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INDIVIDUALS PERFORMANCE MEASUREMENT IN AGILE SOFTWARE DEVELOPMENT

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Abstract

Many organizations in the last years have been shifting to Agile, especially in software development sector, to deliver their projects. Rapid changes in demands, requirements, technologies, and regulations have made it more important for organizations to respond quickly and effectively. Agile provides the flexibility to reconfigure strategies, processes, people, and technologies toward value creation. Agile promises to deliver value through small, potentially shippable product features developed within short iterations. In Agile, there is no one manager who makes all the decisions alone, but all team members participate in making important project decisions. Agile believes that teamwork is essential to deliver high-quality software. The unique characteristics of the team in Agile make it hard to fit with standard HR processes like annual individual performance reviews. This paper introduces the individual performance management in Agile environment and how the annual performance appraisal might not fit with Agile and discusses the alternatives to make a convenient performance evaluation for agile team members.

Keywords: Agile, Individual, Team, Performance, Evaluation, Measurement

1. Introduction

In 1984, a discussion has been published about incremental software development. It refers to an air defense system which began in 1977 and finished in 1980. The project had significant up-front specifications and was meant to comply with the US Department of Defense (DoD) waterfall¹ model standards. Wong (1984) described the software development as a complex and repetitive process in which the waterfall model does not fit with this complexity. Furthermore, Wong (1984) said that the reason to use the waterfall model was only due to the requirements of the DoD standards.

Takeuchi and Nonaka (1986) studied manufacturers that were releasing successful innovations much faster than their competitors. They said that the reason of this success is a team-oriented approach that changed design and development process instead of following the traditional methods of development, in which one group of specialists finishes its work and passes it to the next group. They called this approach 'rugby' approach, where a team tries to go the whole distance as a unit.

¹ The waterfall model is a classical model used in system development with a linear and sequential approach, which means each phase must be completed before the next phase can begin.

Traditionally, companies have used waterfall development model to develop software applications in which requirements are identified up front. The classic waterfall considers developing software applications as a linear or sequential series, starting by planning the project, designing the software, and then building the code and testing the product. Running into the same kinds of problems led teams to suspect that a major source of the failure might be the waterfall process itself (Stellman and Greene, 2014).

The business today is moving ahead so fast. Therefore, the software development lifecycle needs to be faster and more flexible. In recent years, an increasing number of companies has realized that the old, sequential approach to develop new products simply will not get the job done.

2. Agile

In the late 1990's, several methodologies began to gain increasing attention among IT industry leaders who were frustrated of the software development process. These methodologies emphasized strong collaboration between the development team and business owners, frequent delivery of business value and self-organizing teams. In 2001, 17 famous software development practitioners gathered to discuss their shared ideas for software development and called the term "Agile" on the collection of these methodologies (Agile Alliance, 2016).

Agile is also a mindset that helps people on the team to share information with each other. It offers planning, design, and process improvement to the entire team. In Agile, there is no one manager who makes all of the decisions alone, but all team members participate in making important project decisions (Stellman and Greene, 2014).

Agile promises to deliver value through small, potentially shippable product features developed within short iterations. The value in the context of Agile development is often referred to the delivery of business value, which includes any benefits that keep the health of the company (Winter, 2015).

Agile has four core values that are common to successful teams and their projects. These values are as follows:

- People and their interactions are more valuable than processes and tools.
- Documentation is valuable, but working software is more valuable.
- Collaborating with customers is more important than negotiating the contract.
- Responding quickly and effectively to changes².

Agile software development depends on teamwork, as opposed to traditional methodologies that are characterized by an individual assignment. In Agile environment, most of the decisions are taken by the development team and the customer (Nerur, Mahapatra and Mangalaraj, 2005). The Agile manifesto principles claim that best architectures, requirements, and designs come from self-organizing teams. The team in Agile is characterized by self-organization and strong collaboration, but it does not mean a leaderless team; It is a team that can organize in a different configuration to meet new arising challenges (Cockburn and Highsmith, 2001).

Software development is a complex process, performance measurement is essential to know what is going on and what can be done to improve. Agile focuses on providing a value and continuous improvement. In Agile development, a performance measurement is a tool and not an end itself.

3. Performance Management

Organizations try to manage performance with having two objectives in mind: to assess the current employees' performance and to develop their performance. The process of performance management starts with setting the organization's objectives and then assessing the employees' performance against the preset objectives. After that, the organization can benefit from the results by building performance development programs for their employees. This

² More information about agile manifesto can be found at: <http://agilemanifesto.org>

process is cyclic rather than annual and helps the organization to identify the performance gap among its employees and develop the proper programs to shape their employees' skills and competencies (Bhattacharyya, 2011).

Briscoe and Claus (2008, p. 15) defined the performance management as "the system through which organizations set work goals, determine performance standards, assign and evaluate work, provide performance feedback, determine training and development needs and distribute rewards". Latham *et al.* (2007) considered performance management as a continuous process and the performance appraisal as an even at discrete time intervals.

Performance appraisals are used by managers with an important goal, which is to motivate employees to do their best and become more productive. However, managers used to get the opposite. Most employees don't find it motivating, but frustrating and not relevant to their jobs (Adler *et al.*, 2016).

There are many studies suggesting new ways of thinking about job performance. Arvey and Murphy (1998) differentiated between task performance, which is focusing on job-specific aspects, like core technical skills, and contextual performance, which focuses on non-job-specific aspects that support technical tasks like cooperation, dedication, and persistence. With the increasing importance of the team-based work and effective communication, the contextual performance seems to be increasingly relevant (Fletcher, 2001).

4. Measurement of Individual Performance in Agile

Agile software development has principles and values rather than rules. Many teams that use agile have struggled to measure the performance of their teams and individuals. There is no metric that will tell you how your agile teams are performing. The people participated in software development have different roles and backgrounds, the good term can be different for each role in agile development.

- A developer might think of good as a well-designed working software.
- A product owner thinks of it as more features delivered.
- A project manager thinks of it as done on time and within budget.

Agile is a partnership between clients and product creators, so developing the communication between the two sides is essential by turning the data you are generating during the development into metrics to measure your team performance (Davis, 2015).

5. Challenges of Individual Performance Measurement in Agile

Software applications are usually built by teams, not individuals. Each individual participates in producing a high-quality software, which means that individuals help each other and share collective ownership to deliver such high-quality software. The objective here is to deliver a good quality software and not being a hero. This can be considered as a conflict with the performance appraisal process as it almost centered on how individuals perform (Gautam, 2012).

Plenty of researchers say that individual performance appraisals are demotivating and harmful, especially in environments like agile, where the value comes from collaboration and teamwork. Some outdated practices of human resources management, like performance appraisals, have harmful effects on self-organized teams. The long-term effects of performance appraisals interfere with their meant aims (James, 2010). He goes on to discuss the importance of hiring for team cohesiveness rather than technical skills. The technical skills are important, but the ability to work effectively as a team is more important.

Vivek (2012) raised the following question "is it correct, in Scrum³ methodology to track an individual's performance?" and answered it as "no". Tracking and measuring the productivity of a single member of an agile team is against the spirit of Scrum. Scrum does not forbid us

³ Scrum is a subset of Agile and one of the most popular methodologies for implementing Agile.

from measuring performing individuals, you can do whatever you want under scrum methodology, but this idea attacks the spirit of the scrum. The basic notion of scrum is that every individual should participate in producing a high-quality software and help each other to get to the team's objectives, regardless of their different skill levels and types. If any team member cannot contribute, such action points to a team problem. Therefore, measuring the individual performance would open the door for a competition and division within the team. Team members should work as a unit and succeed or fail as a unit.

In organizations that emphasize competition rather than cooperation among their team members, individuals place their own goals above the organization's ones. Therefore, the organizations goals are better met by applying cooperative reward systems. Distinctions among team members in a reward system might lead to block the teamwork and information sharing (Beersma *et al.* 2013).

There are challenges that make it hard to perform accurate individual performance assessment under agile development, such as measuring individual tasks in agile projects is more difficult than the traditional ones. Task allocation is no longer done by the project manager but happens as part of working in a self-managing team. Individuals usually have a wider set of tasks. The measurement of individual performance is considered anti-agile practice as it stands against the collaboration in agile teams. However, most organizations that apply agile methodologies insist on assessing the individual performance for the team members, some practitioners have proposed some metrics to help to measure the individual performance in agile development (Gregory *et al.*, 2015).

6. Suggestions for Individual Performance Measurement in Agile

Gamble and Hale (2013) defined four metrics to characterize the individual performance as it relates to the agile development teams, they are as follows:

- Contribution measures the direct participation in sprint meetings⁴.
- Influence measures the individual effect on the team's progress.
- Impact measures the individual role in the quality of the resulted software artifact.
- Impression measures how well team members acknowledge the performance that fellow team members made toward the successful completion of the project.

After each sprint, all team members confidentially submitted their performance evaluation on each member including themselves during the sprint. The evaluation consisted of two parts, a questionnaire on each member performance and another form of giving a percentage weight of a variety of roles and responsibilities, such as leader, programmer, analyst, and tester for each team member. The research found that teams with higher individual levels of contribution and impact had better final product outcomes. In addition, team members can form accurate appraisals of each other's contributions, influence, and impact on the project given high visibility of the development process.

Gautam (2012) suggested that appraisal backlog should be created for every individual, with goals and acceptance criteria for each goal. These goals need to be centered on the individual. For instance, how can they achieve these goals and improve at a software developing? The mentor of backlog (product owner in the scrum) should assign story points for the various goals. After the sprint and reviewing the result done by the individual, new goals should be assigned based on and suitable for the previous results. In the ultimate performance review, a matrix of goals and qualified acceptance criteria are found.

Sutherland (2010) suggested replacing the performance appraisal with a self-evaluation review followed by a discussion between the reviewer and individual and lastly create a review that is signed by both the reviewer and individual and includes the agreed perception of them both.

Agile represents a new way of working and requires changes on each level, even with management. People in agile are self-organized and share the team's performance. If the evaluation is done based on the individual performance, the required cooperation between agile

⁴ In scrum, sprint is timeboxed iterations, usually two weeks.

team members will be hard to implement. Conboy et al. (2010) recommended developing team-based performance evaluation system with some agile-tuned indicators. For example, creating team-based bonus program rather than rewarding individuals. Conboy also suggested to use 360 feedback programs, in which all team members evaluate each other to ensure that cooperation and mentoring will be captured in the appraisal.

7. Conclusion

Many companies have been using agile methodologies to deliver software applications to their clients. Teams in Agile are characterized by self-organization and strong collaboration. Agile claims that best architectures and solutions come from self-organized teams, in which the responsibility for the delivery of the product is held by all team members and not by a project manager.

Performance measurement is essential for organizations to know what is going on and what can be done to improve and motivate people to do their best and be more productive. Many teams that use agile struggle to measure the performance of their individuals since they still use their traditional existing performance evaluation methods. This is considered anti-agile practice because it stands against strong collaboration and forces team members to modify their behavior to match the evaluation system, which eventually minimizes the team's effectiveness. Implementing accurate individual performance assessment under agile environment is difficult due to many reasons. For example, measuring individual tasks in agile projects is more difficult than the traditional ones and task allocation is no longer done by the project manager. Therefore, a lot of experts suggest evaluating the team performance rather than individuals.

Even though traditional performance appraisals stand against the spirit of agile, many organizations that use agile still insist on assessing individual's performance by following traditional annual appraisals. To deal with such challenge, some practitioners proposed some metrics to help to evaluate the individual performance under agile environment, such as assigning goals and acceptance criteria for everyone, which should be evaluated and reviewed at the end of each sprint, and then the new goals should be set based on the previous results. Others suggested setting some metrics, such as contribution, influence, and impact, to characterize the individual performance during each sprint, and then evaluating the performance by using 360 feedback methodology, which ensures that cooperation and mentoring will not be missing from the appraisal.

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