. We used a statement and Likert scale system similar to the one used by Petroni & Colacino (2008).

External validity is the extent to which the research results from a particular study are generalizable to all relevant contexts (Saunders, 2009, p. 592). As previously mentioned, the specific characteristics of the industry where Odfjell Drilling operate limit the generalization of the findings. Thus our results have to be taken as industry specific. In addition, the data was collected in one specific company and therefore our findings could be influenced by their corporate culture or other specifics which limits the external validity of this study. However, the similarities with previous research in other industries add validity to our research. Our study alone could not drive to general conclusions but we believe it can together with previous studies in other industries.

Reliability is the robustness of the questionnaire and whether or not it will produce consistent answers at different times and under different conditions (Saunders, 2009, p. 373). As our resources did not allow us to test re-test to check reliability we needed other ways of measuring it. We include several questions in the survey that were measuring the same, intrinsic or extrinsic motivation. These questions were used to test for internal consistency in the answers we received. Basically we could check that a respondent who was mostly intrinsically motivated in Q1 also would be so in similar questions in Q2.

4 Results and discussion

4.1 Description of variables

From the results in the survey we defined the following variables which are summarized in table 6:

Variable	Obs	Mean	Std. Dev.	Min	Max
Offshore	443	0.523702	0.5000026	0	1
topmanagement	459	0.0479303	0.2138518	0	1
midmanagement	459	0.3747277	0.4845807	0	1
male	446	0.8542601	0.3532415	0	1
status1	442	0.5	0.5005666	0	1
status2	442	0.2443439	0.4301844	0	1
status3	442	0.2556561	0.4367237	0	1
Children	442	0.760181	0.4274567	0	1
age1	448	0.1227679	0.3285374	0	1
age2	448	0.2723214	0.4456521	0	1
age3	448	0.3705357	0.4834881	0	1
age4	448	0.1986607	0.3994381	0	1
age5	448	0.0357143	0.1857843	0	1
KW	459	0.2788671	0.4489313	0	1
IntrinsicQ1	459	0.2396514	0.4273365	0	1
IntrinsicQ2	459	0.9019608	0.2976921	0	1
Education	448	4.004464	1.211421	1	6
Strenght	450	2.595556	1.278912	1	5

Table 6: Summary of variables

Offshore: It takes value 1 for individuals working offshore; value 0 otherwise

Topmanagement: It takes value 1 for individuals with top management positions; value 0 otherwise.

Midmanagement: It takes value 1 for individuals with middle management positions; value 0 otherwise.

Male: Takes value 1 for male and 0 for female.

Status: We defined three dummy variables:

- **Status1:** takes value 1 for married, 0 otherwise.
- **Status2:** takes value 1 for cohabiting, 0 otherwise.
- **Status3:** takes value 1 for single, 0 otherwise.

Children: Takes value 1 for workers with children and 0 otherwise.

Age: Variable indicating the age group of the worker, we defined 5 dummy variables:

- **Age1:** takes value 1 for individuals under 30, 0 otherwise.
- **Age2:** takes value 1 for individuals between 30 and 39, 0 otherwise.
- **Age3:** takes value 1 for individuals between 40 and 49, 0 otherwise.
- **Age4:** takes value 1 for individuals between 50 and 59, 0 otherwise.
- **Age5:** takes value 1 for individuals over 60, 0 otherwise.

KW: It takes value 1 for workers with 3 or more years of higher education and who rarely or never uses physical strength in their daily work; value 0 otherwise.

IntrinsicQ1: It takes value 1 when the worker is mostly intrinsically motivated in Q1; value 0 otherwise.

IntrinsicQ2: It takes value 1 when the worker is mostly intrinsically motivated in Q2; value 0 otherwise.

In addition to these variables, we established the workers' educational level and how often they use physical strength in their daily work. Both these variables were used to define the variable KW.

Education: Variable measuring from 1 to 6 the level of education achieved by each worker. From value 1 being the completion of primary school to value 6 having completed 5 years or more of higher education.⁴

Strength: Variable measuring how often physical strength is needed in each individuals work. It takes values from 1 to 5; 1 being never and 5 being always.⁵

4.2 Descriptive statistics

In a first step, we present some descriptive statistics. While table 6 summarizes the different variables, table 7 shows the correlation between some of the variables. The correlation between the variables Education and Strength with KW is high. This is

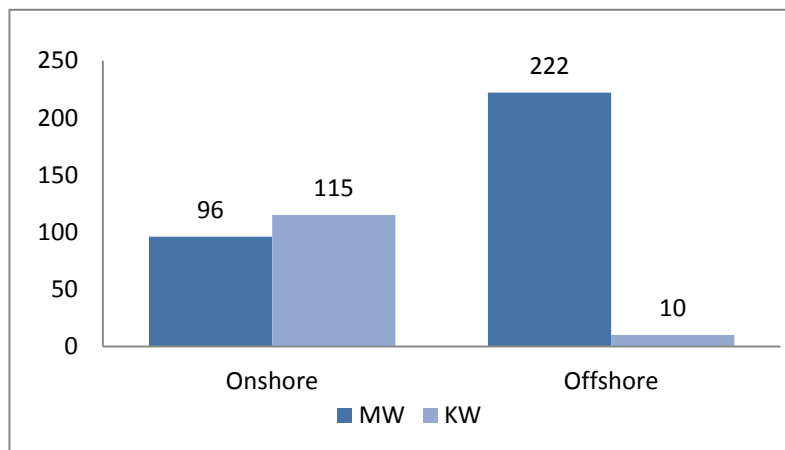
⁴ The number of options provided for this question were 5 but due to a coding error in Qualtrics option 2 was coded as 3 and so forth. See Appendix II.

⁵ All the questions and their coding can be found in Appendix II.

because Education and Strength are the variables used when defining KW. In addition, the correlation between KW and Offshore is high which will be discussed in 4.5.

	KW	Education	Strength	Offshore
KW	1			
Education	0.7731	1		
Strength	-0.5561	-0.4798	1	
Offshore	-0.5664	-0.4647	0.7222	1

Table 7: Correlation matrix



Graph 3: Relationship Offshore-KW

We identified 125 KWs (28%) in our sample matching our criteria for classification of a minimum of three years of higher education and who rarely or never use physical strength in their work as displayed in Graph 3. We found that most of our 125 KW's (64%) are between 30 and 50 years old and only 10 of them work offshore. This is explained in the definition of KW itself; offshore work is naturally more physically demanding than onshore work as can be seen in the high correlation coefficient between Strength and Offshore in table 7. Thus it is reasonable to expect to find more MWs offshore. At the same time, the level of education stated in our criteria makes it more probable to find KWs among younger employees as an increasing part of the population is educating themselves.

If we consider the gender distribution, even if still far from even, the women's ratio is a lot higher among KWs than MWs. We found that 60% of the responding women are KWs while only 22.57% of the men are. Even though 85% of the total respondents are male only 72% of the KWs are male, giving a higher female ratio among the KWs than

the sample as a whole. This is probably due to the traditional gender distribution in the industry, where men have been dominant in building and running the offshore installations. This could explain why the gender difference is even higher when considering only the offshore personnel. In our sample 98.25% of the offshore workers are male while there are only 4 female offshore workers. The identified KWs in our sample are in fact highly educated and around 50% have completed 5 years or more of university.

On the other hand, even if we found different age and gender distributions for KWs and MWs, this is not the case for the managerial positions. There are 57% employees without any managerial position, 38% in middle management positions and the rest being top management almost exactly evenly distributed between KWs and MWs. Finding the same distribution however could suggest that the same organizational structure is applied to both groups of workers, which in the sense of the literature is not optimal as KWs benefit best from flatter hierarchies, less control and more freedom (Petroni & Colacino, 2008). However, cultural characteristics have to be taken into consideration. Organizations in Norway usually have relatively flat hierarchies and therefore all Norwegian workers are used to working under these conditions. The same organizational structure can therefore work for both KWs and MWs as the flat hierarchy involve less bureaucracy and control for KWs while MWs can have structured work at the same time.

4.3 Empirical testing of hypotheses

In order to test our first hypothesis and see if there is a connection between intrinsic motivation and what type of worker individuals are we performed a chi-square test to study the relationship between our defined intrinsic variables in Q1 and Q2 and the KW variable.

The chi-square test tells us how likely it is that these two variables are associated based on comparing the observed values with expected values if the two distributions were completely independent (Saunders, s. 452).

H0: KWs and MWs are equally intrinsically motivated.

H1: KWs are more or less intrinsically motivated than MWs.

We will reject H_0 if $p < 0.05$ in a 95% confidence interval.

First we ran the chi-square test on the variables IntrinsicQ1 and KW from Q1. Our result were statistically significant with $p < 0.0001$ and we rejected H_0 that KWs and MWs are equally intrinsically motivated.

Second we ran the chi-square test on the variables IntrinsicQ2 and KW from Q2 to see if we could confirm the relationship from Q1. Also in Q2 the results were statistically significant with a p-value of 0.022 and we rejected H_0 that KWs and MWs are equally intrinsically motivated.

	chi2(1)	Pr	H0
IntrinsicQ1	245.599	0.000	Rejected
IntrinsicQ2	52.546	0.022	Rejected

Table 8: Chi square test Intrinsic Q1-Q2 and KW all statements included

The results in Q1 and Q2 are consistent and confirm our hypothesis that intrinsic motivation and type of worker are related and we conclude that there is indeed a relationship between the variables without telling us which type is more or less intrinsically motivated.

Once the relationship had been established we performed linear regressions to study and measure this relationship and test our second hypothesis. A linear regression assumes that the dependent variable is continuous and normally distributed both characteristics that our dependent variable lacks. However, as both our dependent and independent variables are binomial and our model is therefore fully saturated and we can use the Linear Probability Model to fit our model in a linear regression without the normality and continuity assumptions (Angrist & Pischke, 2009). We started with a simple linear regression which enabled us to study the linear relationship between KWs and intrinsic motivation. We then proceeded with several multiple regressions to control for other variables that might influence the results.

H0: KWs and MWs are equally intrinsically motivated.

H1: KWs are more intrinsically motivated than MWs.

The first two simple linear regressions are estimated by the following equations:

$$\text{IntrinsicQ1}_i = \alpha_0 + \alpha_1 KW + \varepsilon_i$$

$$\text{IntrinsicQ2}_i = \beta_0 + \beta_1 KW + \varepsilon_i$$

First we tested the relationship between KWs and IntrinsicQ1. Our results in table 9 were statistically significant within a 95% confidence interval. The coefficient of 0.22 shows a positive relationship between KWs and intrinsic motivation. Thus KWs are more probable to be intrinsically motivated than MWs. Next we tested the relationship between KWs and IntrinsicQ2. These results were also statistically significant within a 95% confidence interval. The coefficient of 0.0709 tells us that there is a positive relationship between being a KW and being intrinsically motivated. We reject H0. Both of these regressions support our hypothesis that KWs are more intrinsically motivated than MWs.

	Q1	Q2
KW	0.2201898 (0.0433202)	0.0709498 (0.03841)
R²	0.0535	0.0114

Table 9: Simple linear regressions⁶

Then we control for other variables in our empirical model performing a multiple linear regression on Q2 summarized by the following equation where d_j stands for the dummy control variables (age, managerial position, gender, marital status and children):

$$\text{IntrinsicQ2}_i = \beta_0 + \beta_1 KW + \sum_1^j \beta_j d_j + \varepsilon_i$$

When running the multiple regressions controlling for the variables that might be influencing the intrinsic motivation, table 10 shows KW is still statistically significant with a coefficient of 0.074 (p=0.01).

⁶ Each estimate represents the coefficient for the different simple linear regressions. In brackets is the standard deviation

KW	0.074942 (0.0289109)
R²	0.0555

Table 10: Multiple linear regression⁷

The variable coefficients in both the simple and multiple linear regressions are positive and we still reject H0 that the two types of workers are equally intrinsically motivated.

The overall model is also statistically significant as the fisher test leaves error probability of 0.011. However the R square is very low for Q1 and Q2 as shown in tables 9 and 10. Only a little above 5% when including the control variables, which means that even if KW is an independent variable that explains intrinsic motivation, our model only explains a very small amount of its variance.

4.3.1 Modified estimations of Q2

After reviewing our results, some statements in Q2 resulted in very similar responses from all of the respondents. The language used for these statements was rather extreme and might have resulted in a bias in our results.

The first statement and the one that got more extreme results was

“My paycheck is why I wake up in the morning”

The wording in the statement can drive the respondent to have a feeling of rejection as there are many things to wake up to in the morning. Money as a main life driving force is not socially accepted, especially considering the Norwegian culture, and therefore resulted in the unanimous rejection of the statement.

The other statement that produced a similar result was:

“I work hard in order to get promoted”.

The rejection of this one can also be better explained with the Norwegian culture. Flatter structures are preferred in addition to not too ambitious people. Therefore, a very visible desire to get promoted and high ambition are not as common in Norway as in

⁷ Each estimate represents the coefficient estimated in the multiple linear regression. The standard deviations are represented in brackets.

other countries like for example USA. This could explain the general rejection of the statement by our respondents.

In order to control for this possible bias in the wording of these particular statements in Q2 we decided to run the same tests again dropping these two statements from our study.

For the first test, the chi square test, we obtained the same result of statistical significance and could confirm a relationship between type of worker and intrinsic motivation with an even stronger confidence interval as can be seen in table 11. This supports our thoughts that those two questions were interfering with our findings.

chi2(1)	Pr	H0
65.232	0.011	Rejected

Table 11: Chi square test IntrinsicQ2 and KW

Then we ran the linear regression with IntrinsicQ2 and KW using the same estimation model that we used above. As shown in table 12, we obtained a higher coefficient than shown in table 9 which indicates an even stronger positive relationship between being a KW and being intrinsically motivated. The p value is also lower ($p=0.11$) and the results are statistically significant.

	Q2
KW	0.1101303 (0.0429059)
R²	0.0142

Table 12: Linear regression IntrinsicQ2 and KW

Then we ran the multiple regression including the same control variables as above. The results as shown in table 13 obtained after removing the two biased questions reassure us that the answers for those statements were biased. We decided therefore to continue the analysis without taking those questions into account.

KW	0.1276505 (0.044996)
R2	0.0450

Table 13: Multiple linear regression modified⁸

⁸ Each estimate represents the coefficient estimated in the multiple linear regression. The standard deviations are represented in brackets.

The R square is again very low at 4.5%. This is understandable as we are studying individual's behavior which can be influenced and explained by a wide variety of variables. Therefore we do not attempt to explain a great amount of variance. Our research focuses more on the different nature of motivation between KWs and MWs and not so much on the overall drivers for intrinsic motivation. Thus we can establish that KWs are motivated differently and therefore should be treated differently. The success of potential HR practices depends on how well targeted they are and should not be the same when targeting KWs and MWs.

4.3.2 Consistency

When building the questionnaire we purposely included Q1 and Q2, measuring type of motivation in two different ways, as a test for consistency in our answers.

	IntrinsicQ2 = 0	IntrinsicQ2 = 1	Total
IntrinsicQ1 = 0	86	263	349
IntrinsicQ1 = 1	15	95	110
Total	101	358	459

Table 14: Consistency in answers 1

As shown in table 14, only about 40% of the respondents were consistent in both questions, which mean that if they were classified as intrinsically or not intrinsically motivated in Q1 they were classified in the same category in Q2. However, in the first question we were only asking about four different variables while in Q2 we had many variables not measured in Q1.

The variables measured in Q1 were pay, safety, challenging work and freedom. Thus we analysed the answers corresponding to those variables in Q2; statements 2, 9, 12, 14 and 15⁹. By defining the IntrinsicQ2 only from the answers in those questions, we obtained a consistency in the answers of 56% as displayed in table 15.

	IntrinsicQ2 = 0	IntrinsicQ2 = 1	Total
IntrinsicQ1 = 0	188	161	349
IntrinsicQ1 = 1	41	69	110
Total	229	230	459

Table 15: Consistency in answers 2

There are still plenty of inconsistent answers. However, the way of asking was substantially different, in Q1 respondents were asked to rank and therefore choose

⁹ See survey questions in Appendix II.

among the variables and compare them whereas in Q2 they analysed each individually. We believe that by the use of statements in first person respondents are able to identify situations where they interact with those variables easily and therefore give a more honest opinion. Even if the results from Q1 are stronger in order to confirm our hypothesis and give a more definite answer to our research question, the Q2 answers are more reliable.

4.3.3 Most important HR policies for motivation of KW

As our findings established a positive statistically significant relationship between intrinsic motivation and being a KW we decided to look into the main drivers of this relationship in order to test our last hypothesis. In Q2 we used different statements to measure the intrinsic motivation of each individual but at the same time, each statement is referring to a specific policy or variable. Thus we can measure the relationship between KWs and each variable.

We ran regressions with all the twenty-two statements' answers and found a relevant relationship between KWs and five of the statements: 9, 4, 14, 15 and 19.¹⁰ The results are displayed in table 16. First we ran a simple linear regression (1) and then we controlled for the same variables as before in a multiple linear regression (2).

	KW	
	(1)	(2)
14	-0.1811964 (0.0712997)	-0.1408366 (0.0774652)
15	-0.3658354 (0.0898175)	-0.3687452 (0.096889)
19	-0.2117321 (0.0817421)	-0.1912039 (0.0869038)
9	0.4074332 (0.0704843)	0.4209673 (0.0755315)
4	-0.2121871 (0.1083565)	-0.053884 (0.1158296)

Table 16: Linear regressions for HR policies¹¹

¹⁰ See survey questions in Appendix II.

¹¹ Each estimate represents the coefficient obtained in two regressions; (1) simple linear regression and (2) multiple linear regression with the control variables. The numbers in brackets represent the standard deviation.

Each statement is associated with a motivational policy: private life balance, freedom and autonomy, safety at the work place and fringe benefits. The respondents agreed or disagreed to the statements on a scale from 1 to 5; where 1 is strongly agree and 5 strongly disagree¹².

The statements 14 and 15 both refer to the same policy: workers freedom and autonomy to plan their own work. We included two contradicting statements to measure it as previous literature highlights the importance of this motivational policy for KWs.

Statement 14 said:

“I like to have freedom to organize my work”

Statement 15 said:

“I don’t like my work to be rigid, structured and planned when given to me”

The results from (1) shown in table 16 establish a statistically significant positive relationship with KW; the coefficients are negative as the lower the value the stronger the individual agrees with the statements. Both tests support the idea that freedom to plan their own work plays a great role in KWs’ motivation. When including the control variables (2) only statement 15 is statistically significant.

These findings are consistent with the previous literature; freedom to plan work was the most relevant motivation strategy according to Horwitz et al.’s (2003) findings. In addition, Yan et al. (2011) found freedom to be significantly important for KWs’ motivation and even stated that MWs need more of a Tayloristic approach for better motivation. Petroni & Colacino (2008) also found great relevance in this variable but their findings focused more on job design and job enrichment.

Challenging work is identified as an important variable by many authors. Horwitz et al.’s (2003) findings for example classified it as the second most important motivation strategy. When measuring these strategies we found that challenging task assignment is very important for motivation in general but could not establish a significant relationship with KWs motivation. For our respondents, challenge in their everyday work is important whether they are KWs or not.

¹² All the statements, the scale and coding values can be seen in Appendix II.

Statement 19 said:

“It is important for me that my employer lets me balance my private life with my working life”

The results in table 16 show a coefficient of -0.21 and -0.19 when adding the control variables. This implies a positive relationship between being a KW and caring for private life balance as the lower the value, the stronger the respondent agrees to the statement.

Statement 9 said:

“Safety in the work environment is an important concern for me”

In the case of safety at the workplace, table 16 shows a negative relationship between safety and KW as the coefficient is positive and the higher the level the more the respondent disagrees. Safety policies are therefore more important for MWs. This relationship could be due to the fact that most KWs work onshore where safety is not as important as offshore.

Statement 4 said:

“I feel that employee benefits like use of company cabin, free phone, canteen and so forth are important to me”

As shown in table 16 fringe benefits such a company cars, cabins or mobile phone are important for KWs motivation. The estimated t-value for the simple linear regression is equal to the critical value of 1.96 in a 95% confidence interval while there is no statistical significance when including the control variables. Non-monetary benefits are components of many employment contracts and are used as rewards and even attraction instruments for desirable employees (Brickley, Smith, & Zimmerman, 2009). There is still no statistically significant relationship between being a KW and being motivated to work more by monetary rewards¹³. This result is explained by the fact that fringe benefits are not offered equally to all employees at Odfjell Drilling; onshore employees have greater access to them.

¹³ All 22 statements in Q2 were regressed with KW but only the statistically significant ones are included here.

4.4 Additional testing

After testing our hypotheses we expanded our analysis looking for other relevant results. We analyzed the relationship of the KW variable with other variables such as job satisfaction, pay satisfaction and labor turnover. For this purpose we defined these additional variables:

PaySat: Variable measuring pay satisfaction, taking values from 1 very satisfied to 5 very dissatisfied.

JobSat: Variable measuring job satisfaction, taking values from 1 very satisfied to 5 very dissatisfied.

Staying: Variable measuring how long the employee is planning to stay at Odfjell Drilling, taking values from 1 less than a year to 5 more than 10 years.

Table 17 shows the results from the t-tests that enabled us to compare the difference in means of the two groups, KWs and MWs. Regarding job satisfaction we found that even if respondents on average were satisfied with their job, KWs were less satisfied than MWs. We obtained that KWs have a statistically significant higher mean than MWs when it comes to job satisfaction which translates in higher dissatisfaction. This finding could be related to the policies in the company and their lack of specific KW targeting. As Petroni & Colacino (2008) found, the inability to differentiate the KWs and design HR policies specifically for them, results in lower job satisfaction. The results from pay satisfaction do not show a significant difference in the means of the answers of KWs and MWs. However we found that on average respondents were less satisfied with their pay than they were with their job. The mean for job satisfaction was 1.73 while it was 2.43 for pay satisfaction; being the coded answers: 1 very satisfied and 5 for very dissatisfied.

	Mean	T	p	H0
JobSat	1.727477	-2.2981	0.0000	Rejected
PaySat	2.472851	-0.3943	0.6936	Accepted

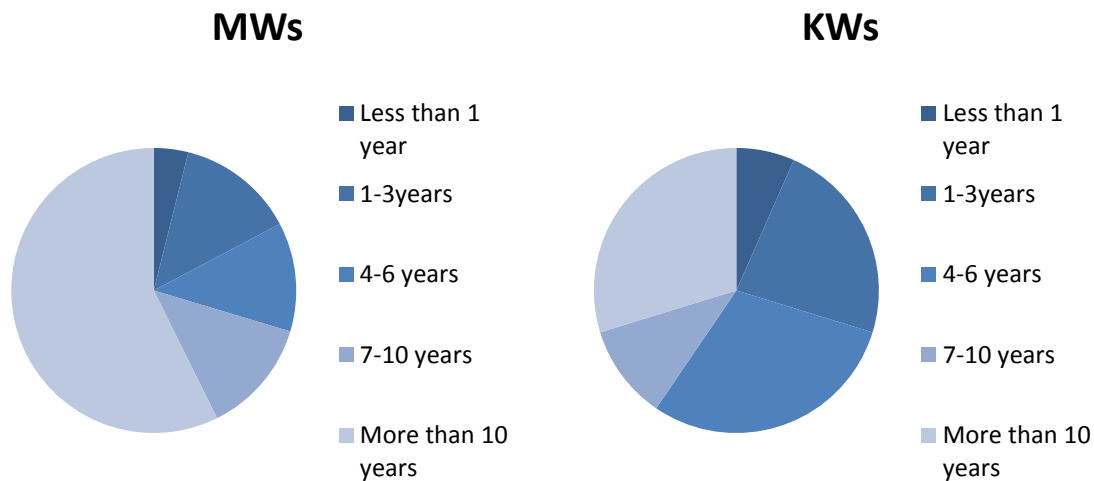
Table 17: t-test results for JobSat and PaySat¹⁴

Another topic frequently discussed as mentioned in the literature review is the turnover rate on KWs which has been found to be significantly higher than for MWs (Horwitz,

¹⁴ T values obtained after performing t-test on the values in JobSat and PaySat for KWs and MWs.

Heng, & Quazi, 2003). These kinds of workers have a high education and evolved skills, often also speaking several languages. Their characteristics make them highly mobile between different jobs and companies as they have high amount of general human capital while the MWs have more specific human capital as a result of on-the-job training. This is one explanation for why turnover rate usually is higher among KWs. As Alvesson (2000) stated, these workers develop their career paths across companies and not within one company as it was done traditionally.

Our respondents were asked how long they plan to stay at Odfjell Drilling from less than a year to more than 10 years. The results were consistent with the theory as KWs plan to stay in Odfjell Drilling for a much shorter period than MWs as it can be seen in graph 4.



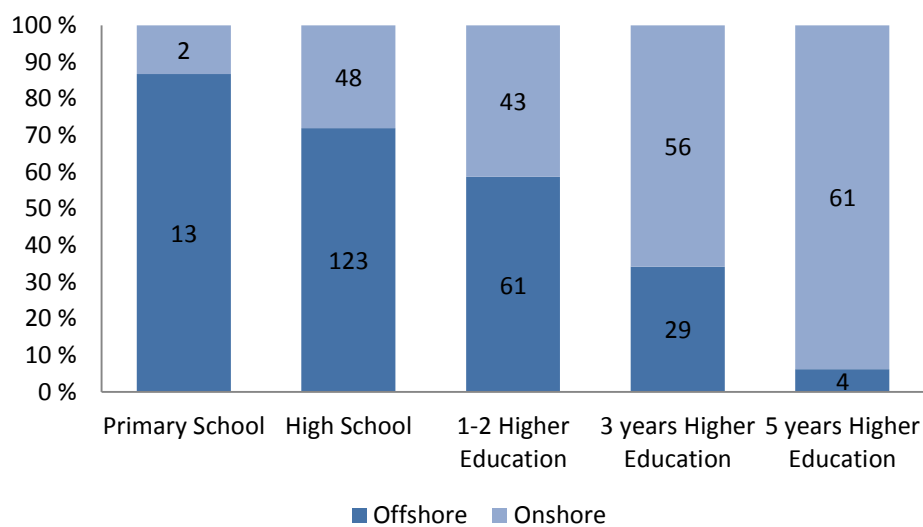
Graph 4: Number of years planned to stay at Odfjell drilling

In addition, we ran a t-test that resulted in KWs answering a statistically significant lower average number of years than MWs with a $p < 0.0001$. Thus KWs plan on staying shorter than MWs in the company. Our results are therefore consistent with the previous literature and the KWs in Odfjell Drilling should be expected to have a higher voluntary turnover rate than the MWs according to our analysis.

4.5 Offshore effects

We included the offshore work in the study as a dummy variable defined from one of the survey's questions: "Do you work offshore?" This variable has special importance

due to the special characteristics of the industry and because of its relationship with the KW variable. As previously mentioned, only ten of the KWs work offshore and there seems to be multicollinearity between the MW/KW and offshore/onshore variables. This relationship can be logically explained by the necessary use of physical strength when working offshore. In addition, offshore workers on average have less formal education than onshore workers as can be seen in graph 5. As confirmed under the interview, offshore workers receive a lot of on-the-job training rather than having formal education before entering the workforce. Thus onshore workers rather than offshore workers are more likely to be classified as KWs.



Graph 5: Completed education by offshore/onshore workers

As discovered in the linear regressions, the inclusion of the offshore variable in the model changes the results considerably. The correlation coefficient between both variables is -0.56 and when running a Chi-square test between both variables the null hypothesis is clearly rejected. Thus there is a relationship between the variables. We ran a linear regression and obtained a linear negative relationship between working offshore and being a KW as shown in table 18. The R-square of our simple linear relationship is 31%, thus working offshore explains an important part of the KW variable's variance.

Offshore	-0.5019202 (0.0356379)
R²	0.31

Table 18: Linear regression KW Offshore¹⁵

When looking again to labour turnover from the offshore perspective we found that offshore workers on average are planning to stay longer in the company than onshore ones. We ran a t-test and found that the average is higher for offshore workers with an error of probability of 0.0005.

Again this result could be due to the relationship between KWs and working offshore, we face the same correlation problem for this measurement. Offshore workers might be planning to stay longer in the company on average because they are mostly MWs. On the other hand, there is also a logical reasoning for this result in the component of specific and general human capital in the average offshore worker. The higher expected stay in the company could be due to the fact that offshore workers are highly specialized and receive a lot of specific training from the company which makes them highly valuable for Odfjell Drilling but not as valuable for other companies especially outside the oil and gas sector.

The literature on KWs is not developed yet around the Oil and gas industry and the offshore work. Our research therefore faces multicollinearity challenges that can be solved with further research on the subject for example by sampling more KWs that work offshore.

¹⁵ The estimate represents the coefficient obtained a linear regression where KW is the independent variable and Offshore the dependent one. The number in brackets represents the standard deviation.

5 Managerial implications

The final objective of this study is not only to test whether KWs are differently motivated than MWs, but also advice Odfjell Drilling and similar companies on how to manage this type of workers. As shown the results obtained in this study are consistent with previous literature. Being a KW is a significant variable that explains employee motivations. The nature of KWs motivations is different from the traditional MWs. We found that KWs are significantly more intrinsically motivated than MWs. Thus organizations should have HR policies targeted to each type of employee. We also found that KWs on average are less satisfied with their job than MWs. There is therefore room for improvement in the management of KWs at Odfjell Drilling. These recommendations can be applied to other organization although there are some industry specific elements.

We found that overall KWs benefit more from policies aimed at increasing intrinsic motivation. At the top we identified two especially important policies for KWs in Odfjell Drilling. First, freedom to plan work and lack of rigidity is highly important for KWs motivation. Job design and flat hierarchies that allow KWs to plan their own work should be preferred to rigid job structures. This does not mean that KWs should not have goals stated from management that are aligned with the organization's goals but that the way they achieve those goals in their daily work should be flexible to each employees' preference. As Petroni & Colacino (2008) recommended, not only should some performance goals be settled but also personal and subordinates development efforts should be included. Making growth and development a goal will set clear advancement opportunities and not only improve motivation but also attraction and retention of KWs. Freedom and autonomy are supported by almost every author in the field and was mentioned already by Drucker (1989) in earlier studies. Also important in job design and reorganization is to include personal challenge and job enrichment. Both Petroni & Colacino (2008) and Horwitz et al. (2003) defended the use of challenge and the achievement feeling that come when a task is successfully completed. It is indeed a powerful motivational tool. However, as we reviewed Yan et al.'s (2011) study it became clear that this is not applicable for all workers. Yan et al. (2011) defend that for some workers, MWs specifically, Taylor's Scientific Management ideas of routine and structure work better as these workers suffer from less stress when they can concentrate

on completing narrowly defined tasks. In our study, offshore work specifically is highly structured mainly for security and efficiency reasons. When working in a dangerous, tight environment where your actions affect the well-being of others, structure is the norm. Thus, job enrichment theory should be applied cautiously in the oil and gas industry and taking the working environment issues into account. Challenge and enrichment can be applicable offshore, but not freedom.

Flexibility is in general perceived as key in KWs motivation by authors such as Thompson & Heron (2002) and Horwitz et al. (2003). We found that it is important not only in the way the work is structured, but also in the schedules. We found that balancing personal and professional life is especially important for KWs. This is understandable considering KWs are mostly intrinsically motivated. Thus MWs care more about the extrinsic elements of the job like salary, fringe benefits or safety and less about the intrinsic matters such as the ability to balance personal life. In fact most of the MWs in our sample work offshore where they are away from their family for days as an essential part of the work they performed. Outside of that, Norway is widely known for its family friendly working hours and flexibility and we believe there is little need for improvement. As if it is of great importance for KWs we believe there might be room for improvement for KWs based in other geographical areas, and further studies are recommended.

Another important finding with managerial implication is the success of fringe benefits among KWs. An adequate compensation system is fundamental for every organization. We found that KWs are equally satisfied with their pay as MWs. However, our literature review suggests that the compensation system should also be different for KWs and MWs and can be used as a motivational, attraction and retention system. Petroni & Colacino (2008) also discussed the compensation system as their findings suggested the importance it has on KWs. Even if it is not the main motivational tool for KWs, it is a requirement especially for attraction and retention and can be a negative factor on intrinsic motivation as we saw with the crowding out theory (Deci, 1972). The design of the compensation and reward system is therefore very important and Petroni & Colacino (2008) suggests linking the reward system to status and career advancement. In relation to that, an adequate reward system should also recognize the personal development and growth efforts that are highly important for motivation as mentioned above. By doing so, the organization shows support for continuous education

and growth as well as encouraging it. Status was an important part of Petroni & Colacino's (2008) study on engineers as they felt that their salary level should represent their status as KWs in the organization even if they are not in management positions. Ultimately, the job of a KW is to analyze, evaluate, critique and innovate. The best compensation and reward system should be aimed to achieve the best of KWs in these areas and therefore differ significantly from the MWs' one.

An important issue when managing KWs is the voluntary labor turnover. Sutherland and Jordaan (2004) defend that high levels of labor mobility among KWs are a defining characteristic of KWs and that long term loyalty should not be expected to be achieved, only employee commitment. In Odfjell Drilling's case we found the expected higher turnover among KWs and necessary job design and career planning policies should be put into place to improve this data. Petroni & Colacino (2008) also highlights the importance of career planning for retention of KWs. It is essential to offer a fulfilling career with personal enrichment and growth. The career ladders however do not need the traditional model towards management position. Petroni & Colacino (2008) states that diversity is quite important when career planning for KWs, they need to be provided with new fields to enlarge their interests. This is especially important for engineers that are abundant at Odfjell Drilling, as they don't necessary look for a career in management but the fundamentals can be applied to other KWs. This diversity can be applied with rotation programs, job transfer availability and management support on continuing education and growth. Manager support is very important for KWs as confirmed by Horwitz et al.'s (2003) study. KWs need to feel that the organization and managers care for them and that their efforts contribute positively to the organization.

6 Conclusion

The majority of today's workers is highly educated and has different needs and desires than the traditional factory worker during the industrial revolution. This master thesis was inspired by these changes in the workforce and what they imply for worker motivation. Several studies have been conducted in different industries to find the main motivational factors for these new types of workers defined as KWs. In our study KWs are defined as workers with three years or more of formal, higher education and who rarely or never use physical strength in their work. The rest of the workforce is defined as MWs. The oil and gas industry is a unique industry where MWs are highly skilled and the work environment is very demanding for both KWs and MWs. To our knowledge there has not previously been conducted any studies into motivation of KWs in the oil and gas industry. Our work is therefore a pioneering study and an important contribution to understanding what motivates KWs, particularly in this industry.

The first step in our research was reviewing relevant literature in order to find answers to our three research questions. Is there a relationship between the type of worker and intrinsic motivation? Are knowledge workers more intrinsically motivated than manual workers? Are different motivational policies needed for knowledge workers and manual workers? Motivation is traditionally divided into either extrinsic or intrinsic motivation and different motivational policies are implied as a result of how the workers are motivated. Previous studies in other industries concludes that KWs are more intrinsically motivated than MWs but is this also the case in the oil and gas industry?

The second step was conducting an explanatory study in Odfjell Drilling. We built a survey based on the previous literature as well as an in depth interview with the HR manager in MODU. The analysis provided strong evidence that there is a relationship between type of worker and intrinsic motivation. On average KWs are more intrinsically motivated than MWs in the oil and gas industry. These findings suggest that different motivational policies are needed for different types of workers. Freedom and autonomy to plan their own work is the most important motivational factor for KWs according to our findings. We found that KWs are less satisfied with their job than MWs. The expected turnover is higher for KWs than MWs which is consistent with previous studies on KWs. Some of the findings are industry specific and not consistent with previous research. For example the fact that challenging work is not more

important to KWs than MWs as it is in other industries. There is also a problem with multicollinearity between being an offshore worker and KWs. As a result of these findings it is recommended that motivational policies should be differentiated between KWs and MWs as they are motivated differently.

All the research questions were answered through this explanatory study. However, as this is the first study on KWs' motivation in the oil and gas industry further research is needed to confirm the external validity of our findings. In addition, new research could help solve the multicollinearity problems and improve the understanding of the offshore variable.

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Appendix I: Interview guide

This is the guide we used when interviewing the HR manager in the MODUS unit the 14th of February 2014.

1. Identification, differentiation Knowledge workers.

In the first part of the interview we want to know if the company can differentiate between KW's and MW's. We want to know to what extent the company differentiates between the two and if H.R. policies are adapted consequently.

- Do you acknowledge the existence of workers within your company that fit into the definition of knowledge workers?
- What about manual workers?
- Do you have one uniform HR policy for all workers in the company? Globally?
- Do you experience a difference in job satisfaction and motivation between the two types of workers?

2. Motivation policies / schemes

In the second part we will like to identify the motivation policies or schemes used in the company. Three types of motivational tools are defined in the literature: 1. Formal structures, 2. incentives, rewards and recognition and 3. informal management techniques.

- Do you have any of these formal motivational structures?
 - Clear career ladder moving upwards within the organization.
 - Third-career orientations; employees moving from one challenging project to another and not really moving upwards on a ladder.
 - Internal funding for innovative ideas?
 - On the job training and development through courses/classes, new challenging tasks and so forth.
 - Employee of the month? Year?
 - Do you have any other kind of formal, written procedures or motivational policies in your organization?
- What kind of compensation system do you have?
 - Do you offer bonuses/incentives?

- In what way?
- Who gets bonuses?
- Is it specifically agreed upon when hiring or does it depend on tenure or what position you hold in the company?
- What kind of benefits do you offer?
 - Canteen? Car? Insurance? Pension? Internet & phone? Flexible hours?
- Do you acknowledge the existence of informal techniques that are commonly used in the organization?
 - How would you describe the managerial style?
 - Is the work structured or do employees have freedom to plan their work?
 - How do managers give recognition to their subordinates?
 - Is there employee participation in the managerial decisions?
 - Do managers receive education on management?
 - How are the core values of the organization implemented in the day-to-day?
 - Are they present in every aspect of the organization?
 - Do you measure how employees identify with these core values?
 - Do you measure how they live up to these values in their work?
 - How would you describe the work environment?
 - Do you incentive positive relationships in the workplace? How?
 - Do you have social gatherings outside of the workplace? How often?
 - Do you encourage team spirit? How?
 - Would you describe it as a competitive or cooperative environment within the different teams?

Appendix II: Survey questionnaire, English version

Here is the questionnaires we used translated to English as the original was sent in Norwegian. The numbers in brackets represent the coded values for each answer.

Dear participants,

First of all we would like to thank you all for taking some time and participating in this survey. It will take you approximately 7 minutes. This survey is going to be an important part of our Master's thesis at NHH (Norwegian School of Economics) in which we focus on worker's motivation and motivational policies within Odfjell Drilling. All data submitted will be treated anonymously.

Thank you for participating!

Hanne and Natalia

PS: If you have any questions contact us at: Natalia.Corchon@stud.nhh.no

Q10 Do you work offshore?

- Yes (1)
- No (2)

Q11 Do you have a managerial position in the company?

- No (1)
- Top management (2)
- Middle management (3)

Q13 How frequently do you need to use physical strength in your daily work?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the Time (4)
- Always (5)

Q1 Which of the following variables are most important for your work motivation? Please rank them from 1 to 4, where 1 is most important and 4 least important.

- _____ Pay (1)
- _____ Safety at the workplace (2)
- _____ Challenging tasks (3)
- _____ Autonomy and independence, freedom to plan your own work (4)

Q2 To what extent do you agree or disagree with the following statements ? Please refrain from answering the question if it does not apply to you.

	Strongly Agree (1)	Agree (2)	Neither Agree nor Disagree (3)	Disagree (4)	Strongly Disagree (5)
My pay-check is why I get up in the morning (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will work harder if I get paid more (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My bonus motivates me to stay longer at Odfjell Drilling (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that employee benefits like use of company cabin, free phone, canteen and so forth are important to me (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work hard in order to get a promotion (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work hard in order to get recognition from my manager (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work hard in order to get recognition from my co-workers (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel encouraged by the training and education I receive at the workplace (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety in the work environment is an important concern for me (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>My work gives me a feeling of personal accomplishment (10)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I work hard to make my unit the most successful (11)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I like to be challenged in my work (12)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I can identify with Odfjell Drilling's core values: Committed, Safety Conscious, Creative, Competent and Result Oriented (13)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I like to have freedom to organize my work (14)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I don't like my work to be very structured, rigid and planned when given to me (15)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>My colleagues are part of making my workday better (16)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>My supervisor's support is important to me (17)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>I work hard when encouraged to come up with innovative solutions (18)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>It is important that my employer lets me balance my private life with my work life. (19)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Odfjell's focus on job security by using the Competence Pool instead of "laying off" additional resources is important to me. (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding the company strategy and having clear goals and KPIs motivates me. (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Receiving feedback from my manager motivates me to do my job better (22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3 All things considered, how satisfied are you with your job?

- Very Satisfied (1)
- Satisfied (2)
- Neutral (3)
- Dissatisfied (4)
- Very Dissatisfied (5)

Q34 All things considered, how satisfied are you with your pay?

- Very Satisfied (1)
- Satisfied (2)
- Neutral (3)
- Dissatisfied (4)
- Very Dissatisfied (5)

Q7 All things considered, how much longer do you plan to stay at Odfjell Drilling?

- Less than 1 year (1)
- 1 to 3 years (2)
- 4 to 6 years (3)
- 7 to 10 years (4)
- More than 10 years (5)

Q26 Nationality

- Norwegian (1)
- European (2)
- Other (3)

Q27 Gender

- Male (1)
- Female (2)

Q28 What level of education you have completed?

- Primary School (1)
- High School (3)
- 1 to 2 years of higher education/ university (4)
- 3 years of university (5)
- 5 or more years of university (6)

Q29 Marital status

- Married (1)
- Cohabiting (2)
- Single (3)

Q30 Do you have any children?

- Yes (1)
- No (2)

Q31 Age

- Less than 30 (1)
- 30 to 39 (2)
- 40 to 49 (3)
- 50 to 59 (4)
- More than 60 (5)

Appendix III: Survey questionnaire, Norwegian version

Here is the original survey used in Norwegian, the numbers in brackets represent the coding used for each answer when analyzing the data set.

Kjære deltaker,

Tusen takk for at du tar deg tid til å delta i undersøkelsen vår som ikke vil ta deg mer enn et par minutter. Denne undersøkelsen er en viktig del av Masteroppgaven vår ved NHH (Norges Handelshøyskole) med fokus på motivasjonsfaktorer innen Odfjell Drilling. All data som samles inn vil være anonym og kan ikke knyttes til den enkelte deltaker.

Med vennlig hilsen

Hanne og Natalia

PS: Dersom du har noen spørsmål kan vi kontaktes per email:
Natalia.Corchon@stud.nhh.no

Q10 Jobber du offshore?

- Ja (1)
- Nei (2)

Q11 Har du en ledende stilling i selskapet?

- Nei (1)
- Toppleder nivå (2)
- Mellomleder nivå (3)

Q13 Hvor ofte benytter du fysisk styrke i arbeidet ditt?

- Aldri (1)
- Sjelden (2)
- Noen ganger (3)
- Ofte (4)
- Alltid (5)

Q1 Hvilken av de følgende variablene er viktigst for din arbeidsmotivasjon? Vennligst ranger dem fra 1 til 4 hvor 1 er viktigst og 4 minst viktig.

_____ Lønn (1)

_____ Sikkerhet på arbeidsplassen (2)

_____ Utfordrende arbeidsoppgaver (3)

_____ Autonomi og selvstendighet, frihet til å planlegge eget arbeid (4)

Q2 I hvilken utstrekning er du enig eller uenig i de følgende uttalelsene? Dersom spørsmålet ikke gjelder din arbeidssituasjon, vennligst unnlatt å svare.

	Veldig enig (1)	Enig (2)	Hverken enig eller uenig (3)	Uenig (4)	Veldig uenig (5)
Lønsslippen min er hovedgrunnen til at jeg kommer meg opp om morgenen (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Jeg vil jobbe hardere hvis jeg får betalt bedre (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bonusen min motiverer meg til å bli lenger i Odfjell Drilling (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg føler at firmagoder som tilgang til firmahytte, gratis telefoni, subsidiert kantine osv er viktig for meg (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg jobber hardt for å bli forfremmet (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg jobber hardt for å få anerkjennelse fra lederen min (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg jobber hardt for å få anerkjennelse fra mine kolleger (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg motiveres av opplæringen og utdannelsen jeg mottar på jobb (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er viktig for meg at sikkerhet tas på alvor på arbeidsplassen min (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arbeidet mitt gir meg en følelse av stolthet, jeg føler at jeg bidrar. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg arbeider hardt for at	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

min avdeling skal være bedre enn de andre (11)					
Jeg liker å bli utfordret i arbeidet mitt (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg kan identifisere meg med Odfjell Drilling's kjerneverdier: (Committed, Safety Conscious, Creative, Competent and Result Oriented) (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å ha frihet til å organisere mitt eget arbeid (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker ikke at arbeidet mitt er for rigid, strukturert og planlagt når det gis til meg (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine kolleger er med på å gjøre arbeidsdagen min bedre (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Støtte fra min nærmeste leder er viktig for meg (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg arbeider hardt når jeg oppmuntres til å komme opp med innovative løsninger (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er viktig at min arbeidsgiver lar meg balansere privatlivet mitt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

med arbeidslivet mitt (19)					
Odfjell's fokus på jobbsikkerhet gjennom bruk av Competence Pool istedet for oppsigelser er viktig for meg (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forståelse for selskapets strategi samtidig som jeg har klare mål og KPI motiverer meg (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tilbakemeldinger fra lederen min motiverer meg til å gjøre jobben min enda bedre (22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3 Alt i alt, hvor fornøyd er du med jobben din?

- Veldig fornøyd (1)
- Fornøyd (2)
- Hverken fornøyd eller misfornøyd (3)
- Misfornøyd (4)
- Veldig misfornøyd (5)

Q34 Alt i alt, hvor fornøyd er du med lønnen din?

- Veldig fornøyd (1)
- Fornøyd (2)
- Hverken fornøyd eller misfornøyd (3)
- Veldig misfornøyd (4)
- Misfornøyd (6)

Q7 Alt i alt, hvor lenge planlegger du å bli hos Odfjell Drilling?

- Under 1 år (1)
- 1-3 år (2)
- 4-6 år (3)
- 7-10 år (4)
- Mer enn 10 år (5)

Q26 Nasjonalitet

- Norsk (1)
- Europeisk (2)
- Annet (3)

Q27 Kjønn

- Mann (1)
- Kvinne (2)

Q28 Hvilken utdannelse har du fullført?

- Grunnskole (1)
- Videregående skole (3)
- Høgskole eller universitet, 1-2 år (4)
- Høgskole eller universitet, minimum 3 år (5)
- Høgskole eller universitet, minimum 5 år (6)

Q29 Sivilstand

- Gift (1)
- Samboende (2)
- Singel (3)

Q30 Har du barn?

- Ja (1)
- Nei (2)

Q31 Alder

- Under 30 (1)
- 30 - 39 (2)
- 40 - 49 (3)
- 50 - 59 (4)
- Over 60 (5)

Appendix IV: Descriptive statistics

Here are the descriptive statistics for each question in the survey. In addition, we specified the name we gave the different variables in Stata for analysis purposes.

Q10. Do you work offshore? Coded as Offshore

#	Answer	Response	%
1	Yes	270	53%
2	No	239	47%
	Total	509	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.47
Variance	0.25
Standard Deviation	0.50
Total Responses	509

Q11. Do you have a managerial position in the company? Coded as Management

#	Answer	Response	%
1	No	303	58%
2	Top Management	25	5%
3	Middle Management	190	37%
	Total	518	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.78
Variance	0.91
Standard Deviation	0.95
Total Responses	518

Q13. How frequently do you need to use physical strength in your daily work? Coded as Strength

#	Answer	Response	%
1	Never	129	25%
2	Rarely	133	26%
3	Sometimes	91	18%
4	Often	129	25%
5	Always	36	7%
	Total	518	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	2.63
Variance	1.65
Standard Deviation	1.28
Total Responses	518

Q1. Which of the following variables are most important for your work motivation? Please rank them from 1 to 4, where 1 is most important and 4 least important. Coded as Q1

#	Answer	1	2	3	4	Total Responses
1	Pay	85	124	97	44	350
2	Safety at the work place	107	68	46	100	321
3	Challenging work	105	76	72	61	314
4	Autonomy and independence, freedom to plan your own work	65	90	88	72	315
	Total	362	358	303	277	-

Statistic	Lønn	Sikkerhet på arbeidsplassen	Utfordrende arbeidsoppgaver	Autonomi og selvstendighet, frihet til å planlegge eget arbeid
Min Value	1	1	1	1
Max Value	4	4	4	4
Mean	2.29	2.43	2.28	2.53
Variance	0.94	1.54	1.26	1.12
Standard Deviation	0.97	1.24	1.12	1.06
Total Responses	350	321	314	315

Q2. To what extent do you agree or disagree with the following statements ? Please refrain from answering the question if it does not apply to you. Coded as Q2

#	Question	Strongly agree	Agree	Neither agree nor disagree	disagree	Strongly disagree	Total Responses	Mean
1	My pay-check is why I get up in the morning	19	42	146	131	103	441	3.58
2	I will work harder if I get paid more	47	117	203	56	16	439	2.72
3	My bonus motivates me to stay longer at Odfjell Drilling	57	110	129	52	46	394	2.80
4	I feel that employee benefits like use of company cabin, free phone, canteen and so forth are important to me	54	173	135	41	24	427	2.55
5	I work hard in order to get a promotion	33	106	214	72	19	444	2.86
6	I work hard in order to get recognition from my manager	58	175	167	35	5	440	2.44
7	I work hard in order to get recognition from my coworkers	53	205	146	26	8	438	2.39
8	I feel encouraged by the training and education I receive at the workplace	86	200	120	22	8	436	2.23
9	Safety in the work environment is an important concern for me	235	175	22	5	2	439	1.55
10	My work gives me a feeling of personal accomplishment	150	237	43	6	3	439	1.80
11	I work hard to make my unit the most successful	76	176	161	22	6	441	2.33
12	I like to be challenged in my work	160	247	34	1	2	444	1.73

13	I can identify with Odfjell Drilling's core values: Committed, Safety Conscious, Creative, Competent and Result Oriented	154	224	57	4	4	443	1.83
14	I like to have freedom to organize my work	188	217	31	3	2	441	1.67
15	I don't like my work to be very structured, rigid and planned when given to me	40	147	192	44	7	430	2.61
16	My colleagues are part of making my workday better	204	201	30	5	1	441	1.63
17	My supervisor's support is important to me	170	233	32	7	1	443	1.73
18	I work hard when encouraged to come up with innovative solutions	115	246	77	2	2	442	1.94
19	It is important that my employer lets me balance my private life with my work life	175	198	58	4	4	439	1.78
20	Odfjell's focus on job security by using the Competence Pool instead of "laying off" additional resources is important to me	96	185	114	10	9	414	2.16
21	Understanding the company strategy and having clear goals and KPIs motivates me	70	214	104	38	9	435	2.31
22	Receiving feedback from my manager motivates me to do my job better	136	248	48	6	4	442	1.86

Question number	1	2	3	4	5	6	7	8	9	10	11
Min Value	1	1	1	1	1	1	1	1	1	1	1
Max Value	5	5	5	5	5	5	5	5	5	5	5
Mean	3.58	2.72	2.80	2.55	2.86	2.44	2.39	2.23	1.55	1.80	2.33
Variance	1.16	0.89	1.42	1.03	0.85	0.74	0.71	0.79	0.47	0.52	0.75
Standard Deviation	1.08	0.94	1.19	1.02	0.92	0.86	0.84	0.89	0.69	0.72	0.87
Total Responses	441	439	394	427	444	440	438	436	439	439	441

Question number	12	13	14	15	16	17	18	19	20	21	22
Min Value	1	1	1	1	1	1	1	1	1	1	1
Max Value	5	5	5	5	5	5	5	5	5	5	5
Mean	1.73	1.83	1.67	2.61	1.63	1.73	1.94	1.78	2.16	2.31	1.86
Variance	0.42	0.56	0.46	0.73	0.46	0.47	0.49	0.60	0.78	0.84	0.53
Standard Deviation	0.65	0.75	0.68	0.85	0.68	0.68	0.70	0.78	0.88	0.92	0.73
Total Responses	444	443	441	430	441	443	442	439	414	435	442

Q3. All things considered, how satisfied are you with your job? Coded as JobSat

#	Answer	Response	%
1	Very satisfied	172	39%
2	Satisfied	232	52%
3	Neutral	33	7%
4	Dissatisfied	6	1%
5	Very dissatisfied	2	0%
	Total	445	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	1.73
Variance	0.48
Standard Deviation	0.69
Total Responses	445

Q34. All things considered, how satisfied are you with your pay? Coded as PaySat

#	Answer	Response	%
1	Very satisfied	39	9%
2	Satisfied	230	52%
3	Neutral	143	32%
4	Dissatisfied	9	2%
6	Very dissatisfied	22	5%
	Total	443	100%

Statistic	Value
Min Value	1
Max Value	6
Mean	2.47
Variance	1.06
Standard Deviation	1.03
Total Responses	443

Q7. All things considered, how much longer do you plan to stay at Odfjell Drilling?
Coded as Stay.

#	Answer	Response	%
1	Less than 1 year	20	5%
2	1-3 years	69	16%
3	4-6 years	74	17%
4	7-10 years	53	12%
5	More than 10 years	212	50%
	Total	428	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	3.86
Variance	1.72
Standard Deviation	1.31
Total Responses	428

Q26. Nationality t. Coded as Nationality

#	Answer	Response	%
1	Norwegian	433	97%
2	European	14	3%
3	Other	1	0%
	Total	448	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.04
Variance	0.04
Standard Deviation	0.20
Total Responses	448

Q27. Gender. Coded as Gender.

#	Answer	Response	%
1	Male	381	85%
2	Female	65	15%
	Total	446	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.15
Variance	0.12
Standard Deviation	0.35
Total Responses	446

Q28. What level of education you have completed? Coded as Education.

#	Answer	Response	%
1	Primary School	15	3%
3	High School	172	38%
4	University/higher education: 1-2 years	107	24%
5	University/higher education: 3 years	89	20%
6	University/higher education: 5 years	65	15%
	Total	448	100%

Statistic	Value
Min Value	1
Max Value	6
Mean	4.00
Variance	1.47
Standard Deviation	1.21
Total Responses	448

Q29. Marital status. Coded as Status.

#	Answer	Response	%
1	Married	221	50%
2	Cohabiting	108	24%
3	Single	113	26%
	Total	442	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.76
Variance	0.70
Standard Deviation	0.84
Total Responses	442

Q30. Do you have any children? Coded as Children.

#	Answer	Response	%
1	Yes	336	76%
2	No	106	24%
	Total	442	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.24
Variance	0.18
Standard Deviation	0.43
Total Responses	442

Q31. Age. Coded as Age

#	Answer		Response	%
1	Less than 30		55	12%
2	30 - 39		122	27%
3	40 - 49		166	37%
4	50 - 59		89	20%
5	More than 60		16	4%
	Total		448	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	2.75
Variance	1.05
Standard Deviation	1.02
Total Responses	448

Appendix V: Stata output

```
. *chi2*
. tabulate IntrinsicQ1 KW, chi2
```

IntrinsicQ	KW		Total
1	0	1	
0	272	77	349
1	59	51	110
Total	331	128	459

Pearson chi2(1) = 24.5599 Pr = 0.000

```
. *chi2*
. tabulate IntrinsicQ2 KW, chi2
```

IntrinsicQ	KW		Total
2	0	1	
0	39	6	45
1	292	122	414
Total	331	128	459

Pearson chi2(1) = 5.2546 Pr = 0.022

```
. *regressions*
. regress IntrinsicQ1 KW
```

Source	SS	df	MS	Number of obs =	459
Model	4.47527304	1	4.47527304	F(1, 457) =	25.84
Residual	79.1630712	457	.173223351	Prob > F =	0.0000
Total	83.6383442	458	.182616472	R-squared =	0.0535
				Adj R-squared =	0.0514
				Root MSE =	.4162

IntrinsicQ1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
KW	.2201898	.0433202	5.08	0.000	.1350582	.3053213
_cons	.1782477	.0228765	7.79	0.000	.1332916	.2232039

```
. regress IntrinsicQ2 KW
```

Source	SS	df	MS	Number of obs =	459
Model	.464651457	1	.464651457	F(1, 457) =	5.29
Residual	40.1235838	457	.087797776	Prob > F =	0.0219
Total	40.5882353	458	.088620601	R-squared =	0.0114
				Adj R-squared =	0.0093
				Root MSE =	.29631

IntrinsicQ2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
KW	.0709498	.030841	2.30	0.022	.0103419	.1315576
_cons	.8821752	.0162865	54.17	0.000	.8501695	.9141809

```
. regress IntrinsicQ2 KW age* status* Children midmanagement topmanagement
male
note: age5 omitted because of collinearity
note: status3 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	434
Model	1.59854541	11	.14532231	F(11, 422) =	2.26
Residual	27.1871689	422	.064424571	Prob > F =	0.0113
Total	28.7857143	433	.06647971	R-squared =	0.0555
				Adj R-squared =	0.0309
				Root MSE =	.25382

IntrinsicQ2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	.074942	.0289109	2.59	0.010	.0181146
age1	-.1716847	.0781941	-2.20	0.029	-.3253832
age2	-.1113564	.0697847	-1.60	0.111	-.2485254
age3	-.0429028	.0674931	-0.64	0.525	-.1755673
age4	-.0412474	.0698758	-0.59	0.555	-.1785953
age5	0	(omitted)			
status1	.0502097	.0352041	1.43	0.155	-.0189875
status2	.0224921	.0367957	0.61	0.541	-.0498335
status3	0	(omitted)			
Children	-.097364	.0366491	-2.66	0.008	-.1694016
midmanagement	.0105718	.0269827	0.39	0.695	-.0424655
topmanagement	.006556	.062151	0.11	0.916	-.1156082
male	-.0097402	.0368396	-0.26	0.792	-.0821521
_cons	1.030923	.0828039	12.45	0.000	.8681637

After dropping Q2_1 and Q2_5 for language bias we repeat some of the the tests:

```
. *chi2*
. tabulate IntrinsicQ2 KW, chi2
```

IntrinsicQ2	KW		Total
	0	1	
0	83	18	101
1	248	110	358
Total	331	128	459

Pearson chi2(1) = 6.5232 Pr = 0.011


```
. *regressions*
. regress IntrinsicQ2 KW
```

Source	SS	df	MS	Number of obs =	459
Model	1.11953795	1	1.11953795	F(1, 457) =	6.59
Residual	77.6560612	457	.169925736	Prob > F =	0.0106
				R-squared =	0.0142
				Adj R-squared =	0.0121
Total	78.7755991	458	.171999125	Root MSE =	.41222

IntrinsicQ2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	.1101303	.0429059	2.57	0.011	.025813 .1944476
_cons	.7492447	.0226577	33.07	0.000	.7047185 .7937709

```
. regress IntrinsicQ2 KW age* status* Children midmanagement topmanagement
male
note: age5 omitted because of collinearity
note: status3 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	434
Model	3.10382368	11	.282165789	F(11, 422) =	1.81
Residual	65.8547017	422	.156053795	Prob > F =	0.0505
				R-squared =	0.0450
				Adj R-squared =	0.0201
Total	68.9585253	433	.159257564	Root MSE =	.39504

IntrinsicQ2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	.1276505	.044996	2.84	0.005	.0392063 .2160946
age1	-.2927112	.1216986	-2.41	0.017	-.5319221 -.0535003
age2	-.2177861	.1086105	-2.01	0.046	-.4312711 -.0043012
age3	-.1923498	.1050439	-1.83	0.068	-.3988242 -.0141245
age4	-.135901	.1087522	-1.25	0.212	-.3496644 -.0778625
age5	0	(omitted)			
status1	.0043741	.0547904	0.08	0.936	-.1033221 .1120702
status2	.0373277	.0572675	0.65	0.515	-.0752373 .1498928
status3	0	(omitted)			
Children	-.0485775	.0570394	-0.85	0.395	-.1606942 .0635391
midmanagement	.0320569	.041995	0.76	0.446	-.0504885 .1146023
topmanagement	.1549176	.0967297	1.60	0.110	-.0352144 .3450496
male	.0251787	.0573358	0.44	0.661	-.0875205 .137878
_cons	.9452225	.128873	7.33	0.000	.6919094 1.198536

```
. *Consistency*
. tabulate IntrinsicQ1 IntrinsicQ2, chi2
```

IntrinsicQ1	IntrinsicQ2		Total
1	0	1	
0	86	263	349
1	15	95	110
Total	101	358	459

Pearson chi2(1) = 5.9026 Pr = 0.015

Intrin3 measures intrinsic motivation in Q2 only for the variables that are also contained in Q1.

```
. tabulate IntrinsicQ1 intrin3
```

IntrinsicQ1	intrin3		Total
1	0	1	
0	188	161	349
1	41	69	110
Total	229	230	459

```
. *HR policies*
. regress Q2_19 KW
```

Source	SS	df	MS	Number of obs =	438
Model	3.98520368	1	3.98520368	F(1, 436) =	6.71
Residual	258.9737	436	.593976377	Prob > F =	0.0099
Total	262.958904	437	.601736623	R-squared =	0.0152
				Adj R-squared =	0.0129
				Root MSE =	.7707

Q2_19	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
KW	-.2117321	.0817421	-2.59	0.010	-.3723897	-.0510745
_cons	1.840764	.043493	42.32	0.000	1.755282	1.926246

```
. regress Q2_19 KW age* Children status* topmanagement midmanagement male
note: age5 omitted because of collinearity
note: status3 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	425
Model	16.4580515	11	1.4961865	F(11, 413) =	2.60
Residual	237.904301	413	.576039471	Prob > F =	0.0033
Total	254.362353	424	.59991121	R-squared =	0.0647
				Adj R-squared =	0.0398
				Root MSE =	.75897

```
-----
```

	Q2_19	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	KW	-.1912039	.0869038	-2.20	0.028	-.3620328 -
.0203749	age1	.5371205	.239026	2.25	0.025	.0672613
1.00698	age2	.1781023	.2144316	0.83	0.407	-.2434112
.5996158	age3	.3269142	.2076812	1.57	0.116	-.0813298
.7351581	age4	.3964984	.2151994	1.84	0.066	-.0265243
.8195211	age5	0 (omitted)				
.2414779	Children	.0228	.1112455	0.20	0.838	-.195878
.0554586	status1	-.155343	.1072386	-1.45	0.148	-.3661446
.0157759	status2	-.2033705	.1114838	-1.82	0.069	-.422517
topmanagement	status3	0 (omitted)				
.3682126	topmanagement	.0024281	.1860812	0.01	0.990	-.3633563
midmanagement	midmanagement	.1553055	.081513	1.91	0.057	-.0049266
.3155376	male	.1755844	.1117539	1.57	0.117	-.044093
.3952619	_cons	1.42858	.2531237	5.64	0.000	.9310088
1.926152						

```
-----
```

. regress Q2_14 KW

Source	SS	df	MS	Number of obs =	440
Model	2.92385111	1	2.92385111	F(1, 438) =	6.46
Residual	198.292058	438	.452721594	Prob > F =	0.0114
				R-squared =	0.0145
				Adj R-squared =	0.0123
Total	201.215909	439	.45835059	Root MSE =	.67285

```
-----
```

Q2_14	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	-.1811964	.0712997	-2.54	0.011	-.3213284 -.0410644
_cons	1.721519	.0378505	45.48	0.000	1.647128 1.79591

```
-----
```

. regress Q2_14 KW age* Children Status topmanagement midmanagement male
note: age1 omitted because of collinearity

Source	SS	df	MS	Number of obs =	427
Model	5.87339023	10	.587339023	F(10, 416) =	1.27
Residual	191.878366	416	.461246073	Prob > F =	0.2431
				R-squared =	0.0297
				Adj R-squared =	0.0064
Total	197.751756	426	.464206001	Root MSE =	.67915

```
-----
```

	Q2_14	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	KW	-.1408366	.0774652	-1.82	0.070	-.2931085
.0114354	age1	0 (omitted)				
.2383682	age2	.0001064	.1212107	0.00	0.999	-.2381555
.2288618	age3	-.0126882	.1228835	-0.10	0.918	-.2542382
.3354097	age4	.0677603	.136161	0.50	0.619	-.1998891
.2973439	age5	-.1112593	.2078683	-0.54	0.593	-.5198625
.1757454	Children	-.0164849	.0977931	-0.17	0.866	-.2087151
.0731026	Status	-.0191013	.0469068	-0.41	0.684	-.1113053
.0730274	topmanagement	-.253668	.1661995	-1.53	0.128	-.5803634
.090421	midmanagement	-.0525977	.0727578	-0.72	0.470	-.1956164
.3723055	male	.1775182	.099094	1.79	0.074	-.0172692
2.000673	_cons	1.635364	.1858433	8.80	0.000	1.270055

```
-----
```

```
. regress Q2_15 KW
```

Source	SS	df	MS	Number of obs =	429
Model	11.6845617	1	11.6845617	F(1, 427) =	16.59
Residual	300.739681	427	.704308386	Prob > F =	0.0001
Total	312.424242	428	.729963183	R-squared =	0.0374
				Adj R-squared =	0.0351
				Root MSE =	.83923

```
-----
```

Q2_15	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	-.3658354	.0898175	-4.07	0.000	-.5423749 - .189296
_cons	2.710098	.0478974	56.58	0.000	2.615954 2.804242

```
-----
```

```
. regress Q2_15 KW age* Children Status topmanagement midmanagement male
note: age5 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	416
Model	18.1480516	10	1.81480516	F(10, 405) =	2.56
Residual	287.198102	405	.709131117	Prob > F =	0.0052
Total	305.346154	415	.735773865	R-squared =	0.0594
				Adj R-squared =	0.0362
				Root MSE =	.8421

```
-----
```

Q2_15	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	-.3687452	.096889	-3.81	0.000	-.5592133 -
age1	.4637191	.258111	1.80	0.073	-.0436854
age2	.2353816	.2302631	1.02	0.307	-.2172784
age3	.0644545	.2235677	0.29	0.773	-.3750436
age4	.1927054	.2328103	0.83	0.408	-.2649621
age5	0	(omitted)			
Children	.0310068	.12279	0.25	0.801	-.2103785
Status	.0656642	.0590726	1.11	0.267	-.050463
topmanagement	.2204632	.2111554	1.04	0.297	-.1946343
midmanagement	.0509324	.0910745	0.56	0.576	-.1281053
male	.0128439	.1264616	0.10	0.919	-.2357593
_cons	2.346303	.3094285	7.58	0.000	1.738016

```
-----
```

. regress Q2_9 KW

Source	SS	df	MS	Number of obs =	438
Model	14.6843396	1	14.6843396	F(1, 436) =	33.41
Residual	191.607898	436	.439467655	Prob > F =	0.0000
Total	206.292237	437	.472064617	R-squared =	0.0712
				Adj R-squared =	0.0691
				Root MSE =	.66292

```
-----
```

Q2_9	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	.4074332	.0704843	5.78	0.000	.2689019 .5459646
_cons	1.438095	.0373515	38.50	0.000	1.364684 1.511507

```
-----
```

. regress Q2_9 KW age* Children Status topmanagement midmanagement male
 note: age5 omitted because of collinearity

Source	SS	df	MS	Number of obs =	425
Model	22.4470417	10	2.24470417	F(10, 414) =	5.20
Residual	178.611782	414	.431429425	Prob > F =	0.0000
Total	201.058824	424	.474195339	R-squared =	0.1116
				Adj R-squared =	0.0902
				Root MSE =	.65683

```
-----
```

	Q2_9	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	KW	.4209673	.0755315	5.57	0.000	.2724943
.5694403	age1	.3299831	.2053048	1.61	0.109	-.0735867
.7335529	age2	.2110125	.1839682	1.15	0.252	-.1506159
.5726408	age3	.1408449	.1792082	0.79	0.432	-.2114266
.4931164	age4	.0438766	.1858406	0.24	0.813	-.3214322
.4091855	age5	0 (omitted)				
.3110638	Children	.1207946	.0967941	1.25	0.213	-.0694747
.075941	Status	-.013802	.0456542	-0.30	0.763	-.1035451
.0979492	topmanagement	-.4141101	.160838	-2.57	0.010	-.7302711
.0246104	midmanagement	-.114047	.0705381	-1.62	0.107	-.2527044
.2407617	male	.0510027	.0965346	0.53	0.598	-.1387563
1.706002	_cons	1.226521	.2439222	5.03	0.000	.7470405

```
-----
```

```
. regress Q2_4 KW
```

Source	SS	df	MS	Number of obs =	426
Model	3.93890932	1	3.93890932	F(1, 424) =	3.83
Residual	435.525879	424	1.02718368	Prob > F =	0.0509
Total	439.464789	425	1.0340348	R-squared =	0.0090
				Adj R-squared =	0.0066
				Root MSE =	1.0135

```
-----
```

Q2_4	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
KW	-.2121871	.1083565	-1.96	0.051	-.4251699 .0007957
_cons	2.610561	.0582241	44.84	0.000	2.496117 2.725005

```
-----
```

```
. regress Q2_4 KW age* Children Status topmanagement midmanagement male
note: age5 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	413
Model	16.2143356	10	1.62143356	F(10, 402) =	1.60
Residual	406.294139	402	1.01068194	Prob > F =	0.1029
Total	422.508475	412	1.02550601	R-squared =	0.0384
				Adj R-squared =	0.0145
				Root MSE =	1.0053


```

Ha: diff < 0
Pr(T < t) = 0.3468

```

```

Ha: diff != 0
Pr(|T| > |t|) = 0.6936

```

```

Ha: diff > 0
Pr(T > t) = 0.6532

```

```

. *Labor turnover*
. ttest Staying, by (KW)

```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	307	4.065147	.0718299	1.258562	3.923804	4.20649
1	121	3.338843	.1182714	1.300985	3.104674	3.573012
combined	428	3.859813	.0633564	1.310727	3.735284	3.984342
diff		.7263036	.1363916		.4582193	.9943879

```

diff = mean(0) - mean(1)
Ho: diff = 0
t = 5.3251
degrees of freedom = 426

```

```

Ha: diff < 0
Pr(T < t) = 1.0000

```

```

Ha: diff != 0
Pr(|T| > |t|) = 0.0000

```

```

Ha: diff > 0
Pr(T > t) = 0.0000

```

```

. tabulate Staying KW, row col

```

```

+-----+
| Key          |
+-----+
| frequency    |
| row percentage |
| column percentage |
+-----+

```

Staying	KW		Total
	0	1	
1	12	8	20
	60.00	40.00	100.00
	3.91	6.61	4.67
2	41	28	69
	59.42	40.58	100.00
	13.36	23.14	16.12
3	38	36	74
	51.35	48.65	100.00
	12.38	29.75	17.29
4	40	13	53
	75.47	24.53	100.00
	13.03	10.74	12.38
5	176	36	212
	83.02	16.98	100.00
	57.33	29.75	49.53
Total	307	121	428