

Clients' participation in software projects: comparative case study between an agile and a 'traditional' software company

Zornitza Racheva, Maya Daneva

University of Twente
Netherlands

{z.racheva, m.daneva@utwente.nl}

ABSTRACT

One of the main characteristics of agile software development is the active and continuous participation and involvement of the clients throughout the project. According to agile proponents, this leads to building 'the right' product and to satisfied clients. In this paper we present a comparative study of two Dutch software development companies in respect to client participation and its impact on the project. One of the companies is purely agile while the other is following a traditional software development approach. Our study suggests that active clients' participation is not an exclusive attribute of agile projects and that it can be successfully integrated (and implemented) in a traditional project as well. Further, the study shows that by involving clients, software companies have the chance to get higher customer satisfaction, regardless whether or not they implement agile software development processes. Although our study is not quantitative, we think that it is indicative about the impact of the factor "client's participation" on the client's satisfaction.

Categories and Subject Descriptors

D.2.1 Requirements/Specifications – Methodologies, agile

General Terms

Management, Human Factors

Keywords

Customer participation, comparative case study, agile development

1. INTRODUCTION

One of the main characteristics of agile software development is the active and continuous participation and involvement of the clients throughout the project. Ambler, a prominent agile practitioner, defines *active stakeholder participation* as An Agile Best Practice [1]. Clients are responsible for providing information and making business decisions during a project,

including prioritization of the requirements according to their value for the client's business. The agile proponents and practitioners claim [2] that this leads to higher customer satisfaction, to creating value fast and early in the project, and to building the product the client really wants. In the agile software engineering literature, the participation of clients in agile context has been studied from different perspectives. The scientific community has investigated some aspects of the participation such as the role of the on-site customer, challenges related to customers' involvement, and communication challenges. To the best of our knowledge, however, there are no studies that have compared the levels of clients' involvement in traditional and in agile projects. In this research we want to gain deeper insight about the phenomenon of the customer's participation and its implications for software projects. In our view, empirical investigation is the means to be used in order to understand the state of the practice in this respect, and, eventually, to distill best practices for future use.

We are set out to answer the following research questions (RQ):

RQ1: *How can the client be actively involved during a non-agile real-life project and what are the implications of this involvement for the project?*

RQ2: *What are the differences and similarities between agile and non-agile projects in respect to client's participation?*

The rest of the paper is structured as follows: in section 2 we provide a summary of related publications. Section 3 provides background on the case study, section 4 describes the results in respect to the research topic, and section 5 concludes the paper and provides an outlook for future research.

2. MOTIVATION AND RELATED WORK

In recent years, the studies of the clients' participation in software development are linked predominantly with agile approaches. Most attention by the scientific community has been paid to studying the role of the agile customer in XP, the most prominent agile methodology, as it prescribes explicitly the way the of customer's involvement throughout the project. According to XP methodologists [3, 4] this should be implemented through the availability of so-called on-site customer. A number of studies are dedicated to the investigation of this practice. For example, [5] discusses various important challenges related to the implementation of this practice. Further, the problem of the customer involvement has been investigated and discussed by [6] and [7]. Other aspects of the user involvement that have attracted the attention of the researchers are communication challenges [8], and challenges in the global and distributed development [9].

Whereas the role of client is explicitly stated in the agile software engineering literature, we must note that before the 'agile era' the importance of clients' collaboration was stressed in areas as 'collaborative systems modeling' [10], 'participatory design' [11], 'user-centered design' [12]. In [10] the relationship between specific participative behaviors and user satisfaction was examined in situations where the need for participation was high. The authors of this study compared their results with results in situations characterized with a lower need for participation. The authors found that not all participative behaviors were equally effective in all situations. The conclusion was that the effectiveness of a participative behavior is contingent on the level of task complexity and on the level of system complexity. Furthermore, [11] compares participatory design with the XP practices of client involvement and [12] advocates to integrate user-centered concerns (from the Human-Computer Interaction field) in XP projects. These researchers [12] also present the results of a study on customer collaboration in practice, however in this study only agile and XP practitioners were involved. [13] presents an investigation of the link between user participation and user satisfaction. They reach the conclusion that only participation in information-needs analysis predicts end-user satisfaction and task productivity.

[12] provides a summary of focus-group discussions on 'on-site customer', where the participants explored, shared and reflected on their practical experiences of making customer collaboration work in all its various forms. The discussion covered the following issues (which also were re-visited throughout the discussion as themes emerged):

- (i) trust,
- (ii) the bridge (between the two worlds, and modeling as a possible bridge);
- (iii) access to customers;
- (iv) workshops;
- (v) supporting collaboration.

In this paper we organize our findings from the case study around these five areas [12]. The rationale behind this is that these areas represent focal points of the clients' involvement and provide a structure to reason about and compare the clients' participation practice in an agile and a non-agile company. Our purpose in this study is to share with the community the simple mechanisms that one non-agile company has adopted to cover all areas discussed above, and that led to high customer satisfaction and building the right product in non-agile project settings.

3. CASE STUDY DESCRIPTION

In order to answer our RQs we performed a qualitative case study following the guidelines of [14]. Our study includes two Dutch companies. Because of confidentiality constraints, here we refer to them as Company A (the agile company), and Company N (the non-agile company).

3.1 Case study composition

First, during a common meeting, representatives of the two companies gave 50 minute presentations on the process that is in place in their company, and on the development method used. In the next step, the researchers interviewed the company representatives in separate interviews that lasted about 60 min. each. Those were open-end unstructured interviews. During the interviews questions related to client's involvement and its impact

on: (i) building the right product, and (ii) customer satisfaction, were discussed. This form was chosen because we had a concrete, narrow research goal and wanted to obtain as deep insight as possible. The questions that the researchers asked originated and were triggered by the information provided in the presentations.

Company A participated in the study with two representatives:

- a developer and project manager (because of the flat team structure in the company one person serves multiple roles), and
- another developer, who is responsible as well for governance issues.

The representative of company N was the lead architect (and technical manager) and responsible for the delivery of a number of projects.

3.2 Description of company A

The company has about 260 employees, divided in departments of approximately 25 people. Each department is specialized in a concrete application domain that the company provides software development services to. For example, the Financial domain, Health care, and Education. The company is strongly oriented towards providing software as a service. Because of the specialization in concrete domains the company can reuse core parts of the software applications, and extend them with custom-made components in order to tailor the product to the concrete client's needs. The development process of the company is agile, both as process and as company's philosophy. Although the company does not follow a concrete agile method with all its practices, the development process is built around the core agile characteristics: short iterations and frequent releases, active customer participation, fast reaction to / and accommodation of / changes.

The communication with the client can be organized in a different way depending on the project. In some projects developer on site is practiced, which means that the developer, responsible for communication with the clients, can freely access the client's premises and collect the information he/she needs. In other projects the communication is via the phone and the clients can call all the time and express their desires/opinions. In addition to these options in some projects a web site is organized where the clients can track the progress of the project and thus see the timeline for implementing the requirements. This helped to reduce the pressure on the developers that came in form of phone calls asking "When will be my feature implemented?", and at the same time helped increase the trust between the parties as the client got the feeling that the developers are really taking him/her seriously, are acting on his/her needs, and that the project is really progressing.

3.3 Description of the Company N

The company has about 160 employees. Half of them are involved in software development. The company has middle-sized projects (4.000 to 15.000 person hours approximately), and in each project are involved between 5 and 30 people. The majority of the projects (around 75%) are maintenance projects, i.e. making changes to existing products. The remaining 25% of the company's projects are new development ones. In contrast to company A, the products of the company N are intellectual property of the clients and no software components can be reused. The new development is done from scratch. The contractual basis for the projects are 'fixed-price, fixed schedule'. The development phase is preceded by a workshop phase that consists

of extensive discussions and meetings with as many clients' representatives as possible. During the so-called 'workshop phase', the following issues are discussed and elucidated:

- (1) business case,
- (2) functional requirements,
- (3) architecture infrastructure,
- (4) project management,
- (5) maintenance,
- (6) security,
- (7) usability,
- (8) domain knowledge,
- (9) test approach.

The workshop phase finishes by providing a quotation for the project. The results on each of the discussed issues are captured in a deliverable. In rare cases where no reliable estimation can be elaborated based on the input during the workshop, this phase can be repeated until more detailed information is collected or some prototyping is done in order to capture the client's needs. The clients' participation during the project consists of weekly sessions. They are included in the contract between the parties as an inseparable part of the project. During the sessions issues are discussed that have been captured in Requests for Information (the so-called RfIs) between the sessions. These RfIs are written by the developers and become part of the project's documentation. According to the company's representative that we interviewed, frequent releases would not work for the majority of the projects the company currently runs. For example it is not feasible and desirable to update frequently a banking software that serves multiple branches of a bank, as this would cause disturbance of the work of the client and possible irritation. Other products that the company N develops could not be put into production unless the whole functionality is fully developed (e.g. a ticketing system for a big organization). This explains the choice of the development method that the company uses.

In order to better understand the clients' domain, company N invests in the education of their own staff-members in the business of their clients. Staff that will be included on development teams that deliver systems in a specific business sector go to specialized training program that let them learn the way businesses in a specific sector operate. This gives the staff members exposure to both the operational procedures common for organizations in a sector and the IT issues related to the support of these operations. The training costs are absorbed by company N, and hence are free of charge for the clients. This way the company wants to make sure that in addition to the excellent expertise in the domain of software development, a good understanding of the client's domain is ensured. In spite of this, it is expected that the client is the one that has to provide the ultimate competence in his/her domain.

4. RESULTS

In this section we compare the processes of the two companies in two respects: first, the overall process according to the core agile characteristics, and second – the processes related to client participation.

Table 1. compares the processes of the two companies in respect to the practices used. These are structured according to the areas explicitly discussed by the agile manifesto. We make a decomposition of the development method used in the two companies in respect to the process aspects listed in Agile

manifesto. The rationale behind this is that these areas represent the main differences between agile and non-agile development. Moreover, they are: (i) directly impacted by the level of client's participation, and (ii) are immediately linked to the project's outcome /success/ client's satisfaction. The table explicates the similarities and the differences between the process of the two companies.

Table 1. Comparison of the processes at Company A and company N.

	Company A	Company N
Short iterations and frequent releases	Fully complies to this practice.	- Does not apply this practice at all. - Has big releases with detailed planning up-front.
Working software vs. detailed documentation	Complies to this practice, while the level of documentation is chosen to comply with the maturity standards	Both working software and documentation are important.
Response to changes	Changes are handled in two ways – through agile change management in the product backlog – when changes of a requirement happens, or through Request for changes when bigger changes are required that lead to changes in the schedule/ budget.	Handled through RfCs.
Collaboration and communication between clients and developers.	Frequent, an ad-hoc basis, developer on client's site.	Frequent, on scheduled basis – workshop at the start of the project, and then during weekly sessions.

We observe that both companies differ significantly in respect to:

- (i) the cycles in which the development is organized, the planning (up-front vs. iterative),
- (ii) how the product is developed – incrementally vs. in big releases,
- (iii) the amount of documentation, and
- (iv) the response to changes.

While company A follows an agile approach in all these areas, company N sticks with plan-driven (or the so-called 'traditional') practices. Still, the comparison shows that in respect to *clients' involvement* there are significant similarities between the two companies, especially when the amount of clients' cooperation is considered.

Next, we look back at the areas of client's involvement listed in section 2 ([12]), and below we provide a summary of how the company N in our study addresses them:

- trust – this was ensured by: listening to the clients, studying client's domain, and last but not least – by mutual social events.

- the bridge (between the two worlds, and modeling as possible bridge) was implemented by the education that the company provides for part of its employees in order to study the client's area.

- access to customers – is defined in the contract and access to information is guaranteed by RfIs. We make the note here that in our earlier case studies [15,16], we investigated a number of agile companies that were small and we found that a large number of agile projects, especially in the small companies, do not implement the practice of client on-site.

- workshops – extensive meetings with as many as possible customer representatives as possible; more than one workshop can be organized in case the requirements or the estimates are not clear enough.

Beck [4] says that there is no process that fits every project, but rather the practices should be tailored to suit the needs of individual projects. Our study suggests that in reality the difference between traditional and agile development can be quite blurred and successful projects can choose their set of practices that best suit the concrete project realms independently from the 'extent of agility' the concrete practice. In the case of this study a traditional company has adopted a very 'agile' practice that shows its merits in completely non-agile project settings. This shows that the practice 'active user participation' can be successfully implemented and incorporated in a context of long cycles and big releases. The company has found a way of how to implement this practice to fit the rigor of the more traditional and heavily-documented way of development of company N. This was ensured by a set of mechanisms during different project phases. For example, at the beginning of project these are the workshops with the client, while during the whole project request for information (RfIs) are used. Moreover, mutual social events with the client's organization are organized once per month for some of the projects. The purpose of all these activities is not only to deliver the right product, but also to promote a spirit of trust and cooperation. As one interviewee put it "That is the personal touch".

Furthermore, company N does not experience the problem that they don't have enough information in order to create the right product. The results of the study suggest that the context of each particular project might play the essential role for the instantiation of the process. For example, the company N did not feel it necessary to organize the development in shorter iteration and to deliver the product in multiple releases. On the contrary, according to the representative of the company, this would be counter-productive for the majority of their projects, as the specifics of the products require delivering the complete and thoroughly tested functionality as one piece.

5. CONCLUSIONS AND FUTURE WORK

Active customer participation is an essential component of each agile SD methodology. In this paper we present a comparative study of the development process of an agile and a non-agile company in respect to: (i) clients' involvement, (ii) frequency of releases, (iii) response to changes. We observed that the non-agile company has successfully implemented mechanisms for active clients' participation during the project. This increases the satisfaction, enhances the level of trust between the parties, creates a feeling of 'personal touch'. We observed these effects both in the traditional and in the agile project and our study suggests that these effects are a result of the close cooperation and

frequent contact with the clients. Further, the study shows that there might not be a clear-cut border between agile and non-agile projects in respect to the practice of clients' involvement and that active customer collaboration throughout the project can be successfully implemented in non-agile projects as well.

6. ACKNOWLEDGMENTS

This research has been funded by NWO under the Jacquard project Quadread.

7. REFERENCES

- [1] Scott Ambler, Agile modeling, URL: <http://www.agilemodeling.com/essays/activeStakeholderParticipation.htm>
- [2] Koskela J, Pekka Abrahamsson, On-Site Customer in an XP Project: Empirical Results from a Case Study, In Software Process Improvement, 2004, Springer Berlin, pp: 1-11
- [3] Agile Manifesto, <http://agilemanifesto.org/principles.html>
- [4] Beck, K. eXtreme Programming Explained: Embrace Change, Addison Wesley, 2000.
- [5] Mohammadi, S. Bahman Nikkhahan, Sahar Sohrabi. Challenges of user Involvement in Extreme Programming projects. International Journal of Software Engineering and Its Applications Vol. 3, No. 1, January, 2009
- [6] Martin A, Robert Biddle, James Noble: XP Customer Practices: A Grounded Theory. AGILE 2009: pp 33-40
- [7] P. Abrahamsson, J. Warsta, M. T. Siponen, J. Ronkainen: New Directions in Agile Methods: A Comparative Analysis. ICSE 2003: pp 244-254
- [8] Korkala, M., M. Pikkariainen, K. Conboy, Distributed Agile Development: A Case Study of Customer Communication Challenges, in Agile Processes in Software Engineering and Extreme Programming, Springer, 2009
- [9] R. Akbar, M. Haris, M.Naeem, Agile framework for globally distributed development environment (the DAD model), in Recent Advances In Computer Engineering, 8th conference on Applied informatics and communications, Greece, 2008
- [10] J.D. McKeen, T. Guimaraes, Successful strategies for user participation in systems development, Journal of Management Information Systems archive, Vol. 14 , 2 (September 1997), Special section: Strategic and competitive information systems, pp: 133 – 150,
- [11] Rittenbruch, M., G. McEwan, N. Ward, T. Mansfield, D. Bartenstein, Extreme Participation – Moving Extreme Programming Towards Participatory Design, PDC 2002, Proceedings of the Participatory Design Conference, Sweden
- [12] Sharp H, H. Robinson, J. Segal, Integrating User-Centred Design and Software Engineering: A Role for Extreme Programming? BCS-HCI Group's 7th Educators Workshop: Effective Teaching and Training in HCI, 1-2 April 2004
- [13] Doll, W., X. Deng The collaborative use of information technology: End-user participation and system success, In: Collaborative information technologies, 2002
- [14] Yin, R. Case Study Research, Sage, 2008.
- [15] Racheva, Z., Daneva, M., Sikkil, K., Buglione, L., Business Value Is Not Only Dollars - Results from Case Study Research on Agile Software Projects; PROFES 2010, Springer, pp 131-145
- [16] Racheva, Z., Daneva, M., Sikkil, A. Herrmann, R. Wieringa, Do we Know Enough about Requirements Prioritization in Agile Projects: Insights from a Case Study, RE 2010, in print