

Business Value Is Not Only Dollars – Results from Case Study Research on Agile Software Projects

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Abstract. Business value is a key concept in agile software development. This paper presents results of a case study on how business value and its creation is perceived in the context of agile projects. Our overall conclusion is that the project participants almost never use an explicit and structured approach to guide the value creation throughout the project. Still, the application of agile methods in the studied cases leads to satisfied clients. An interesting result of the study represents the fact that the agile process of many projects differs significantly from what is described in the agile practitioners' books as best practices. The key implication for research and practice is that we have an incentive to pursue the study of value creation in agile projects and to complement it by providing guidelines for better client's involvement, as well as by developing structured methods that will enhance the value-creation in a project.

Keywords: Business value, agile software development, value-based approach, multiple case study.

1 Introduction

Demonstrating the linkages between investments in IT solutions and business benefits is becoming mandatory for an increasingly large number of organizations. This is particularly necessary in the context of agile software development, as new agile methodologies are being adopted and need to prove their merits. A key characteristic of any agile approach is its explicit focus on business value [1]. Essentially, in an agile software project, the development process is a value creation process. Indeed, the agile community established a common understanding [2] that (i) the main purpose of an agile project is to deliver maximum business value for the client and that (ii) agile approaches deliver business value fast and early in the project.

This paper builds on our previous work [17] that investigated the understanding of business value in agile projects from publications in the agile software engineering (SE) and requirements engineering literature. This systematic review [17] of literature showed that, with very few exceptions, most published studies take the concept of business value for granted and do not state what it means in general as well as in the specific study context. We could find no study which clearly indicates how exactly

individual agile practices or groups of those create value and keep accumulating it over time. This finding motivated us to pursue further studies of value creation in agile projects by deploying empirical research methods, for example case study research [22]. In this paper, we present the results of a case study that investigated (i) the ways in which agile practitioners perceive the notion of business value, and (ii) those agile development practices that create value, in the practitioners' opinion.

We have set out to answer the following research questions (RQs):

RQ1: What concepts of business value do practitioners in the context of agile projects perceive?

RQ2: In which way do agile projects create business value (process of value creation)? In which way do specific or individual practices influence the creation of business value?

RQ3: Do practitioners perform value-driven decisions during agile development?

RQ4: How do developers combine value creation for their own organization with value creation for the client's organization?

To answer our research questions, we have performed a multiple case study [22] in eight software developing organizations. In the next section, we provide background on our motivation for this study and related work. Section 3 describes the details of our case study process and Section 4 presents the results. Section 5 assesses our answers to the research questions and discusses implications for researchers and practitioners. Section 6 analyses the possible validity threats, and Section 7 concludes the paper.

2 Background

2.1 Motivation

The literature of agile SE [12] has emphasized the value creation attributable to the nature of agile projects. Agile software practices are credited with saving failing projects and increasing the success chance of many others. In the understanding of the agile SE community, the value delivered to the client lies not only in what the final software product represents, but also in the development process as such, which significantly contributes to the amount of value delivered. For example, a recent study at Intel Shannon [12] reports on the application of agile practices which lead to reductions in code defect density by a factor of 7. Moreover, Favaro [11] points out that agile approaches generate two kinds of economic benefits: operational and strategic. This means that the value creation process is not limited to the development of a product. The operational benefits of agile practices include lower costs for the clients, better quality product, shorter time-to-market. The strategic benefits include flexibility to respond to changes and ability to take advantage of new information, which ensure longer-term additional benefits for the client. Our research attempts to capture the state of the practice in this respect, as practitioners in agile software organizations witness it. As already stated in the Introduction, our current case study research is strongly motivated by the fact that we could not find any published study which indicated how exactly the value creation happens in real-life projects. (We refer interested

readers to [17] for more details on our earlier work which resulted in this finding.) We also felt motivated by a recent call by Petersen and Wohlin [16] who suggest that more qualitative studies are needed to make agile studies comparable and also to uncover issues that have not been explicitly identified in the agile literature. Moreover, Barney et al. [4], [5] point out that: “there is little research into the criteria used in the decision-making process around requirement selection for value creation”.

2.2 Related Work

At the time of writing this paper, the topic of value creation receives increasing attention in the research community [3]. In SE, the sub-field of Value-based Software Engineering (VBSE) which focuses on the value analysis and value creation process in a software projects, has been gaining in importance [6]. Drawing on the value-based SE theories, Aurum and Wohlin [3] advocate a value-based approach in requirements engineering. In essence, this is about aligning clients’ requirements, business requirements and technological opportunities when making requirements prioritization decisions. For example, recent studies by Barney et al. [4], [5] investigated the release-planning process to create software product value through requirements selection. These authors identified the factors that determine the decisions about inclusion of certain requirements for implementation. Next, Rönkkö et al. [18] present three aspects of software – as a technology, as a design, and as an artifact. They use these aspects to divide the value concept into three components that are relevant for software developing companies and their clients: intrinsic value, externalities and option value. The authors propose a value-decomposition matrix as a vehicle to reason about the various aspects of value. We make the note however, that they take a broader look at the development of software products, without discussing a specific development method. As these authors stress, the vagueness of the concept of value seems to be a central problem in the VBSE.

Furthermore, publications in agile SE converge on that agile methods get “more done with less” [10], [15], [20]. More specifically, in our earlier systematic review [17], we found that agile literature sources agree that business value is considered the key requirements prioritization criterion in most agile projects. For example, the study of Cao et al. [8] reached the conclusion that “...*agile RE practitioners uniformly reported that their prioritization is based predominantly on one factor – business value as the customer defines it.*”

We make the note that unlike our study, the literature sources that form the related work in this section have not discussed the question of value definition and value creation *through the agile process*. In fact, the focus of the studies of Barney et al [4], [5], is not the agile process itself, as most of the projects included in the studies followed incremental development. The authors do not discuss the process on itself and how the process affects the value creation. Although iterative development is in the focus of the study, the development approach does not play a role beyond the fact that the product is developed in multiple releases.

3 The Research Method

We conducted a multiple-case study [22] to explicate the decision-making process during an agile project in the context of changing requirements. The case study

consisted of semi-structured open-end in depth interviews with practitioners that work in organizations that develop software by using agile approaches. The case study is a first step in discovering the way in which the agile requirements mid-course decision process contributes to the client's value creation.

The companies, included in the study, characterized themselves as following agile methodologies. Some of them did strictly follow Scrum principles such as daily stand-up meetings and release retrospective. More detailed discussion about the study participants can be found in section 'limitations'.

3.1 The Case Study Process and Participants

We executed a rigorous case study by performing the following steps: (1) Compose a questionnaire; (2) Validate the questionnaire through an experienced researcher; (3) Implement changes in the questionnaire based on the feedback; (4) Do a pilot interview to check the applicability of the questionnaire to real-life context. (5) Carry out open-end in-depth interviews with practitioners; (6) Sample (follow-up with those participants that possess deeper knowledge or a more specific perspective).

Each in-depth interview included a section with questions related to the business value perception and value creation. Those questions were:

- What does business value of a requirement mean for you?
- At your meetings with your clients/product owners, do they explicitly discuss the business value of the requirements, so that all meeting attendees understand why some requirements are of higher priority than others?
- Is 'value' connected to the business goals which the clients want to achieve by deploying the software system? If so, in which way does 'value' connect to clients' business goals?
- When judging the value of the requirements, do clients also consider any other factors (e.g. cost, size, risk)?
- Has the desired value been quantified? If yes, how?
- In which way, in your experience, does the agile process add value to the client? Can you give a specific example from your practice?
- For yourself, as part of the developing side – do you consider the value for your own organization, or is it more important what the client wants?
- Do you share knowledge about business value creation within the organization?

We make the note that no substantial changes in our interview protocol took place after the pilot interview, so that the pilot interview could be considered part of the case study. The study included 11 practitioners who were working for eight different companies/public organizations:

- 1 middle size company in the Netherlands (3 cases, 3 participants)
- 2 small companies in the Netherlands (3 cases, 3 participants)
- 1 small company in Bulgaria (1 participant)
- 1 middle size company in Bulgaria (1 participant)
- 1 university in Germany (1 student project)

- 1 country-specific business unit of a large international company, Italy (1 participant)
- 1 department in a large governmental organization, Turkey, (1 participant).

The participants described a total of 11 projects. The application domains for which software solutions were developed represent a rich mix of fields and include banking, ERP for small businesses, health care management, automotive, content management system, online municipality services system. In each organization we interviewed one or more representatives that were directly involved in the decision-making and the development process. Many of the participants performed multiple roles in the team and thus had a wide overview of the end-to-end process.

3.2 The Data Collection

We collected data from our case study participants by carrying out in-depth interviews. According to research methodologists [9], [22], in-depth interviews are intensive conversations with a small number of respondents to explore their perspectives on a particular project, practice or idea. We used this data collection technique because it is deemed useful when a researcher needs detailed and context-specific information so that he/she explores an issue in depth.

The interviews took place between July 15 and Nov 10, 2009. Nine interviews were done in face-to-face meetings. Two interviews took place over the phone. Each interview lasted between 60 and 90 minutes. Each interviewee was provided beforehand with information on the research purpose, the research process and the rights and responsibilities of the participating case study companies. At the meeting, the researcher and the interviewee walked through the questionnaire which served to guide the interviews.

We make the note that in each interview, the interviewer (that is the first author of this paper) used her judgment and tact to decide how closely to stick to the interview guide and how much to follow up the practitioners' answers and the new directions they might open up. Throughout the data collection, the interviewer attempted to verify her interpretation of participant's answers. She also summarized the key data immediately following the interview. The data was then transcribed and analyzed, which is described in the next section.

3.3 The Data Processing

The data analysis in this study was guided by the grounded theory method according to Charmaz [9] that is a qualitative method applied broadly in social sciences. This approach is explorative and well suited for situations where the researcher does not have pre-conceived ideas, and instead is driven by the desire to capture all facets of the collected data. On the next step the data can be used to build a theory. The data analysis followed the following steps (1) Coding, which was focused on attaching a 'code' to a portion of the text; (2) Clustering all portions of text with the same code; (3) Creating lists with codes and clustering them into families; (4) Identifying patterns, i.e. multiple occurrences of the same mechanisms or concepts. These steps were executed by the first two authors of the paper who worked independently at two different locations. Each researcher read through the practitioners' responses and

searched for themes and patterns that appear to be common among the practitioners. The third author of this paper acted as a checker in the process of identifying patterns (step 4 of the list above). We got a variety of themes which we grouped in two ways that we found meaningful: by perspective (clients’ versus developers’ perspectives) and by company size (small, medium, large). For example, our analysis found that small agile software development companies who have small organizations as their clients set up their prioritization process differently compared to larger companies.

4 Results

This section presents the results in an order corresponding to our research questions formulated in Section 2.

1. *What concepts of business value do practitioners in the context of agile projects perceive?* Table 1 summarizes what the participants in the study perceive as a business value.

Table 1. Understandings of business value from the interviews

The business value...
“...is in the context of the main functionality: does the feature support our main scenario?”
“...what the organization will gain when we implement the requirement”.
“...usually it is what they like to see, what is used most (from workflow perspective).”
“...what will it means if we implement this requirement – will the client become more efficient, more competitive, will it gain something”
“...is defined based on: how much the client uses certain feature; whether it works good, and to help them do their work (in this case – the work flow)

Table 1 indicates that in our observations, many of the business value definitions are context-dependent, that is, a definition could be traced back to a specific context characteristic of a project. For example, one of the participants, who worked on a project in the context of a software suppliers’ network, defined the term business value as: *“Business value is to allow the client develop the functionality for which he/she is dependent on us”*. This perception clearly demonstrated the linkage between the perceived business value by this interviewee and the role he plays with respect to his clients in the suppliers’ network. Another interviewee shared that *“perceptions of business value vary from project to project, even if you have the same client on site in both projects”*. Examples as these brought us to think that we can not expect one universal definition of BV. Moreover, practitioners also indicated that the definition of the same client would probably change from project to project, depending on (i) the different project-specific settings, (ii) the specific needs of the client (for example, the need to have highly reusable or highly scalable software), and (iii) the market position of the client’s organization. To us, this all indicated that multiple layers of business value are clearly observable in agile project organizations and that it might make good sense to look into these layers in order to understand the underlying mechanisms responsible for the variation of perceived business value across agile projects within an organization. We consider it intuitive to think that agile projects may well vary in terms of how much of an agile approach they adopt in the project delivery cycle, and

this, in turn, leads to variations in the perceived business value of both the system being delivered (that is, the product) and of the way it is delivered (the process). This reasoning motivates us to carry out a follow-up case study in which we plan to collect more observations on how business value is created and to understand the relationship which could possibly exist between the extent to which a project is agile and the perceived business value.

2. *In which way do agile projects create business value or influence the creation of business value?* All study participants agree on that agile development better suits the project objective to satisfy customer needs and, hence, it leads to increased customer satisfaction, regardless of other project context characteristics as level of customer involvement, organizational culture, type of product, level of risk and requirements volatility. More in detail, the answers by practitioners and the agile practices they addressed are presented in Table 2.

As suggested in Table 2, our observations from the interviews bring us to the conclusion that business value is created by a combination of agile practices and mechanisms at play in a project-specific context. For example, in short projects with limited resources and a short list with requirements, the client profits from the agile process through (1) the efficiency of the process, (2) the ‘savings’ made by the light-weight method, and (3) the ability to figure out early what they’ll get and whether it is what they need. This profit-making mechanism is deemed by our participants important to obtain the best possible system for the money spent.

Another example is in a context of volatile or unclearly defined requirements. In this case, the value is ensured by the change management mechanisms and by incorporating learning loops in the process [19]. An interesting finding in our study was that the views by all participants agreed on that the agile paradigm has an effect on the social aspects of project delivery, such as work moral and atmosphere, as well as on the relationship between client and developing organizations.

3. *Do practitioners perform value-driven decisions during agile development?* While the concept of business value was deemed important to all participants, when it comes down to making requirements prioritization decisions at inter-iteration time, we found a surprising result: nine out of eleven participants stressed the importance of, what they called, a ‘**negative** value’. This is a prioritization criterion that the practitioners used in requirements prioritization and it means ‘*how big the damage for the client/product will be if a requirement is not implemented*’.

The practitioners explained that in their requirements prioritization experiences the important point of reasoning was not the estimation of the value being present in a certain feature, but instead – the question of how much this feature would detract from the product’s value, if the developers do not implement it. The ‘negative’ value thus is equivalent to loss of value or damage to the business. In the experience of one practitioner, this reasoning reflects a professional pragmatic behavior especially in projects that have very limited resources and clients preoccupied with whether or not they derive maximum benefit from the project. Unlikely to contexts in which scarcity of project resources is an important concern, in projects which enjoy ‘more generous’ budgets, practitioners agreed on that their decisions were driven mainly by value consideration, namely supporting the main functionality of the software system being delivered and keeping in mind the ‘negative value’. We note that making decisions by considering ‘negative value’ sounds intuitive, as the scarcer the resources, the more

Table 2. Agile practices and business value creation

Answers to the question of how agile software processes create business value	Practices addressed:	Results in:
<p>“...The clients are included in the development process which enhances the understanding between the parties.”</p> <p>“The process was adding value. The project included many relatively small requirements; there was a high through flow in the PB (product backlog) that you can not handle in a waterfall way.”</p> <p>“The clients prefer to get something more often instead of one big thing once per year that might not be what they want.”</p>	<p>Client’s involvement</p> <p>Handling changing requirements</p> <p>Frequent releases</p>	<p>Satisfied client, better relationship</p> <p>Creating a product that the client desires and that answers to changes</p> <p>Satisfied client</p>
<p>“...by the efficiency of the process, the ‘savings’ made by the light-weight method, and by figuring early what they’ll get and whether it’s what they need. Gives the client peace of mind! Gives them the idea about what they’ll get, at the same time they don’t pay up front and don’t have to sign a piece of paper; also they know that they can add something if they forget.”</p> <p>“if it was not agile, we could have made a completely different system from what they want. Especially in this case where the requirements were not SMART. We discovered very early what they really want. Otherwise you need much more specific requirements. Also, for the developers – they have more voice, there is more interaction, they are happy. We have almost no cases of people that leave the company.”</p> <p>“You can show very early what they can get; and you can manage expectations – what to expect and when.”</p>	<p>Close cooperation with the client</p> <p>Requirements’ changes are allowed</p> <p>Small releases and frequent demos</p> <p>Early release</p>	<p>Satisfied clients;</p> <p>Harmonious trustful relationship; peace of mind; less probability for requirements creep</p> <p>The developers are happy! And work better; creating the right product, happy client, no waste of time and resources</p> <p>Happy client, realistic expectations</p>
<p>“I don’t believe in requirement documents; I think they are exactly as good as a card, and all the rest effort (specification, etc.) is a waste. Another good think is that you don’t sign something up front. It is good for both sides, and for us to make expectation management; Agile makes products faster to market; you have de facto demo every 2 weeks, which is extremely helpful, as nobody can do everything right from the first time. It allows the client to collect feedback, observations and experience from the beta-versions, and so the first version in production is much better.”</p> <p>“You can make changes during the project; nobody knows in advance what they really want. This process helps them to see what happens, at an early stage.”</p>	<p>Slim RE process, less documentation, frequent releases, incorporate learning</p> <p>Change management, early releases, incorporate learning and experience</p> <p>Information sharing techniques</p> <p>Client participation</p>	<p>Good use of resources, no waste, lower risk (do not sign something fixed up front), faster to market, creating the right product, higher quality</p> <p>Better product and right product via learning</p> <p>Faster time to market, better team work, information sharing</p> <p>Happy clients, more ‘value for money’</p>
<p>“...to reduce the time for development... The project team is more cohesive, the experience is shared, also to the whole company.”</p> <p>“The special benefit of agile is that the client can better influence/re-define what he gets for his money.”</p>		

conscious the project teams are on how to spend them. However, we also make the note that, to the best of our knowledge, the agile literature sources do not mention the concept of ‘negative value’. Reflecting on the discrepancy between the business value concepts discussed in agile literature and our experience that the concept of ‘negative value’ surfaced during the interviews with the majority of the participants, regardless of their locations, company sizes, and cultures, we think that it is an under-researched topic which warrants further research. First, the concept of ‘negative value’ suggests that we may need to redefine the concept of business value in agile all together. Second, this concept clarifies the type of value that feeds into the decision-making processes in agile projects. Understanding the mechanisms that condition the use of ‘negative value’ in agile can bring us to restate the decision-making conceptual frameworks which we, the researchers, have been using to explain agile phenomena until now. We consider this a research problem for our immediate future. More specifically, we plan to get back to the case study sites and do follow-up in-depth interviews to explicate the meaning of ‘negative value’ and its use in agile decision-making.

4. *How do developers combine value creation for their own organization with value creation for the client’s organization?* The practitioners shared the views that in the software project organizations, the developers regularly perform their own estimations and revise their understandings of how the business value from the client’s standpoint relates to the bottom line of the developers’ companies. They explained that this developers’ value-conscious estimation happens, because of the pressure on the developers to maximize the value creation for the client, only while ensuring a descent level of profit for their own companies. This means that not all wants of the clients get implemented at inter-iteration time, and certainly, not all requirements that the client specified at project inception time are implemented. Overall, the practitioners agreed that the developers are active participants in the requirements decision-making processes. Their participation is deemed even stronger in cases of small projects, where the client is a small organization or company that does not possess knowledge in the IT domain and cannot afford paying extra for IT consulting services. Such a client may even find it very expensive to allocate a resource to the role of ‘on-site client’. Often, it is economically unfeasible for the client organization to pool away a full-time employee from their every-day business and task him/her to serve ‘on-site’ in an agile project. In such a context, it happens that the client delegates the decisions influencing the value creation, to the developing team. Our case study participants indicated with certainty that a high level of trust is a prerequisite for such cooperation. Some participants described situations where they even had to ‘save the clients from themselves’, meaning to prevent unwise decisions or suboptimal choices that will be harmful in long term. The practitioners motivated this course of action with their experience from previous projects at the client’s site as well as their profound knowledge of the client’s business domain. The developers also justified this behavior by their desire to create maximal value for the client and, thus, to contribute to a successful project. In the experience of our interviewees *“this leads to high client satisfaction and good relationship with the client, which will, eventually, lead to future mutual projects”*. This observation represents an interesting point for further discussions and research, as it does not converge with the common understanding in the agile literature that the customer is responsible for making the (prioritization) decisions. We think, therefore, that knowing more about the variation in project contexts is key to understand

how relevant project context characteristics possibly affect the choice of decision-making approach in a project.

That the developers strongly participate in the prioritization and decision-making gives us the hint that agile and traditional requirements engineering processes may not be that different, compared to what originally was thought, regarding who prioritizes the requirements. Our study suggests that in agile (as well in traditional) contexts, we can find examples of clients who essentially rely on developers to prioritize their project requirements; we, therefore, think that the difference between agile and traditional processes is not with respect to who prioritizes the requirements, but: (1) with respect to what competencies and (tacit) knowledge those, who prioritize, have of their client's business, (2) with respect to whether the client is able to participate in the process. Our interviewees suggested that the developers, who 'saved the clients from themselves' are experienced professionals (e.g. in the words of one interviewee, with 10 to 15 years of experience in IT systems delivery in a specific business sector) and this might indicate that for agile prioritization to be led by developers, it should include highly-competent and experience people. At the time of writing this paper, we consider this a hypothesis for future research and we feel motivated to carry out further case studies in company sites to confirm or disconfirm it.

Last, the observation that clients feel their knowledge of requirements priorities limited when it comes to inter-iteration decision-making opens up a question to those researchers that develop and evaluate requirements prioritization methods. The existing prioritization techniques rest on the assumption that clients are aware of the mechanics behind the application of requirements prioritization techniques and, as a minimum, they are conscious about their role of providers of the input that feeds into these techniques. It appears that our case study findings question the extent to which this assumption is realistic. Indeed, requirements prioritization methods take for granted that there are objective values to provide inputs into the methods. Now, looking at our case study findings, the suspicion grows that these objective values may not always exist and are difficult to make. Our findings are indicative for a limitation being present in the current requirements prioritization methods, and therefore, we think that future research is warranted to understand those cases in which the assumption is not realistic.

5 Discussion on the Results

We were surprised that our study yielded a few findings regarding essential aspects of business value creation in agile projects, which were misaligned with what agile literature says on these aspects. Reflecting on these findings, we formulated a number of interesting research questions for the future. Below, we present the research questions according to those findings which indicated a gap between agile project realities and the agile literature:

- (1) Business value is more than just numbers. It comes out of a human judgment that is based on competencies and deep knowledge of the client's domain. An interesting question then is how a judgment about business value is formed and what tacit knowledge should be made explicit, so that knowledge about business value gets shared among developers and clients.

- (2) Perceived business value varies from project to project, as projects vary in terms of amount of agile practices they use. Does any relationship exist between the extent to which a project is agile (i.e. the amount and the combination of agile practices) and the perceived business value? If so, what kind of relationship is it?
- (3) The value-creation process plays an important role for the developers' organization. The agile practitioners' literature [2] seems to share the opinion that the only value-creating considerations that drive the development decisions are those of creating value for the *client*. During this study we made the consistent observation that, more often than not, the value creation for the developers has been considered as well. Clearly, developers and clients have some goals that ensure mutual benefits to incur e.g. "we want to make the client happy, so that he/she comes back", while other goals on the developers' side may not be related to one particular project or one particular client, and instead are related to issues like reuse, other concurrently running projects and distribution of resources for maximizing value for the organization. We need to consider more carefully in which ways development teams balance the client's business value with their own organizational bottom-line. We think this is an important topic for future research on its own right. We think, if we collect and analyze examples of good and not-so-good ways to balance client's and developers' value-creation perspectives, then we will be able to deduce patterns, principles, do's and don'ts, and other general understandings that help practicing requirements engineers build up a body of knowledge that can assist them in value-creation.
- (4) As already noted in the previous section, the developers rely on their own estimations and understandings, even on common sense, in order to maximize the value creation for the client. The situations in which the developers had to 'save the clients from themselves' opens up perspectives for future research. For example, it would be interesting to see what level of trust is necessary in those situations when clients 'delegate' the value creation process to the developing team who delivers the system.
- (5) The evidence from the study shows that, in contrast to the documented agile best practices in the literature [10], in most of the cases the developers are those who made inter-iteration decision making. Our interviewees agreed that more often than not the involvement of the clients consisted mainly of approving the plan/giving comments. Only in few cases practitioners were able to provide evidence that the client is really capable/interested/aware of the agile way of defining priorities, and thus able to navigate the functionality by the mid-course decision-making process. In Section 4 we already expressed the suspicion that this may question the fundamental assumption behind the contemporary agile requirements prioritization methods, namely that some objective values exist to feed as inputs into the methods. We think, this alone is worthwhile researching so that we understand the extent to which this assumption is realistic. In our case study, the interviewees went further to explain why developers are that strongly participating in the decision-making. In their view, the developers' company is the one to make sure that the project delivery process runs in a way that is profitable for the company. If developers accommodate all wishes which clients might come up with at inter-iteration time, the company may find it not sustainable in the long run. As said in the previous paragraph, while an agile software company lets its clients

prioritize the requirements, this decision-making process can take place only when the client's sense of flexibility is balanced against the company's sense of profitability. However, it remains to uncover the mechanisms that are at play in contexts where this balance is feasible.

- (6) Throughout the interviews, it became explicit that there is a link between the project's settings and the way the decisions are made, i.e. how the value creation process is organized. In all projects where the client's company was a small company, the decision making was deliberately delegated to the developer. It could be a product owner, a project manager or another representative of the developing team that was responsible for the communication with the client.

6 Limitations

We explicitly addressed the possible threats to external and internal validity of the observations and conclusions in a case study as per the recommendations of qualitative case study research methodologists [21],[22]. First, the external validity addresses the generalizability of our observations and conclusions beyond the studied sample of companies, projects and participants. The following aspects of the study can be considered as possible threats to the validity: (i) the number of companies and projects that have been studied; and (ii) the choice of study participants. The scale of the study does not allow us to make statistically relevant observations. However, as discussed earlier, this was not the purpose of our study. For a qualitative study, the question is rather [21],[22]: to what extent the companies included in the study can be considered as representative for a broader range of companies? We deliberately included in the study representatives of companies of different sizes and business sectors. Some of the findings apply generally across the cases, despite the heterogeneity of the set of case studies. This gives confidence that the conclusions hold for other companies in similar context as well. It is for this reason we have searched for aspects that the cases have in common rather than aspects in which they might differ. Our findings correspond to the intuitive thought that agile companies in similar contexts would share similar approaches to business value in their projects, but, more importantly, it was also confirmed by participants in a panel discussion where first results of the study have been presented. Of course, the stress here is on the word 'context'. We believe that the most important aspects of the context, in this case, are: location of the company, company size and project size. As participants in the study indicated, the geographic zone, where a company is located implies the presence of a country-(or zone-) specific culture, which defines to a large extent the relationships between the clients' and developers' organizations. In addition, there are specific legal aspects in each country in respect to the contractual terms an agile project organization would adopt. Furthermore, the geographical location of the company is linked to the way in which the agile methodology is applied and the extent to which the agile way of thinking and working as a philosophy penetrates in a specific part of the world. This means to us that it is realistic to expect that the results of our study are generalizable to companies in a similar context, especially in companies of similar size, located in Central and South-European countries. We make the note that we are aware of the different level of penetration of the agile paradigm in the different geographic zones. E.g. in North

America, the increased awareness and usage of agile approaches have led to the formation of professional communities and networks as well as to specialized professional certifications (e.g. scrum master). It will be very interesting to observe, compare and contrast the agile development and project management practices at companies working in different cultural settings. Furthermore, it would be interesting to compare their processes of value creation and their understanding of value with the observations in this paper.

It should be noted that our cases are limited to small and medium-sized companies. Due to their different nature, the findings cannot be generalized to large companies, which have a different, and often distributed, software delivery process. For example, in [13], the authors describe a large-scale Scrum-of-scrums approach that ensures multi-team coordination in large organizations (e.g. Nokia) and relies on a set of mechanisms unique to agile contexts in large companies. In this case, study, we did include one large organization, however, the project which we included in the case study was small. This meant, it had a smaller project organization, consisting of a few representatives of the country-specific business unit of the company (to which our interviewee belonged) and a representative of the client.

Second, with respect to internal validity, our key concern refers to the choice of the companies. As we are analyzing agile processes, we want to be sure that this is in fact what we are investigating. The important question to discuss is how did we (the researchers) know that the processes we studied were indeed agile ones. To minimize the effect of this threat on the results of the case study, we took some extra actions: We confirmed with all participants that they (or their team) apply an agile methodology. The participants stated that their organizations were known as agile method adopters and that they were committed to use agile in the projects that we collected information about. Next, during the interviews, we consciously looked for confirmation of whether the interviewees indeed referred to examples of their experiences in agile projects (and not in projects that used other approaches). Certainly, this is a philosophical question as well – where is the line between other iterative and incremental approaches and which characteristics of the project should be observable in order to claim a team or a project to be agile. This question is out of the scope of this paper, though. To the best of our knowledge, the projects included in our study are truly agile projects in the sense of the Agile manifesto [2]. Furthermore, our interviewees agreed on that the agile process helped them create rapport with their clients easier than it could have been possible in a project that uses a traditional delivery approach. The interviewees also agreed that the agile process makes it “*much easier than ever before*” to consistently maintain communication with the client organization. They felt that this all was instrumental to “*making the clients happy*”. Clearly, one could raise the concern that these observations are biased, as they are provided by agile practitioners. More than 70% of the interviewees were seasoned practitioners with more than 15 years of software project experience and that they accumulated a large part of this experience while working for organizations with traditional software development approaches. So, they had enough practice to compare the both worlds. However, we admit that there is a possible threat to validity as we interviewed only those people that are currently engaged in agile development. Theoretically, there could have been people that came back to traditional approach. However, this was not a feasible option within the resources we had.

7 Conclusions

This paper presents the results of empirical investigation on the understanding of agile software practitioners on the concept of business value and its creation during the development process. All participants in our explorative study expressed the opinion that agile projects make clients satisfied by the outcome of a project. This was a point of convergence across case study sites regardless of the significant variety in project characteristics (type of software project, organization size, culture) at these sites.

The study revealed an important gap between the realities of the practitioners in the studied projects and the agile literature. In our view, acknowledging the presence of this gap is a valuable input to agile project managers and practitioners when they make decisions on how to implement the agile practices concerning the interactions with their clients. Agile managers may choose to avoid certain practices if they deem this brings them closer to their project realities in which business value is to be created. Reflecting on the gap also brought us to research questions for the future.

We believe that value creation in agile projects is a lively, difficult and richly articulated research field and, therefore we think that our explorative case study can be just one step on the way to develop a deeper understanding of the agile phenomena related to essential aspects of business value. We consider it a work-in-progress that the community may want to adapt and expand.

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