Experimental Analyses of a Tournament Design

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Abstract

Tournaments are a reward system commonly used when individual output is difficult to measure. Like all reward systems, a tournament has some advantages and disadvantages. This paper discusses the effects of implementing a tournament reward system, by using results from previous experiments. By combining these results with information from a real world firm, this paper seeks to find possible improvements for using tournament based reward systems.

Contents

1. Introduction

Tournaments have been around for a long time. Though mostly observed in sports and games, some firms have implemented a tournament system to reward their employees. Such a reward system creates a different working environment than the more often used fixed or variable (per unit) pay schemes. Currently there has been an increase in the number of researches investigating these different working conditions. The most important findings from these papers concern the effects on the incentives and the sorting of labour.

In this paper the focus is on the experimental studies performed with respect to tournaments. By combining the results of these experiments, this paper will try to provide and overview of research results and use them to find an opportunity to improve on these systems.

To do so, this paper will start with describing the effects of a tournament design and separating them into sorting and incentive effects. Following that will be a detailed review of a tournament design implemented by a multinational consulting firm. Using the information of this company and combining it with the results of the experiments, opportunities for improvement of this particular system will be investigated. By investigating the advantages and flaws of this system however, this information may also prove useful to other firms implementing a tournament reward system. Combining the results this way may also lead to new insights and provide a new point of view for future research and some final remarks regarding the research are given in the conclusion.

2. The effects of tournament design

This chapter will try to determine the effects of tournament design on the motivation of employees. Using data from existing field and lab experiments, I will try to distinguish the most important factors to consider when implementing a tournament system in a firm. These factors will later be used to identify possible effects of a real world firm's performance pay framework and to see if there is room for improvement.
First will be a brief description of rank-order tournaments. Then will be an explanation why labour market experiments are used to identify the effects on a real world firm instead of theoretical or empirical studies about tournament design. Following that will be a discussion of the findings from these labour market experiments where I will separately discuss the role of each factor on the behaviour of the employees.

2.0.1 Rank-order tournaments

Tournaments use competition as an incentive device for agents by rewarding them according to their relative performance compared to other agents.[1] The rewards for these tournaments are fixed in advance. Such reward systems are mostly observed in sports, but there are firms using tournaments as a reward system as well. The implementation of a tournament as a reward system has a number of effects on the behaviour of employees that will be discussed later.
The focus in this paper will be on tournament reward systems for firms. Under such reward systems, employees in equivalent functions (peers) are rated against each other. By setting certain rewards (usually monetary, but they can also take the form of non-monetary rewards) in advance, with a higher reward for the 'winners' of the tournament this system may stimulate the employees to perform well. Examples of these rewards are an increase in base pay, a bonus or an award for employee of the month. Over the past few decades, there have been numerous articles discussing the effects of tournaments and the role of specific factors in a tournament design. The theoretical and experimental findings from these articles will be

[1] Harbring, C., Irlenbusch, B. 2003 *An experimental study on tournament design*, Labour Economics 10, page 443-464

discussed later. Why was chosen to use information from experiments and not empirical evidence will be explained below.

2.0.2 Why labour market experiments?

As scientific research often requires that the theories are tested in order to be accepted, data is needed. This data can come from several different sources. Friedman and Sunder make a distinction between the following types of data: happenstance and experimental data, and field and laboratory data.[2] As they describe it, happenstance data is the by-product of uncontrolled, naturally occurring economic activity. On the other hand, experimental data is made explicitly for scientific purposes under controlled conditions. Also, data from natural environments is considered field data, whereas data generated in a lab environment is considered laboratory data. Using these distinctions, Friedman and Sunder than allow for four possible combinations of these data sources. These are field and laboratory happenstance data and field and laboratory experiments. In this paper I will use only two of the four combinations, being the field experiments and laboratory experiments. Before continuing with the results from the experiments, I will briefly summarize the advantages and disadvantages of using experiments compared to happenstance data.

As there is a large amount of happenstance data available on the subject of labour markets, I will argue below why I choose to use experimental data in this paper using an example from Falk and Fehr's article.[3] When considering tournament theory, laboratory experiments have certain advantages compared to happenstance or empirical data. The most obvious of these advantages is that using empirical tests to study the effects of tournament theory requires a large amount of information that is often not available, but can be (easily) implemented in laboratory experiments. For example information regarding the effort cost function of the employees and the payoff function of the firm. As a consequence, experiments are able to derive and test a precise prediction by observing effort and prize choices of the subjects participating. When using happenstance data this (almost) impossible to accomplish due to the lack of information.
Another problem that can be excluded with experiments is the environment. As many factors may play a role when considering sabotage for example, with experiments these factors can

[2] Friedman, D., Sunder, S. 1994 *Experimental Methods. A Primer for Economists.* Cambridge University Press
[3] Falk, A., Fehr, E. 2003 *Why labour market experiments?* Labour Economics 10, page 399-406

be excluded and studied separately. Such factors can be the amount of communication between employees, and how well they know each other. Since there are many other environmental factors that may influence the results as well, experiments allow for better control.
Finally, as experiments generally report their findings and conditions in detail, they can be easily replicated in order to verify its results. On the contrary, as Falk and Fehr put it, often the best that can be achieved with field happenstance data is that the variables of interest are correlated.

The main criticisms on experiments according to Falk and Fehr are the following.[4] As (laboratory) experimental studies are often performed at universities using students, a major objection to this method is that the subject pool is biased. The argument behind this is that students lack the experience professionals have, in order to deal with many problems. Another objection often heard is the fact that subjects do not take their decisions seriously (enough), as the stakes in the experiments are too low. But although there is agreement on the fact that higher stakes generally reduce variance in behaviour (e.g. Camerer and Hogarth[5]), there is still some discussion regarding the effect on average behaviour. Finally, due to the small number of participants in many experiments, the results could be questioned. As this criticism could be justified, I will try to reduce these problems as much as possible.
In order to reduce these problems, in this paper I shall consider both laboratory and field experiments regarding tournament design to identify the roles that different factors play in such a performance pay framework. Reason for this is that using several experiments on the same topic in order to determine the effect of these factors reduces the chance of biased or incorrect results. At the same time, using multiple experiments effectively increases the total number of participants thereby even further reducing the chance of using wrong conclusions. Also, using field experiments adds more realism to the results, although at the cost of control. Therefore I will use the two as complements when possible and from there try to determine my conclusion.

[4] Falk, A., Fehr, E. 2003 *Why labour market experiments?* Labour Economics 10, page 401-403
[5] Camerer, C.F., Hogarth, a.R.M. 1999 *The effects of financial incentives in experiments: a review and capital-labor-production framework.* Journal of Risk and Uncertainty, page 7-42

2.1 Sorting effects

The first effect discussed will be the sorting effect. This is logical to treat first since it actually occurs before workers start at a specific firm. Sorting (or worker self-selection) can be described as follows: agents with different characteristics feel attracted by different pay schemes and therefore systematically self-select into particular firms and organizations if possible.[6] The idea behind this sorting effect is that more productive employees will prefer performance pay over a fixed hourly or monthly salary, as they know that they have a relatively high productivity that will allow them to increase their income by using such a system. On the other hand, less productive workers will tend to prefer firms without a performance pay system, as they are not attractive to them.[7] While most studies only consider the incentive effects of switching from performance pay systems to fixed wage systems, in this section I will try to separately identify the sorting effect. It should be noted however, that as there are only limited experiments available which try to separately identify these effects, a significant part of the results in the experiment section are derived from the articles of Dohmen and Falk and Eriksson and Villeval (see footnotes 6 and 7).

2.1.1 Theoretical predictions regarding sorting effects of tournaments

Although it may seem this way, there is no single complete theory that covers most of the real life tournaments observed in the economy. There are, however, a number of more specific theories that may provide some insight on the behaviour of participants in tournaments.[8] This section will discuss some of these theoretical predictions regarding sorting into tournaments. As the focus in this chapter will be on sorting, before continuing there will be a brief overview of different types of sorting models. First there are the sorting models of education. Since education (e.g. years of schooling and grades) is often used as a benchmark for the ability of individuals, this is often used in literature in combination with sorting models (such as the one by Andrew Weiss 1983).[9] Also, in practice, education is often used to signal a person's ability to potential employers. Another well-known line of sorting models considers

[6] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001
[7] Eriksson, T., Villeval, M.C. 2008 *Performance Pay, Sorting and Social Motivation* Journal of Economic Behavior and Organization 68, 2, page 412-421
[8] Davies, T., Stoian, A. 2007 *Measuring the Sorting and Incentive Effects of Tournament Prizes*
[9] Weiss, A. 1983 *A Sorting-cum-Learning Model of Education* The Journal of Political Economy, 91, No. 3, page 420-442

partners in a marriage (most notably Becker 1973).[10] There are also models using other examples however. Though using different examples, there is a common feature in all these models: positive (negative) complementarities induce positive (negative) sorting in equilibrium.[11] For the example of marriage in the article of Becker, that would imply that the most desirable persons would get together and the same holds for the most undesirable. However, most of the theories discussed here consider sorting as the self-selection of workers into jobs and are from the employees' point of view.

The most important assumption in theoretical models regarding sorting is heterogeneity. This assumption allows for different levels of productivity among individuals, which in turn makes productivity sorting possible. Productivity sorting can roughly be described as the division between high skilled and low skilled workers (and everything in between) among firms. Theoretical models describing this sorting of workers among firms are in consensus that incentive pay attracts more productive workers (see also the introduction to this chapter). Generally, the reason why fixed pay systems attract lower quality workers can be explained with the lemons problem.[12] As there is information asymmetry between workers and employers, there is no way for employers to be entirely certain about the skill level of a person. Assuming workers know their own productivity, the more productive ones will prefer working under a variable pay scheme over a fixed one as this will provide them with a higher income (if there are no other differences between the jobs). With the variable pay scheme being more attractive for the more productive workers, and the fixed scheme better for the less productive workers, this will lead to a self-selection of workers called sorting. This first theoretical prediction of worker self-selection based on skill level is called productivity sorting.

More recently, there have also been some theoretical predictions regarding the sorting of non-skill traits as a result of various pay schemes.[13] Non-skill traits can be described as all individual traits that have no direct link with productivity (e.g. ambition, optimism). What used to be labelled as "ability" in the past now is defined by the non-skilled traits. One possible explanation found in the literature, as to why employers value these non-skill traits is

[10] Becker, G.S. 1973 *A Theory of Marriage: Part I* The Journal of Political Economy, 81, No. 4, page 813-846
[11] de Melo, R.L. 2009 *Sorting in the Labor Market: Theory and Measurement* University of Chicago
[12] Akerlof, G.A. 1970 *The Market for 'Lemons': Quality Uncertainty and the Market Mechanism* Quarterly Journal of Economics, 84, 3, page 488-500
[13] Stefanec, N.P. 2010 *Incentive pay: Productivity, sorting, and adjacent rents* The Journal of Socio-Economics, 39, page 171-179

the following. Humans prefer to interact with individuals whose preferences are in line with their own objectives.[14] These types of worker preferences, or characteristics, which are found profitable by the employers, can be described as incentive-enhancing preferences. Together, these behavioural preferences and the productive ability can be labelled as worker quality, instead of the more dated and vague term "ability".[15] As it is impossible to describe every individual personality trait in this paper, below will be some of the more general traits which have been debated over both theoretically as well as empirically. Reason why these non-skill traits were chosen is the fact that they appear to be of interest to employers. The non-skill traits discussed below are the core self-evaluation traits from Judge et al, being self-esteem, generalized self-efficacy, locus of control and emotional stability.[16] Another non-skill trait discussed below is the selfishness or willingness to cooperate of workers.

Reason why employers may value non-skill traits such as self-evaluation can be that there is evidence that these traits are linked to job satisfaction and job performance. First of all, it is argued that self-evaluation is related positively to job satisfaction for the following reasons. High self-esteem could cause a person to view a challenging job as an opportunity that he can benefit from, whereas a person with low self-esteem might view that same job as a chance to fail.[17] Locus of control, an individual's generalized expectations about where control over subsequent events resides, is also argued to positively influence job satisfaction since workers that feel they have more control are less likely to stay in dissatisfying jobs.[18] Self-efficacy, a person's belief about his or her ability and capacity to accomplish a task or to deal with the challenges of life, also is assumed to be positively correlated with job satisfaction as it is associated with success on the job.[19] Whether selfishness influences job satisfaction is unclear, but it can be easily linked to job performance as will be explained below.
Then there also is the relationship of self-evaluation with job performance. There is quite some theoretical support for a positive relationship between these factors. One such theory is

[14] Bowles, S., Gintis, H., Osbourne, M. 2001 *Incentive-enhancing preferences: personality, behavior, and earnings* The American Economic Review, 91, No. 2, page 155-158
[15] Stefanec, N.P. 2010 *Incentive pay: Productivity, sorting, and adjacent rents* The Journal of Socio-Economics, 39, page 172
[16] Judge, T.A., Bono, J.E. 2001 *Relationship of Core Self-Evaluations Traits - Self-Esteem, Generalized Self-Efficacy, Locus of Control, and Job Performance: A Meta-Analysis* Journal of Applied Psychology, 86, No. 1, page 80-92
[17] Locke, E.A., McClear, K., Knight, D. 1996 *Self-esteem and work* International Review of Industrial/Organizational Psychology, 11, page 1-32
[18] Spector, P.E. 1982 *Behavior in organizations as a function of employee's locus of control* Psychological Bulletin, 91, page 482-497
[19] Judge, T.A., Locke, E.A., Durham, C.C. 1997 *The dispositional causes of job satisfaction: A core evaluations approach* Research in Organizational Behavior, 19, page 151-188

the self-consistency theory, which suggests that individuals are motivated to behave in a manner consistent with their self-image.[20] Thus according to this theory, a person with high self-esteem would perform well in order to maintain its positive self-image. Also, according to the model of learned helplessness, positive, optimistic persons are less likely to display motivational deficits (e.g. lowering their effort) when faced with unfavourable conditions.[21] In contrast, more pessimistic individuals show the opposite behaviour. However, high self-esteem also creates the risk of an individual becoming overconfident.[22] Overconfidence may create the illusion for an individual that it will succeed at a given task, where the the performance may be negatively influenced due to a lack of skill. Then there is also selfishness. This characteristic can also be linked negatively to job performance through sabotage. When considering a tournament, there is always the possibility of sabotage, due to the nature of the reward system.[23] As sabotage is an activity performed only to increase an individual's chance of winning (by lowering the probability of winning of others), it can be said that this is a selfish activity. Therefore it can be argued that more selfish persons are less likely to cooperate under a tournament system, and more likely to sabotage their colleagues in order to improve their own probability of winning.

Besides the influence of these non-skill traits such as self-evaluation and selfishness on job performance and job satisfaction, they may also be related to the preferences of individuals. The reasoning behind this is the fact that these non-skill traits are characteristics. As described above, there are many theories linking these non-skill traits with job satisfaction and job performance. Following this reasoning, these non-skill traits may influence the preferences of individuals. For example, a person with low self-esteem is likely to have other preferences than an individual with higher self-esteem considering the reward structure of a job. The person with low self-esteem may not want to work under a tournament system as he is less convinced of his ability (and with that his probability of winning the tournament and income). These preferences are then assumed to lead to (or at least influence) job sorting. There is a significant amount of literature available on the role of preferences in the sorting process. A good example is the theory of equalizing differences by Sherwin Rosen.[24] The main argument

[20] Korman, A.K. 1970 *Toward an hypothesis of work behavior* Journal of Applied Psychology, 54, page 31-41
[21] Peterson, C., Seligman, M.E.P. 1984 *Causal explanations as a risk factor for depression: Theory and evidence* Psychological Review, 91, page 347-374
[22] Bénabou, R., Tirole , J. 2002 *Self-Confidence and Personal Motivation* The Quarterly Journal of Economics, 117, No. 3, page 871-915
[23] Lazear, E.P. 1989 *Pay Equality and Industrial Politics* Journal of Political Economy, 91, page 561-580
[24] Rosen, S. 1986 *Handbook of Labor Economics, Volume I*, Elsevier Science Publishers BV, Chapter 12

of this theory is that workers sort themselves into jobs with different attributes, based on their preferences for those attributes (though other incentives such as salary still play a role). This would imply that people who enjoy social interaction for example should find work where they would have a lot of interaction with customers or colleagues, as this would increase their payoff.
Combining these theories, it could be argued that non-skill traits impact the job sorting process indirectly. As non-skill traits such as self-evaluation and selfishness partly determine the preferences of workers, they may influence the sorting process through these preferences. And because there is quite an amount of literature available discussing the relation of preferences and sorting, theory would suggest that non-skill traits, besides other incentives (such as monetary rewards) does influence the sorting decisions of individuals. Whether these theoretical predictions are observed in practice is discussed below in the chapter of sorting experiments.

2.1.2 Job sorting experiments

Due to the versatility in humans and their behaviour, and the different conditions under which people live, reality is practically never exactly the same as how it is reflected by theory when trying to model human behaviour. In order to gain a better understanding of how much of the theories from above are observed in real life, this section will use a number of labour market experiments from various sources. These experiments have been performed in other articles, and the main goal of this section is to provide an overview of these experiments with the most important conclusions from these articles with regard to job sorting.

The theoretical prediction that tournaments attract more productive workers is also observed in labour market experiments. Eriksson and Villeval, among others, observe in their experiment that high skilled workers prefer variable pay schemes over fixed pay schemes.[25] The explanation they provide in their article is the fact that high skilled workers have a higher expected payoff under variable pay schemes. As they have a higher expected payoff under the variable system, this will result in the self-selection of more productive workers to the variable (tournament) reward system. In the experiment performed by Dohmen and Falk, it is also observed that the output is also much higher under a variable pay scheme than under a

[25] Eriksson, T., Villeval, M.C. 2008 *Performance Pay, Sorting and Social Motivation* Journal of Economic Behavior and Organization 68, 2, page 412-421

fixed reward system.[26] This increase in output is largely driven by productivity sorting according to Dohmen and Falk.

However, this increase in output due to productivity sorting may not be as high as observed by Dohmen and Falk, as their experiment did not consider efficiency wages (pay employees above the market-clearing wage in order to increase the productivity or efficiency) and it only used one period. Why this increase in output may not be as high as Dohmen and Falk observed can be found in the experiment from Eriksson and Villeval (see footnote 25). In their experiment performance pay became less attractive under repeated interaction and efficiency wages. Reason for this was, that fixed firms offered efficiency wages which made it more attractive for the least high skilled persons to work under a fixed pay scheme. Also, fixed wages are considered to be less risky than performance pay systems, as they offer more stability.[27] It can be argued that this risk factor becomes increasingly more important as there are more periods to consider with respect to income, as risk is positively correlated over time. Where fixed income offers a stable prospect of the future income, this is not the case under a tournament reward system. The result of this uncertainty may cause the more risk averse high skilled workers to prefer a fixed reward scheme over a performance pay system.

Besides sorting based on productivity, there is also the role of non-skill traits in the sorting process. Although this topic is given more attention recently, there have been few experiments regarding this subject so far. One of the more well known of these experiments is the one performed by Dohmen and Falk in which they let their subjects choose between a fixed, variable and tournament reward system.[28] In this experiment they do not only focus on the productivity of the subjects and its role in the decision process, but also on personal attitudes, or non-skill traits.

As already described in the previous section, theory would expect these non-skill traits to play a role in the job sorting process. The experiment of Dohmen and Falk confirms this statement, as one of its conclusions is that personal attitudes affect the sorting decision in a systematic way. In their experiment, they used non-skill traits such as self-assessment, risk attitudes,

[26] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001
[27] Eriksson, T., Teyssier, S., Villeval, M.C. 2009 *Self-selection and the Efficiency of Tournaments* Economic Inquiry, 47, page 530-548
[28] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001

social preferences and personal indicators. For each of these non-skill traits they also provided possible explanations of how they interacted with the sorting decision. These explanations are given below.

In their article, Dohmen and Falk argued that the payoff in tournaments not only depends on individual output, but also on the output of colleagues. Therefore they claimed that a person's belief about his relative rank affects the decision to select a tournament reward system.[29] Because a person's belief about his relative rank in a tournament is the result of his self-assessment (see Judge et al's core self-evaluation traits in the section of theoretical predictions above), they argue that relative self-assessment affects the decision to select into a tournament. This was also supported by the experiment as they found that relative self-assessment significantly predicts sorting into the variable pay system.
Another non-skill trait that Dohmen and Falk observed to influence the sorting decision into tournaments is risk attitude.[30] The way risk attitude is involved here, is because all variable pay systems yield an uncertain income for the employees in contrast to fixed pay schemes. Hence, in their article Dohmen and Falk argue that the utility of a variable pay scheme is lower for more risk averse persons than for more risk neutral individuals. Due to the lower utility of variable pay schemes for risk averse persons, they conclude that risk attitude affects the sorting decision, as more risk averse workers are less likely to self-select into tournament and piece rate systems. This is also supported by the experiment they performed.
Then there are the social preferences. Most literature regarding social preferences and tournaments is about fairness and selfishness. Recent experiments have found that if people care about fairness this may influence the optimality of contracts. For example Fehr, Klein and Schmidt found that contracts that are optimal when all agents are selfish might be less efficient if there are some people that care about fairness.[31] This also works the other way; contracts that are inefficient when all agents are selfish, can reach high levels of efficiency if there are agents that care about fairness. Dohmen and Falk also considered reciprocal fairness in their experiment. They observed that this social preference plays no role in sorting to either fixed or variable pay schemes, but does seem to influence the attractiveness of tournaments.[32]

[29] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001, page 19-20
[30] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001, page 20-21
[31] Fehr, E., Klein, A., Schmidt, K. 2007 *Fairness and Contract Design* Econometrica 75, 1, page 121-154
[32] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001, page 21-23

Possible explanations they provide in their article are the fact that in tournaments higher work effort imposes a negative externality on others (as it decreases their probability of winning). But more importantly, they argue that since tournaments lead to unequal outcomes this system is more likely to attract selfish individuals. This is also supported by their experiment, as they observe that tournaments attract significantly less people that care about reciprocal fairness than fixed wage contracts.

The last group of non-skill traits discussed in Dohmen and Falk are the personal indicators. More specifically the focus they made here is on gender and personality. Correcting for productivity, they observed that men are more likely to choose a variable pay system than women.[33] Their explanation for this finding is that this effect is at least partly driven by gender specific risk preferences. This argument can be backed up, as there have been numerous other studies which have shown that on average women tend to be more risk averse than men as well (see for example Croson and Gneezy).[34] With personality Dohmen and Falk refer to what they label as 'soft skills' such as responsibility and positive attitude. When viewing from a bit broader perspective however, they can also be considered as a part of the non-skill traits. Using personality information of the experiment's subjects from questionnaires, Dohmen and Falk found that personality does influence the sorting decision with respect to different pay schemes. How personality influences the sorting decision differs with different personality traits. For example, observed was that women that are "self-confident", "reckless" and "can deal easily with defeat" are more likely to choose for tournaments, whereas women that were "rather shy", "mentally stable" and "unwilling to experiment" were more likely choose a revenue-sharing reward scheme.

Also, though not an experimental result, it should be kept in mind that there are also some empirical measures of non-skill traits such as the Rosenberg Self-Esteem score and the Rotter Scale of Externality score that can be linked with incentives. This suggests that these non-skill traits are also of interest to employers.[35]

[33] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001, page 23-26

[34] Croson, R., Gneezy, U. 2009 *Gender Differences in Preferences* Journal of Economic Literature, 47, 2, page 448-474

[35] Bowles, S., Gintis, H., Osbourne, M. 2001 *The determinants of earnings: a behavioral approach* Journal of Economic Literature, 39, page 1137-1176

2.1.3 Overview

In short, the main conclusion of this chapter is the fact that not only productivity and wage seem to determine the sorting decisions of labour, though they are still important, non-skill traits seem to play an important role as well. Although the role of non-skill traits is recently becoming more popular among scientists, there have been few experiments regarding this subject. These experiments came up with some interesting observations however. Self-assessment, risk attitude, social preferences and personal indicators all seem to be related to the sorting decision of workers in some way. And although this paper is limited to experimental findings, these observations were also made in empirical studies.
Given the observations from the experiments, it can be said that implementing a tournament reward system instead of fixed or piece rate system will affect job sorting in the following ways.
Perhaps the most important finding with respect to sorting into tournaments is the fact that tournaments tend to attract more productive people, because they have a higher expected payoff under such a reward system than with a fixed pay scheme. However, the impact of productivity sorting may differ from what Dohmen and Falk observed in their experiment when considering repeated interaction and if other firms offer efficiency wages. Efficiency wages and repeated interaction may result in the least high skilled and most risk averse persons to prefer another reward system over the tournament system. This leaves the most highly skilled and least risk averse persons to select the tournament system.
With respect to self-assessment, tournaments can be expected to attract people that have more belief in themselves (e.g. higher self-esteem), as these types of persons will belief their probability of winning the tournament is higher. This also brings the risk of attracting overconfident workers. Being a variable pay scheme, a tournament can also be expected to attract less risk averse individuals, due to the uncertainty of income. Also, as a result of the competitive nature of a tournament system, it is more likely to attract people that care less about reciprocal fairness and tend to be more selfish. Finally, personal indicators are also related to sorting into tournament reward systems, as tournaments attract relatively more men than women, as they are less risk averse on average.

2.2 Incentive effects

Tournaments have several implications on agents' behaviour. These implications can be divided in sorting and incentive effects. Sorting and incentive effects are driven by specific characteristics of the tournament design. Tournament size and prize structure are regarded as the most crucial elements of a tournament structure. The aim of this chapter is to determine if, and to what extend sorting and incentive effects occur and how they are driven by specific design characteristics such as size and prize structure. By using experimental studies the impact of sorting, incentive effects, and more specific characteristics of tournaments on the behaviour of agents will be examined. The behaviour of agents consists of productive and destructive behaviour (e.g. effort and sabotage).

There is general consensus among scientists that the implementation of a tournament design in a firm will have an effect on the incentives of the employees. How such a system specifically effects each individual worker is still for a large part unknown. Ever since Lazear and Rosen's[36] seminal paper in 1981, however, researchers have become more and more interested in the effects of tournament designs. This section will provide a brief overview of the literature regarding the incentive effects of tournament design.
The main setup of the model of Lazear and Rosen is that the output of the worker depends on his effort and an individual random component. With that setup, they find an equilibrium, where the effort of the worker depends positively on the difference between the winner and the loser prize (or prize spread). Also, as the influence of the random component increases, the amount of effort exerted by the worker(s) will decrease. With their model they showed that tournaments could induce efficient effort levels, like piece rates.

The main extensions to this initial work with regard to the incentive effects of a tournament design consider the effects of factors such as prize spread (the difference between winner and loser prizes), tournament size, the amount of information available (both to workers and employers) and repeated interaction. Although tournament theory is a broad subject, much of it follows from the agency theory and related literature. Important related literature analyses how the characteristics of an organization, such as its compensation system, can improve

[36] Lazear, E.P., Rosen, S. 1981 *Rank-Order Tournaments as Optimum Labor Contracts* Journal of Political Economy, 89, No. 5, page 841-864

worker performance under imperfect information and with monitoring costs. The focus with tournament literature lies mostly with individual worker characteristics and organizational characteristics, and the effect they have on efficiency and incentives under such a reward system.

The incentive effects of a tournament design structure can be described as a self-enforcing reward structure that is desirable when monitoring is either unreliable or costly.[37] Tournament theory explains this by arguing that the attraction of higher salaries motivates workers at all job levels below to devote more attention towards organizational interests and on the other hand makes shirking less attractive. In contracting theory, the focus is slightly different, as there the alignment of individual and organizational preferences is considered. Workers can exert a large amount of effort, either to the benefit of the organization or to shirk. So in contracting theory, the incentive effects of a tournament design are explained by the improved alignment of the interests of workers with the organization. Both tournament theory and contracting theory are a part of the more broad agency theory.

Keeping the focus more on tournament theory in this article, following is one of the most (or perhaps the most) famous examples of incentives in tournament theory in order to provide a better view of how incentives work under a tournament design. The example mentioned is about corporate tournaments and executive compensation (numerous articles have been written about this subject, e.g. Conyon et al[38]).
As mentioned before, in tournament theory a group of agents compete for a fixed prize and are rewarded according to their relative performance. The example of corporate tournaments and executive compensation is one of the applications of such a competition. In this example, employees compete for the position of CEO in an organization. As in tournament theory the prizes are fixed in advance, agents (the employees) may exert effort in order to improve their chances of winning a prize. The same holds for sports tournaments (hence the name tournament theory), where the absolute performance does not matter, but only the relative performance compared to the other agents/competitors matters. There can be only one person or team that wins a gold medal in each separate competition during the Olympics for example.

[37] Lazear, E.P., Rosen, S. 1981 *Rank-Order Tournaments as Optimum Labor Contracts* Journal of Political Economy, 89, No. 5, page 841-864
[38] Conyon, M.J., Peck, S.I., Sadler, G.V. 2001 *Corporate Tournaments and Executive Compensation: Evidence from the U.K.* Strategic Management Journal, 22, page 805-815

The properties of tournament systems have drawn the attention of researchers for some time now, and there have been several papers that considered these properties. An important article regarding this theory is an article by Prendergast.[39] In this article Prendergast collected information from a number of important theoretical and empirical researches (e.g. Groves et al 1994, Lazear 1996), which she then used to point out important issues in this topic. With her survey she found evidence to support the theory that relative performance payment contracts (incentives) influence the behaviour of employees. The roles of other factors such as risk and peer pressure were less obvious. Reason for this is mainly the lack of data to empirically confirm theories regarding such subjects, as personnel databases are often not easily accessible. Another problem is the lack of literature regarding contracts in complex jobs, such as consultancy, where output is less clear than in for example the woodcutting business. Therefore, below will be an overview of several experimental findings regarding tournaments to reduce this data problem, as in experiments more data can be created. The next paragraph however, will first discuss some predictions from tournament models, which will then be used in the section of the experiments to test these theories.

2.2.1 Theoretical predictions regarding tournament incentives

The first theoretical predictions that will be discussed here, regard tournament prizes. In firms, such prizes usually are promotions (which come with an increase in salary) or cash bonuses for good performance. However, prizes also include non-monetary rewards that employees may value, such as an increase in responsibility or the more interesting assignments that may come with a promotion. Homogeneity is assumed for the rest of this section with respect to the ability of workers.

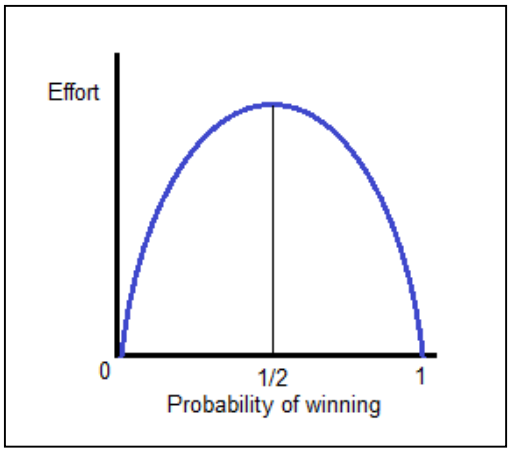
Related to tournament theory incentives, are several predictions from tournament models regarding the behaviour of employees.[40] In short they can be summarized as follows:

1) larger prizes motivate more effort and performance
2) there is a U-shaped relationship between promotion rates and rewards
3) prizes are relatively larger higher up the hierarchy in order to maintain incentives

[39] Prendergast, C. 1999 *The provision of incentives in firms* Journal of Economic Literature, 37, page 7-63
[40] Gibbs, M. 1995 *Testing Tournaments? An Appraisal of the Theory and Evidence* Labor Law Journal

1) The first prediction made by theoretical tournament models is that there is a positive relationship between tournament prize and the effort. These models predict that a prize (monetary or non-monetary) stimulates workers to exert more effort as compared to not offering a prize. A monetary prize can be seen as the difference in wage between different levels, whereas a non-monetary reward can take many forms. These non-monetary rewards can be grouped as awards and their effects are recently being studied more intensive.[41] If prizes stimulate effort, higher output and performance should be expected as a result from a larger prize (usually a larger wage gap).[42] As mentioned earlier, a larger prize (spread) will also influence the sorting decisions of potential employees. The focus in this section however, will be on the incentive effects.

2) Another factor often discussed in tournament literature is tournament size. As employees in a tournament reward system compete for a prize, the number of competitors (the tournament size) influences their chances of winning the tournament. This in turn, will have an impact on the behaviour of the workers. Assuming the prizes are fixed, different tournament sizes may lead employees to exert low, high or even no effort (see graph below).



Considering the graph above, in order to keep effort at a constant high level, the rewards at a very low or high probability of winning should be relatively high compared to the reward if the probability of winning is (close to) one half. This would result in a U-shaped relationship between promotion rates (probability of winning) and rewards. As the number of participants influences the probability of winning, a question an employer implementing a tournament system could ask himself is whether it is better to have a single tournament with many

[41] Neckermann, S., Frey, B.S. 2008 *Awards as Incentives* Institute for Empirical Research in Economics, Working Paper No. 334, University of Zurich
[42] Bloom, M. 1999 *The performance effects of pay dispersion on individuals and organizations* Acadamy of Management Journal, 42 page 25-40

participants or multiple tournaments with few participants.[43] Given the relation between tournament size and the probability of winning, tournament models predict that the prize is increasing with the number of participants (tournament size).[44]

3) The last two predictions of tournament models discussed here are if there are many job levels in a firm, the compensation gap will increase if individuals move up in the hierarchy.[45] Also, in sequential elimination tournaments (multiple rounds), workers will compete with each other at given job levels. As the winner(s) of these tournaments are promoted, they will compete in the next round for an even higher job level. Therefore, promotion in one round will also indicate that those workers promoted are still in the race for the next round. For this reason, the prizes of winning the later rounds also influences the effort exerted in the first round. If the stakes are high enough (large prize spread), this may lead to a more than healthy competition between workers of the same firm. As a consequence, problems such as sabotage may occur.[46] Because the prizes at the final rounds affect the entire company, tournament models predict that compensation is an increasing function of the organizational level and may help to understand the large salaries of CEO's in multinationals.[47]

2.2.2 Experimental findings regarding tournament incentives

As mentioned earlier, there are many predictions based on the theoretical tournament models. As theory and reality, are (almost) never the same, due to simplifications in the models and unpredictable human behaviour, this section will rely on several experimental researches performed on tournament theory models in order to provide a more realistic view on tournament incentives. Below are the observations and possible explanations for these experiments with regard to incentives.

[43] Harbring, C., Irlenbusch, B. 2003 *An experimental study on tournament design*, Labour Economics 10, page 443-464
[44] Prendergast, C. 1999 *The provision of incentives in firms* Journal of Economic Literature, 37, page 7-63
[45] Eriksson, T. 1999 *Executive compensation and tournament theory: empirical tests on Danish data* Journal of Labour Economics, 17(2) page 224-242
[46] Lazear, E.P. 1989 *Pay Equality and Industrial Politics* Journal of Political Economy, 91, page 561-580
[47] Lambert, R.A., Larker, D.F., Weigelt, K. 1993 *The structure of organizational incentives* Administrative Science Quarterly, 38 page 438-461

One of the most important observations from these experiments is that under variable pay schemes the output is much higher than with fixed rewards.[48] According to Dohmen and Falk, this difference in output under fixed and variable reward systems can be largely attributed to productivity sorting (see also sorting chapter). Also contributing to this increase in output is the fact that reported effort under variable pay schemes is significantly higher than under fixed ones. As all firms, with the possible exception of non-profit firms, would prefer a larger output, why would a firm prefer a fixed reward system over a variable one? Some other experimental observations may provide an answer.

Another observation often observed in experiments with regard to reward systems is that not only the effort exerted by the employees is higher under variable systems, but there also tends to be significantly more stress and exhaustion among workers in firms with variable pay schemes.[49] Reason for this, is the fact that variable systems reward more effort (in fact firms usually reward higher output, but this can be achieved by the workers if they increase their effort). This relation between wage and effort increases the pressure on workers in a variable system as they have more incentives to perform better. The higher pressure on the employees may in turn lead to stress, and eventually exhaustion as a result from working overtime consistently. Under a tournament reward system, the reported stress is even higher as the pressure on individuals is larger due to the more competitive nature of the system. As wage in such systems does not only depend on output, but also on the relative performance of the employees, this automatically creates a more competitive working environment, hence resulting in more pressure (especially on the least skilled workers that will have to exert even more effort to compensate for their lack of skills).
Also interesting to note with regard to effort is the fact that experimental evidence indicates that more competitive and more risk tolerant persons tend to exert more effort in (promotion) tournaments.[50] Altmann, Falk and Wibral provide some possible explanations for these observations in an experiment with a random shock. First, the more competitive persons exerted higher output after receiving intermediate feedback. Therefore, in the case of more competitive persons, knowing how they are doing may push them to exert some extra effort in order to win the tournament. Second, their explanation for the fact that they observe risk

[48] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001 page 13-15
[49] Dohmen, T., Falk, A. 2007 *Performance Pay and Multi-dimensional Sorting – Productivity, Preferences and Gender* IZA Discussion Paper No. 2001 page 26
[50] Altmann, S., Falk, A., Wibral, M. 2007 *Promotion in Multi-Stage Elimination Tournaments: an Experimental Investigation* Working paper

attitude is related to effort is as follows. They argue that effort choices in tournaments are risky for two reasons. One being the fact that the output of individuals does not only depend on effort, but on a random shock (a factor not controlled by the individual) as well. Their other argument is that there is also a strategic risk involved in the workers decision to exert effort, as promotion decisions in their experiment depend on the relative comparison of outputs, which in turn depend on the competitor's behaviour. Keeping in mind the sorting effect discussed earlier, which indicates that more competitive and risk tolerant workers will apply to the firm; this may be beneficial to the firm as these persons tend to exert more effort in tournaments as well.

More specifically, tournament reward systems do not only provide more stimulus for employees to increase their effort, they also provide them with some negative incentives. A field experimental study by Burks, Carpenter and Goette for example, shows that there is less cooperation under performance pay than there is with a fixed system due to the more competitive nature of the performance pay system.[51] As tournament systems are even more competitive than standard performance pay systems, the cooperation should be even lower. This is, in fact, what is predicted by tournament theory and also observed in experiments. Depending on the circumstances, it could even lead to employees sabotaging each other, which is, needless to say, negative for the firm. Considering the previous paragraph, which explains that more competitive and risk tolerant persons are more willing to exert effort in order to win the tournament, it would seem logical that they are also less willing to cooperate and more likely to sabotage their colleagues. Due to their competitive nature, I would expect them to be less cooperative as it decreases their chances of winning the tournament (since it helps increasing the output of others). On the other hand, being less risk averse, they would value a possible punishment for sabotage (when caught) lower than a more risk averse person. Unfortunately I did not find an experimental research confirming this, but it would be interesting to see it tested.

What also has a significant impact on the incentives of employees working under a (relative) performance pay system is the prize structure. Under a tournament system, that would be the height and the amount of winner and loser prizes. Regarding the role of prize structure and incentives in tournaments, there have been performed several experiments which included this

[51] Burks, S., Carpenter, J., Goette, L. 2006 *Performance Pay and the Erosion of Worker Cooperation: Field Experimental Evidence* IZA Discussion Paper No. 2013

factor. The most interesting observation found in the experiments, considering prize structure is the fact that a balanced fraction of winner and loser prizes is optimal for stimulating productive activities. Although there is only weak support for these findings, this observed in a number of experiments such as the ones performed by Harbring and Irlenbusch[52] and by Orrison, Schotter and Weigelt.[53]

Unlike theoretical analysis suggest, Harbring and Irlenbusch, similar to Orrison, Schotter and Weigelt, argue that workers do not limit their behavior on the (constant) marginal probability of winning (based on their observations). Both experiments had observations where at some point the effort was lower while the fraction of winner prizes was larger (e.g. lower effort when fraction of winner prizes was 2/3 than at 1/2). This implies that even though the marginal probability of winning was larger, at some points the reported effort was not, hence contradicting with theory.

Possible explanations for this observation are that employees are not willing to spend any (extra) effort if the probability of obtaining a winner prize is close to zero or one (achievement motivation theory). If the chance of winning for a worker is close to zero, he will know that it is pointless to spend any effort as he will not end up with the winner prize. On the other hand if the probability of winning for a worker is very high (close to one), the employee may not be willing to spend extra effort as he is convinced he will end up with a winner prize anyway. Agents may even end up shirking when there are too much winner prizes available.[54] For this reason, a fraction of winner and loser prizes which lies somewhere in between is optimal for stimulating productive activities. This is also more or less in line with the theoretical models predicting a U-shaped relationship between promotion rates and rewards (following from a concave relationship between effort and probability of being promoted). Some possible explanations for the low effort at very high or low chances of winning mentioned in the experiments are the achievement motivation theory and the vulnerability concept. The achievement motivation theory explains the low effort at high chances of winning by the fact that people take pride in their accomplishments. If there is no challenge to winning a prize (the chance is high), workers will be less motivated according to this theory. The vulnerability concept considers how fast the equilibrium payoff of an agent

[52] Harbring, C., Irlenbusch, B. 2008 *How many winners are good to have? On tournaments with sabotage* Journal of Economic Behavior & Organization 65, page 682-702

[53] Orrison, A., Schotter, A., Weigelt, K. 2004 *Multiperson tournaments: an experimental examination* Management Science 50, page 268-279

[54] Orrison, A., Schotter, A., Weigelt, K. 2004 *Multiperson tournaments: an experimental examination* Management Science 50, page 275

would decrease if others were to deviate from the equilibrium effort level.[55] In Harbring and Irlenbusch's experiment it was shown that agents are more vulnerable if the number of winner and loser prizes is balanced.[56] This implies that the reduction of payoff for workers, as a result of an increase in effort by other workers, is largest at this point. It is then argued that this leads the workers to exert higher effort, as there is more to lose. For example, a worker has more to lose in a tournament with a balanced fraction of winner prizes than in a tournament with a relatively large fraction of winner prizes if one of his colleages exerts more effort. The reason for this is that the deviation in the probability of winning for the worker is relatively larger with a balanced fraction of prizes compared to a large fraction of winner prizes when one of his collegeas increases his effort level. This indicates that a worker has more to lose with the balanced fraction of winner prizes (he is more vulnerable), providing him with more incentives to increase his own effort as well.

Although in theory tournament size is considered an important factor, experiments indicate that it has (almost) no effect on the behaviour of employees. As long as the fraction of prizes remains the same, a change of tournament size in experiments does not significantly impact the effort exerted or the amount of sabotage by workers.[57]

2.2.3 Overview

Summarizing this chapter, it can be said that many predictions of tournament theory models (regarding incentives) are confirmed in labour market experiments. The most important of these confirmations is the fact that pay schemes that are linked to performance result in higher effort of employees. Another important finding, also predicted by theoretical models, is that the prize structure has a significant influence on the behaviour of employees. A balanced amount of winner and loser prizes appears to be optimal. Tournament size is, as predicted, of no significant influence as long as the fraction of prizes remains the same. Also observed in the experiments is that more risk tolerant persons on average exert higher effort levels than less risk tolerant persons.

[55] Nalbantian, H.R., Schotter, A. 1994 *Productivity under group incentives: an experimental study* New York University Research Report #94-04
[56] Harbring, C., Irlenbusch, B. 2008 *How many winners are good to have? On tournaments with sabotage* Journal of Economic Behavior & Organization 65, page 682-702
[57] Harbring, C., Irlenbusch, B. 2008 *How many winners are good to have? On tournaments with sabotage* Journal of Economic Behavior & Organization 65, page 682-702

There are some negative effects found in the tournament systems as well. Due to the more competitive nature of the system, stress and exhaustion reported is higher and the willingness to cooperate decreases. Even worse, tournament systems stimulate not only productive effort, but also destructive effort (sabotage).

3. The Firm

The aim of this chapter is to provide a link between the experiments and reality. Seeing how tournament systems are applied in real life may provide a better understanding of its workings, and combining its results with theory and experiments could lead to more efficient reward systems for firms (at least for firms similar as the one discussed here). Using information provided by a real world firm, this chapter will first provide a general description of the firm and its business in order to see why the firm chose to implement a tournament system. Following that is a detailed overview of the company's tournament reward system. After that there will be an evaluation of the firm's tournament system by combining the results of the experiments with the real world system of the firm. Applying the experimental results to the real world system may provide a better understanding of that particular firms reward system and allows to identify any possible improvements.[58]

[58] Note: Due to privacy considerations, the name of the firm will not be mentioned in this article. However most of the information used in this article is retrieved from an information package provided by the firm and from the company's website. For this reason, there will also be no references to these two sources in this chapter.

3.1 General description of the firm

The company used in this article is a multinational consultancy firm. This implies that it is a firm that consists of experts that provide professional advice to organizations for a fee, and that it operates in multiple countries. This section will describe the main business of the company and the market it operates in. Reason why this section is included is that a better understanding of the specific situation of this firm and the environment it operates in may help the reader to see how the reward system influences the firm. First will be an overview of the main business of the firm, describing the firm's most important activities. Following that will be a section discussing the market and other external factors playing a role on the firm's performance.

3.1.1 Main business of the firm

As mentioned above, the firm (or firm X from now on) is a (management) consultancy firm active in multiple countries. Being a consultancy firm, its main business consists of aiding the firm's clients in achieving their goals. Firm X helps their clients realize these goals by using their specific knowledge and experience. More to the point, consultancy firms like firm X usually aid clients that require help with for example improving their performance or entering a new market.

The main business areas of firm X discussed below will only provide a short description of how clients are generally assisted by consultancy firms. This is done using the general descriptions from the consultancy group website.[59] Although there are differences between consultancy firms in the way they help their clients, it is not necessary to go into details here for the following reason. The aim of this section is to provide some insight into the business activities of firm X as a consultancy firm in order to help understand the nature of the reward system. Details of firm X that are important for understanding the reward system however are included in the section regarding the reward system.

[59] http://www.theconsultancygroup.nl

Helping firms enter new markets is a task usually done by a consultancy firm by performing a market entry analysis. Such an analysis answers the question whether or not a certain market should be entered and if so how and when. Although the specific approach to answering these questions differs among consultancy firms, the basic idea remains the same. First the relevant markets are observed and evaluated and then the consequences of several entry options are compared (e.g. fusion, franchise or takeover). If the clients decide to enter the market based on these results, the consultancy firm can also help with the implementation of the market entry.
Helping to increase the revenues in existing markets is usually done based on a market analysis of the current markets. This type of analysis tries to determine the market position of the client and how well it is doing compared to its competitors. Using methods like the SWOT-analysis the consultancy firm can help clients improve their market position and revenues in existing markets.[60]

Mentioned above, firm X as a whole can be considered as a management consultancy firm. Management consultancy can be divided into the subgroups of strategy consulting, IT consulting and business consulting. Where helping entering new markets and increasing the revenues could best be described as strategy consulting, improving performance and efficiency are more of a combination between IT and business consulting. Strategy consulting could be seen more as advice about the strategy, while business consultants help with the implementation of this strategy in various ways (e.g. supply chain management or human resource consulting). The goal of IT consulting is to provide advice to clients on how best to use information technology to meet their business objectives.
Using these definitions, helping to improve to operational performance can be considered mostly IT and partly business consulting. Delivering a clients products and services more effectively and efficiently on the other hand can be categorized mostly as business consulting.

3.1.2 The business environment

This section will discuss the current global consultancy market, how it got to this point, and what trends can be expected in the future. This is done in order to see how the business environment influences firm X. As a result, this will provide some more insight into if and

[60] Kotler, P., Keller, K. 2006 *Marketing Management (twelfth edition)* Chapter 2, Pearson Education, New Jersey

how the reward system is related to the business environment now and in the future. The global consultancy market is discussed here, because firm X is a multinational company active on multiple continents.[61]

The management consultancy industry grew with the development of management. Founded in 1886 Arthur D. Little founded the first management consultancy firm with the same name. Since then, the consulting market has gone a long way and has grown significantly. Especially in the 1980s and 1990s there was a rapid growth of management consulting in the US and Europe.[62]

The current state of the consultancy market is the result of differentiation of management consultancy firms. This differentiation has led to four main types of consultancy firms.[63]

- Large management and strategic consulting specialists
- Boutique firms
- Medium-sized information technology consultancy firms
- Large networks

Firm X best suits the large network type of firm. Below will be a brief description of these types of firms and some expected developments in the consultancy market based on recent developments and trends in this market.

The large management and strategic consulting specialists only offer strategy consulting and are specialized in a specific industry.

Boutique firms are often small firms, and are far more numerous than the other types of consultancy firms. These agencies focus on specific areas of consulting expertise in specific industries or technologies. Such small niche companies compete with the larger and broader consultancy firms in the areas they specialise in.

Then there are the medium-sized information technology consultancy firms that combine the boutique firm style with some of the same services and technologies global firms offer to their clients.

[61] Note: As I was unable to obtain a management consulting industry report, the information in this part may not be entirely up to date as the only other relevant sources available were two articles from 2007. It should not be a problem for the rest of the article however; as the purpose of this section is merely to show what factors are influencing the global consultancy market.

[62] Brondoni, S.M. 2007 *Management Consulting, Global Markets and Corporate Networking* SYMPHONYA, Emerging Issues in Management

[63] Brondoni, S.M. 2007 *Management Consulting, Global Markets and Corporate Networking* SYMPHONYA, Emerging Issues in Management

And there are the large networks such as firm X; diversified organizations that provide a broad range of services, among which information technology consulting. Compared to the boutique firms however, these larger firms often have a more reliable reputation that may attract more clients.

Since the beginning of this century there have been several developments in the consulting market. Today, some of the most important trends in the consultancy market are the result of increasing globalization. This globalization of the consultancy market is driven by several factors. A main driver is the client demand.[64] As many western firms expand their business to other geographic regions such as Asia, it becomes more attractive for service firms to establish an office in those regions. Another important consideration is the indigenous client demand. If consultancy firms want to serve locally focused clients in for example China, it is important to have an office in that country. Besides client demand, other factors influence globalization in this market as well, however client demand is the most influential.
Besides creating opportunities in new markets, globalization has increased the competition in the consultancy market as well. Combined with the recent economic crisis this has led to tighter budgets, shorter engagements and more competitive bidding. Also, although new markets are arising in India and China, the consultancy market is still limited to the developed areas of the world, which only adds to the competition in the market. Mentioned above, large firms such firm X, will not only have to compete with other large consultancy agencies but will also face local competition from the smaller boutique firms.
This is not the only competition faced by consultancy firms however. A recent trend in the management consulting market is the rise of internal consulting groups.[65] In order to reduce costs from hiring external experts, an increasing number of large firms have created their own internal consulting groups to improve the performance of their company. Needless to say that this indicates that the business environment of firm X is highly competitive.

[64] Bernard, A., Byrne, J., et al. 2007 *The Management Consulting Industry Confronts Globalization* Center for International Business, The Tuck School
[65] Brondoni, S.M. 2007 *Management Consulting, Global Markets and Corporate Networking* SYMPHONYA, Emerging Issues in Management

3.2 The reward system

This section will discuss the system used by firm X to reward their employees.[66] It will start with description of the individual components of the performance management framework, followed by a description of the interaction between these components and a brief overview. These components are objective setting, outcome assessment, comparing and rating and plan development. The information of this framework will later be used in another section of this paper for the evaluation of the reward system.

Graphical overview of firm X's Performance Management Framework

[66] Note: the information in this section is taken from the information package provided by firm X, mentioned at the start of the chapter (page 26).

3.2.1 Objective setting

The aim of objective setting in the performance management framework of firm X is to make sure that all employees know what is expected of them and what they need to do. Before continuing with the details of this process, there will be a description of firm X's definition of what an objective is.
Firm X describes an objective as a measurable and specific statement of results an individual in the company is expected to achieve. In this company they combine their own ideas regarding objectives with the well-known SMART objectives first mentioned by Doran.[67] With SMART standing for Specific, Measurable, Achievable, Relevant and Time-bound. The idea behind such clear goals is that it allows persons to focus their effort in a better way. Firm X's SMART objectives are defined by descriptions and targets. Descriptions can be seen as the way to reach a goal, including possible challenges, significance, focus and a timeframe for the meeting objectives. Targets on the other hand are the destinations and describe what should be accomplished. Therefore, targets also serve as a benchmark to determine the amount of success on reaching objectives. Firm X only uses objectives for the most relevant activities and do not include (simple) day-to-day responsibilities.

The reason why firm X sets these objectives is to allow employees an active participant of their performance management system. As mentioned above, objective setting provides the employees better knowledge of what they are expected to accomplish. By regularly (at least once per year) rating the results achieved by performance against objectives, this system also provides the workers with incentives to reach these objectives and thus increases their effort if necessary. The incentives mentioned here are the result of the rewards related to different levels of ratings (e.g. bonus for good rating), which will be more thoroughly discussed in this section under compare and rate.
Also, in order to align the corporate strategy with the individual objectives, firm X sets the individual objectives while keeping in mind the areas the company values most. These areas in which firm X is interested mostly are shareholder and stakeholder value, people skills and profits and are called the Leadership Contribution Areas. This results in all employees having at least one objective related to each of these areas. The amount of objectives varies per employee, but tends to increase with their level of experience and the complexity of their role.

[67] Doran, G.T. 1981 *There's a S.M.A.R.T. way to write management's goals and objectives* Management Review, Vol. 70, Issue 11, page 35-36

When objectives are set precisely depends on the type of work they are set for. Also objectives can and should be revisited over time if necessary.

3.2.2 Assess outcomes

The second step of the performance management framework is the assessment of outcomes. This step is required in order to rank the employees in the following step of the process. Individual performance in firm X is evaluated using results and behaviours. Consequently, the performance of employees is not only linked with what is achieved, but with how they achieved this as well. The assessment of outcomes in firm X is an ongoing process, providing the workers with feedback regularly (at least two times per year) and allows them to improve themselves. Besides this continuous process of information feedback, at the end of a project or assignment employees receive formal feedback as well, regarding their performance at that particular job.
This information feedback revolves around a computerized system called myPerformance. Supervisors use this system to rate the employees they work with using results against objectives in the Leadership Contribution Areas and behaviours using performance factors. The performance factors are designed to capture how the results are achieved and vary among different workforces and career levels. The myPerformance system does not only allow supervisors to rate the performance of employees, but also allows for workers to comment on their colleagues and allows them to provide evidence of their own contributions by documenting self input. Together, the ratings of the results and performance factors provide the employees with an understanding of their performance against their job standards, which provide the basis for the comparing and rating.

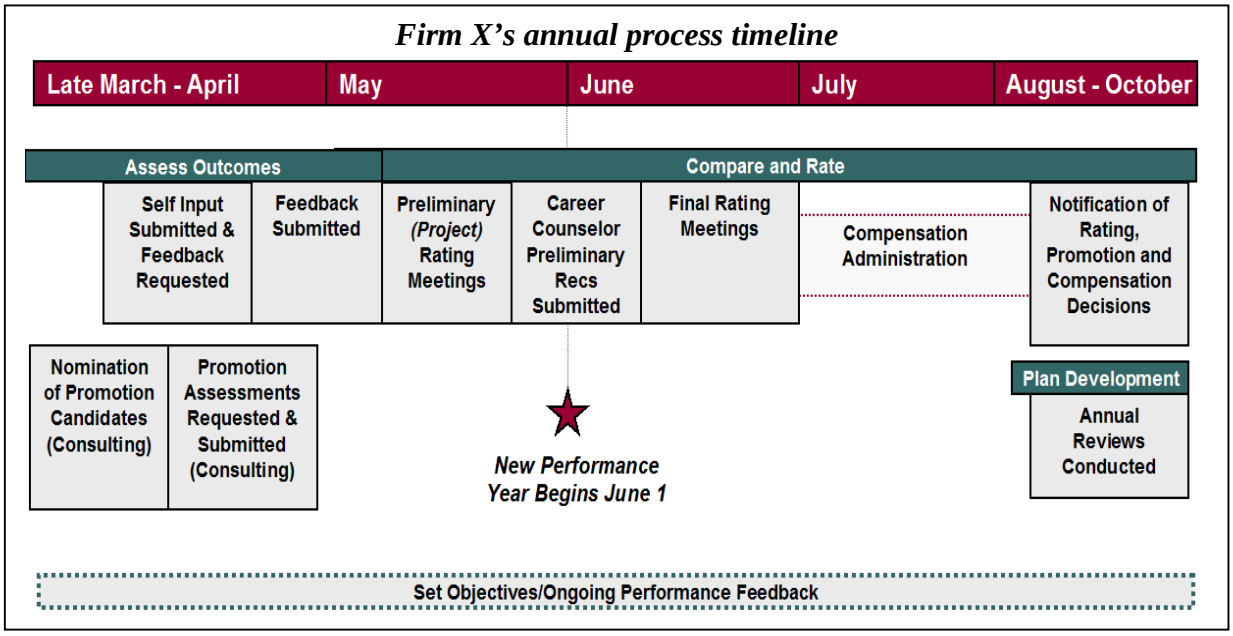
Before the comparing and rating occurs however, there is the nomination of promotion candidates (see annual process timeline below[68]) which occurs at a specific time each year rather than being a continuous process. The key factors considered at the decision whether or not to nominate a person for promotions are the following:

- Individual's months at level and past performance
- Individual's demonstrated and sustained ability to perform at the next level
- Firm X's ability to staff the individual to the client at the next level

[68] Source: Information package firm X

Nomination for promotion does not guarantee the promotion however, as the final promotion decisions are based on the individual's readiness to advance and the business need for higher-level employees.

To be nominated, managers can submit the names of candidates to the human resources department. The bases for such submissions are the key factors mentioned above. Once this is done, the promotion candidates can use the myPerformance system to request promotion input from up to six assessors. These assessors have to be executives that the candidate has had to deal with regularly during the last performance year (see timeline below for an overview of the performance year). Human resources then reviews the nominations and the promotion input from the assessors and then decides whether or not to promote the candidate. If the employee has had no recent exposure (or not enough) the promotion decision will be postponed.



3.2.3 Compare & rate

The compare and rate section of the reward system of firm X is what turns their system into a tournament. Both the objective setting and the assessment of outcomes are necessary steps in order support the rating system. At the compare and rating step the contribution of workers is discussed and compared a peer group. Based on this comparison, the annual contribution rating is determined.

The comparison of employees occurs at the rating meetings (see the timeline above). In these rating meetings individual contribution at projects is discussed, based on the assessed outcomes earlier in the performance year and rated against peers at the project(s) the employee was involved. Based on the assessment of overall contribution for the performance year the career counsellor then recommends a rating for the individual. After that workers are compared with employees of equivalent experience and function in a peer group in the same geographical area (or "deployed-to" organization) to determine a relative contribution. There is no formula for determining the ratings, but they are based on thoughtful, objective discussions according to the information package provided by firm X. As the firm uses a common framework to determine the individual performance, the comparison of employees is also made easier. At the end of these rating meetings, the rewards are given to the employees based on their relative rank in their peer group. Rewards include increases in the base pay and a possible bonus. Also good ratings may improve the chances of being nominated for promotion later in the performance year. What specifically is discussed during the rating meetings is mentioned below.

In the rating meetings, not only the contribution of individuals is discussed, but also the support of firm X's core values is taken into account. These values include respect for others, integrity, client value creation, teamwork, talent and a heart for the company. Besides the individual contribution and these core values, firm X specifically lists factors that are (not) taken into consideration when determining the rating of employees. This list is given below:

Considered	**Not considered**
Individual performance feedback including the ratings for each leadership contribution area and for the performance factors	Previous ratings
Scope and complexity of roles	Past experience prior to the current performance year
Reason for any un-staffed time	Potential for promotion or promotion candidacy
Trends in performance	Retention risk
How individual results compare to what is expected of someone at a given career level	Part-time or leave status
Leadership survey scores (for senior managers)	Information related to gender, age, race/ethnicity, sexual orientation
Demonstrated stewardship/corporate citizenship (involvement with the company, also a core value)	Operational or quality issues with the project not related to the individual's performance
Administrative compliance	Personal bias against certain behaviors or styles

At first glance, two of these factors may seem to contradict each other. The previous ratings are not considered, but the trend in performance is. This implies that one year of bad performance will not be considered in a rating meeting, but several years of bad performance after each other will be. Other interesting factors here are retention risk, part-time or leave status, which should not be considered and demonstrated stewardship. As persons that have a higher retention risk, or only work part-time may be seen as less involved with the company. Since the annual ratings are based on (thoughtful, objective) discussions, the involvement of personal bias in the rating decisions can not be removed entirely.
During the rating meetings, employees are laddered by their supervisors based on the comparison of performance and contribution. This ladder shows the place of individual employees relative to his peers. The exact rating of a worker is a number, such as 4 out of 10 (with number 1 being to best performer in the peer group). Based on these ratings, the contribution of the worker in relation to its peers can be determined using the rating scale. The guideline in this scale is that at least 40% of the employees should perform consistent with peer group. This percentage can improve if there are fewer workers that perform above average for that particular group. Well performing employees can perform (significantly) above peer group and very well performing workers are at the very top of their peer group. For employees performing above average, there is an upper limit of the percentages that can be in the particular groups but does not have to be reached. Workers whose contribution is considered below the average of the peer group are grouped as well and have a limit of up to 10%. This ladder is then used to identify the top and lower performers and to reward them appropriately.

Based on the nominations, during the rating meetings some nomination candidates are also recommended for promotion (preliminary rating meetings) and the promotion decisions are made final as well (final rating meetings). Where the supervisors of an employee perform the preliminary rating meetings, the final rating meetings include senior executives, career counsellors and members of the human resources department. The career counsellor (usually a supervisor) represents the employee for which he is responsible during the final rating meeting. Once the final rating meetings are finished, there is one final review by the leadership before approving of the final rating decisions. After that, the final contribution ratings form the basis for the compensation decisions such as a bonus or base pay adjustment (the compensation administration step in the annual process timeline).

3.2.4 Plan development

Plan development is the final step in firm X's annual process. This step is used to review the past performance year and, more importantly, planning for the future. Planning for the future and the annual review are done by the career counsellors and the employees they are assigned to. The first issues discussed at the plan development are the key performance themes of the previous performance year. Based on this review, the focus shifts to planning for the future with suggestions for possible development and training activities. The main objectives of this future planning are to ensure objectives are finalized for the current project or role, to discuss the job satisfaction of the employees and to align performance feedback and skill gaps with possible development activities in order to allow the workers to reach their performance objectives and career goals.

3.3 Evaluation

This section will try to evaluate firm X's reward system based on the experiments performed in the previous chapter. It will start with a discussion considering the effects of firm X's reward system on the sorting decisions based on the experimental data. Following that, there will be a similar discussion regarding the effects of the performance management framework and the effects it can be expected to have on the incentives of firm X's employees based on the experimental data mentioned earlier. Based on these discussions, there will follow a new discussion in which the strengths and weaknesses of the reward system will be discussed. Following that there will be argued if (and where) there is room for improvement in firm X's reward system.

3.3.1 Evaluation of sorting effects

The reward system of firm X is a typical tournament system. Considering the sorting experiments mentioned before, this implies that there are certain effects regarding labour with respect to the attractiveness of firm X as an employer. The effects identified in the sorting experiments and their effects on firm X are summarized below.

Productivity sorting is often one of the first effects that comes to mind when considering a tournament reward system and one of the main reasons for firms to implement such a system. Due to the higher expected payoff such a system yields for more productive people, a tournament reward system is more likely to attract more productive people. However, given that there is repeated interaction and some other firms offer efficiency wages in the real world this also has some consequences on the sorting decision of labour. The least productive of the highly skilled may prefer to work for a firm which pays efficiency wages leaving the more highly skilled to apply to firm X. Repeated interaction seems to influence the level of risk aversity of labour preferring a tournament reward system. The least risk averse persons are attracted to firm X.

Besides the productivity sorting effects for firm X, there are also sorting effects based on non-skill traits (such as risk aversity mentioned above). As pointed out in the experiments section, a tournament system such as implemented by firm X, is likely to result in less risk averse persons to apply to the company. Also related to risk aversion is gender. As men tend to be less risk averse on average, it can be expected that relatively more men will apply to firm X as

well. Other non-skill traits such as self-assessment and social preferences are related to the sorting decision of firm X in the following way. The company will tend to attract people with higher self-esteem as they will think better of their chances in the tournament. Due to the competitive nature of the tournament system implemented by firm X, the workers willing to work under such a system will tend to be more selfish. However, as firm X tries to include other values, such as teamwork, in their reward system as well this may slightly reduce the selfishness of (potential) employees. Still, as the importance of such factors as team work lags behind performance in the tournament, firm X will likely attract more selfish workers on average compared to companies with other reward systems.'

3.3.2 Evaluation of incentive effects

By implementing a tournament reward system, firm X created several incentives for its employees that they otherwise would not have had. The most important of these effects have been identified by experiments, which have been discussed in a previous chapter. How exactly the reward system as it is implemented by firm X affects the incentives of its employees is summarized below.

The main reason why firm X would prefer a tournament system is to stimulate employees to increase their effort. This is also confirmed by the experiments, as pay schemes that are linked to performance result in a higher effort of employees. The increase in productivity is even more increased, as another experiment concluded that more competitive and risk tolerant persons tend to exert more effort in tournaments (when provided with intermediate feedback). Given that firm X tends to attract more risk tolerant and competitive workers due to their reward system and they provide employees with continuous performance feedback, the amount of effort exerted will be even greater.

The fraction of winner and loser prizes affects the incentives of employees as well. As firm X's combination of winner and loser prizes seems relatively balanced (the probability of winning is neither very large nor very small) and the percentage of winners and losers remains the same as the tournament size varies, their prize structure appears to be optimal.

Besides these positive incentive effects, there are also some downsides on implementing a tournament reward system. Due to the competitive nature of the tournament, the reported level of stress and exhaustion increases as well. The willingness to cooperate under such a system decreases as well and a tournament system may even cause some employees to devote some of their effort to sabotage. By including factors such as teamwork in their reward

system, firm X partially reduces the incentives to sabotage. The inclusion of these factors may also cause a reduction in the reported levels of stress and exhaustion. On average however, firm X's tournament system will be more likely to stimulate sabotage and report higher levels of stress than other, more conservative, reward systems.
Another incentive created by firm X's reward system, is for employees to invest some time into getting on friendly terms with his or her career counsellor. As the career counsellor plays an important role in both the promotion and rating process for the employees he is assigned to, workers may want to invest part of their effort to get on good terms with their career counsellor as they think this might improve their chances for promotion or lead to a higher rating. Though firm X tries not to involve personal bias in these decisions, it may prove difficult in practice to keep these factors out of the equation completely when such decisions are made based on discussions.
Finally, the myPerformance system, allowing employees to provide feedback on each other will provide some positive incentives as well. By receiving regular feedback about how an employee is doing; this may result in higher effort if the worker is afraid he might be performing not well enough. This system is also likely to increase the cooperation between employees, as bad team workers will receive negative feedback from their colleagues.

3.3.3 Strengths, weaknesses and suggestions

With the tournament reward system of firm X evaluated, this section will try to determine the strengths, weaknesses and possible improvements. First the strengths and weaknesses of firm X will be discussed, based on the evaluations and the general description of the firm. After that, the aim of this section is to identify the problems commonly encountered when implementing a tournament reward system, but also the less obvious problems associated with such a system. Using firm X as an example, this section will try to provide new insights on the tournament reward system and see if there is room for improvements. Such solutions may also be beneficial to other firms struggling with the same issues from tournament systems as firm X. Finding possible improvements for firm X's reward system proved to be quite difficult, as the company implemented their tournament system quite well. However, using the experiments as a basis, a few possible improvements were found.

After analyzing the evaluations and the description of firm X some strengths and weaknesses of the reward system could be identified. An important aspect of the tournament reward

system beneficial to firm X is the productivity sorting. Given that firm X is a consultancy firm, attracting high quality workers is even more important than most other types of firms as its main business is focused on knowledge. This observation automatically leads to another strength of this reward system for firm X. As the main business involves aiding clients with knowledge, productivity may prove difficult to measure which makes it hard to stimulate employees to exert more effort under other reward systems. What could also be considered as a strength is that this tournament reward system keeps the employees of firm X on edge and competitive and does not allow for slacking. This is important for firm X as the global consultancy market is becoming more competitive as a result of a reduction in clients following the economic crisis and the increased competition of small boutique firms and internal consulting groups.
The competitive nature of the reward system could also be seen as a weakness leading to increased levels of stress and exhaustion among employees. Another obvious weakness of the reward system is the reduction in cooperation, as sharing knowledge is essential for a consultancy firm.

One possible way to improve upon firm X's system is by minimizing the negative aspects of their tournament system. The major drawbacks of the tournament system are the increased chance of sabotage together with the decrease in cooperation of employees and the higher levels of reported stress and exhaustion that follow from working under such a competitive environment. Firm X partially tackles these problems by including factors such as team work in the rating system and allowing the workers to participate in the objective setting (reducing stress as they influence their own objectives). To reduce sabotage and stress even further however, an option firm X could consider is to alter their rating system.
What could be done is pooling employees with peers randomly just before the compare and rating step. By creating at least two random pools just before the comparing and rating step, the incentive to sabotage the people an employee works with is reduced. The reason for this is, that if there are at least two pools of peers that are only created just before comparing and rating, the incentive for individuals to sabotage their colleagues is reduced as they do not know whether or not they are in the same 'peer pool' thus reducing the incentive to sabotage. By creating more pools of peers, the incentive for sabotage will be reduced even further, as the chance an individual is pooled with a colleague decreases. Creating too much pools however, may cause administrative problems. By randomizing the pooling just before the compare and rating step, it can be prevented that information regarding an individual's peers

is somehow obtained beforehand (thus increasing the incentive for sabotage again). As a result the cooperation between team members may increase as well and the level of stress may decline as workers may feel more part of a team working towards a common goal. In order to provide even more incentives to cooperate as a team, (roughly) similar project teams could be rated against each other as well based on their performance as a team. It is important however to keep the laddering system of individuals with peers to prevent shirking within teams. Switching to a system where the effort of teams is rewarded as well may reduce stress and create more involvement with colleagues. This new system would create new incentives to sabotage other teams on the other hand. But as there is less interaction between different project teams than between project members, overall sabotage can be expected to decline as a result.

With the importance of the career counsellors in the promotion and rating process for the employees, there is an incentive for workers to devote part of their effort to 'befriending' their career counsellor. This may lead to some employees to reducing their productive effort and spending part of their time getting on good terms with their career counsellor. As a result, these counsellors might become biased and it may become difficult to ignore this factor in the rating decision. To deal with these problems, it is best to regularly switch career counsellors for individuals in order to prevent a bias playing a role in the rating decision and to keep employees focused on their job.[69]

Besides these possible improvements of the reward system, there is an idea for a possible improvement of firm X's tournament system which requires some more research. This idea is based on the article of Fehr, Klein and Schmidt.[70] In their research they considered the optimality of contracts with respect to fairness. Now assuming that the contracts for a given project team in firm X are not optimal when all team members are relatively selfish (due to sorting and the tournament design), the efficiency of the team may be improved if one or more less selfish persons (or care more about fairness) were added to the team. As mentioned before, this requires further research before anything can be said with certainty, but it would be interesting to compare the efficiency of project teams with only relatively selfish members to teams with one or two people that care more about fairness. The idea remains however, that adding some less selfish people to a project team may result in more cooperation and productivity. One way to determine project teams this way would be by using personality test,

[69] Note: Whether or not firm X regularly switches career counselors was not mentioned in the information package and is therefore mentioned as a possible improvement.

[70] Fehr, E., Klein, A., Schmidt, K. 2007 *Fairness and Contract Design* Econometrica 75, 1, page 121-154

or perhaps adding a woman to each project group (which tend to be less competitive on average). To determine the exact composition of attributes that would be favorable when creating projects groups would require more research. There is evidence however, that team composition affects performance. For example the gender composition of teams and the gender of the manager (or project leader in this case) jointly affect performance under competition.[71]

[71] Delfgaauw, J., Dur, R., Sol, J., Verbeke, W. 2009 *Tournament Incentives in the Field: Gender Differences in the Workplace* Tinbergen Institute Discussion Paper, TI 2009-069/1, Erasmus University Rotterdam

4. Conclusion

In this paper, the effects of a tournament design have been examined and there have been considered some options to improve upon this system. The paper started off by determining the effects of a tournament reward system and separating them into sorting and incentive effects. After listing these experimental results, a review of firm X's reward system followed. By combining these results with the information from firm X, possible improvements for tournament systems in practice were determined.

The most important experimental results were related to productivity, cooperation and stress and exhaustion. A tournament reward system is more likely to attract more productive people and provides workers with incentives to increase their effort. At the same time, the competitive nature of the system reduces the willingness to cooperate and may even lead to sabotage. The competitiveness created by this system also results in higher reported levels of stress and exhaustion. To improve on the tournament system therefore, these were the factors mainly considered. Any modifications to the tournament system (of firm X) that either increase the level of (productive) effort and performance or decrease the amount of sabotage or level of stress and exhaustion could qualify as a possible improvement.

In short, the possible improvements for the reward system of firm X are the following. A regular change of career counsellor may increase the level of productive effort as it can be expected to result in less time devoted by employees in befriending them. Another way to possibly improve the efficiency of firm X's tournament system is by randomly pooling employees with peers just before comparing and rating them. This may result in more cooperation among project members and reduce the level of stress and exhaustion. At the same time the incentive to perform well remains as employees still participate in a tournament. To even further stimulate team effort and cooperation, project teams could be laddered the same way employees are to provide a stronger incentive to perform well as a team. As there is generally less interaction between different project teams than within project teams, the chance of sabotage occurring in this case will be smaller than within teams.

These possible improvements should be tested first however, to provide more detailed insight in their specific influence on the tournament reward system. Less clear, but perhaps even more interesting for future research is the role of personality on the productivity of project teams. It would be interesting to see an experiment regarding the productivity of such teams with respect to different combinations of personality types.

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