Worker Self-selection in a Changing Work Environment

the profits from the new world of work

Abstract

The new world of work is an upcoming organizational feature. It is a new type of work environment; it allows people to do their work anytime, anyplace and anywhere. This calls for less monitoring and trust within the organization. In this thesis insight is given into the effect of this new world of work on the self-selection of workers. A competitive labor market is presumed, where workers differ in their willingness of being monitored and types are private information. It is showed that there can exist a separating equilibrium in which workers self-select into different firms, and firms employing only trustworthy workers will make strictly positive profits. Profit differences across firms persist because separation requires firms employing trustworthy workers to pay out weakly lower wages. However, this equilibrium can only exist if the share of trustworthy workers is low.

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INTRODUCTION

Since a couple of years several organizations in the Netherlands (e.g. Microsoft and Rabobank) have introduced 'the new world of work' (in Dutch: 'het nieuwe werken'). It implies that workers do not have a permanent workplace anymore and can do their tasks where and when it suits their convenience. The new world of work is a flexibilization of work towards time and place, like the telework concept. "Teleworking occurs when employees perform all or a substantial part of their work physically separated from the location of their employer, using IT for operation and communication" (Baruch, 2001: 114). In the Netherlands, at the end of 2007, almost half of the firms with ten or more workers had teleworkers employed. This is twice as much as the share in 2003, where teleworking was facilitated by approximately one fourth of all firms. For large firms (i.e. 250 or more workers employed), nine out of ten firms had workers who frequently teleworked in 2007. Among the smaller firms (i.e. 50 or less workers employed), 43 percent had teleworkers. Especially in the service sector (energy and water supply companies, businesslike services and financial offices, respectively), most of the time teleworking is a common way of working. However, notice that the high share of large firms in this sector can be an explanation for this result (CBS, 2009). These figures show an increased interest in a flexible work environment and the new world of work does fit into this development.

As mentioned above, the change of the conventional workplace is due to the increased development and use of information and communication technologies (ICT). The use of for example laptops, smartphones and webcams makes it possible to work at other places than the office. People no longer go *to* work, but go *at* work. This does fit better into the busy lives of the high-educated knowledge workers nowadays. Careers, social obligations and the raising of children can be better combined. The new world of work, however, asks for a new way of working and a new way of management (Keunen, 2009). Being at your desk does not count anymore; what matters is the output a worker produces. For workers it implies that they have to be more flexible and self-disciplined. For managers it implies that they have to loosen their control and have to trust their workers. As a result the level of monitoring could be lower in an organization where the new world of work is introduced.

Benefits in the new world of work can be a declining office space, shorter communication lines and from that less email traffic, decreased commuting, increased productivity and perfect accessibility of workers (Microsoft, 2009). These benefits are from a firm perspective, but what about the workers? Is the new world of work appealing to all working people? How do organizations that introduce the new world of work concept attract the right people, the people who know to get on with less monitoring? What kind of contract needs to be offered to these workers? Will these new organizations also attract people who will not work in such an empowered environment? These questions are the basis of this thesis.

The purpose is to examine theoretically how organizations of the new world of work can keep the 'suitable' workers, and also, how they can keep the 'wrong' workers out. For these firms, suitable workers are workers who can perform without monitoring (i.e. trustworthy workers), while wrong workers will shirk under a lack of monitoring (i.e. lazy workers). Results emerge from an investigated competitive labor market, where workers differ in their willingness of being monitored and types are private information. There will be searched for a separating equilibrium in which workers self-select into different firms, and firms employing only trustworthy workers will make strictly positive profits. The self-selection process arises because of conditions put on the utility function of both types of workers. Profit differences across firms persist because separation requires firms, employing trustworthy workers, to pay out weakly lower wages. However, this equilibrium can only exist if the share of trustworthy workers is low.

To come to these results, the concept of the new world of work will first be explained on the basis of two interviews. These interviews were held with persons who were involved in the introduction of the new world of work concept by their firm. Secondly, a theoretical background will give an introduction to the model that will be described thereafter. In the last two parts, the results of the model will be put forward and some concluding remarks will be made.

CONCEPT

In the new world of work, working and cooperating is done in a different way and supported by advanced technologies. It can be seen as a development of, for example, flex-work, telework and telecommuting. It is all the same in the sense that people are no longer committed to their workplace. Because of the existing overlap and unclear boundaries between the different types of work, it is important to describe and define the concept of the new world of work here. To get the answer to the question what the new world of work is all about, an interview with M. Burghouts (Microsoft) and one with H. van Egmond (Rabobank) is held. The purpose of these interviews was to get the answer to the following question: why did these two organizations implement the new world of work and how did this concept influence the organization?

It was interesting to see that both interviewed persons gave non-economic answers to the question above. Introducing the new world of work was not to gain extra profits; extra profits from making workers more productive by offering them a more flexible work environment. However, it was about reacting on a changing environment. Like H. van Egmond said, processes in which products and services are organized become more and more knowledge intensive. This change asks for a different way of structure. Managing by command and control is no longer maintainable, but a flexible organization is needed. In former times, a bank offered the possibility to save and lend money and the office hours were four hours a day. Nowadays, a bank offers much more services besides saving and lending money, like doing investments and taking out insurances. Internet banking makes it possible for people to have access to the banking system 24/7. These changes in the way of organizing also needs a change in the way workers work. People do not need to be at their desk all the time, and the current technology makes this possible.

This was also what Bill Gates explained in his white paper about the new world of work, where the term came into existence. He described his vision about how the work environment will look like in the future. “We are evolving toward a diverse yet unified global market, with customers, partners and suppliers that work together across cultures and continents. The global workforce is always on and always connected – requiring new tools to help people organize and prioritize their work and personal lives” (Gates, 2009). With the help of technological innovation, information can be better shared and people can communicate and work with each other in a different way. However, nowadays it is important to look at how people get access to the existing information they need. Software needs to evolve to help “information workers adapt and thrive in an ever-changing work environment” (Gates, 2009) and getting their jobs done. “At Microsoft, we believe that the key to helping businesses become more agile and productive in the global economy is to empower individual workers – giving them tools that improve efficiency and enable them to focus on the highest-value work. And a new generation of software is an important ingredient in making this happen” (Gates, 2009). Like M. Burghouts (Microsoft) said, the new world of work is a showroom for the technology of Microsoft. The individual plays a central role and will be supported by the new technology. For workers this means that they do not need a workplace for themselves anymore. When they decide to come to office they can choose where to work and plug in their laptop anywhere. It will not be a nine-to-five job anymore; people can choose where and when they work.

This new type of work does need a different way of management. Though, it is important for workers to feel connected to their organization and, for Microsoft, to work on an output basis. In practice this means that each department makes agreements about the frequency of meetings and progress reviews. For example, the HR-department agreed that all workers had to be at the office every Friday. This way people continue to see each other and get more involved with the department. Also, twice a year each worker has an individual talk to make agreements about individual objectives and commitment and the progress regarding these agreements. Furthermore, each department does have its own part in the entire open workspace. This makes it easier to find each other, however workers are not forced to be at that place. People can choose to work somewhere different than their own department space, a main feature of the new world of work. For a right balance between feeling connected with the organization and being given the freedom to work anytime, anyplace and anywhere, Microsoft introduced a physical minimum and a virtual maximum. Because of the physical minimum, people do see each other regularly (e.g. each Friday). And because of the virtual maximum, people do not only communicate via a communicator (i.e. chat), for example. This also strengthens the commitment to the organization.

As mentioned above, the new world of work is demanding a new way of management. The structure of command and control (i.e. monitoring) has to be replaced by a structure of trust. Because people are not at the same place all the time, it is hard to control what they are doing and whether they are doing their job well. Furthermore, a command and control structure signals that workers are mindless and not reliable. Hence, managers need to *trust* their workers in that they do their job well. This is supported by a statement made by Microsoft: control is good, trust is even better. Trust implies that people can and must take on their responsibilities and that they need to be reliable. Therefore, these characteristics are important for the (new) workers. Because of the importance of trust and responsibility, a hierarchical structure and many rules are not needed, this will allow people to get more motivated to do their job well. A hierarchy is only needed when it comes to decision-making, directing and the final responsibilities. However, even the 'boss' does not have his own office and can easily be approached. Trust, as a point of interest, has led to a behavioral change in the organization.

The purpose of Rabobank is not to sell software, like Microsoft, but to focus on policy. This makes trust even more salient because policies cannot, like output, be measured. Therefore Rabobank is dependent on the trustworthiness of its workers, that they do their job well to make the organization profitable. According to H. van Egmond, this can be attained trough servant leadership. That is, directing the workers toward cohesiveness and values (e.g. sustainability, integrity). Workers will feel committed to the organization, what is important when working in a new type of work environment. The modern manager also needs to commit his workers to what they want to achieve, their input. What is their contribution? It is about the internal locus of control and not the external locus of control. People need to act according to what they think is right and not to what they think what is right according to others.

The main difference between Microsoft and Rabobank, when it comes to the new world of work, is that Microsoft wants to sell its software and hence is aiming for output. Rabobank does focus on the policy of the organization and is therefore aiming for input. The overlap between the two organizations is that besides trust, dialogue is important as well. A dialogue about how things are getting done and what the added value is for the organization. This stands in relation to the values of the organization, where the new world of work is based on. For both firms the future was the basic principle, and not for example, the reduction in costs (e.g. less office space), increase in productivity and decrease in absenteeism, effects caused by the new world of work. They called these results side effects. Further, they argued that when the purpose of the new world of work was to reduce costs, the workers would not cooperate with the concept.

To make the new world of work a success, the office space of Microsoft and Rabobank has entirely changed. Workers do need room, input and information to manage their work and make decisions on their own (Microsoft, 2009b). This is feasible in the sense that, for example at Microsoft, a lot of meeting rooms are created with the equipments to give presentations. Also, everywhere in the building the workers do have access to the Internet and with the use of some card they do have access to the entire information system. The new world of work also needs to be mentioned in the contracts of the workers. For example, operating hours cannot be defined anymore as entering the office between eight and nine o'clock and leaving the office between five and six o'clock. It is important that working at home and on the road is recognized. This means that work overtime and arrangements about working at home are not enclosed in the contracts anymore. Now, these possible arrangements are part of the normal work contract.

Based on the interviews with Microsoft and Rabobank, pioneers when it comes to the new world of work, the new world of work can be defined as follows:
The new world of work is a new type of work environment where people can do their job anytime. anyplace and anywhere. They work independently for which they get the space, input and information. This empowerment of workers calls for trust in the organization.

Because workers are empowered under the new world of work concept, managers cannot monitor their workers as is done under the old conventional concept. Instead of monitoring and control, managers need to trust their workers in that they accomplish their tasks well. Therefore, in the forthcoming model the level of monitoring defines the difference between the ‘old’ and ‘new’ concept. This difference will also be used when describing the theoretical background. The level of monitoring as the only difference is a simplification of reality, but for now it is used to make, as far as known, a first model about the selection of workers in a new world of work environment.

THEORY

As mentioned above, the new world of work is a new organizational concept. In what follows, this new concept will be compared to the ‘old’ concept. The old concept is described as a conventional workplace where monitoring is an important incentive mechanism. By explaining the relationship between monitoring and exerted effort, the relationship between a manager and a worker becomes obvious and this will be used in the model of this thesis.

The employment relationship will be described on the basis of the principal-agent model. This often-used model in economics is about an agent who needs to do agreed-on work to the principal’s satisfaction. However, both the principal and the agent will act in their own best interest. For the selfish utility maximizing agent this means always trying to do as little as possible, as he benefits from avoiding work or shirking (Frey, 1997). On the contrary, the principal benefits from an agent who does as much as possible. This difference in interest is called the principal-agent problem. The problem is the delegation of a task to an agent who has different objectives than the principal who delegates this task. It is also about the imperfect information the principal has about the agent (Laffont and Martimort, 2001). The question is how the principal can motivate the agent to perform as the principal would prefer (Sappington, 1991).

The principal can motivate the agent by giving the right incentives to promote effort and performance, like wages and bonuses. When the agent responds to these incentives the principal-agent problem will be reduced. In economics, the mentioned “contingent rewards serve as “positive reinforces” for the desired behavior” (Bénabou and Tirole, 2003: 489). Another and also additional way to reduce the principal-agent problem is to control, i.e. monitor, the agent. With monitoring, the principal examines whether the agent is doing his tasks in the right way, and therefore is looking for the desired behavior. Accordingly, monitoring is called the discipline effect. So far, the manager uses contingent rewards and monitoring to realize the desired behavior of the worker, i.e. exerting effort. However, another reason for the principal’s need to monitor the agent is distrust in the employment relationship and worker’s shirking. According to the agency theory, both distrust and shirking dominate the principal-agent relationship. With monitoring, distrust and shirking will be less present and hence will reduce the principal-agent problem. From the above can be deduced that both contingent rewards and monitoring can be used by the principal to increase the agent’s effort and performance and hence the desired behavior. It can be said that it improves the principal-agent relationship.

Bénabou and Tirole (2003) called contingent rewards positive reinforcements for the desired behavior of an agent, however, monitoring can also be accompanied by negative reinforcements or sanctions, like the threat of dismissal (Frey, 1997). In turn, these negative reinforcements can also lead to the desired behavior. For a self-interested agent possible negative reinforcements will let him work harder to reduce the probability of a sanction if he is caught shirking (Dickinson and Villeval, 2008). The combination of positive and negative reinforcements with monitoring is what the conventional workplace is all about. In this thesis this conventional workplace can be seen as the old concept. Thus, under the old concept a principal, i.e. manager, does monitor/discipline his agent, i.e. worker, to make sure that they will exert a high enough effort. Because of this definition, it can be stated that workers are only extrinsically motivated by monitoring and the received wages and bonuses and possible negative sanctions. When extrinsically motivated, a worker’s satisfaction does not come from the activity itself but rather from the extrinsic consequences to which the activity leads.

Hence, extrinsic motivation requires an instrumentality between the activity and some separable consequences such as tangible or verbal rewards (Gagné and Deci, 2005). By linking the agency theory perspective to the old organizational concept, there can be concluded that the conventional workplace is an environment where managers need to extrinsically motivate their workers to prevent shirking under a distrustful relationship, and therefore monitoring is needed.

From an economic perspective more monitoring by the manager will lead to a higher level of effort exerted by the worker. Compared to the new organizational concept, where the level of monitoring is lower, this would mean that the level of worker's effort is reduced. However, this does not have to be the case. According to a psychological and sociological view, effort can be reduced instead of increased when monitoring is increased. The hypothesis of this crowding out effect points out that "monitoring may reduce the intrinsic motivation of the task, which would reduce the agents' self-esteem or self-determination, and it could also be interpreted as an expression of distrust that violates a norm of reciprocity" (Dickinson and Villeval, 2008: 57). For the intrinsically motivated worker external monitoring gives him a feeling of distrust and being not trustworthy. And this perspective will be used when talking about the new concept or the new world of work. Because of less monitoring by the principal it is assumed that the agent is particularly intrinsically motivated to exert high enough effort. The agent does an activity[1] because he finds it interesting and he derives spontaneous satisfaction from the activity itself (Gagné and Deci, 2005) and not because he is forced by monitoring to do the activity. It can be said that under the old concept, the intrinsic motivation of the agent is substituted by externally controlled extrinsic work motivation (Frey, 1997). When extrinsically or controlled motivated, a worker is acting with a sense of pressure and of having to engage in the actions (Gagné and Deci, 2005).

Under the new concept it is all about less monitoring and control by the principal, and the intrinsic motivation of the agent. When following the crowding out hypothesis, worker's intrinsic motivation of a task is increased by less monitoring. According to Thomas and Velthouse (1990) increased intrinsic task motivation is a definition for empowerment. In this sense, the lower level of monitoring empowers the worker and according to Gagné and Deci (2005) the autonomy of the worker makes him act with a sense of volition and experience of choice. It is under the new concept that workers get the freedom to choose where and when to

[1] Note that activity and tasks are used interchangeably.

do their tasks, and the freedom to take responsibility for their ideas, decisions and actions. However, to accomplish this there must be a trustful relationship between the principal and the agent, the manager and the worker. So, as mentioned before, by describing the new concept in the concept section, trust is a key factor for the new concept. The question is why should a principal trust his empowered agent?

From the above there can be stated that working in a new world of work environment intrinsically satisfies an empowered worker. To keep this intrinsic satisfaction he knows he does need to behave in a desirable way towards the principal. This is also true for the principal, he does need to adapt to the new concept otherwise the agent will not behave desirable. It can be said that there exists a norm of reciprocity between the principal and the agent. “Reciprocity is the non-strategic conditional behavior to reward kind acts (positive reciprocity) and to punish unkind ones (negative reciprocity) even if this is costly for the reciprocating subject” (Gächter and Falk, 2002: 6). Translating this towards the new world of work and from the agents’ perspective, agents will exert high enough effort (the reward) because they can be empowered (the kind act). The empowered agent knows that when he does not exert a high enough effort he will get punished by increased monitoring or even dismissal by the principal. The principal is aware of this conditional behavior and hence, because of this reciprocity, the principal and the agent can trust each other. This trustful relationship makes less monitoring by the manager and high enough effort by the worker possible under the new concept.

In the same line of reasoning, a trustful employment relationship can also be seen as a gift-exchange between the principal and the agent. “The famous gift-exchange hypothesis posits that workers who are paid higher than market-clearing wages develop sentiment for their employer and reciprocate the ‘gift’ by working harder (Akerlof 1982)” (Dur, 2008: 1). Here the hypothesis will be interpreted somewhat different because as mentioned above it is not only economic resources (i.e. wages) that cause worker’s sentiments toward his manager. Socio-emotional resources (i.e. social and esteem needs) are also important to build up a social-exchange relationship (Dur, 2008). For the new concept, socio-emotional resources can be seen as the empowerment of workers or the lower level of monitoring. Thus, workers who are empowered develop sentiment for their manager and reciprocate the ‘gift’ by working harder. Also, by giving increased freedom to choose where and when to work, the manager signals that he trusts his worker in that he exerts a high enough effort.

Note that not all people are selfish and not only material payoffs are powerful motivators, as is often assumed in self-interested economic models. People can also be trustworthy in the sense that when the level of monitoring is lower, they will still exert effort. Then, the empowerment of workers can be seen as a motivational factor, in particular the intrinsic value workers enjoy from it. These different views represent the old and new concept in the model that follows. A concept of "strict controls combined with contingent rewards and punishments […] in which work tasks are presumed to have only instrumental value to workers, and in which the worker's role is primarily to comply" versus a concept of "relaxed (or broad) controls and an emphasis or internalized commitment to the task itself" (Thomas and Velthouse, 1990: 667). As not all workers can work under the old concept, not all workers can work under the new concept. This diversity in the type of workers is used to come to an equilibrium model of self-selection.

Because workers are not identical, at the same wage rate for each worker firms prefer to hire those applicants who will be the most productive. Firms can use a self-selection device to get information about the worker's type, thus a "pricing scheme that causes the applicant to reveal truthful information about himself by his market behavior" (Salop and Salop, 1976: 620). Hence, a certain wage needs to attract a certain type of worker. This idea of a self-selection procedure was also used by the article of Kosfeld and von Siemens (2009) about a competitive labor market with team production and workers who differ in their motivation to exert team effort. They showed that "there can exist a separating equilibrium in which selfish and conditionally cooperative workers self-select into different firms and conditionally cooperative workers cooperate" (Kosfeld and von Siemens, 2009: 1). The separating equilibrium can exist because selfish workers do not accept the lower wage offered by cooperative firms. Conditionally cooperative workers do accept this wage because it is ensured that they are matched with their own type, leading to some additional intrinsic benefit (Kosfeld and von Siemens, 2009). The lower wage and worker cooperation makes cooperative firms benefit from this worker self-selection.

The basics of Kosfeld and von Siemens' model will be used in the model section that follows, especially the idea of two types of workers self-selecting into different types of firms, and the intrinsic benefit one type of worker can receive in equilibrium. The main difference is that in the article of Kosfeld and von Siemens team incentives are central, while in the model of this thesis workers do not influence each other's utility function. This lack of interdependency is needed to understand the fundamental ideas of the upcoming model, i.e. to make the model manageable. It is also for simplicity that it will be assumed that under the new concept managers *cannot* monitor their workers, instead of the lower level of monitoring (compared to the old concept) used this far.

MODEL

It is assumed that there is a competitive labor market with two types of workers. These workers differ in their preferences of being monitored by a manager. One type gets positive intrinsic benefits of working if he is not monitored, i.e. if the manager trusts him to exert effort. The other type gets no intrinsic benefits of working. In this thesis the first type is the *trustworthy* workers *t*, and the second type is the *lazy* worker *l*. Being of one type is private information. Let $\theta \in \{t, l\}$ denote a worker's type. Further, there will be assumed that fraction α of all workers is trustworthy and fraction $(1 - \alpha)$ is lazy. Each type of worker exerts effort, where $e_\theta \in \{0, 1\}$. Individual output is stochastic, meaning that a worker can be successful or not. When successful, generated output is $G > 0$, if not $G = 0$. The probability of success $\pi(e_\theta)$ depends on worker's effort, where $\pi(1) > \pi(0) > 0$. Whether output is verifiable or not depends on the concept chosen by the firm.

Like workers, firms can come in two types. A firm can be organized consistent with an *old* concept O where workers *can* be monitored or consistent with a *new* concept N where workers *cannot* be monitored. More precisely, under the old concept output can be made verifiable by managerial monitoring, while under the new concept, managers cannot verify effort nor output. Thus, it is assumed that monitoring is useless under the new concept. Here, the new concept is the concept of the new world of work where workers are empowered, i.e. they are made fully responsible. So, workers working under the new concept will be called empowered workers m. The concept choice, where $C \in \{O, N\}$, made by a firm is verifiable and cannot be changed overnight[2]. It is further assumed that monitoring is costless for a manager. Also, for the firm there are no costs involved in choosing either one of the two concepts.

[2] The binary concept choice can also be made within the firm. For example, each department chooses the best suitable concept. For the model this makes no difference.

Each firm offers a contract to the competitive labor market. The contract w offered by a firm, where $w = (f_C, b_C, C)$, consists of a fixed wage f_C, a bonus b_C and the concept choice C made by the firm. Both wage and bonus are dependent on the concept choice and agents receive a bonus unless the manager can verifiably show that output was zero[3]. It is assumed that managerial monitoring is not verifiable. This implies that the manager cannot credibly commit not to monitor. As monitoring is costless, while there is a possible benefit of monitoring (not having to pay the bonus when the worker is not successful), the manager will always monitor under the old concept.

Firms sell output at a price of one. Given contract and workers' effort choice, let

$$\pi(e_\theta)G - [f + \pi(e_\theta)b]$$

be a firm's expected profit per worker generated. Firms can hire any number of workers and may offer multiple contracts, maximizing expected profit per worker.

A key assumption is that workers differ in their willingness of being monitored by the firm. While trustworthy workers derive intrinsic utility from working when they are not monitored, lazy workers do not intrinsically care about monitoring. Once a contract w is accepted, the expected utility of worker being of type θ, choosing effort e_θ is:

$$u_\theta(w, e_\theta) = f + \pi(e_\theta)b - c(e_\theta)$$

A worker enjoys expected utility $f + \pi(e_\theta)b$ from his wage. Exerting effort causes him effort cost $c(e_\theta)$. Let

$$c(e_\theta) = \begin{Bmatrix} 0 & if\ e_\theta = 0 \\ c(1) - I_C * \gamma_\theta & if\ e_\theta = 1 \end{Bmatrix}$$

be workers' cost function. First, assume that $c(1) > c(0)$. Exerting higher effort means higher effort costs. Second, I_C is the indicator function for the concept of the firm, where $I_C \in \{0,1\}$. When a firm is organized according to the old concept $I_O = 0$, and when organized according to the new concept $I_N = 1$. Third, γ_θ is the level of intrinsic satisfaction a worker of a certain type receives from working in a firm. For the lazy worker $\gamma_\theta = 0$ and for the trustworthy worker $\gamma_\theta > 0$. Thus, only a trustworthy worker can get some intrinsic

[3] So, under the old concept, the worker receives a bonus either when the manager does not monitor, or when the manager monitors and the worker is successful. Under the new concept, the worker's output cannot be made verifiable through monitoring, so the manger will never monitor.

benefits and only if he exerts effort under the new concept. The cost function shows the difference in effort costs for the two types when working under one of the two different concepts. For both types, exerting no effort will mean zero costs and total utility will equal the expected utility from his wage. For a lazy worker when exerting positive effort, the effort costs will not differ between the two concepts. This is different from a trustworthy worker. When exerting positive effort, a trustworthy worker's cost function and thus his whole utility function is influenced when working under the new concept. Because of the intrinsic benefits getting from working in a new world of work, the effort costs of the trustworthy worker will be lower making his total utility higher. The key assumption is made that when the trustworthy worker exerts $e_\theta = 1$ under the new concept, the intrinsic benefit γ_θ will be higher than the costs $c(1)$. So, the total costs will become negative. Then, total utility $u_\theta(w, e_\theta = 1)$ becomes higher because subtracting negative costs means adding this to the expected utility from his wage. That costs can be negative comes from the trust-relationship between the worker and manager. It is because of the existing reciprocity in the employment relationship that the trustworthy worker will not shirk when the manager does not monitor him. See also the theoretical section.

It is also assumed that there are liability limitations on workers. This will lead to efficiency-wages in order to induce workers to exert effort. Because of this limited liability constraint, workers cannot be paid a negative wage, thus $f + b \geq 0$ and $f \geq 0$. Moreover, the worst thing that can happen to a worker is to receive zero income. Because of the risk-neutrality of the worker, attention can get restricted to the case where workers are paid a zero wage when caught shirking (Acemoglu and Newman, 2002). At last, it is assumed that under the old concept it is optimal to induce workers to exert effort. This implies that the following condition should hold, $G \geq \frac{c(1)}{[\pi(1)-\pi(0)]}$. In the section that follows it will become evident how this condition is obtained.

For this model, the sequence of actions is as follows. First, a firm offers a contract w on the competitive labor market. Second, workers choose simultaneously among the set W of contracts. Third, given the contract of the firm workers choose a level of effort. At the same time, the firm (i.e. the manager) chooses to monitor his workers or not. Finally, payoffs are determined.

The results of the above-described model will become clear in the following section. However, a last note has to be made about the definition of a competitive equilibrium. With respect to workers, assume that equilibrium strategies are optimal given all offered contracts. With respect to firms, the equilibrium set of contracts contain no irrelevant contracts that are never accepted in equilibrium. Also, no firm offers a contract yielding expected losses in equilibrium, and no firm can enter the market by offering a new contract that attracts workers and yield strictly positive expected profits per worker (Kosfeld and von Siemens, 2009).

RESULTS

The model described above will be used to show that there are conditions under which a separating equilibrium can exist, namely an equilibrium where the two types of workers self-select into the different types of firms. Research will be done to see whether and when the trustworthy worker will work in the firm where the new concept is introduced and the lazy worker will work in the firm where the old concept is still implemented. The model is solved through backward induction.

Under the old concept only, the manager *can* monitor his workers. As monitoring is costless, when he can monitor his workers he will do so. This is because when a manager notices that a worker is not successful the worker will get no bonus, which increases the payoff of the manager. Hence, for any positive b_O under the old concept monitoring strictly increases managerial payoff. This implies that there is no difference between the two types of workers under the old concept, as trustworthy workers know that they will be monitored. Workers exert effort when employed under the old concept if and only if

$$f_O + \pi(1)b_O - c(1) > f_O + \pi(0)b_O$$

Hence, when $b_O \geq \frac{c(1)}{[\pi(1)-\pi(0)]}$, workers will exert high effort. Risk neutrality and limited liability imply that $f_O = 0$. Further, competition among firms implies that firms that operate under the old concept will earn zero profit. Hence, under the old concept it must be that $b_O = G$. Thus, both types of workers will exert effort, i.e. $e_\theta = 1$, if and only if

$$\pi(1)G - c(1) > \pi(0)G$$

where the left-hand side is worker's utility when exerting effort under the old concept, and the right-hand side is worker's utility when exerting zero effort under the old concept. Hence, when $G \geq \frac{c(1)}{[\pi(1)-\pi(0)]}$ workers will exert effort. This result equals the above derived b_O, corresponding to the fact that under the old concept $b_O = G$.

Under the new concept, the manager *cannot* monitor his workers. This makes it impossible to notice whether a worker is successful or not. Hence, the bonus will always be paid out, which implies that the bonus does not provide the intended incentives. In other words, the bonus is identical to the fixed wage. Without loss of generality, it is assumed that firms using the new concept set $b_N = 0$. Thus, under the new concept, worker's income is fully given by the fixed wage f_N.

Note that because of no monitoring the two types of workers act differently. Hence, a firm working according to the new world of work does have the choice to attract either type of worker or only the trustworthy type of workers. Assume that the new concept firm does want to attract trustworthy workers only. Then, a wage is needed that only attracts these types of workers. Trustworthy workers receive intrinsic benefits from working under the new concept and will exert effort because of reciprocity, see theoretical section. This type of worker wants to work under the new concept if and only if

$$f_N - [c(1) - \gamma_t] > \pi(1)G - c(1)$$

Here, the left-hand side gives the utility of a trustworthy worker, who exerts effort under the new concept as $\gamma_t > c(1)$, and the right-hand side gives his utility when working in a firm using the old concept.

Lazy workers, who exert no effort without monitoring, do *not* want to work under the new concept if and only if

$$f_N < \pi(1)G - c(1)$$

Here, the lazy worker's utility under the new concept is lower than when working under the old concept.

These two constraints impose the lower and upper bound on the fixed wage f_N to ensure that only trustworthy workers work under the new concept, that is

$$\pi(1)G - \gamma_t < f_N < \pi(1)G - c(1)$$

Because it is assumed that $\gamma_t > c(1)$, there are values for f_N which do fulfill both constraints.

For a new concept firm to make no negative profits, the maximum wage that can be set is $f_N \leq \pi(1)G$. However, if $f_N = \pi(1)G$ holds, also lazy workers will be attracted because his utility will be higher than under the old concept, i.e. $\pi(1)G > \pi(1)G - c(1)$. Thus, to keep the lazy workers out it is needed that $f_N < \pi(1)G - c(1)$ and thus $f_N < \pi(1)G$. For the trustworthy workers, this lower wage is compensated by the received intrinsic benefits. This holds when $\gamma_t \geq \pi(1)G - f_N$. Hence, the maximum wage f_N^* that can be given to trustworthy workers without attracting lazy workers is given by $f_N^* = \pi(1)G - c(1)$. Therefore, the utility of an empowered worker m in the separating equilibrium is given by $\pi(1)G - 2c(1) + \gamma_m$. As $\gamma_\theta > c(1)$, this is higher than the utility under the old concept.

Thus, in a separating equilibrium in a competitive labor market where two types of workers and two types of firms are present, firms using the old concept offer a contract $w = (0, G, O)$ and attract lazy workers, while firms using the new world of work concept offer a contract $w = (\pi(1)G - c(1), 0, N)$ and attract trustworthy workers. It can be seen that the first contract consists of a higher total wage than the latter total wage. Apparently, this will influence the profit of both firms. The contract choices only make firms working consistent with the new world of work profitable. Firms working according to the old concept will make zero profits because expected generated output equals bonus b_O. For a new concept firm, the expected profit per worker given the contract and workers' effort choice is $\pi(1)G - [\pi(1)G - c(1)]$, thus a profit of $c(1)$ per worker.

As can be seen, the difference in profit between the two types of firms appears because of the difference in the offered total wage, $f_\theta + b_\theta$. The difference in wage can exist because the two types of workers behave differently when facing the different firms. The trustworthy worker accepts the lower wage offered by the new concept firm because the empowerment gives him some intrinsic benefits, and because of the trustful relationship with his manager he will exert effort. The lazy worker will not enjoy the intrinsic benefits and thus will not exert effort and not accept his lower wage. He accepts only the contract offered by the old concept firm. For the new world of work this separating result is intended, because the lazy worker exerts only effort when monitored. For the old concept firm it does not matter which type of worker it attracts with the offered contract, because of managerial monitoring worker's output is verifiable making workers exert effort. However, only lazy workers will accept the contract offered by the old concept firm, because of the received higher wage.

Market entry and competition will not erode the profits of this separating equilibrium. On the one hand, if a new firm entering the market (or an existing old concept firm) mimics an existing new concept firm, it does not offer trustworthy workers more than what they currently earn. Hence, for these workers it is optimal to stay at their current firm. On the other hand, if a new firm offers a higher wage than offered by the existing new concept firm it will only attract lazy workers. In this case, trustworthy workers will not be attracted as they would lose their intrinsic benefit from being empowered[4]. Here, a separating equilibrium can only be stable if trustworthy workers are better off not working with lazy workers. However, what if trustworthy workers are better off in a pooling equilibrium?

A pooling equilibrium, in which trustworthy workers are better off if working with lazy workers, is possible. For instance, when the new concept firm sets a 'too' high wage this will also attract lazy workers. This higher wage, that increases workers' utility, is beneficial for the trustworthy workers as well as for the lazy workers. In this pooling equilibrium, given the share of trustworthy workers α, average output per worker will be $\alpha * \pi(1)G + (1-\alpha) * \pi(0)G$, simplified to $[\pi(1)-\pi(0)]\alpha G + \pi(0)G$. Competition among firm implies that f_N will be equal to this average output per worker. Trustworthy workers will prefer this pooling wage if and only if

$$[\pi(1)-\pi(0)]\alpha G + \pi(0)G > \pi(1)G - c(1)$$

where the left-hand side is the pooling wage, and the right-hand side the separating wage when working under the new concept. Hence, when $\alpha > \frac{[\pi(1)-\pi(0)]G - c(1)}{[\pi(1)-\pi(0)]G}$, resulting in $\alpha > 1 - \frac{c(1)}{[\pi(1)-\pi(0)]G}$, trustworthy workers will prefer a pooling equilibrium.

[4] Note this is true for the trustworthy workers only when the higher offered wage by the new firm is lower than the received utility under the new concept firm.

Hence it appears that for a stable separating equilibrium to exist, the highest share of trustworthy workers is $\alpha^* = 1 - \frac{c(1)}{[\pi(1)-\pi(0)]G}$. Because $[\pi(1) - \pi(0)]G \geq c(1)$, derived from the condition $G \geq \frac{c(1)}{[\pi(1)-\pi(0)]}$, it becomes evident that $0 \leq \alpha^* < 1$. An estimation of α^* can be derived from the fact that trustworthy workers will prefer the separating wage and not the pooling wage if $[\pi(1) - \pi(0)]\alpha G + \pi(0)G < \pi(1)G - c(1)$. This equation will hold if the value of α^* is low. What the exact value of α^* will be, depends on the variables $c(1)$, $\pi(e_\theta)$ and G.

In this section, research has been done to find a separating equilibrium where trustworthy workers are employed in the new concept firms and lazy workers are employed in the old concept firms. This objective is reached in the sense that this equilibrium exists if the optimal share of trustworthy workers α^* is low. For the new concept firm this equilibrium results in a lower offered wage and positive profits of $c(1)$ per worker compared to the old concept firm, for which the wage is higher and profits are zero. These results emerge from a simplified model. What can be done in the near future will be discussed in the following section.

CONCLUDING REMARKS

With this thesis a first attempt is made to give a theoretical approach to the new world of work. As defined in the concept section, the new world of work is a new type of work environment where people can do their job anytime, anyplace and anywhere. They work independently for which they get space, input and information. This empowerment of workers calls for trust in the organization. For workers, it means the freedom to choose where and when to work, and the freedom to take responsibility for ideas, decisions and actions. For firms, the managers, it means losing their command and control and the need to trust their workers. On the competitive labor market, a new concept firm needs to offer such a contract that attracts only the trustworthy workers who can associate with the empowered environment. It is the firm's offered contract that influences the selection process. In the preceding sections it is showed that workers will self-select if new concept firms pay out a lower wage than old concept firms. However, this separating equilibrium can only exist if the share of trustworthy workers is rather low.

Note that the results emerged from a simplified model. However, for the new world of work as an upcoming feature it is an interesting first theoretical insight. Offering an empowered work environment is not suitable for each worker, some types like to shirk rather than to exert effort. Firms need to know how to deal with these types of workers and a possible selection method is described above. Working according to the new world of work makes a firm even more profitable compared to firms working according to the conventional workplace. However, to accomplish this in practice, one important question needs to be answered: what is the exact share of trustworthy workers? Further research also needs to focus on what happens in the presence of teamwork, a normal work setting in real life. Here, the individual worker was central to the model. However, how will workers behave when put in a team (see for example Kosfeld and von Siemens (2009)). Will the new world of work make teamwork more complicated, because workers are less present at their workplace? In what sense will this influence the utility functions? Is it most profitable to put only trustworthy workers in a team? These are examples from many more questions that can be asked. For further research it is also important to empirically test the model. An example which needs to be tested is whether the received intrinsic benefit from working in a new concept firm really compensate the offered lower wage for the empowered worker.

As mentioned before, this thesis is a first attempt to model the new world of work. It is a way of work an increasing amount of firms have already introduced or are planning to do so in the near future. Hence, sufficient research should and can be done to learn more about this new organizational design.

REFERENCES

Acemoglu, D., and A.F. Newman. 2002. The Labor Market and Corporate Structure, European Economic Review 46: 1733–1756.

Baruch, Y. 2001. The Status of Research on Teleworking and an Agenda for Future Research, *International Journal of Management Reviews* 3(2): 113–129.

Bénabou, R., and J. Tirole. 2003. Intrinsic and Extrinsic Motivation, *Review of Economic Studies* 70: 489–520.

CBS. 2009. "Aandeel bedrijven met telewerkers in vier jaar verdubbeld", *Webmagazine CBS*, January 7, 2009, http://www.cbs.nl/nl-NL/menu/themas/bedrijven/publicaties/artikelen/archief/2009/2009-2650-wm.htm (downloaded 3rd December 2009)

Dickinson, D., and M. Villeval. 2008. Does Monitoring Decrease Work Effort? The Complementarity between Agency and Crowding-out Theories, *Games and Economic Behavior* 63: 56–76.

Dur, R. 2008. Gift Exchange in the Workplace: Money or Attention?, *IZA Discussion Paper* 3839: 1–13.

Frey, B.S. 1997. On the Relationship between Intrinsic and Extrinsic Work Motivation, *International Journal of Industrial Organization* 15: 427–239.

Gächter, S., and A. Falk. 2002. Reputation and Reciprocity: Consequences for the Labour Relation, *Scandinavian. Journal of Economics* 104(1): 1–26.

Gagné, M., and E.L. Deci. 2005. Self-determination theory and work motivation, *Journal of Organizational Behavior* 26: 331–362.

Gates, Bill. 2009. "The New World of Work", *Executive E-mail*, May 19, 2005, http://www.microsoft.com/mscorp/execmail/2005/05-19newworldofwork.mspx (downloaded 22nd September 2009)

Keunen, Mirjam. 2009. "Dit kantoor is meer een ontmoetingplek". *NRC-Next*, March 4, 24–5.

Kosfeld, M., and F. von Siemens. 2009. Worker Self-Selection and the Profits from Cooperation, *Journal of the European Economic Association* 7(2-3): 573–582.

Laffont, J., and D. Martimort. 2001. *The Theory of Incentives: the Principal-Agent Model*. New Jersey: Princeton University Press.

Microsoft. 2009. "Het Nieuwe Werken: de cijfers", http://www.microsoft.com/netherlands/het_nieuwe_werken/de_cijfers.aspx (downloaded 3rd December 2009)

Microsoft. 2009b. "Het Nieuwe Werken", http://www.microsoft.com/netherlands/het_nieuwe_werken/organisatie/default.aspx (downloaded 23rd September 2009)

Salop, J., and S. Salop. 1976. Self-Selection and Turnover in the Labor Market, *The Quarterly Journal of Economics* 90(4): 619–627.

Sappington, D.E.M. 1991. Incentives in Principal-Agent Relationships, *The Journal of Economic Perspectives* 5(2): 45–66.

Thomas, K.W., and B.A. Velthouse. 1990. Cognitive Elements of Empowerment: An "Interpretive" Model of Intrinsic Task Motivation, *The Academy of Management Review* 15(4): 666–681.