

BACHELOR THESIS

*Creativity within the knowledge-based economy: Why do we need it and how can we foster it?
A research on the use of incentives specified on 'types' of workers.*

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PREFASE

This Bachelor Thesis is executed as the last and finishing part of my Bachelor of Economics and Business Economics on the Erasmus University Rotterdam.

This Thesis has become the combination between the two fields of study I have been interested for in the past years, namely the fields of Interior Architecture and Economics. As a recent graduated Interior Architect from the Willem de Kooning Academy, I feel strongly about the creative part of our society. As a Bachelor student in Economics I had to deal with mostly theoretical knowledge in the first two years of the study, in which I could not find a connection to the ‘real’ world because of its assumptions and limits. At that time I never had the idea of the possibility of combining the two fields. Until the third academic year when I got the opportunity to explore these two parts together during the Minor Creative Economics educated by the Faculty of History, Culture and Communication. There I found a long time searched connection between both extremes, especially within the themes that affected the creative firm and worker. Subjects such as possibilities for firms to foster creativity, how creative organizations actually work and ways to manage and stimulate creative workers passed during this course. These topics became the inspiration and at the end the overarching subject of my Thesis.

This Bachelor Thesis was a great opportunity to explore and analyze the connection between creativity and Economics. Where within the minor the economic perspective was hidden, now the economic approach could be the starting point. This way creativity within the economic perspective became the main topic, taking the knowledge-based economy into account where creativity is one of the most important assets for innovation and a potential generator for economic growth.

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1. INTRODUCTION

Research topic

Creativity is an important asset within our knowledge-based economy, that tends to focus on quality, innovation and creativity (Best. 1990). Within this knowledge-based economy creative assets are believed to be potentially responsible for economic growth and development. These creative assets are captured mainly in the creativity of the individual worker.

This study will focus on the use of different incentives to stimulate the active involvement of the individual worker in a creative task. Important in this study is the distinction of different ‘types’ of workers and how these ‘types’ react on the use of incentives. Proposed for distinguishing the ‘types’ are Kirton’s Adaptor-Innovator theory, which divides workers into an Adaptor or Innovator and Gough’s Creativity Personality Scale to determine a high or low creativity ‘level’ for the individual worker.

By using the data collected from 61 respondents of an online survey this study finds a positive relationship between financial rewards and the active involvement in the creative task. No significant result is found for the use of incentives specified on the different ‘types’ and creativity ‘levels’ of the individuals.

Aim of the study

This study is important to understand how creativity within the individual worker can be fostered and stimulated. In practice the departments of Human Resource or Personal managers can use this study to incentivize the individual worker to a higher level of creativity, by suggesting different incentives for different ‘types’ of workers. By using the suggested theory this kind of departments or managers can specify the use of different incentives on the individual worker. By determining the ‘type’ of worker they can determine which incentive(s) will work best for stimulating the creativity level of the worker. This way they can also exclude negative effects that certain incentives can imply. Stimulating the creativity level of the individual worker becomes far more effective this way. Additional to this individual result, the overall result when using these theories is to create a better work environment for the firm. A work environment where workers feel more challenged by the work they do and where they feel more appreciated because of it. Enhancing the creative performance of their workers is a necessary step if organizations are willing to achieve a competitive advantage in the knowledge-based economy. This way a work environment is created where organizations can flourish through innovation.

Research and partial questions

Research Question:

Creativity within the knowledge-based Economy: Why do we need it and how can we foster it?

Research Partial Questions:

- What defines creativity from the economic perspective?
- Why is creativity important within the knowledge-based Economy?
- What motivates the individual worker?
- What ‘types’ of workers can be distinguished?
- What are the effects of incentives on the ‘types’ of workers?
- Can the use of incentives be specified on the ‘types’ of workers?

2. WHAT DEFINES CREATIVITY FROM THE ECONOMIC PERSPECTIVE?

Creativity in general

The general term creativity is mostly associated with the liberal arts and the cultural sector. The image of creativity is in first instance connected to the free spirits of artists that express their feelings by creating a work of art. How can this image be associated with the economic field? Creativity includes more than the work of the “creative genius” (Ochse. 1990). Psychologists claim that “at its heart creativity is simply the production of novel, appropriate ideas in any realm of human activity, from science to the arts, to education, to business to every day life. The ideas must be novel, different from what has been done before, but they can’t be simply bizarre, they must be appropriate to the problem or opportunity presented” (Amabile. 1997).

Economic creativity

From the economic scope, creativity also starts with the reference of the work of a “creative genius” (Ochse. 1990). Economic creativity according to Howell and Higgins (1990) includes “research” and “idea generation” and often occurs because of the efforts of an inventor (Howell and Higgins 1990; Thomas 1994). The ideas are stimulated by numerous sources of information, problems, and opportunities. Von Braun gives several examples to illustrate this, such as advances in scientific knowledge, the recognition of a need for a new or improved product, service, or process. Even technical improvements which render specific characteristics of technology that are economically attractive in one or more applied fields can be seen as an example (von Braun. 1997). All these sources can imply a reason for a person to start generating ideas. Only if a person’s interest and curiosity drives the person to invest his intellectual resources towards a potentially creative outcome (Williams & McGuire. 2008).

Codification of the idea

Something economists find important is the concept of efficiency. Interesting here is the inefficiency that may come along during the creative process, because of the majority of ideas and projects that will never be realized. According to Kanter (1988) codification plays an important role within this process. For economic creativity to occur, a person, team, or organization must codify the idea in the form of a prototype, model, manual, patent, document, database, training materials, business plan, or other means. To be successful, potential innovators produce models “that can be touched or experienced, that can be diffused or mass produced, and can be turned into productive

use, or can be institutionalized” (Kanter. 1988). The main feature of economic creativity implies the codification of an idea to ensure that the idea has potential economic value (Williams & McGuire. 2008). Though even codified ideas that never get implemented have a value according to Nonaka and Kenney (1991): the codification of both successes and failures helps to ensure that learning accumulates and mistakes are not repeated. Economic creativity, therefore has a “ripple effect” that goes beyond a given idea or project (Nonaka & Kenney. 1991).

The economic definition of creativity

The potential economic value is a demarcation to the definition of creativity within the economic scope, by introducing the term of ‘value’ into the definition. In summary: economic creativity is “any form of creativity that results in codified knowledge with potential economic value” (Guerrero-Cusumano & McGuire. 2001). Different from the artistic approach, where thinking outside the box can be taken to extremes and goes preferable to the impossible, is that last condition. Ideas must be appropriate to the problem or opportunity presented. Ideas can be outside the box, but need to be useful and practicable and in the end profitable.

3. WHY IS CREATIVITY IMPORTANT WITHIN THE KNOWLEDGE-BASED ECONOMY?

Shifting from an industrial to a knowledge-based economy

“The knowledge-based economy is simply the notion that economic wealth is created through the creation, production, distribution and consumption of knowledge and knowledge-based products. The great virtue of the knowledge-based economy is its firm rejection of the economic law of diminishing returns, and therefore its slowing productivity growth. A new piece of knowledge could be applied an infinite number of times with no deterioration in its value due to repeated use. Knowledge was and still is infinitely durable through time and space and can be stored at the low to zero cost in the new digital mediums. This in turn led to entirely new visions of economic growth based on the creation of new knowledge and its applications” (Harris. 2001).

Increased importance of innovation in this ‘new’ economy

Since the 1950’s economists have understood that technological innovation is critical to economic growth, innumerable studies have documented the strong connection between technological progress and economic prosperity. By the work of Abramowitz (1956) and Solow (1956) the importance of technological change has been generally understood. An understanding that has been deepened by studies in recent years, documenting the numerous positive effects of technological progress in specific areas, such as information technology (Bresnahan et al. 2002). Innovative activities are necessary to maintain the technological progress and productivity improvements that generate national prosperity. “Countries that improve their standards of living are those in which firms are becoming more productive through the development of the more sophisticated sources of competitive advantage based on knowledge, investment, insight and innovation” (Porter. 1990). If indeed more innovation leads to a greater prosperity, then a better understanding of the factors influencing innovation is needed (Williams & McGuire. 2008).

Stimulating forces behind innovation

What makes it difficult to link industrial innovation to productivity growth and economic outcomes, is the problem of the scientific research community that operates to a large extent outside the profit sector of the economy (Grossman & Helpman. 1991). Where at first scientific discoveries took the position of the primary stimulating force behind innovation, this view takes a shift around 1942. When the view of the market forces driving industrial innovation was taken over by Schumpeter

(1942) and by Schmookler (1966). They argued that it is the expected profitability of the inventive activity, reflecting opportunities in the relevant factor and product markets, that determines the pace and direction of the innovation. Later on Dosi (1988) and Mowery & Rosenberg (1989) offered a moderated view in which technological opportunities are created by scientific discoveries and incentives for applied research which emerged from market opportunities (Williams & McGuire. 2008). According to Yusuf (2009) “Innovation springs from the creative application of knowledge.” His theory determines two essential factors for innovation, namely creativity (scientific or other) and a stock of knowledge. Knowledge and the functionalities it supplies are the essential raw materials, but the creative act forms the basis of an innovation (Yusuf. 2009). In the same line of ideas also the theory of Huws arose. According to Huws in this knowledge-based economy, creativity is regarded as the raw ingredient of economic growth (Huws. 2006). Therefore creativity becomes the main source of innovation in our ‘new’ economy.

The starting point of innovation: the individual worker

Building further from the point of view that creativity is the essential starting point for innovation (Amabile. 1996; Glynn. 1996; Yusuf. 2009; Huws. 2006), it is important to know where creativity can be found. While the management of an organization can enhance the likelihood of the innovation, it is the individual who is the source of a new idea (Mumford. 2000). Knowledge workers are viewed as the core to the competitiveness of a firm in the knowledge-based economy (Lepak & Snell. 2002; Hirst et al. 2009). They are the vital sources of renewing products, services and creative processes in the organization (Amabile. 1988). When following the theory of Yusuf (2009) next to the factor knowledge, also the factor creativity is essential to innovation. Therefore employee creativity is crucial for organizations innovation and survival (Amabile. 1988, 1996; Oldham & Cummings. 1996). Causing managers and scholars to seek for the ingredients that foster individual creativity (Breugh. 1985; Amabile. 1988; Wolfe. 1994; Oldham & Cummings. 1996; George & Zhou. 2001; Dul et al. 2011; Song et al. 2012).

4. WHAT MOTIVATES THE INDIVIDUAL WORKER?

Extrinsic and intrinsic motivation

The first step in finding the ingredients that foster individual creativity is to understand what exactly motivates the individual worker. “Motivation determines what people will actually do” (Amabile. 1998). The level of expertise and creative thinking can be seen as an individual’s raw materials, their natural resources, but their motivation determines how and at what level they will activate their resources (Amabile. 1998). Based on the level of the individual, the literature argues that there are mainly two motivational processes: extrinsic and intrinsic. To illustrate these two processes a popular theory of motivation that was initially developed by Deci and Ryan (2000) is discussed. This Theory is called the Self-Determination Theory (SDT) (Sheldon & Krieger. 2007; Patrick, Knee, Canevello, & Lonsbary. 2007; Ntoumanis, Edmunds, & Duda. 2009). Central to SDT is the distinction between autonomous motivation (intrinsic) and controlled motivation (extrinsic) (Gagné & Deci. 2005).

Economic model =extrinsic motivation

“The economic model of human behavior is based on incentives applied from outside the person. The model implies that people change their actions because they are induced to do so by an external intervention” (Becker. 1976; Coleman. 1990; Frey. 1992). Economic theory takes extrinsic motivation to be relevant for behavior, with most of the time money, as the effective motivator. Though economists also recognize the intrinsic motivation people may experience, determining people’s preferences is most of the time excluded from the economists' field. Preferably they work with people’s preferences as given. Resulting in a study that disregards the inner feelings of the human behavior. To study more about the motivation coming from within the person, a shift to the psychological field has to be made. In position against economists, “psychologists are indeed focussing on the behavioral motives coming from within the person” (Deci. 1971). In this field the concept of intrinsic motivation emerged as a reaction to behaviorism, which was the main direction within psychological science from the 1920’s to the 1960’s (Ryan & Deci. 2000).

Self-Determination Theory

From a group of psychologist researchers, who focused on competence and self-determination as a basis for intrinsic motivation, the Self-Determination Theory arose. An early and influential theorist representing this approach was White (1959 as cited in Kaplan & Oudeyer. 2007) who assumed a

need for competence or effectance to be at the root of intrinsic motivation. He used the terms competence and effectance to refer to the satisfaction derived from exercising and extending one's capabilities (White as cited in Deci & Ryan. 1985). This approach was later developed by Deci and Ryan (2000) to what is called the Self-Determination Theory. SDT is concerned with the optimal functioning of human beings and the conditions that foster such functioning. Within SDT the driving forces for intrinsically motivated behavior are assumed to be three basic psychological needs. The needs for competence, autonomy and relatedness. When people have an opportunity to meet these three needs, their actions are likely to be based on intrinsic motivation.

Autonomy, competence and relatedness

Three basic psychological needs have been identified as essential factors for facilitating optimal functioning. Autonomy, according to Deci and Ryan (1985), refers to the person's experience of having freely chosen to engage in his behavior. Competence refers to the individual's perceived ability in relation to a specific task. Finally, relatedness refers to having a sense of belonging and experiencing some degree of social support. According to Ryan and Deci (2000), intrinsic motivation is seen in SDT as an evolved property of human beings. Therefore SDT is not concerned with what causes intrinsic motivation but with the conditions that sustain or diminish it. Central to these conditions, as indicated by a substantial amount of research, (for a review see Ryan & Deci. 2000) is whether or not they support the fulfillment of people's needs for autonomy, competence and relatedness. As an example of research in support of this, studies by Deci (1975 as cited in Ryan & Deci. 2000) have shown that positive feedback on performance increased intrinsic motivation while negative feedback on performance diminished it. Studies by Valler and Reid (1984 as cited in Ryan & Deci. 2000) found that these effects were mediated by perceived competence. Furthermore, studies by Fisher (1978 as cited in Ryan & Deci. 2000) and Ryan (1982) have shown that the positive effect of competence on intrinsic motivation is present only when the person experiences a sense of autonomy. Indicated by these and other studies (Deci & Ryan. 2000) is that when individuals' basic psychological needs are met they tend to be intrinsically motivated, whereas when these needs are not met, levels of intrinsic motivation tend to be low.

Criticism on dichotomy

Not all academics distinguish intrinsic and extrinsic motivation. Frey (1997) says the following about the dichotomy: "The distinction between intrinsic and extrinsic is not clear cut. It can even be claimed that all motivations come from outside. On the other hand recognition and monetary gain

are not final goals, what matters is the intrinsic satisfaction one derives. For the purposes of explaining economically relevant human behavior it suffices that it makes sense to distinguish activities in which individuals mainly do just because they like them and other because they are induced to do so by monetary payment or by command. In many cases two motivations come together. What is crucial is the systematic relationship between the two” (Frey. 1997).

Other kinds of motivation: continuum

Until now intrinsic and extrinsic motivation have been referred to as the only two kinds of motivation that exist. However, according to Ryan and Deci (2000), SDT acknowledges a continuum of types of motivation between extrinsic and intrinsic motivation. Organismic integration theory (OIT), a sub-theory within SDT, describes these different types of motivation (for a detailed description see Ryan & Deci. 2000). As described, the types of motivation on the continuum, moving from extrinsic to autonomous, are called external, introjected, identified, integrated and intrinsic regulation. External motivation refers to when one is doing something solely to attain a specific goal or reward. In introjected regulation the person has taken in the regulation to a certain extent but mainly acts on it to maintain or enhance self-esteem, to avoid guilt or to enhance pride. Both of these types of motivation are varieties of external regulation and have in studies often been combined to form a controlled motivation composite. Controlled within the meaning of types of motivation that are characterized by an experience of having to do something, such as having to go to work in order to attain a decent living standard (external regulation) or having to go to church in order to preserve feelings of worth (introjected regulation), as opposed to doing these things based on an experience of choice. Next on the continuum is identified regulation, where the person has consciously accepted the goal or regulation as personally important. This is followed by integrated regulation, where the regulations are fully assimilated to the self so that they are in congruence with one’s values and needs. Both of these more autonomous regulations are still considered extrinsic since they are done to attain certain outcomes and not because of the satisfaction derived from the activity itself. Together with intrinsic motivation they have in some studies been combined to form an autonomous motivation composite. Empirical evidence has been provided in support of the motivation continuum (Ryan & Connell. 1989; for a review of additional support for OIT see Ryan & Deci. 2000).

5. WHAT 'TYPES' OF WORKERS CAN BE DISTINGUISHED?

Different 'types' of workers

Next to understanding what motivates the individual worker it is important to distinguish the 'type' of worker. This is useful for determining or even understanding which way of working the individual prefers and flourishes through. Knowing their working style results in understanding how to stimulate the worker or how to adapt the working environment on the style of the worker. To distinguish different 'types' of workers the most prominent theory used in this research will be the Adaption-Innovation Theory. This theory is chosen from other theories because it is the only theory that describes two different 'types' of workers, focussing on the style of creativity the worker enhances. The Adaption-Innovation theory does not endorse which type is more or less creative. Other indicators are most of the time focussed on measuring the level of creativity the individual endorses.

Myers-Briggs type indicator

The indicator that comes closest to the Adaption-Innovation Theory is the Myers-Briggs Type indicator. What is left unclear is whether the indicator measures the level or the style of creativity of the worker. The Myers-Briggs Type indicator is a personality test, founded on Jung's theory of type (1923), composed on four bipolar dimensions. The four dimensions are: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling and Judgement-Perception. These four measures describe the specific way in which an individual tends to rely on perception or judgement, combined with their personal preference for style of perception (intuition/sensing) and style of judgement (feeling/thinking). Finally it determines whether the individuals' perception and judgement directs upon the world of ideas (introversion) or the external environment (extraversion). After the test one of the two options for all of the four dimensions shows what kind of 'type' the individual is. Therefore the MBTI is offered as a 'type indicator' on the assumption that it can classify individuals into 1 of 16 qualitatively different types, formed by combination of these four dichotomous preferences. The manual (1962) for the Myers-Briggs Type Indicator (pp. 32-34) claims that two of its dimensions (Sensing-Intuition & Judgement-Perception) are indicators of creativity, especially in combination with each other. Therefore certain 'types' connect to a higher level of creativity than others, therefore the test can also function as a level indicator. This way although the name of the personality test refers to determining a certain 'type', it is left to question if the indicator refers only to style or to style and level of creativity.

Measuring the level of creativity

Other theories that are associated with individual creativity factors but which are related to measuring the level of creativity are the Creative Personality Scale, Big Five personality, and Self-perception Theory next to the general accepted Torrance Tests of Creative Thinking (TTCT).

The TTCT is a composed verbal and figural test. The verbal test consists of five activities (written or oral responses) and the figural test of three activities (drawn responses). The strength of this test lies in the ability to find creative strengths that are hidden (for instance due to behavioral problems). Because of the open-end items respondents are also able to express their interest, fears, hoped knowledge about diverse topics and emotional states (Torrance. 1966, 1974). Torrance originally planned to use the test as a basis for an individualized instruction for different students based on the test scores (Torrance. 1966, 1974). The test may yield a composite score: the Creativity Index (CI), but Torrance discouraged interpretation of scores as a static measure of a persons ability. Instead he argued for using the profile strengths as a means to understand and nurture a persons creativity level (Hebert et al. 2002; Torrance. 1966, 1974, 1979).

Creativity Personality Scale

One of the most widely used and respected of these four measures is Gough's Creative Personality Scale (CPS) (Gough. 1979). The CPS includes 30-items developed systematically from the 300-item Adjective Check List (Gough. 1979). Respondents are asked to select from adjectives that best describe them. Eighteen of the 30 adjectives describe characteristics most consistent with creative personalities, where the other twelve adjectives are features of less creative individuals. CPS has increasingly identified a consistent number of factors associated with individual creativity including aesthetic sensitivity, attraction to complexity, broad interests, intuition, aesthetic sensitivity, and toleration of ambiguity (Martindale. 1989). Overall CPS survey items have been validated and are consistent with the key features associated with creativity identified above. Despite the efforts of a number of researchers, reliable measures as predictors of creativity in a variety of contexts, including organizational environments, have yet to be conclusively developed (Zhou & Shalley. 2003). In an effort to further explore the concept of creative personalities, Oldham & Cummings (1996) used the CPS instrument to explore the moderated and direct effects of creative personality on creative outcomes. It was hypothesized in the study that factors such as supervision and personality factors associated with creativity could interact, leading to increased levels of creative outputs. The study found that supportive supervisory behaviors in combination with creative

personality traits led to more creative outcomes. Zhou and Oldham (2001) also used the CPS and found that individuals with more creative personalities had more creative outcomes. What favors the CPS in comparison with the other test is the easy workability of the test. Compared to the Theory of Torrance this test speaks less to the imagination of the respondent, what could undermine or overestimate the measured level of creativity.

Big Five Personality

The Five-Factor Model of personality, also known as the Big Five Model, is a thorough and well-researched model with a long history of development. The model was validated primarily by organizational psychologists (Wiggins & Trapnell. 1997). The Big Five model situates personality traits hierarchically with an emphasis on conscientiousness, openness to experience, extraversion, neuroticism and agreeableness. The Big Five model is intended to provide an elaboration of core personality traits. According to Costa and McCrae (1995) the factors most associated with creativity are conscientiousness and openness to experience. This perspective was confirmed by Feist's (1998) meta-analysis of studies focusing on artists and scientists, who were found to be less conscientious and more open to experience than were those in less creative occupations. Although Feist's study supports two elements of the Five-Factor Model in association with creativity, there was no claim made that individuals in other professions were less creative or that the same factors would be related to their creativity. The relationship among creativity, openness to experience, and divergent thinking was supported in several other studies as well (Carson et al. 2003; Peterson & Carson. 2000). In an effort to expand understanding regarding the relationship between conscientiousness and openness to experience, George and Zhou (2001) explored creativity with employees. The results of this study indicated that higher conscientiousness was related to lower levels of creativity. And that those individuals with higher levels of openness to experience exhibited characteristics associated with creativity (namely curiosity, flexibility, imaginativeness, openness to change, and unconventional ideas). Employees with lower openness have been found to be more rigid and conventional in other studies as well (Feist. 1998). George and Zhou (2001) have suggested that positive feedback and tasks allowing for a variety of approaches and outcomes may be a creative catalyst for employees with high levels of openness. It was also emphasized that organizations should be aware of situations and environmental factors that may inhibit openness to experience even among those with orientations toward being creative and open. This test is at some point very similar to Gough's CPS (Gough. 1979). Terms from the CPS like for instance unconventional-conventional, interests wide-interest narrow are all terms the Big Five also relies on. The Big Five

and the CPS both have a similar design of the test where the respondent has to link his own characteristics by terms and sentences. This layout speaks again less to the imagination of the respondent, compared to the TTCT, where the respondent actually needs to be creative during the test. As a result the outcomes of this test could undermine or overestimate the measured level of creativity.

Self-Perception Theory

The impact of workers' self-perception regarding their individual creativity on their work related outcomes is becoming an emerging area of study. Farmer, Tierney, and Kung-McIntyre (2003) explored the concept of creative role identity, meaning whether individuals view themselves as creative. Their research was held among doctors, engineers, pharmacists, research scientists, and software developers. The results found that creative role identity was predicted by three factors: creative expectations from coworkers, self views of creative behavior and exposure to U.S. culture. Creativity was highest when employees with a high creative role identity worked for organizations perceived to value creativity. Another emerging area of research focuses on the concept of creative self-efficacy. The employees' beliefs that they can be creative in their work roles. Tierney and Farmer (2002) found creative self-efficacy to be associated with job complexity, job self-efficacy, job tenure and supervisor behavior. Creative self-efficacy was found to also relate to creative performance. Several traits have been suggested to be related to creativity (Feist. 1998). However for the following three personality traits, openness to experience, self-efficacy, and perseverance, there has been theoretical and empirical support found that the trait predicted both creative performance and intrinsic motivation according to literature related to creativity (Barron & Kenny. 1986).

Adaption-Innovation Theory

Recent literature regarding the 'types' of workers is proposed by Kirton (1994) who introduced the Adaption-Innovation Theory. This theory distinguishes a bipolar continuum of cognitive styles with Adaptors and Innovators being located at the ends. According to this perspective, individuals with an adaptive cognitive style (Adaptors) tend to operate within given paradigms and procedures without questioning their validity. Those with an innovative style (Innovators) tend to be willing to take the risk of violating the agreed-upon way of doing things to develop problem solutions that are qualitatively different from previous ones (Oldham & Cumming. 2003). In addition to differing in the extent to which they propose creative and frame-breaking ideas (e.g. Keller. 1986; Lowe &

Taylor. 1986; Tierney, Farmer & Graen. 1999) Adaptors and Innovators also differ in the extent to which they derive excitement and enjoyment from extrinsic rewards (Amabile, Hill, Hennessey & Tighe. 1994).

KAI

The test that is part of the Adaption-Innovation Theory is called KAI (Kirton Adaption-Innovation Inventory). This is a 32-item pencil and paper test on which the respondent indicates the degree of ease or difficulty in which they could maintain specified styles of adaptive and innovative behavior. Responses on a 5-point scale can be computed into a composite score. Scores range theoretically from the most adaptive at 32 to the most innovative at 160. While adaption-innovation is conceptualized as a continuous variable, for respondents who score below or at and above the midpoint of the theoretical range of 96 are called Adaptors and Innovators.

Characterizing the types

Both Innovators and Adaptors can be equally creative, the only difference exists in how they express their creativity (Ee, Seng & Kwang. 2007). Adaptors operate within a framework of systems and are associated with sufficiency of originality, efficiency and rule-group conformity. Whereas Innovators break away from the existing framework of systems and are associated with high interest levels in terms of originality of ideas, less concern for efficiency and rule group conformity. Adaptors prefer to create change by improving on the existing structure and favor staying in groups (Kirton. 1994). In addition they maintain cohesion by following the accepted ways and prefer to solve problems in a disciplined, methodical and predictable manner. On the other hand Innovators often come up with many new and practical ideas and are risk-oriented (Kirton. 1994). Adaptors value being recognized for their efforts and achievements, while Innovators describe themselves as depending less on extrinsic reinforcements such as rewards and recognition (Amabile et al. 1994). In addition employees with an innovative style tend to value complex, challenging activities that stretch their abilities and allow them to gain new experiences, whereas those with an adaptive style prefer work that is relatively routine and straightforward (Amabile et al. 1994; Kirton. 1994).

Summarizing:

	Type	
Characteristics	Adaptor	Innovator
Operating	with given paradigms without questioning their validity	willing to take a risk to develop problem solutions that are qualitatively different from the previous ones
Value	being recognized for efforts and achievements high	being recognized for efforts and achievements low
Preferable kind of work	routine and straightforward	complex, challenging activities that stretch abilities and allow them to gain new experiences
Primarily driven by	work instrumental to obtaining rewards (external motivation)	challenge and stimulation of the work itself (intrinsic motivation)
Extrinsic rewards on creativity	positive in simple, routine job condition/negative on complex job condition	weak/negligible effects on both job conditions.

Source: Baer, Oldham & Cummings. 2003.

6. WHAT ARE THE EFFECTS OF INCENTIVES ON THE 'TYPES' OF WORKERS?

Incentives

In the chapter concerning the motivation of the individual worker, intrinsic motivation emerges to be partly responsible for the workers' motivation and thereby the workers' activity level. Several scholars have argued that high intrinsic motivation is a necessary ingredient for creative achievement (Amabile. 1996; Shalley & Oldham, 1997). To support this a number of studies have shown that intrinsically motivated individuals are most likely to exhibit high levels of creativity (Amabile, 1996). Managers regarding the stimulation of creativity should consider implementing practices and procedures designed to enhance the workers' intrinsic motivation levels (Baer, Oldham & Cummings. 2003). Managers could provide workers with more opportunities to obtain intrinsic rewards, for instance by assigning them to jobs that are challenging and stimulating in nature (Hackman & Oldham. 1980; Oldham & Cummings. 1996). Next to improving the intrinsic motivation of the worker the manager can use extrinsic rewards to incentivize their workers. The mostly used extrinsic reward is money (or other kinds of financial rewards). Other extrinsic incentives that concern factors of the work environment could also influence the creativity level of the individual worker. Recent studies have found that the perceptions of work environment do influence creative performance (Amabile, Conti, Coon, Lazenby, & Herron. 1996; Oldham & Cummings. 1996). For instance characteristics that have been shown to enhance workers creativity levels include autonomy on the job, viewing the work as important, challenging, and urgent, and receiving encouragement from supervisors. For all incentives the different effects for the two types (Adaptor/Innovator) determined in the previous chapter are hypothesized.

Intrinsic motivation

Many scholars argue that individuals are likely to be most creative when they experience a high level of intrinsic motivation (Amabile. 1996; Oldham & Cummings. 1996; Shalley & Oldham. 1997). Under such conditions individuals tend to be curious, cognitively flexible, willing to take risks and persistent in the face of barriers (Deci & Ryan. 1985; Utman. 1997; Zhou. 2003). Those are characteristics that should facilitate the development of new and potentially useful ideas. Moreover intrinsically motivated individuals tend to experience positive mood states, such as excitement and enthusiasm (Amabile, Goldfarb & Brackfield. 1990) which enables them to make more connections and to integrate a variety of available resources again contributing to a higher level of creativity (Isen. 1999; Baera, Oldhama & Cumming. 2003).

Adaptor versus Innovator

	Intrinsic motivation	
	Adaptor	Innovator
Basic level	0	+

For the Adaptor type the work is instrumental to obtaining rewards, therefore the Adaptors basic intrinsic motivation level is expected to be negligible. For the Innovator type the challenge and stimulation of the work itself is the primary source for working. Meaning that for Innovators basic intrinsic motivation level is expected to be high. This difference between these starting points is important for understanding how the intrinsic level of both types can be stimulated by different incentives.

Extrinsic rewards

Although the literature suggests that providing employees with intrinsic rewards has the potential to enhance creative performance, many managers continue to emphasize the use of extrinsic rewards, like monetary rewards and recognition for instance, in an effort to stimulate their workers creativity level (Fairbank & Williams. 2001; Frese, Teng and Wijnen. 1999; Van Dijk & Van den Ende. 2002). Unfortunately there is little agreement among scholars concerning the direction of the effects of monetary rewards on creativity (Amabile. 1996). Deci (1999) argued that such rewards reduces intrinsic motivation and presented in 1999 a meta-analysis concluding that expected tangible rewards decreases intrinsic motivation (Deci, Koestner & Ryan. 1999). A paper of the same year by Eisenberger and Cameron (1999) found contrary results. Here was found that offering extrinsic rewards for creativity will enhance the individuals' creative performance (Eisenberger. 1992). They reported that granting rewards for exceeding the past performance of others increases the workers intrinsic motivation. Where the authors did agree upon was the fact that both intrinsic and extrinsic motivation are influenced by many factors where elements such as reward, appreciation, job security, promotion and interesting work are the most important (Wiley. 1997).

Financial rewards

Summarizing the literature results in two camps on the influence of financial rewards on creativity:

1. Financial rewards are interpreted as controlling, which undermines the intrinsic motivation of the workers, which causes creative performance to decrease. This process is also called the Crowding out effect.
2. Financial rewards are of informational value, which can be seen as performance feedback to the worker to stimulate the goal-directed behavior by increasing the intrinsic motivation and therefore stimulating the creative performance. This process is also called the Crowding in effect.

There also exists empirical research that provides support for both positions. Still other studies demonstrate that extrinsic rewards have weak or negligible effects on individuals' creativity (Hennessey. 1989; Joussemet & Koestner. 1999).

Hypothesis 1: The Adaptor values financial rewards more than the Innovator.

	Intrinsic motivation		Effect on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Financial reward	+	0	+	0

Individuals with an innovative style tend to value extrinsic rewards less than those with an adaptive style (Amabile et al. 1994). Previous research has demonstrated that when individuals experience extremely high levels of intrinsic motivation, like the Innovator type does, they are basically immune to the detrimental effects of extrinsic rewards (Arnold. 1976; Hennessey, Amabile & Martinage. 1989; Hennessey & Zbikowski. 1993). In such circumstances individuals are in a state of cognitive stability and have little need to cognitively reevaluate their jobs when offered financial rewards (Baer, Oldham & Cummings 2003). Thus extrinsic rewards are expected to have weak or negligible effects on the creativity of employees in the innovative style and positive effects on the creativity of workers in the adaptive style. Also extrinsic rewards are expected to have positive effects on the intrinsic level of the Adaptor type. The Adaptor is accompanied with a low intrinsic motivation for the work, incentivizing with financial rewards increases their level of intrinsic motivation and creativity.

Recognition

Performance appraisal, or the evaluation of employees' job-relevant behavior, and feedback are a part of the recognition an individual worker experiences on the work that has been done. Although evaluation is usually seen as an indispensable tool for effective Personnel management (Cascio & Aguinis, 2011) evaluation and feedback also have the potential of undermining, rather than enhancing the workers' performance. This issue has been studied particularly extensively in the context of creative performance (Amabile, 1979; Eisenberger & Rhoades, 2001; Shalley & Perry-Smith, 2001; Zhou, 1998). Carson and Carson (1993) showed that individuals who were given informational feedback about their creativity on the first trial of a task exhibited higher creativity on subsequent trials than individuals who were given no feedback. Harackiewicz (1979) demonstrated that individuals who were given positive informational feedback about their task performance (for instance: "you performed better on these puzzles than the average participant") exhibited higher levels of intrinsic motivation than individuals who were given no feedback. Other empirical research on this topic has been done by McLoyd (1979) who demonstrated that extrinsic rewards (such as a "Good Reader Award") increased children's intrinsic motivation to perform an uninteresting activity. Finally Loveland and Olley (1979) showed that a "Good Player Award" significantly boosted intrinsic motivation among participants who initially showed little interest in performing an activity.

Hypothesis 2: The Adaptor values recognition more than the Innovator.

Recognition	Intrinsic motivation		Effect on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Low	-	0	-	0
High	+	0	+	0

Adaptors and Innovators value the extrinsic reward recognition differently. For Adaptors recognition is valued high. For Innovators recognition is valued low or negligible. Thus according to the same theory discussed regarding the effects of financial rewards, recognition is expected to have weak or negligible effects on the creativity of employees in the innovative style and positive effects on the creativity of workers in the adaptive style.

Supervision

Studies have shown that open interactions with supervisors, encouragement and support enhances creativity and innovation (Kimberly. 1981). Supervision that is supportive of workers is expected to enhance creative achievement, while supervision that is controlling or limiting is expected to diminish the creative performance of the worker (Deci et al. 1989; Deci & Ryan. 1985, 1987). When supervisors are supportive, they show concern for the workers' feelings and needs, encourage them to voice their own concerns, provide positive, informational feedback, and facilitate the workers' skill development (Deci & Ryan. 1987). These actions on the part of the supervisor are expected to promote the workers' feelings of self-determination and personal initiative at work. This boosts the levels of interest in work activities and enhances the creative achievement of the worker. In contrast when supervisors are controlling, they closely monitor the workers' behavior, make decisions without the workers involvement, provide feedback in a controlling manner and generally pressure workers to think, feel or behave in certain ways (Deci et al. 1989). Supervision that is experienced as controlling undermines intrinsic motivation and shifts a worker's focus of attention away from work activities and toward external concerns (Deci et al. 1989; Deci & Ryan. 1987). This reduction in intrinsic motivation is then expected to lower creative performance.

A few studies provide some support for the proposed effects of supportive behavior on intrinsic motivation (Deci, Schwarz, Sheinman, & Ryan. 1981; Ryan & Grolnick, 1986; Zuckerman, Porac, Lathin, Smith, & Deci. 1978). For instance Zuckerman and colleagues (1978) found that when individuals were given choices about which tasks to complete and how much time to spend on it, were significantly more intrinsically motivated than individuals who were not offered choices about their work. Other research also supports the proposed association between positive supervision and workers creativity level. Stahl and Koser (1978) demonstrated that the creative output of R&D scientists was significantly related to the extent to which supervisors were empathic and attempted to understand the workers' feelings. Regarding to creative outcomes, a field experiment by Koestner and his associates (1984) examined the effects of "controlling-limits" on the creativity of children's artwork. The experimenter set limits about being neat while painting a picture. Results demonstrated that children in the controlling- limits condition exhibited significantly lower levels of creativity than children in a no-limits condition. Finally, Stahl and Koser (1978) showed negative relations between workers reports of supervisory control and objective indicators of creative output.

Adaptor versus Innovator

Supervision	Intrinsic motivation		Effect on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Supportive/positive	+	0	+	0
Discouraged/negative/none	-	0	-	0

Also for the supervision incentive the valuation of recognition seems to be influential for the effect. Expected would be that for Adaptors supportive supervision could be interpreted as a way of receiving recognition for their work. Or at least the incentive that their work is being monitored. Negative or no feedback or evaluation could therefor work in a negative way. As the Innovator defines himself as less dependable on extrinsic rewards ad recognition, the effects of the supportive or discouraging environment would be low or negligible. Therefor the effect of supervision is expected to have weak or negligible effects on the creativity of employees in the innovative style and positive or negative effects on the creativity levels of workers in the adaptive style depending on the supportive or discouraging element of the supervision.

Job complexity

The complexity of jobs has long been considered an important aspect of the workers' intrinsic motivation and creativity (Amabile. 1996; Boomer & Jalajas. 2002; Hackman & Oldham. 1980). Namely complex jobs, which are defined by high levels of autonomy, skill variety, identity, significance, and feedback, are expected to encourage higher levels of intrinsic motivation and creativity than jobs that are relatively simple and routine in nature. When jobs are complex, individuals are likely to be excited and enthusiastic about their work activities and interested in performing them for the sake of the activities themselves (Oldham & Cummings. 1996). Empirical studies provide some support for these arguments. For example, a meta-analysis of the job design literature concludes that employees working on complex jobs are more satisfied and internally motivated than employees working on jobs that are relatively simple (Fried & Ferris, 1987). Also Hatcher, Ross & Collins (1989) demonstrated that a job complexity measure significantly and positively works as an indicator of creativity. Which creates a possible link between job complexity and creativity.

When extrinsic rewards involve in this process, they can result in positive effects on creativity at certain levels of job complexity and negative effects at others. According to Cognitive Evaluation Theory (Deci & Ryan, 1985) offering extrinsic rewards to individuals who work on complex jobs that have a high intrinsic motivation should have negative effects on their intrinsic motivation and creativity. In this circumstance individuals are likely to perceive their behavior as being motivated by the extrinsic reward rather than by the work itself. As a consequence the worker will begin to view their job as a means to an extrinsic end. Rather than appreciating its work because of challenging, stimulating qualities. At this moment the worker experiences the job as less enjoyable and involving and creative thinking becomes harder. Using extrinsic rewards to workers on complex jobs should cause an undermining of their intrinsic motivation and creativity (Calder & Staw, 1975; Daniel & Esser, 1980; Deci, Koestner & Ryan, 1999). By contrast, offering extrinsic rewards to workers on simple, routine jobs should boost their creative performance. The activities required by such jobs provides workers with little opportunity to exercise personal control at work (Hackman & Oldham, 1980). Many individuals in these simple job conditions are likely to seek out alternative ways to exert personal control (Lawler, 2000). Extrinsic reward systems might provide such an opportunity by giving employees a chance to control the extrinsic rewards they receive for producing creative work (Eisenberger & Rhoades, 2001). Individuals' feelings of personal control may be enhanced this way, thereby boosting levels of intrinsic motivation and creativity. In addition other aspects of the workers' jobs will also become more attractive. For example, simple jobs are generally not perceived by employees as important and provide individuals with few opportunities to obtain feedback about their effectiveness (Hackman & Oldham, 1980). It may be that the presence of extrinsic rewards in simple job conditions will suggest to workers that their work is of value to the organization while providing information about their performance at work. Here the informational value of extrinsic rewards dominates the effect of the incentive. According to the Feedback Intervention Theory (Kluger & De Nisi, 1996) this information should be highly beneficial to workers occupying such jobs. A few earlier studies focusing on intrinsic motivation provide indirect support for these arguments (Deci, 1971; Eisenstein, 1985). Deci (1971) showed that offering individuals monetary rewards for completing a challenging puzzle-solving task decreased their intrinsic motivation relative to individuals who received no rewards for completing the task. Calder and Staw (1975) conducted an experiment in which they manipulated task interest as well as whether or not participants received financial rewards for working on the task. Results showed that financial rewards decreased satisfaction for participants working on the interesting task and increased satisfaction for individuals working on the dull task.

Hypothesis 3: The Adaptor prefers simple jobs, the Innovator complex jobs.

Job complexity	Intrinsic motivation		Effect of extrinsic reward on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Simple job	+	-	+	0
Complex job	-	+	-	0

Workers with an adaptive style prefer simple jobs (Amabile et al. 1994; Kirton. 1994). As a consequence Adaptors tend to derive less enjoyment and intrinsic motivation from complex activities (Amabile et al. 1994; Kirton. 1994) because of their preference for simple jobs. When Adaptors occupy complex jobs, their intrinsic motivation level is low and not able to immunize them against the effects of the extrinsic incentives. In contrast, when Innovators are placed in simple, routine jobs, they should be less likely to take advantage of opportunities to exert greater control at work by engaging the external reward because they are primarily driven by the work itself. Extrinsic rewards are expected to have generally weak or negligible effects on the creativity of workers in the innovative style. For the adaptive type, using extrinsic rewards with the simple job condition will lead to a higher intrinsic motivation and therefor a higher creativity level. When the Adaptor is placed in the complex job condition, the intrinsic motivation is lowered because he prefers a simple job. The effect on his creativity level is therefor also lowered.

Job autonomy

Job autonomy refers to the workers' self-rule and independence in conducting their tasks in terms of process, decision making and time management (Hackman & Oldham. 1976, 1980). Task-related job autonomy would be critical for the innovation process and activities (Hackman & Oldham. 1975; Wang & Cheng. 2010; Song et al. 2012). Job autonomy is also connected to freedom on the job. According to DiPietro (2003) "a work environment which embraces freedom is needed for innovation to sprout and to flourish" (DiPietro. 2003). According to the Social Exchange Theory (Bateman & Organ. 1983) task-related job autonomy provides work-related emotional (Wenjing, Wei & Shuliang. 2013). Research has indicated that scientists' creativity was higher when they had freedom at work (Andrews & Farris. 1967), and a positive, significant relationship has been found between autonomy and the number of new ideas employees submitted to a suggested program (Hatcher, Ross & Collins. 1989).

Adaptor versus Innovator

	Intrinsic motivation		Effect on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Job autonomy				
Low	+	-	+	-
High	-	+	-	+

Job autonomy is according to many scholars a part of job complexity (Amabile. 1996; Boomer & Jalajas. 2002; Hackman & Oldham. 1980). Adaptors value simple jobs, with a low level of job autonomy. In contrast Innovators value complex jobs, with a high level of job autonomy. Job autonomy is also connected to the incentive supervision. When job autonomy is high, the level of supervisions is low, resulting in a preferred condition for the Innovator type. This also works vice versa: when job autonomy is low, the level of supervision is high, which is preferred by the Adaptor type.

Challenging work

Andrews and Farris (1972) found that time pressure for important, urgent projects increased the perception of work as challenging and also enhanced creativity. This observation suggests that when workers are challenged by their jobs they will be more likely to break cognitive mind-sets. This will stimulate the workers to come up with new and more creative responses. Furthermore Amabile and Gryskiewicz (1987) found a significant relationship between R&D professionals' self-reports of creativity and their jobs being challenging. Important was the providing of freedom of how the work should be performed. Therefore a work environment that required creativity is expected to be structured to provide a context that facilitates creative behavior. Resulting in a work environment, which is complemented by the complexity of work and high demands.

Hypotheses 4: The Adaptor prefers routine work, the Innovator new challenges.

	Intrinsic motivation		Effect on creativity level	
	Adaptor	Innovator	Adaptor	Innovator
Activities				
Routine	+	-	+	-
New challenges	-	+	-	+

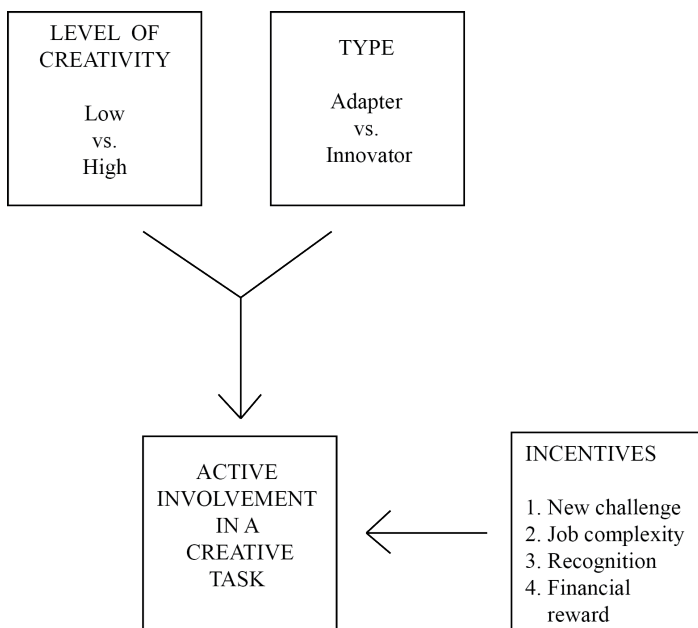
Concerning this incentive it is interesting to find a link in previous research between the level of creativity and challenging work. It also makes it hard to distinguish the effect of this incentive for the two 'types' because of this. The distinction that is made clear in the Adaption-Innovation Theory is that Adaptors prefer work that is routine and predictable. As a consequence Adaptors tend to derive less enjoyment and intrinsic motivation from challenging activities (Amabile et al. 1994; Kirton. 1994). Workers with an innovative style prefer challenging activities that stretch abilities and allow them to gain new experiences (Amabile et al. 1994; Kirton. 1994). This also correlates with the observation that if employees are challenged by their jobs they will be more likely to break cognitive mind-sets. Which is a characteristic of the work style of Innovators.

7. EMPIRICAL RESEARCH: CAN THE USE OF INCENTIVES BE SPECIFIED ON THE ‘TYPES’ OF WORKERS?

The ‘right’ types and the ‘right’ environment

Long ago Schumpeter (1950) recognized the importance for innovation of the entrepreneur or the entrepreneurial spirit. The ‘right’ types of people should embody this entrepreneurial spirit. From his point of view innovation and introducing new technology involved changes in existing practices. This takes a certain type of individual, willing to undertake innovation. This research will extend in Schumpeters’ theory, by dividing people in certain types. A division is made between first; the ‘style’ of creativity and second; the ‘level’ of creativity. The first division is based on the Adaption-Innovation Theory, where Kirton divides workers in Adaptors and Innovators (1994). The second division is determined by Goughs CPS: the Creative Personality Scale (Gough. 1979). The theory of Schumpeter combines the characteristics of the individual with the environment. The environment in his theory is represented by everything outside human beings. “For economic creativity to flourish, the environment must be at least suitable, if not favorable for creativity. This means that it must provide an incentive, or at least not a penalty, for creativity” (Schumpeter. 1950). The environment in this research exists of four incentives and a creativity measurement, determined by the active involvement experienced during a creative task. In the research the incentives will be used to investigate if and what kind of effects they have on workers and if these effects are different for the ‘types’ of workers.

Research question: Can the use of incentives be specified on the ‘types’ of workers?



Design of the survey

1. Type

The 'type' of the respondent, Adaptor or Innovator, is determined by a small version of the KAI. Scores from 0-4 result in the Adaptor type, scores from 5-9 result in the Innovator type. The small and the whole versions of the KAI questionnaire can be found in the Appendix 1.0 and Appendix 1.1.

2. Level of creativity

Determining the status quo level of creativity from the respondent based on character traits. This is determined by the CPS Creative Personality Scale. The respondent is exposed to 30 character traits of which 18 are connected to a high level of creativity and 13 of them with a low level of creativity. From this selection the Creativity Index can be established which indicates the level of creativity from the respondent. Scores from -12-4 result in a Low level of creativity, scores from 5-18 result in a High level of creativity. The CPS questionnaire can be found in the Appendix 1.2.

3. Incentives

The following effects of four incentives are tested on the respondents:

- New challenges
- Job complexity
- Recognition (for the work that has been done)
- Financial rewards

4. Control

The last part of the survey includes a control test, asking each respondent for their age, gender, level of highest education (mbo, hbo wo), type of work and years of working experience.

Method: Vignette Technique

A vignette is a short description of a hypothetical situation asked to indicate the individual behavior as if they were in the described situation. Each vignette consists of a composition of randomly selected values for each of the vignette dimensions. The vignette dimensions are the factors that define the situation and represent those variables whose impact on behavior is being studied. The systematic variation of the values in the different dimensions estimate the effects of changes in combinations of variables as well as changes in individual variables. Each vignette describes the

introduction of a new incentive. All vignettes have identical textual descriptions and ask the respondent to indicate their active involvement in the same creative task from a scale from 0 till 7. Where 0 matches not being involved at all and 7 matches a total involvement in the task. The vignettes only differ in terms of the realized factor levels in each of the different vignette dimensions (Neckermann & Frey. 2008).

In this study the following vignette, factors and factor levels are used:

Vignette:

Please imagine the following:

For the company you work for a team building day will be organized. You are in a meeting with your boss and he just invited you to join the committee to organize this day.

Factor	Level
1.New challenge	1. Your tasks on the committee would be similar to your work on a daily basis. 2. Your tasks on the committee would be new to you and different from your work on a daily basis
2. Job complexity:	1. The work would namely include simple tasks like making phone calls and sending emails 2. The work would namely include complex tasks concerning the overall concept of the day and managing the whole team.
3. Recognition:	1. committee stays anonymous 2. the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year.
4.Financial rewards:	1. none 2. normal hour wage

In each of the vignettes the respondent is asked to indicate:

1. if they would join the committee (yes/no).
2. How actively involved they would be in this creative task (scale 1-7).

All the different vignettes used in the test can be found in the Appendix 2.0

Research group

The 16 vignettes are combined into four surveys that were randomly distributed online at the period of 12.08.2013-25.08.2013. The composition of the four surveys can be found in the Appendix 3.0. The respondents were invited to participate in the survey by an email notification. From the 68 invitations that were send a total of 61 people responded, resulting in a response rate of 0.90.

The research group had the following characteristics:

Characteristics			
Respondents	Total	n	61
Gender	Female	n	25
		% (valid)	41 (49)
	Male	n	26
		% (valid)	43 (51)
Age	in years	mean	37
		median (range)	29 (25 - 56)
Education level	0=mbo 1=hbo 2=wo	mean	1.45
		median	2
Working experience	in years	mean	13
		median	5
Type	Adaptor	n	44
		% (valid)	72 (73)
	Innovator	n	16
		% (valid)	26 (27)
Creativity level	Low	n	30
		% (valid)	49 (52)
	High	n	28
		% (valid)	46 (48)

Characteristics			
Adaptor	Low creativity level	n	19
		%	46
	High creativity level	n	22
		%	54
Innovator	Low creativity level	n	6
		%	38
	High creativity level	n	10
		%	63

Before the results of this sample are explored for further research, some of the group characteristics must be taken into account:

- Important in this research group is an average age of 37 years old compared to the median of the group that lies at 29 years. This difference can be declared by the fact that this group is roughly divided into two groups based on age. One group where the age has a range between 21-31 years old and the other group with a range of 57-60 years. Where the frequency of the first group is the biggest.
- The education level of the group has a mean of 1.45 and a median of 2. Here for we can conclude that this sample is a high educated sample.
- Looking at the ‘type’ characteristic noted must be that the Adaptor type is far more represented in the sample than the Innovator type, with almost a 75-25 distribution (n=44-16). Important to keep in mind with this characteristic is how the types have been determined. The scoring range of the types varied between 0 and 9. From the test results emerged that the Adaptor group was a group of people scoring on a range between 0 and 4. The Innovator group was a more conservative group based on a 5 till 7 range. This mean the strongest outcomes of the test should be found within the Adaptor group.
- Looking at the group of Low and High-leveled creative people an almost 50-50 distribution can be found (n=30-28). Here the scoring range of a lot of the respondents’ outcomes lie close to the median score. From the Low-leveled Creative people 9 out of 29 respondents enhanced the highest possible outcome of the Low-leveled score and from the High-leveled creative people 11 out of 30 respondent were given the lowest possible outcome of the High-leveled score. For

analyzing the results the fact that the groups lie very close to each other can mean that the results should be interpreted as weaker.

- Also interesting to find is that the Adaptor group has an almost 50-50 (n=19-22) division Low-High-leveled creativity respondents. The Innovator group has slightly skewed sample 62-38 with more high than Low-leveled respondents (n=10-6), but is less reliable due to the small sample. This finding does show that Kirton's Index does define a certain type or style of creativity and not a level of creativity.

Analyzing the data

The data is analyzed using the statistical program SPSS. Using the Mixed Effects Model for an analysis of the data. This model has been chosen to adjust for correlated data due to the different vignettes that have been used. The different vignettes can be seen as repeated measures of a subject, where the Model needs to take into account for. The Mixed Effects Model takes as well the Random as the Fixed Effects into the analysis. The random effect here is associated with the sample procedure also called the subject effect. The fixed effect here is the primary interest concerning the effect of the incentives, types and level of creativity on the level of respondents' activity. Outcomes of the test from SPSS can be found in Appendix 4.0-4.2.

Test results

- Main results for the whole sample (Appendix 4.0)

From the main model concerning the whole sample, only for the incentive financial rewards a 90% significant result can be found. The estimate for financial rewards coefficient has a value of 0.631. This means financial rewards will stimulate the active involvement in the creative task.

- Results for the 'types': Adaptor versus Innovator (Appendix 4.1)

As a first measure it is interesting to see if the active involvement in general is different between the two 'types'. To see if a relation can be found between the type and active involvement in general, which could relate to the intrinsic motivation of the two types. Here the same mean of active involvement can be found with a value of 5. Only important difference is the lower quartile of the Innovator which lies till the value of 3 instead of the 4 of the Adaptor. This could be due to one of the Innovators who answered 0 to all the vignettes. Combined with the small sample of the Innovator types this could influence the result. The expectations were a higher mean of intrinsic

motivation for the Innovator, because according to AI theory the Innovator is more primarily driven than the Adaptor.

For determining the main effect the sample is divided into the two 'types'. Now a 95% significant result can be found for the Adaptor group for the effect of the financial reward. The estimate of the financial reward coefficient has a value of 0.828. Concluding in a higher effect of the financial reward in the Adaptor group. The Adaptor group is more accessible by the use of financial rewards than the Innovator group. This result is expected from Kirton's Theory that evolves from the idea that Adaptors are driven by external rewards regarding to Hypothesis 1: The Adaptor values financial rewards more than the Innovator. To investigate if the differences between the groups are statistically significant the model has been extended with Interaction effects. Int1-Int4 are the interaction effect of the 'types' with the four different incentives. From this test none of the interaction parameters are significant. Therefore concluded can be that there is a sign of difference between the types on the effect of the financial reward incentive, but this difference is not statistically significant.

Hypothesis 1: The Adaptor values financial rewards more than the Innovator.

Hypothesis 2: The Adaptor values recognition more than the Innovator.

Hypothesis 3: The Adaptor prefers simple jobs, the Innovator complex jobs.

Hypotheses 4: The Adaptor prefers routine work, the Innovator new challenges.

Reviewing the results there are no statistically significant results to support Hypotheses 1-4.

- Results for the 'levels': Low versus High creativity level (Appendix 4.2)

Also in this sample as a first measure it is interesting to see if the active involvement in general is different between the two levels of creativity. Here the same mean of active involvement can be found with a value of 5. The lower quartile range of the Low-leveled part of the sample lies till the value of 3 instead of the 4 of the High-level group. This is interesting to find because the Innovator group which had the same characteristics had a relatively higher level of creativity than the Adaptor group. Expected should be that this kind of deviation has been found in the High-leveled group. This strengthens the uncertainty the Innovator groups entails due to the small sample.

For determining the main effect the sample is divided into the two creativity levels (High/Low). Now a 95% significant result can be found for the High-level group for the effect of financial rewards. The estimate of the financial reward coefficient has a value of 1.052. The High-level group is more accessible by the use of financial rewards than the Low-level group. Another 95% significant result can be found for the High-level group for the job complexity incentive. The estimate of the job complexity coefficient has a value of 0.813. Concluded can be that when the job is complex the High-level group will be more actively involved in the creative task than the Low-level group. This result is expected because of the positive link between creativity and complex jobs.

To investigate if the differences between the creativity levels are statistically significant the model has been extended with Interaction effects. Int5-Int8 are the interaction effect of the creativity levels with the four different incentives. From this test none of the interaction parameters are significant. Therefore concluded can be that there is a sign of differences between the creativity levels on the incentives job complexity and financial reward, but these differences are not statistically significant.

8. CONCLUSION

This Bachelor Thesis examines the relationship between creativity and Economics. Our knowledge-based economy thrives on the notion of creativity, as the starting point of innovation. Causing managers and scholars to seek for the ingredients that foster creativity. Most important asset for creativity is the individual worker, who is the source of an idea. Motivating the individual therefor becomes important for enabling creativity to flourish. From the economic approach this will be based for a large extend on the stimulation of workers by the use of financial rewards. Even though the influences of intrinsic motivation on the workers' creativity level have been proven by numerous of empirical research. The Self-Determination Theory helps to explain what kind of determinants are important for fostering intrinsic motivation. Within SDT the driving forces for intrinsically motivated behavior are assumed to be three basic psychological needs; competence, autonomy and relatedness. To stimulate the creativity level of the worker more effectively the 'type' of worker can be determined. Kirton's Adaptor-Innovator theory offers a distinction in 'type' of worker who reacts different on the use of incentives. Therefor managers can specify the use of incentives on the 'type' of worker. Also the individual level of creativity is from relevance specifying for the use of incentives on the worker. Other theories such as the Self-Perception Theory and the concept of creative self-efficacy are becoming more important in stimulating creativity. The SPT regards the creative role identity and how individual creativity relates to work outcomes. The concept of creative self-efficacy is responding on this theory by defining the employees' beliefs that they can be creative in their work roles.

Most important finding in the empirical part of the Bachelor Thesis can be found in the sign of the different effect that financial rewards have on the active involvement of the different 'types' and 'levels' of the workers in the creative task. For the Adaptor and High-level creativity group the study has given a positive sign for stimulating the active involvement by financial rewards. Next to financial rewards, the use of the incentive job complexity results in a sign of different effects in the division based on creativity levels. This could be the starting point of empirical proof considering the positive link between high creativity and job complexity. Although the empirical part of this Bachelor Thesis shows weak results on the use of incentives specified on the different groups based on 'types' and 'levels' of the workers, this should be interpreted as an incentive for further research. Namely at the part of the intrinsic motivation there is still much undiscovered. For instance by adding the SPT and the concept of creative self-efficacy into the statistical framework to expand the

intrinsic part of the model. Those theories could be a right complement for understanding the determinants behind creativity and how creativity can be stimulated and motivated from within the individual worker.

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APPENDIX 1.0

Small KAI Questionnaire, used in this research.

Check the one from each of the following pairs which best describes you.

A1. Thinking characterized by precision, reliability, efficiency, prudence, discipline.

A2. Thinking characterized by lack of discipline. linking of unrelated ideas, unusual thought patterns.

B1. Interested in finding problems to solve

B2. Interested in solving problems

C1. If rules don't fit, bend them a bit

C2. Prefer to work within established rules

D1. Solutions sought by tried and true methods

D2. Use unproven ideas in seeking solutions

E1. Can maintain high accuracy for long periods of work

E2. Work best for short bursts of high intensity

F1. Bending the rules for one person is unfair to the rest

F2. Bending the rules if necessary, makes bureaucracy human

G1. Impractical, unpredictable, change-oriented type

G2. Practical, predictable, take-care-of-business type

H1. Command of specialized knowledge

H2. Command of general knowledge

I1. When involved in a project. I forget that other people are involved and probably should be consulted.

I2. When involved in a project, I am still considerate of others.

Source: M Bobic. Davis E & Cunningham R. 1999. *The Kirton Adaptation-Innovation Inventory. Validity Issues, Practical Questions*. Review of public personnel administration. Spring 1999. pp. 18-31.

APPENDIX 1.1

Whole KAI (Kirton Adaption-Innovation Inventory)

Range scale from 1-5 from very easy to very difficult. The subject is asked to imagine that he or she has been asked to present, consistently and for a longtime, a certain image of himself or herself to others. The subject is then asked to rate the difficulty of presenting such an image for each of the traits or attributes stated in the items. The scale is scored so that Innovators are higher than the mean and Adaptors are lower than the mean. (Keller R.T & Holland W E. 1978)

A person who

1. has original ideas
2. proliferates ideas
3. is stimulating
4. can stand out in disagreement against group
5. prefers colleagues who never 'rock the boat'
6. copes with several new ideas at the same time
7. will always think of something when stuck
8. would sooner create than improve
9. has fresh perspectives on old problems
10. likes the protection of precise instruction
11. prefers changes to occur gradually
12. often risks doing things differently
13. prefers to work on one problem at a time
14. enjoys detailed work
15. is prudent when dealing with authority
16. likes bosses and work patterns which are consistent
17. works without deviation in a prescribed way
18. is consistent
19. is predictable
20. masters all details painstakingly
21. imposes strict order on matters within own control
22. fits readily into 'the system'
23. is thorough
24. is methodical and systematic

25. is a steady plodder
26. holds back ideas until obviously needed
27. needs the stimulation of frequent change
28. Conforms
29. readily agrees with the team at work
30. never seeks to bend or break the rules
31. never acts without proper authority
32. likes to vary set routines at a moment's notice

Source: Keller R.T & Holland W E. 1978. *A Cross-Validation Study of the Kirton Adaption-Innovation Inventory in Three Research and Development Organizations*. Applied Psychological Measurement. Vol. 2, No. 4 Fall 1978 pp. 563-5 70. University of Houston

APPENDIX 1.2

Gough's CPS Creative Personality Scale, measuring the individual level of creativity:

Pick the boxes that describe you:

Capable	Cautious
Clever	Commonplace
Confident	Conservative
Egotistical	Conventional
Humorous	Dissatisfied
Informal	Honest
Individualistic	Interest narrow
Insightful	Mannerly
Intelligent	Sincere
Interests wide	Submissive
Inventive	Suspicious
Original	Phony
Reflective	
Resourceful	
Self-confident	
Sexy	
Snobbish	
Unconventional	

Source: Gough, 1979

APPENDIX 2.0

Vignette technique: 16 different vignettes used in this research.

Please imagine the following:

For the company you work for a team building day will be organized. You are in a meeting with your boss and he just invited you to join the committee to organize this day.

1. Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

2. Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

3. Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

4. Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

5. Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

6. Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Because of budget issues there can't be a financial compensation for the work on the committee.

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

7. *Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Because of budget issues there can't be a financial compensation for the work on the committee.*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

8. *Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Because of budget issues there can't be a financial compensation for the work on the committee.*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

9. *Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Joining the committee comes with a compensation per hour in your hourly wage*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

10. *Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Joining the committee comes with a compensation per hour in your hourly wage*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

11. *Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Joining the committee comes with a compensation per hour in your hourly wage*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

12. *Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that the member of the committee with the best idea for the team building day gets awarded in front of the entire staff as employee of the year. Joining the committee comes with a compensation per hour in your hourly wage*

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

13. *Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that this years committee of the team*

building day will be anonymous because of a new approach handled by the board for the first time this year. Joining the committee comes with a compensation per hour in your hourly wage

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

14. Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Joining the committee comes with a compensation per hour in your hourly wage

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

15. Your overall tasks on the committee would be similar to your work on a daily basis. The work would namely include complex tasks, regarding the overall concept of the day and managing the whole team involved. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Joining the committee comes with a compensation per hour in your hourly wage

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

16. Your overall tasks on the committee would be new for you and different from your work on a daily basis. The work would namely include simple tasks, like making phone calls and sending emails. Your boss mentions that this years committee of the team building day will be anonymous because of a new approach handled by the board for the first time this year. Joining the committee comes with a compensation per hour in your hourly wage

Would you join the committee?

(yes/no)

How actively involved would you be?

(scale 1-7)

APPENDIX 3.0

Overview of the four sets of different vignette questions used for the questionnaires.

SET1

	Q1	Q5	Q16	Q10
New Challenge	1	2	2	1
Job Complexity	1	2	1	2
Recognition	2	1	1	2
Financial Reward	1	1	2	2

SET2

	Q2	Q8	Q9	Q13
New Challenge	1	2	1	2
Job complexity	2	1	1	2
Recognition	2	1	2	1
Financial Reward	1	1	2	2

SET3

	Q4	Q6	Q11	Q15
New Challenge	2	1	2	1
Job complexity	2	1	1	2
Recognition	2	1	2	1
Financial Reward	1	1	2	2

SET4

Incentive	Q3	Q14	Q7	Q12
New Challenge	2	1	1	2
Job Complexity	1	1	2	2
Recognition	2	1	1	2
Financial Reward	1	2	1	2

APPENDIX 4.0

Main effects

Parameter	Coefficient estimate	p-value
Intercept	3.798	0.000
New	-0.088	0.790
Job	0.465	0.153
Rec	0.146	0.659
Fin	0.631**	0.053**
Type	0.136	0.719
Cre	0.125	0.703

*Note: this table represents the results from an OLS regression of X; Actively involved on Y; New challenge, Job complexity, Recognition, Financial reward, Type and Level of creativity with * indicates significance at the 5% level, ** at the 10% level.*

Parameters:

New= New challenge

Job= Job complexity

Rec= Recognition

Fin=Financial reward

Type= Type (Adaptor/Innovator)

Cre= Level of Creativity (Low/High)

APPENDIX 4.1

Main effects, sample split in type: Adaptor versus Innovator

	Parameter	Coefficient estimate	p-value
Adaptor	Intercept	3.814	0.000
	New	-0.063	0.864
	Job	0.298	0.416
	Rec	-0.066	0.857
	Fin	0.828*	0.025*
	Type	0	0
	Cre	0.237	0.519
Innovator	Intercept	4.875	0.000
	New	-0.608	0.470
	Job	0.962	0.178
	Rec	1.058	0.211
	Fin	0.038	0.957
	Type	0	0
	Cre	-0.225	0.757

*Note: this table represents the results from an OLS regression of X; Actively involved on Y; New challenge, Job complexity, Recognition, Financial reward, Type and Level of creativity with * indicates significance at the 5% level, ** at the 10% level divided for the two types; Innovator and Adaptor.*

Parameters:

New= New challenge

Job= Job complexity

Rec= Recognition

Fin=Financial reward

Type= Type (Adaptor/Innovator)

Cre= Level of Creativity (Low/High)

Interaction effects

Parameter	Coefficient estimate	p-value
Intercept	3.876	0.000
New	-0.638	0.865
Job	0.298	0.428
Rec	-0.655	0.862
Fin	0.829*	0.028*
Type	-0.361	0.648
Cre	0.125	0.704
Int1: New x Typ	-0.546	0.525
Int2: Job x Typ	0.664	0.376
Int3: Rec x Typ	1.124	0.191
Int4: Fin x Typ	-0.79	0.292

*Note: this table represents the results from an OLS regression of X; Actively involved on Y; New challenge, Job complexity, Recognition, Financial reward, Type, Level of creativity and Interaction effects 1-4 with * indicates significance at the 5% level, ** at the 10% level.*

Parameters:

New= New challenge

Job= Job complexity

Rec= Recognition

Fin=Financial reward

Type= Type (Adaptor/Innovator)

Cre= Level of Creativity (Low/High)

Int1= New challenge x Type

Int2= Job complexity x Type

Int3= Recognition x Type

Int 4= Financial reward x Type

APPENDIX 4.2

Main effects, sample split in level: High versus Low-level creativity

	Parameter	Coefficient estimate	p-value
Low	Intercept	3.965	0.000
	New	-0.209	0.672
	Job	0.103	0.830
	Rec	0.625	0.208
	Fin	0.175	0.716
	Type	0.063	0.904
	Cre	0	0
High	Intercept	3.773	0.000
	New	0.021	0.963
	Job	0.813*	0.066*
	Rec	-0.279	0.528
	Fin	1.052*	0.018*
	Type	-0.406	0.469
	Cre	0	0

*Note: this table represents the results from an OLS regression of X; Actively involved on Y; New challenge, Job complexity, Recognition, Financial reward, Type and Level of creativity with * indicates significance at the 5% level, ** at the 10% level divided for the two levels of creativity; High and Low.*

Parameters:

New= New challenge

Job= Job complexity

Rec= Recognition

Fin=Financial reward

Type= Type (Adaptor/Innovator)

Cre= Level of Creativity (Low/High)

Interaction effects

Parameter	Coefficient estimate	p-value
Intercept	4.027	0.000
New	-0.211	0.658
Job	0.105	0.821
Rec	0.627	0.189
Fin	0.176	0.704
Type	-0.137	0.717
Cre	-0.304	0.664
Int5: New x Cre	0.190	0.773
Int6: Job x Cre	0.707	0.276
Int7: Rec x Cre	-0.906	0.171
Int8: Fin x Cre	0.875	0.178

*Note: this table represents the results from an OLS regression of X; Actively involved on Y; New challenge, Job complexity, Recognition, Financial reward, Type, Level of creativity and Interaction effects 5-8 with * indicates significance at the 5% level, ** at the 10% level.*

Parameters:

New= New challenge

Job= Job complexity

Rec= Recognition

Fin=Financial reward

Type= Type (Adaptor/Innovator)

Cre= Level of Creativity (Low/High)

Int5= New challenge x Level of Creativity

Int6= Job complexity x Level of Creativity

Int7= Recognition x Level of Creativity

Int8= Financial award x Level of Creativity

