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WHAT MOTIVATES TEAM MEMBERS AND USERS OF AGILE PROJECTS?

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ABSTRACT

Users and teams members of agile projects have consistently shown higher motivation and satisfaction compared with projects that use plan-driven methods. User satisfaction is a key measure of IS success if not synonymous with it (Delone and McLean, 1992; Seddon, 1997) and higher team member motivation is known to foster productivity, company loyalty and higher levels of engagement (Locke and Latham, 1990; Meyer and Allen, 1997; Pinder, 1998). Various explanations have been offered for this salutary phenomenon and have as their basis the specific characteristics of Agile methodologies such as people focus, higher levels of user involvement and collaborative development approach (Boehm and Turner, 2005; Dybå and Dingsøy, 2009; Mann and Maurer, 2005). In this study we apply the approach-avoidance theory to suggest “closure effect” as another explanation for the phenomena.

Keywords

Approach-Avoidance theory, Completion effect, Agile methods, Plan-driven methods, Team-member motivation, User Satisfaction

INTRODUCTION

Extant research has consistently emphasized the higher team-member morale and user satisfaction with agile projects (Boehm and Turner, 2003; Ceschi, Sillitti, Succi and Panfilis, 2005). Achieving user satisfaction has long been at the heart of the IS development and is widely considered synonymous with IS success (DeLone and McLean, 2002). There is strong evidence of positive correlation of user satisfaction with measures of system performance (Gelderman, 1998). Team member morale is another critical success factor during development of an information system. It is known to have a positive effect on quality and productivity of employees and increases their job satisfaction. Job satisfaction in turn has a negative impact on employee absenteeism and turnover.

Various explanations have been offered for these salutary outcomes of using agile methods. Intense collaboration with customers, resulting in their increased interactions and involvement in the project, along with a feeling of control, have been repeatedly cited as the reason for increased customer satisfaction with both the process as well as the product of agile projects. The people-centricity of agile methods and their emphasis on interaction among team members rather than following documented processes have been stated as reasons for high team member morale.

However, discussing the pros and cons of Agile methods often generate more sound than light because the Agile principles are insufficiently grounded in theory (Conboy and Fitzgerald, 2004). In this study we use the completion effect, derived from the Approach-Avoidance theory as the basis for explaining high team member morale and user satisfaction with projects using Agile methods. Psychological research suggests that closure, or task completion, is in and of itself a potent influence on behavior (e.g., Katz & Kahn, 1966). The motive to complete a task gets stronger as one gets closer to completion. This has been empirically supported in various studies (Lewin, 1935; Krech, 1935; Miller, 1944; Brown, 1948; Krech, Crutchfield and Liuson, 1969).

Using a deficit model this study first demonstrates that closure perception or task completion effect is stronger in Agile projects than in projects using plan-driven methods. It then uses the “approach-avoidance” theory to both, explain how the “completion effect” leads to higher user and team-member motivation, and offer practice a way of tailoring project processes, irrespective of the specific methodology used, to produce higher user satisfaction and team morale. However, discussing the pros and cons of Agile methods often generate more sound than light because the Agile principles are insufficiently grounded in theory (Conboy and Fitzgerald, 2004).

In this study we use the completion effect, derived from the Approach-Avoidance theory as the basis for explaining high team member morale and user satisfaction with projects using Agile methods. Psychological research suggests that closure,

or task completion, is in and of itself a potent influence on behavior (e.g., Katz & Kahn, 1966). The motive to complete a task gets stronger as one gets closer to completion. This has been empirically supported in various studies (Lewin, 1935; Krech, 1935; Miller, 1944; Brown, 1948; Krech, Crutchfield and Lison, 1969).

LITERATURE REVIEW

Team member motivation

In our survey of extant literature we did not come across a single study that concluded that team members who worked in plan-driven projects demonstrated higher morale compared to those that followed agile approaches. In contrast, numerous studies have found that the morale and motivation of agile team members is higher compared to those using Taylorist plan-driven methods. The results of a survey of around 200 people from a wide range of organizations in North America, Europe, Australia, India, and other locations conducted by the Cutter Consortium in 2001 demonstrated that agile methodologies scored better than rigorous methodologies in terms of employee morale (Cockburn and Highsmith, 2001). In another survey (Mannaro, Melis, and Marchesi, 2004) of job satisfaction among one hundred and twenty-two employees of software companies that used XP (Extreme Programming) and companies that did not use agile development methods, 95% of the employees who used XP answered that they would like their company to continue using their current development process, while the number for the employees in companies that did not use agile development methods was only 40%.

In a comparative analysis (Melnik and Maurer, 2006) of the way agile teams and general IT professionals in the industry perceive their work environments revealed significantly higher rates of satisfaction by agile team members. In addition, it was found that not only workers but also managers of agile teams are overwhelmingly satisfied with their jobs. In another study (Layman, Williams, and Cunningham, 2004) that conducted semi-structured interviews of software developers by asking mixture of open-ended and specific questions, several team members stated that they enjoyed their jobs and enjoyed the XP methodology more than the waterfall method. In a detailed review of agile development literature (Dingsoyr and Dyba, 2009) concluded that most developers were found satisfied with agile methods and suggested that agile methods can improve job satisfaction and productivity.

Customer satisfaction

In their study Mann and Maurer (2005) found that the Scrum process fostered more customer involvement and communication. One developer said that “the Scrum process is giving me confidence that we are developing the software that the customer wants”. The customers believed that the daily meetings kept them up to date and that planning meetings were helpful to “reduce the confusion about what should be developed”. The attitude of the customers was found to change from “one of ambivalence to becoming involved”. The customers stated that their satisfaction with the project that was based on XP was greater than with previous projects at the company.

In another study of Agile development in organizations, such as ABB, Daimler-Chrysler, Motorola, and Nokia, Lindvall et al (2002) found that in all four pilot projects the teams applying the XP practices succeeded in terms of quality and customer satisfaction. Customers were found to be highly satisfied with opportunities to get and give feedback. (Dingsoyr and Dyba, 2009). Customer relationships and satisfaction levels improved (Ceschi, M., Sillitti, A., Succi, G., Panfilis, S.D. (2005) with the introduction of agile methods. In another study Ilieva, Ivanov and Stefanova, 2004) the introduction of an agile method based on XP and the Personal Software Process resulted in the customer feeling that they had constant control over the development process, which was “highly praised by the customer at the project sign off.

Reasons for improved team member morale and user satisfaction

Various reasons have been cited in literature for these salutary observations in literature across multiple studies (Boehm and Turner, 2005; Dybå and Dingsoyr, 2009; Mann and Maurer, 2005; Paetsch, Eberlein and Maurer, 2003; Ilieva, Ivanov and Stefanova, 2004). Higher team member morale is attributed to the agile philosophy in which *people issues are at the heart of the agile movement* (Boehm and Turner, 2005). Agile methods recognize the value competent people and their relationships bring to software development (Nerur, Mahapatra and Mangalaraj, 2005). Teams work by placing people physically closer, replacing documents with talking in person and at whiteboards, improving the team’s amicability and its sense of community (Cockburn and Highsmith, 2001).

The Chaos report (<http://www.standishgroup.com>) showed the critical importance of customer involvement. Unlike traditional approaches in which the customer is mainly involved during the early phase of the project and during product acceptance, agile methods involve the customer throughout the whole development process (Paetsch, Eberlein and Maurer, 2003). Through emphasis on customer collaboration (The Agile Manifesto, <http://agilemanifesto.org>), agile projects promise greater customer satisfaction (Boehm and Turner, 2005).

Approach-Avoidance Theory

Motivation to continue or pull out from a project can be viewed as an approach avoidance conflict. In approach avoidance theory, when driving forces that encourage persistence outweigh restraining forces that encourage abandonment (Brockner and Rubin, 1985) people will be motivated to continue and complete the project. When restraining forces prevail over the driving forces people will withdraw. These competing forces create a conflict over whether to continue or withdraw (Mann, 1966) impacting motivation of individuals and teams.

Derived from approach avoidance theory, the completion effect, a driving force, reflects the notion that the "motivation to achieve a goal increases as an individual gets closer to that goal" (Conlon and Garland, 1993). The completion effect is consistent with psychological research suggesting that the desire to achieve task closure, or completion, can have a significant influence on behavior (Katz and Kahn, 1966). Results from a series of experiments provide support for the completion effect (Conlon, and Garland, 1993; Garland and Conlon, 1998). Specific evidence that the motive to complete a task gets stronger as one gets closer to completion can be found in work by Lewin (1935) whose hypothesis was supported in later empirical work (Krech, 1935; Krech, Crutchfield and Liuson, 1969; Miller, 1944; Brown, 1948). These studies demonstrated that motivational intensity increased as the subjects moved closer to a desirable goal object.

If individuals are motivated to complete what they start and if this motive gets stronger as one gets closer to completion, then project completion may be a driving force behind individuals' continuing to invest efforts in projects that are already well under way. It overcomes the costs of persistence, resulting in motivated individuals and teams working towards task closure, resulting in greater probability of successful project outcomes and user satisfaction.

When the goal seems distant, and there is little visibility into project progress, uncertainty about project outcomes builds up. The restraining force of cost of persistence then dominates resulting in demotivated individuals and teams, project delays and user dissatisfaction. In a classic case, The London Stock Exchange scrapped an electronic share-transfer system known as TAURUS, despite work spanning a decade and investments estimated to be as high as 400 million pounds (Drummond, 1996; Duffy, 1993). TAURUS was originally scheduled to be operational in 1989, but was abandoned in 1993, when it became clear that the system was still several years from completion. A major factor in the decision to abandon the project was the state of project incompleteness (Drummond, 1996).

DISCUSSION

"Completion effect" is an overall subjective judgment of the stakeholders such as users and development team-members regarding the perceived completion of the project. It reflects the stakeholders presumed "proximity to project goals" (Brockner, 1992); and includes the objective temporal dimension, which is the time remaining for delivery of a product, and a subjective "deficit" dimension that is the difference between customer perception of the problem and the customer perception of the quality of delivered product/ system. The greater the deficit the lower is the perception of completion and higher the perception of incompleteness.

The temporal dimension is a frequently used metric in project management and is generally well understood. To further understand the deficit dimension we subdivide this deficit between customer perception of the problem and the customer perception of the quality of delivered product/ system. For comparison the components of a typical plan-driven project are illustrated in the upper portion of Figure 1 and the components of a typical agile project are illustrated in the lower portion of Figure 1. For plan-driven methods:

1. Deficit 1: Deficit between the customer perception of the problem and the requirements specification.

It reflects the inability of the requirements gatherers to effectively capture the requirements of the users. The gap between customer requirements and the requirements specification for the product could happen due to a variety of reasons such as lack of domain knowledge of the requirements gatherers or a lack of closer interactions with

customers for capturing their requirements.

2. Deficit 2: Deficit between Requirements specification and Design specification

The deficit in converting requirements specification accurately to design specifications can happen at two levels: at the level of High level design or architecture and at the level of Low level design. This gap occurs due to a variety of reasons such as incomplete documentation of customer requirements or lack of detailed analysis of requirements or lack of design capability of the designers.

3. Deficit 3: Gap between Design Specification and Developed Code

This deficit arises when the coders are unable to accurately execute the design into building product components. It could happen due to inadequate technical expertise or misinterpretation of the design specifications.

4. Deficit 4: Deficit between the Developed Code and Delivered Product

This can happen due to product integration problems, when either the interface specifications are inaccurate or they are not implemented correctly by the coders. Thus even though individual code work correctly the product does not perform as expected.

5. Deficit 5: Deficit between the Delivered Product and Customer Perception of the delivered product

This deficit may occur because of inaccurate comprehension of the product by the customer or inaccurate capture and understanding of the customer requirements by the developer. This deficit can also be due to inadequate documentation explaining the capability of the product or the customer may not have been trained properly to use the product.

These deficits cumulate as the product/ system development progresses through its lifecycle.

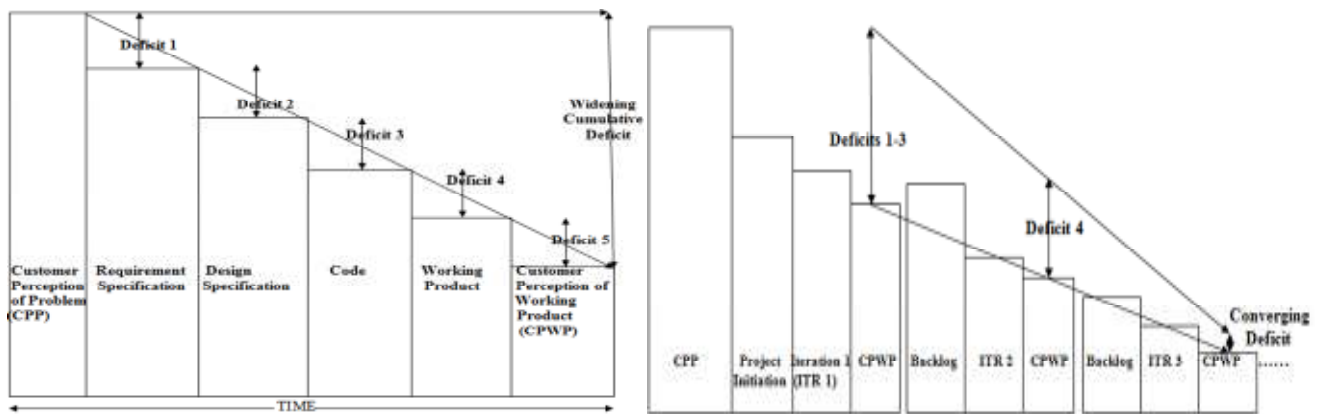


Figure 1: Comparison of Deficits in Plan-driven and Agile methods

For the agile methods the typical deficits include (see Figure 1):

1. **Deficit 1:** Is the deficit between the customer requirements to address the business problem and the initial requirements envisioning and the slim architecture and design during the initiation phase.
2. **Deficit 2:** Is the deficit between the initial requirements envisioning in the project initiation phase and the working product developed in iteration 1.
3. **Deficit 3:** Is the deficit between the actual working product and the perception of the product by the customer/ user. This gap is expected to be narrow due to close collaboration between the developers and the users.
4. **Deficit 4 to Deficit n:** Is the deficit between the backlog of requirements in subsequent iterations, which includes requirements that were not met in the previous iteration and new requirements identified during review of working product, and the user perception of the working product developed to meet this backlog. Deficit n is the deficit for iteration n-2.

Taylorist approaches are based on the principle that the first step in a product/ system solution is to comprehensively capture the set of user requirements to address the business problem. This is followed by architectural and detailed design. Coding or construction is commenced only after confirmation of requirement specification by the customer and completion and approval of architecture/ design. The customer is typically involved at the stage of requirements gathering and the final stage of product acceptance. As a result the validation of the product happens only at requirement gathering stage and at the end of

the long development cycle. In the meantime the total deficit between the requirements gathered from the customer and the product/ system delivered to the customer keeps increasing (Figure 1) as specialists such as requirement engineers, designers and coders exchange information with each other sequentially resulting in information loss and misinterpretations. Requirements volatility further compounds this problem of widening deficit.

On the other hand agile projects work on minimum critical specification (Nerur and Balijepally, 2007). Agile projects start with the smallest set of requirements to initiate the project. They work on the principle of developing working products in multiple iterations. Users review actual working product at demonstrations instead of paper reviews or review of prototypes in plan-driven methods. These working products become the basis for further discussions and the team works towards delivering the business solution using the latest input from customers, users, and other stakeholders. As the solution emerges through working products, the application design, architecture, and business priorities are continuously evaluated and refactored.

The waterfall projects tend to deliver what was originally requested in the requirements document, not what the stakeholders discover they actually need as the project and system unfolds. As a result the deficit between what the customer wants and what is actually delivered keeps increasing throughout the different phase of the long development cycle. In contrast this deficit in agile projects keeps decreasing as development teams and users review actual working products as the basis for further discussions necessary to converge on the correct solution. Iteration by iteration, everyone involved can see whether or not they will get what they want. As a result project progress is visible and the ability to decide what is to be done next is more complete, thus reducing uncertainty and giving stakeholders more confidence in the state of completion of the project.

At any point in the development cycle (Figure 1), the deficit in agile projects is converging while the deficit in the plan-driven projects is widening. As the project moves progressively towards completion, the motivation of team members, and users who form part of an extended team in Agile projects, keeps increasing. The team members and users rapidly hit their stride with increasing motivation, impelling them to continue to invest their efforts and accelerating them towards successful project completion.

CONCLUSION

This study suggests a theoretically grounded approach to explaining why team-members and users experience high motivation and satisfaction with development projects that use agile methods. Using a deficit model this study demonstrates how agile methods provide a sense of “proximity to project goals” or enhances the “completion effect” of project team members and users by developing working solutions in short feedback cycles, impelling them to work towards completing the project by overcoming inertia due to costs of persistence. In contrast, in plan-driven methods, the long development cycle, along with the increasing deficits between customer expectations and the delivered solution often results in the impeding forces such as the costs of persistence gaining an upper hand, resulting in lack of motivation and negative project outcomes that ultimately cause user dissatisfaction.

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