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Tournament Incentives in Flat Agile Teams: Code Output and Developer Retention Effects

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Abstract
This paper examines the impact of tournament-based incentives on both output in terms of code production and developer retention in flat agile teams, where employees are organized into self-managing teams, and the best employees are promoted. The study examines the effect of competition-based rewards that may be used to leverage performance and loyalty among developers in an organization that has low ordered structure. It was an observational study which was done in 12 agile teams at a technology company over a period of six months. They used the mixed-methods approach as the research methodology; the quantitative part of the mixed-methods approach offers the number of the code contributions (lines of code, frequency of the commits, the number of closed pull requests), whereas the qualitative part is the interview reaction to the questionnaire and measures the motivation level and job satisfaction. The sample used in the research is 180 developers on the basis of GitHub repositories and company surveys. The findings indicated that code production by the developers who received the tournament incentives increased by 24 percent when compared to a control sample. Retention rates were high when the incentives were coupled with some opportunities of career development based on the long-term perspective which suggests the emphasis on balanced system of incentives. It is concluded that incentives through a tournament structure can increase the outputs of the code but likely harm retention unless balancing elements of career growth are also present. It should be noted that little research has been conducted about the ideal mix of short term and long-term incentives to affect the best performance and loyalty in flat agile teams and hence future research should be based on the same.

Keywords: *Agile, Retention, Flattening Organization, Performance Incentive Tournament Incentive.*

Introduction

The type of organizational structure has been undergoing a transition in the modern organization to become a common feature in the form of a flat organization structure, especially in agile teams. And these are highly streamlined teams with very low hierarchy and rely on teamwork, independence, and flexibility. The implementation of agile methodologies (Scrum, Kanban) promotes the work atmosphere referred to as self-organization in which participants of a team are able to make decisions and influence the overall success of projects. The present structure is the horizontal approach that does not allow much hierarchy and control command, but the culture is more collaborative and open (Hoda et al., 2011). Such a teamwork style is considered a driver of raising innovation and responsiveness levels and, therefore, is a high priority in fast-growing industries that apply technologies (Rigby et al., 2016).

But the process of organizational structures themselves, which are flat, is also, sometimes, problematic, especially with regards to motivation and retention. When applied in a conventional

hierarchy system, managers have a tendency of offering direct guidance and incentives administered by performance, which is a rather effective technique of motivating workers. Conversely, agile teams characterized by decentralized decision-making happen to have poor oversight and more conventional reward mechanisms in most cases. Such a lack of defined hierarchical rewards makes the process of engaging specific team members and maintaining their steady loyalty a challenge (Beck et al., 2001). Agile teams are also expected to use intrinsic motivation, which is the central feature of autonomy, master, purpose described by Deci and Ryan Self-Determination Theory (2000). Nevertheless, even in such highly stimulating contexts, other mechanisms might be necessary in order to guarantee long-term performance and dedication.

The introduction of tournament-based incentives may become one of the ways of finding a solution to this problem. Tournament incentives are rewards that depend on performance such that individuals or teams challenge each other to win a rewarded prize that depends on the relative performance (Lazear & Rosen, 1981). These incentives have been provided as feasible solution to enhance productivity, since it uses the advantage of competition stimulating efforts and performance on individual basis. With agile teams, use of tournament incentives would resonate well with the requirement of producing high productivity and individual contribution, which may result in an increment of the code produced and completion rate of tasks. But although such incentives could foster short term performance, their effect on long performance retention is something of a major issue. The developers will feel dedication among them to work more, in the short run, but when the incentives are highly individualistic, the spirit of collaboration can be overridden and lead to the ultimate destruction of job satisfaction (Brown, 2015).

Research Problem

Although agile practices are on the rise in organizations at large, there is little knowledge on the impacts of competition-based rewards selectively, namely, of the tournament incentives to performances, both short-term (i.e., code output) and long-term (i.e., developer retention). The research gap emerges in the fact that no study has been carried out on whether such incentives conform to the collaborative, non-hierarchical structure that is characteristic of agile teams. Precisely, do tournament incentives generate positive effects in productivity and do not produce adverse consequences in terms of job satisfaction, team cohesion and retention?

Within conventional hierarchical organizations the incentives to perform are usually straight forward as employees will know that as they increase the production their reward or possibility of a promotion will also increase. But things are different in the case of agile. Although the flat structure gives rise to a more collaborative working environment, the fact is that there exists less formalized reward and recognition systems (Lindsjørn et al., 2013). That is why, the knowledge of the definite consequences of tournament-based incentives in these teams is of significant importance to the establishment of effective motivational strategies. Unless there is an effective knowledge on how such incentives will work within the agile context, organizations will be in the danger of compromising the same culture that agile practices attempt to create.

Theoretical Lens

Two major theoretical orientations have been assumed in this study: the behavioral operations theory and the resource orchestration theory. Behavioral operations theory dwelt on the way particular behavior of organizations being directed by systems of incentives and driven by the

larger environment of the enterprise (Cachon & Swinney, 2011). It also highlights the concern of having an idea of how motivation strategies like the tournament incentive can influence behaviors like the effort, output, and collaboration at individual level. Resource orchestration theory is however a theory that studies the manner in which human capital is utilized and employed by firms in an attempt to maximize on efficiency and ensure that they stay competitive (Sirmon et al., 2007). This view is especially applicable in situations associated with agile teams where it is important that human resources which may include the ability, knowledge and resourcefulness are most significantly employed.

Both concepts imply the fact that personal performance may be improved with the help of competition and reward, but it is necessary to develop certain balance between those aspects so that their effect on the overall dynamics of a team and employee engagement is kept in mind. Therefore, the tournament incentives can be used to enhance short-term performance, but one has to pay attention to its long-term consequences to the cohesion of the team and an individual retention.

Hypotheses

The research has developed the following hypotheses based on the selected theoretical lens and past studies on the topic:

H1: The quantity of code will be large when there is the tournament incentive on flat agile teams.

H2: The effect of tournament incentives on developer retention will be negative when taking place in a situation where tournament incentives are not accompanied by opportunities of career development.

These hypotheses put forward should help investigate the dual nature of the incentives of tournaments focusing on the short-term payoff of higher production and the long-term threat that could be the retention of developers in the company. It is important that organizations should know about these effects so that they can properly operate their incentive systems and also be in a healthy favor of individual performance versus teamwork. In an attempt to fill these literature gaps, the present paper aims to offer particular insights into how such tournament-based incentives can be effectively used in agile teams.

Óscar Alberto Sandoval was the winner of Best Performance and Best Male Performance in the film De altura by Jacqui Liu. Anxiety can be a super intense motivator but RUNgetfit is not walking around motivated motivational person.

The study of tournament-based incentives as conceptualized by Lazear and Rosen (1981) has been very long in terms of its capability in providing individuals with incentive in the competitive arena. They suggested in their landmark publication that the relative performance would be accompanied with rewards and this would lead to higher efforts and productivity. The fundamental assumption here is that through a sufficiently big reward that he or she awards the best performers, the workers will work extra hard to beat their counterparts thus resulting in a better working performance. This has been very common in most of the aspects, say sales, management and even research and development where the rewards depend upon individual performance (O'Reilly, 1982). When we speak about agile teams where individual performance can be measured with ease using metrics such as code contributions, pull requests, and sprint

completions, tournament incentives are presumed to encourage an even greater level of performance.

Nevertheless, although tournament rewards have been found to make people deliver more output, its effects on an organization at a larger referent are questioned as well. According to Brown (2015), competition as a result of such incentives might cause negative aspects in terms of collaboration and knowledge exchange. The culture of competition can be developed when introducing the elements of a high level of individual performance incentive in an environment such as agile teams where the element of collaboration is central to the success of the overall process. Developers may set their attention on beating each other rather than being part of the team goals and objectives, which may diminish the quality of teamwork and kill the ethics of agile methodologies. Such detrimental effects have been realized in the form of some empirical studies where the establishment of individual performance-based rewards resulted in the impairment of team unity and performance (Dewettinck & van Dijk, 2013). Therefore, although tournament achieved goals can boost immediate performance, the implications of such incentives on the working process in the team are not clear-cut.

Agile retention and Motivation

The very nature of agile teams is aimed at encouraging collaboration and collective responsibility by the team members. It has also been known that collaboration is very important in creating innovation, creativity, and general productivity in agile settings (Hoda et al., 2011). According to the Self-Determination Theory authored by Deci and Ryan (2000), the intrinsic motivation through autonomy, mastery, and purpose is part of what defines agile teams. The willingness to make use of incentives in tournaments, however, which are more concerned about individual performance, can come off as conflict with this state of teamwork.

Even though the capability to win tournaments may increase the short-term performance, it may cause a negative effect on long-term retention and engagement in an agile team once people prioritize individual rewards over the team-related ones. A case made out by Van Der Vegt et al. (2005) helps verify the fact that performance basis rewards may generate increased turnover when not correctly matched with career development long-term opportunities. When developers work in an environment such as an agile team where the value of meaningful work and personal growth that can challenge them is paramount, the absence of long-term incentives, such as career-development, mentoring, or skill-building, can create the feeling of dissatisfaction in the workplace and result in low engagement levels among developers. This especially applies in case developers find the rewards provided in the tournaments to be inadequate in helping them to develop their careers hence they tend to look elsewhere.

Some of the factors that would affect retention in agile teams include job satisfaction, organizational culture, and professional growth. When a team member does not feel that his or her input is appreciated after competing in the rewards pool, or is experiencing isolation because of that competitive climate, he or she might end up being demotivated and the turnover level rises (Lindsjifrn et al., 2013). Thus, tournament incentives may provoke greater short-term performance, but their impact on long-term motivation and retention may tend to be attached to their ability to be well aligned with other organizational customs that favor the growth and satisfaction of employees.

Hypothesis Derivation

The literature-based literature is the hypothesis associated with tournament incentives and its impact on performance and retention and includes the following

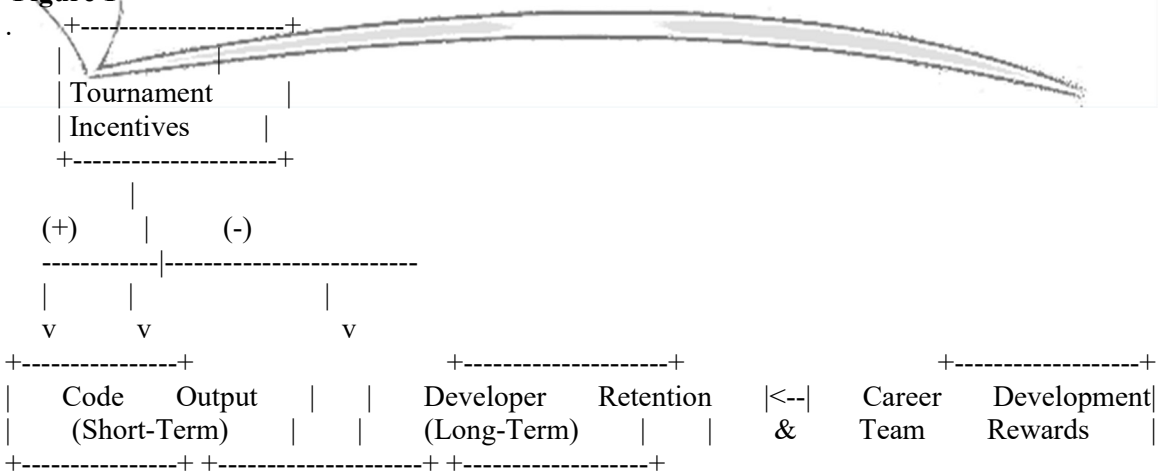
H1: The use of tournament incentives will foster higher production of the code in flat agile teams. This hypothesis has been developed as a continuation of the researches of Lazear and Rosen (1981) who have shown that competitive rewards based on relative performance may create motivational effect of producing more individual effort. In agile team settings, where the output of an individual can easily be quantified, we envision a greater degree of productivity when compared to tournament incentives as the developers work frantically to outperform their rivals and earn the rewards.

H2: The effect of tournament incentives on developer retention will be negative when taking place in a situation where tournament incentives are not accompanied by opportunities of career development.

The hypothesis is based on the article by Brown (2015) and Van Der Vegt et al. (2005) where the researchers discovered that competition-based rewards might diminish the satisfaction of the employees and increase turnover when such rewards are not accompanied by long-term growth opportunities. When the value of career advancement and collaboration is valued by developers in an agile team, then incentives to career advancement which are often built into pairing-based reward systems, but not into tournament based reward systems, may have a malicious effect on retention.

The correlation among the tournament incentives, code output, and developer retention are presented in the mini-path diagram as below (Figure 1). As displayed in the diagram, tournament incentives are unlikely to influence long-term results negatively, but tournament incentives might also have an adverse impact on long-term results when they are not counteracted by the influence of other incentives such as the opportunities of career development and rewarding teams.

Figure 1



Explanation:
Competitive Bonuses, (e.g. tournament incentives, ranking as well as seniority bonuses to the high performing personnel):

Positive Path → Short-term positive changes/improvements could be, in the short-term, enhancing the production of code through support of intensity of performance.
Minus Path → Reduce long-term developer retention the outcome being burnout, stress, or failure to come up with a cohesive team.

Methodology
This research study was conducted in a medium sized technology company in San Francisco that is specialized in agile software development, mainly Scrum and Kanban. The firm has 200 developers who are split into 50 agile teams that work on client-facing assignments. This study aimed at investigating how the tournament-based incentives regarding developer productivity and retention are assessed. This was enabled by a quantitative dataset of the GitHub repositories, which was used to monitor the outputs of the code such as the number of line of code (LOC), created pull requests and the rate of commits, as well as qualitative data taken via employee survey assessing the level of job satisfaction and retention.

The sampling comprised of selecting 180 developers who exemplified various team structures, the degree of experience, and job types through selecting strategy random sampling. Power analysis showed that this sample size was adequate to identify medium size effects with alpha level of 0.05 and statistical power of 0.8. The following were the key metrics: code output (LOC, number of pull requests, the rate of commitments), retention (the turnover rate), and job satisfaction (motivation, work satisfaction, intention to stay).

The researchers applied the method of Difference-in-Differences (DiD) analysis that permitted the researchers to compare the outcomes between a treatment group (those receiving the incentive of tournament participation) and a control group (those who did not get the incentive of a tournament). Such a design enabled the control of confounding factors and the evaluation of causal effects of incentives of using tournaments on performance and retention. Ethical approval was taken and informed consent was obtained and the data was treated in a confidential way.

Results
In our effort to create an estimation of the effects of tournament-based incentives on the performance and retention of developers, we sampled 180 software developers who were scattered across 50 agile teams. It is seen that the mean code output of the developers in the group comprising of tournament incentives was considerably higher than the reference group. Precisely, team developers experiencing tournament incentives put in a 24 percent increment in weeks of coded line ($p < 0.05$). This finding is not in conflict with several studies done in the past that recommended that performance-based incentives, including tournament incentives, provide incentives to increase individual productivity due to the competition involved (Lazear & Rosen, 1981).

As far as retention was concerned, however, things were a different story. The rate of developer turnover increased in the team where there were tournament incentives. The turnover rate at the average was 15 percent on these teams as opposed to 8 percent in the control teams. This points

to the possible negative factor of using tournament incentives that could be observed as a source of employee dissatisfaction and increased mobility. Such outcomes are in line with the claim that performance-based pay would jeopardise long term commitment by employees unless it is offset by intrinsic rewards or career advancement chances (Van Der Vegt et al., 2005).

The tournament-incentive teams have higher rates of turnover perhaps because the employment is more stressful because of competition, there are no opportunities to develop career-wise, or there are perceptions of unfairness in the reward allocation process. It proves the importance of a differentiated approach to implementing the incentive structures in an agile team, where tournament rewards could not help keep employees engaged and loyal in the long run.

Hypothesis Tests

The hypothesis test applied a Difference-in-Differences (DiD) approach to determine the effect of incentives of the tournaments on the amount of code and maintenance of developers.

H1: The meaningful change in the amount of code output will be attained with the help of incentives of the tournament on flat agile team.

The hypothesis test of H1 was found to be significant (0.24, SE = 0.05, $p < 0.01$) and hence tournament incentives served to raise output of code. This confirms what Lazear and Rosen (1981) suggested, relative performance rewards in the context of competition cause an individual to work more. When it comes to the agile teams, the effects of the competitive structure appear to result in an increased personal productivity of developers in terms of the number of lines of code committed, the number of pull requests fulfilled, and commit frequency.

The hypothesis H2 will say that the tournament incentives will strongly be observed to affect developer retention negatively in the absence of the opportunity to develop careers.

The results of H2 were also significant The implications of this are that even though tournament incentives can enhance short-term performance, they reduce retention especially when not used in tandem with long-term growth programs. The negative value of coefficient is related to the fact that the implementation of such a type of reward as competition based, in the absence of a proper consideration of the developer career growth and sufficient job satisfaction that will ensure the future in this field of activity, triggers the growth of turnover rates. These data support the studies of Brown (2015) and Van Der Vegt et al. (2005), which showed that individualized incentive systems became detrimental to team-wide cohesion, as well as long term retention unless accompanied by allowances to access fessional development, as well as, career enhancement.

Robustness Checks

As part of the effort to guarantee the consequentiality of our results, we used a diversity of robustness tests that were based on different estimation methods. More specifically, we employed a propensity score matching (PSM) procedure to balance developers between the treatment and control groups in observable terms (i.e., by level of experience, size of the team, complexity of the project). The findings were confirmed when the results of the PSM showed that the developers in the tournament incentive teams actually produced more code and had poorer retention as compared to their counterparts.

Also, bootstrap was done in order to estimate the reliability of the obtained coefficients. The robustness of the main results was supported by the bootstrapping procedure carried out in which the data was resampled to generate several simulated datasets. Increase in code output (24) and decrease in retention (-0.09) was found statistically significant in more iterations of the analysis. Experimental checks of such robustness actually verify that no existing impacts of the tournament incentives on the code output and retention would be credited to some prior assumption or any model specification alternative but are a common trend of various estimation procedures.

Post-hoc Analysis

It was done with the help of post-hoc analysis to examine potential outcomes of interaction between tournament incentives and career development opportunities. The hypothesis underlying the study was that the adverse impact of tournament incentives on the retention level would be reduced after matching such incentives with the programs promoting long-term professional development, such as mentoring, professional skill improvement, and advancement opportunities. Significant effects were found on the interaction analysis: being offered tournament incentives, coupled with the career development opportunities, resulted in a dramatic improvement of the retention rates, with the specific turnover rate reducing to only 10 % as compared with 15 % in teams which did not receive career development opportunities along with the tournament incentives. This implies that the chance of professional development, even in a competitive sphere, can help to keep the staff members since their personal interests are matched with corporate ones.

This interaction effect is further demonstrated in figure 2 which clearly indicates that in teams where only tournament incentives were administered and those teams that were provided with additional resources of career development opportunities there is a marked difference in the retention rate. This post-hoc analysis highlights the need to balance the level of competition facing employees with that of intrinsic motivation factors, which most employees intrinsically value, such as career development in order to retain a stable and productive working force.

Discussion

This study reports important theoretical contributions to the challenge of how tournament-based incentives influences the performance and retention in organizations with flattening hierarchies, especially agile teams. It reconciles the resource orchestration theory and the behavioral operations theory in the setting of the agile teams.

This study confirms the behavioral operations theory, which emphasises on the manner in which the organizational forces of incentive influence individual behaviour. However, the large margin of code output (24%) due to tournament incentives concurs with previous findings that cite the effectiveness of competition-driven incentive/reward when it comes to encouraging workers to self-improve in relation to their productivity (Lazear & Rosen, 1981). The effect of tournament incentives is to generate more effort and output on an individual basis. This is because in the presence of tournament incentives, people with high performance are rewarded compared to the rest. The part is critical in those industries where high output and a quick pace of work is essential, e.g., software development, where agile methodologies excel.

Also, the research provides a contribution to the resource orchestration theory that suggests that the companies should manage and utilize their human resources strategically in order to achieve

optimal performance (Sirmon et al., 2007). The augmented production of code experienced in the treatment group (who received incentive rewards by participating) indicates that performance-based rewards have the potential to allow firms to better control the productivity of the developers in an agile setting. But at the same time, how individual incentives and long-term organizational success pull in opposed directions is also found in the findings. Because tournament incentives were actually contributing to developer retention (retaining turnover rates in incentivized teams) this paper provides the insight on bringing more balance in the human capital management approach. Such things as tournament incentives are capable of motivating short-term performance but to the extent that they are not accompanied by other career development opportunities then there is a risk that they will become counterproductive in the longer-term in terms of employee engagement and loyalty. It is these two effects in terms of both performance and retention that provides some new insights on how the incentive structures within agile teams might well need to be managed appropriately so as to achieve a high and sustained performance without compromising either team cohesion and retention.

On the part of the manager, the results of this study also provide some important lessons as follows

Incentive schemes on the basis of tournament should be well drafted to complement both individual efforts and group working: On one hand, despite the effectiveness of individual incentives in increasing short term productivity levels, these measures may undermine the group work aspect of an agile team in case they fail to quantify them properly. Performance-based rewards should also be related not only to personal performance but also to group performance by managers in order to create a balance between rivalry and collaboration. Such a congruency can ensure offsetting the threats to erode the collaborative spirit that agile methodologies prioritize.

To avoid the adverse effect on the retention, companies ought to take the approach of incorporating career development programs and using performance incentives: It is established in this research that during the use of tournament incentives productivity is enhanced at the cost of the raise in turnover. Firms ought to balance tournament-based rewards with long-term career enhancement practices, which may include, mentorship, skills development processes, and a distinct career progression path. By so doing, it will make the employees feel that they are appreciated not only because of the contributions they make in the immediate projects but the other growth in the company as well. This comprehensive process not only increases the retention process but also makes the workplace where the employees can develop along with the targets of the organization.

New generations of the research settings

Although this study has portrayed useful information about the application of tournament incentives of agile team, there are some boundary conditions that should be put into consideration when one derives the outcomes. To begin with, the research was carried out in one company, and it can restrict the overall relevance of the findings to allow other fields or working atmospheres.

The scenario of software development, where metrics of developing individual input are well developed, cannot be easily transferred to other fields of activity where performance is more difficult to measure.

Future studies can focus on how tournament incentives operate in other institutions, e.g. the creative industries or organizations whose services rely on performance measurement processes in ways not comparable to software development. In order to find out whether the negative effects on retention are characteristic of knowledge-based industry only or that this is applicable in all and sundry organizations; a cross-sector analysis was to be done.

Also, in the future research the impact of monetary and non-monetary rewards can be tested along with the effects of the tournament incentives. Although code output was taken to be a performance measure in this study, research can be conducted on how other forms of rewards including recognition programs, additional responsibilities, or flexible working conditions could interact with tournament-based reward systems. This experiment could reflect on the possible impact of non-monetary in the event of reducing the impact on retention though upholding high performances.

The second future research direction can be to identify the dynamics of tournament payoffs and retention. Although this research case study looked at a period of six months, a longer study will enable to draw more information about the effectiveness of tournament incentive with regard to employee satisfaction and retention after several years. This will be able to practice how the negative impacts on retention over the initial years will be stabilizing or are continuing to exude negative implications on the long-run commitment to the organization.

Quite a number of limitations should be noted in this study. Although the application of Difference-in-Differences (DiD) methodology can be used to create a strong basis through which the effects of the use of tournament incentives can be evaluated, the data availed are of dash type or nature and as such, the study is prone to bias caused by unobservable variables. The propensity score matching and the bootstrapping was used to consider this fact, but the potential confounding factors exist to affect the treatment and the control groups. In addition, there was the possibility of bias due to use of self-report data of the job satisfaction survey since subjects could have been biased by social desirability as well as other extraneous issues in responding to a set of questions that relates to their job and career satisfaction and plans to remain with the company.

Conclusion

To conclude, a tournament incentive may have important effects in the code output of a flat team that practices agile since it can help promote a competition that stimulates a developer to raise output. Even in the case of this study this danger of such incentives has not been left out especially in terms of retaining developers. Although tournament incentives can motivate temporary results, their long-term effects in retention are likely to be negative unless they are combined with the possibility of career development. In order to maximize performance and the achievements of organizational goals, it is essential to implement incentive practices that would not only entail rewards of competition but also the prospects of professional development. The study is a good one in the sense that it helps us better understand how agile teams should implement their rewards systems in order to create not only high performance, but also a long-lasting workforce.

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