Value in a Digital Services Project

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1 Executive Summary

Delivering value is a key tenet of Agile approaches to software development, including the Agile Project Framework (Agile Business Consortium, 2017). However, there are few techniques for identifying, tracking, and sharing value in Agile IT projects. The value concept is commonly taken for granted, and is rarely clearly identified in IT projects (Racheva et al., 2010).

The Agile Project Framework refers to 'business value' and states that it emerges "*when projects are aligned to clear business goals*". This starts with the identification of a high-level business vision and objectives. However, a key issue is how these business objectives filter down into the project detail. After project set up, the work and decision-making moves to a lower level where the focus is on technical practicalities and business process changes. Decisions made at this level are key to defining the final product or service. What is harder to do is to maintain links to the high-level business objectives throughout the detailed development work, and to measure success at the end based on those business objectives rather than successful completion of the technical work.

We tell the story of a city council housing organisation, our case study, as they digitise part of their tenant services. The business has clear strategic aims, and we found that project stakeholders and team members could describe the value of the project from their point of view. The key challenge areas that emerged were nuanced differences between value perspectives, a need for more precision about and prioritisation of value, and for a coherent thread to join high-level business strategy to project aims and to measurable project outcomes.

Based on the findings of the case study reported in this study, this white paper presents some recommendations from relevant literature on value characterisation in Agile projects and value delivery. To summarise, the main recommendations from literature are:

- ***Value Characterisation*:** To gather value perspectives from different stakeholders to identify and form a mutually agreed understanding.
- ***Build the Right Thing Right Based on Actual Value Need:*** To base the project on customer and user needs and keep them involved throughout the project through continuous stakeholder collaboration.
- ***Value Progress Recognition*:** To estimate, manage, and deliver value based on estimations and feedback, taking stakeholder views into consideration. Moreover, to enhance the system's ability to create value frequently throughout the project and system's lifecycle.

2 Introduction

Delivering value is a central tenet of the Agile Project Framework (the Framework) philosophy, which states that:

> *"best business value emerges when projects are aligned to clear business goals, deliver frequently and involve the collaboration of motivated and empowered people."*

Other Agile approaches also mention '*value*', but tend to use the term in a more general way rather than specifying '*business value*'. The Scrum Guide emphasises '*maximising the value of the product*' (Sutherland & Schwaber, 2016). The eXtreme Programming (XP) book states that '*in XP you only do what you need to do to create value for the customer*' (Beck & Andres, 2004).

The term *value* has many meanings. These include:

- the *desirability or utility of a thing,*
- *monetary worth,*
- *the ability of a thing to serve a purpose,*
- and (in plural) *principles or standards* (Oxford English Dictionary, 2015).

The first three of these are often referenced when talking about software value.

Agile approaches often focus on serving the needs of the customer. In the Agile literature the customer usually means the business for whom the software is being developed. Software users are another group whose needs must be met. Sometimes the software users work within the customer business, but frequently there are several groups of users, some of whom are internal to the business and others who are external, in effect the business' customers. It is therefore important that an Agile team is aware of:

- the customer's view of the value of the project,
- the users' view of the value of the project
- as well as other stakeholders' views of value.

Because of these different perspectives, identifying, estimating, and measuring the value of software systems is complex and multi-layered.

Different types of value come from IT projects. Examples include business value, user value, strategic value, process value. These aspects are distinct but are also interlinked. For example, user value is an important aspect of business value because a product needs to be useable and deliver value to its users in order to deliver business value. In this paper we are primarily interested in business value, by which we mean the outcomes from an IT project that produce benefits for the business to whom it belongs. However, we also reference user value because of its close link with business value.

3 The Organisation and the Context

Our *case study organisation* was a UK city council housing ALMO (Arms-Length Management Organisation) who were working on digitising a range of tenant services. They wanted to know how to measure value in their projects. Our three research questions were:

- What does value mean to different project stakeholders?
- Which aspects of a project contribute to its value?

- How is project value linked to the business's strategic aims?

The *case study organisation* had social values as drivers for their activity. Their purpose was threefold: to deliver great services, to enable people to thrive in their communities, and to support the development of a great city. Their strategic aims for 2020 were to 'provide quality housing management and support services', 'to make the money deliver across everything we do', and 'to continue to create positive outcomes for our customers'. The case study organisation worked entirely for the *city council* whose overall mission was to make the city a good place to live. The city council's strategic directions included wellbeing, safety, health, happiness, care, diversity, and innovation. However, they were pressured by big budget cuts and a drive to digitise.

The Digital Service Standard developed by the UK Government stipulates that all government digital services should be built using Agile, iterative and user-centred methods (UK Government, 2017). The case study organisation had a small in-house IT section whose staff concentrated on application management and working with suppliers, and only occasionally did in-house development. The organisation introduced the Framework in June 2015, 18 months before our collaboration started. Staff were trained in using the Framework by attending courses, reading literature, receiving coaching, and having discussions with colleagues. They started putting it into practice in October 2015, and when we started working with them in December 2016 they saw themselves on a learning curve.

In this research we first interviewed two directors from the *city council* and two directors from the *case study organisation* to understand their perspective on what value they expected to get from IT projects. We then followed a project at the *case study organisation* by attending meetings, looking at documents and doing interviews. The project we followed digitised tenants' reporting of Anti-Social Behaviour (ASB). Although the organisation already used a computerised case database on the business side, the tenant reporting process was still largely manual. In order to make a complaint tenants had to report by phone or email after which they would receive a home visit at which they were provided with recording equipment and/or a diary which they would use to document the anti-social behaviour. Problems identified in this manual process included the cost of providing equipment, the cost of staff time, inaccuracies caused by manual data input, poor customer experience, and the lack of a digital option. The one exception to this partly manual reporting process was the recent introduction of a mobile phone app that enabled customers to make noise complaints, upload sound recordings, and receive status reports about their complaint entirely through their mobile devices.

4 Identifying Value through the Project

The Story So Far

A Foundations meeting was held in January 2017, at which the project's team leader and business analyst were present alongside a business lead, the ASB manager and an ASB officer. The purpose of the meeting was to discuss the project context, identify high-level requirements and outcomes beneficial to the business, and to decide whether it was feasible to proceed.

Technical and business issues dominated the meeting. Technical discussion focussed on how to link the new software with the case database, how feasible it was to replicate the functionality of the mobile noise app on different platforms, and security. Business discussion focussed on identifying benefits and

functional requirements. The main thrust of the discussion was about business issues.

The meeting identified several benefits of developing a digital system. The main ones were saving staff time, saving money, and giving tenants a better and easier experience. Aspects that needed further consideration before progressing included estimating the development cost, identifying unexplored assumptions, and considering dependencies between this system and others.

Tenants were the service users in this project and they were called 'customers' by the business. The business manager acknowledged that it would have been better to have had a customer at the meeting as the team were making assumptions about what customers wanted which may not have been correct. He suggested doing a customer journey exercise to help them think about the customer, but there was no time during the meeting. The ASB manager also focussed on customer needs. At one point he said "*this needs to be about customer engagement. The digital vision is to make it easy for customers to report – so we should focus on that*".

Towards the end of the meeting all the participants worked first separately and then together to develop high-level user stories on post-it notes. These were discussed and prioritised at the end of the meeting. After the meeting they were tidied up and input onto a spreadsheet. Fourteen user stories were identified, of which eight were prioritised into must haves, see Table 1.

As a …	I want …	In order …
Customer	To get updates on my case at a time that suits me	To reduce stress
ASB officer	The system to store information automatically	To avoid duplication in the database
ASB staff	To give customers up-to-date information	To keep customers up-to-date
Customer	To be reassured my report is confidential	To feel safe and know the perpetrator won't find out I complained
Customer	To use any device	To report or view my case
ASB manager	Staff to communicate efficiently with customers	That customers receive timely information
ASB officer	To contact customers digitally	To be efficient and have easy contact with customers
Customer	To be notified when my complaint is received	To know it's been received

Table 1: The 8 Must-Have User Stories identified at the Foundations Meeting

After the Foundations meeting the *project team* was put together. The team of five consisted of a developer (who was also the team leader), a business analyst, a business advisor (the ASB manager), a business ambassador (an ASB officer), and a tester. Development feasibility was discussed and it was decided that the system would be built by a third-party software provider. Work started on the project in February and finished in early September. During development, the project team managed progress by holding weekly Skype meetings with the third-party provider.

The system was deployed in early September and an evaluative survey was sent to tenant users in early October. The survey was developed iteratively by the project lead and one of the researchers. Questions were linked to value extracted from the must-have user stories: ease of use, reporting digitally,

receiving updates digitally, and confidentiality. The survey included five Likert scale sentences (assessed on a five point Likert scale from strongly agree to strongly disagree), along with a question asking how the online portal compared to other methods of reporting, how the respondents heard about the online portal, and whether they had any further comments.

In early December the team reported that all recent ASB reports had been made using the new system, which was a successful outcome for the project.

Different Views about Value from IT projects

At the beginning of our collaboration in December 2016 we asked two directors from the case study organisation and two directors from the city council to explain what value they expected to achieve from IT projects. We analysed the interviews and identified sub-themes and themes in the respondents' answers. A summary is provided in the thematic map in Figure 1.

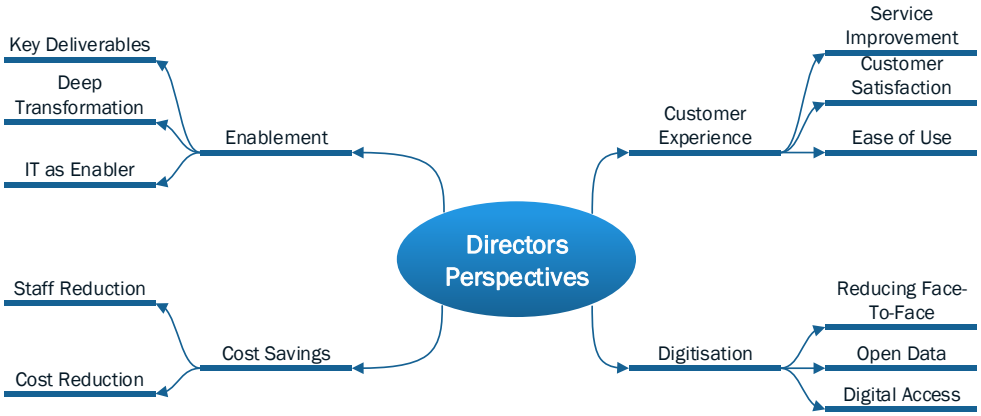

Figure 1, Thematic Map of the Directors Perspectives.

The most pressing need for the city council directors was to make cost savings. In contrast, the main focus for the case study organisation directors was to use IT as an enabler for improving services. However, all four main themes identified were mentioned by all the interviewees, so the difference in responses was a matter of emphasis rather than content. IT as an 'enabler' was mentioned most during the interviews and digitisation was mentioned least. Although customer experience was discussed by all interviewees, they acknowledged that it needed to be assessed better than it currently was.

Soon after the Foundations Meeting in January we interviewed all five members of the project team to ascertain what value they thought would come out of the project. Relevant quotes were identified from the interviews and these were grouped into sub-themes and themes. These are shown in Figure 2.

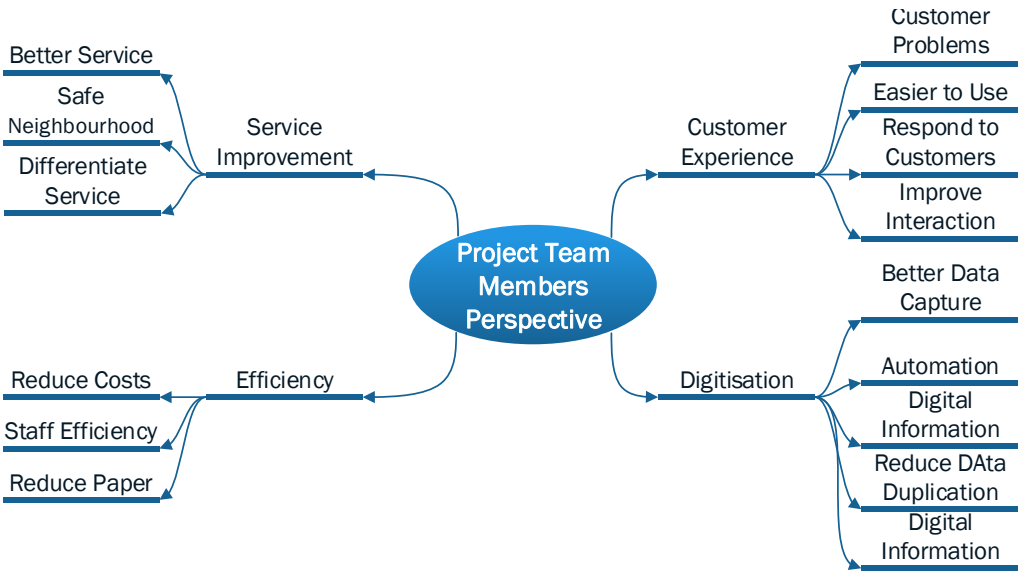

Figure 2, Thematic Map pf the Project Team Members Perspectives of Value Outcomes Expected from the Case Study Project

Three of the four themes identified from the team interviews (customer experience, digitisation and efficiency) map to three of the themes identified from the directors' interviews (customer experience, digitisation and cost savings). The fourth theme in the second set of interviews, 'service improvement', was picked up in the directors' interviews as a smaller point that is a sub-theme of 'customer experience'. The only theme from the directors' interviews that is not present in the second set of interviews is 'enablement'. This is not surprising because in the interviews with the project team we were asking about a specific project rather than about the role of IT in the organisation as a whole. The four themes from these interviews can be linked to the organisation's three strategic aims for 2020 which can be summarised as 'service improvement', 'efficiency', and 'customer satisfaction'.

Looking at how value was managed through the lifecycle, we found that the team used techniques for identifying value at the beginning of the project in the form of high-level user stories, and assessed these at the end of the project during the evaluation. We also found that the project team were aware of different types of value that the project would enable, and those values were linked to the organisation's business strategy. However, the team did not specifically consider value during prioritisation, and did not track value from the high-level user stories down to the lower level development work. Additionally, the team's view of the value of the software was wider than the value that was identified in the initial set of user stories. Given this, it would have been useful for the team to identify and prioritise value more explicitly in their process.

5 Suggestions from the literature

This section focusses on ideas from the literature that address the issues faced by our case study organisation. Several authors, including Khurum et al. (2012), recommend that value perspectives should be integrated into software development processes to extend the traditional focus on technical issues. However, there are no explicit approaches that guide the integration of value perspectives into Agile projects (Racheva et al., 2010). Synthesising the findings from our case study with related literature allowed us to identify three main recommendations for value recognition in Agile projects:

1. **Value characterisation**:
    a. Explicitly identify value from different stakeholders.
    b. Explicitly identify business values (links to the business case).
2. **Build the right thing right based on actual value need**:
    a. Base the project on stakeholder needs
    b. Be especially aware of customer and user needs
    c. Keep stakeholders involved throughout the project.
3. **Value progress recognition**:
    a. Use value (benefit) points throughout the project.
    b. Evaluate delivery of value as it is achieved.

Value Characterisation

It is important to identify value early in the development process and involve all the relevant stakeholders. Such discussion encourages commitment and fosters understanding and mutual agreement about value. Techniques such as workshops (Paasivaara et al., 2014), or other forms of social interaction between stakeholders (Alahyari, 2015) can make it easier to identify and form a mutual understanding of value, but only if the facilitator or team explicitly initiates a discussion about value. The Framework approach (Agile Business Consortium, 2017) recommends using workshops with all relevant stakeholders. These can be used for identifying, sharing, and prioritising value.

A practical way to broaden thinking about value in software development projects is the use of a software value map (Khurum et al., 2012). As each user story has its own value, stories need to be prioritised. To enable this, different perspectives and corresponding value constructs need to be considered during prioritisation. Khurum et al's software value map (2012) provides an overview of value and details four major perspectives 1) financial, 2) customer, 3) internal business process, and 4) innovation and learning. Each perspective is categorised into aspects, sub-aspects, and components. These can be used by software engineers to develop a common understanding of value. The map can also be used as a decision support tool to ensure no perspective is unintentionally overlooked. For example, the perspective 'customer' consists of components such as user-experience value, pragmatic value, hedonic value, intrinsic value.

Azar et al. (2007) discuss requirements engineering and the need for a transparent, grounded, and repeatable process for prioritising requirements from various stakeholders. Value-Oriented Prioritisation (VOP) evaluates requirements according to their impact on the specific values an organisation recognises. Briefly, the organisation's top management identify and distil their core value categories, then assign them in a simple ordinal scale according to their importance to the organisation. VOP also supports the identification and weighting of business risk categories. Weighted risk categories signify the organisation's tolerance for engaging in those risks. Accordingly, using the business risks and values, VOP constructs a prioritisation matrix.

Build the Right Thing Right Based on Actual Value Need

Yap (2006) presents an experience report describing how an organisation adopted a value-based feedback mechanism involving shared responsibility between customer and team. Over time, they merged XP principles with Lean software principles and introduced a family of four Agile practices, 'Value-based investment decisions', 'High confidence stories first', 'Incremental story delivery', and 'Story ownership'. Lean and Extreme Programming both focus on providing value to the customer and on eliminating waste. XP helps development teams to implement engineering practices that ensure a high quality product. Lean principles help development teams to translate estimates into terms such as cost

and value, which are understood by the business. This helps to guide customers toward avoiding the production of unnecessary product features. An interesting related concept described by Racheva et al. (2010) is 'Negative Value'. This is a requirements prioritisation approach that ascertains how much damage will be done to the client/product if a requirement is not implemented.

User needs are an important aspect of value. The Digital Service Standard (UK Government, 2017) suggests that service creation should start from learning about user needs, from which user stories can be created. Good user stories include a description of the value that will be created by the service. The focus is on giving value to users early and continuously. User evaluation should assess the successful achievement of user value in the product. Evaluation should occur throughout development at the alpha, beta and live phases.

The ISO standard 9241-210:2010 for Human-Centred Design (International Standards Organisation, 2010) focusses on understanding user needs and the context of use before designing solutions. User needs are derived from user values; the user does not need a certain feature in itself, but needs it in order to achieve something that brings them value. However, users and customers are not good at describing abstract needs. Therefore, short feedback loops with prototypes or mock-ups can help to uncover user needs in early project phases.

Value Progress Recognition

Torrecilla-Salinas et al. (2015) recommend conducting a set of workshops between users and development teams at the beginning of the project to populate the Product Backlog with user stories and story attributes (described in Table 2). Some Agile support tools provide facilities to store these attributes. For example, the Agile plugin for JIRA includes Theme, Story ID, Description, Business Value, Size, Proposed by, Date, and Comments.

Attributes of User Stories in the Product Backlog

1	**Theme**	Represents a category that links related user stories.
2	**Story ID**	Offers a unique number to represent the story and helps to find and reference it in an easy way.
3	**Description**	Describes the functionality and/or value provided by the story.
4	**Business Value**	Stores the business value the story offers.
5	**Size**	Stores the relative size of the story, in comparison with the rest of stories of the Product Backlog.
6	**ROI**	Stores the relation between cost and value provided by each story. Further details of calculations available in (Torrecilla-Salinas et al. 2015)
7	**Proposed By**	Identifies who proposes the user story.
8	**Date**	Specifies the date when the user story is included in the Product Backlog.
9	**Comments**	Records any additional comment that can clarify the scope of the user story such as restrictions, dependencies, limitations and special cases to take into account or examples, among others. This is a living attribute that has to be updated during the project as a result of the collaborative relation among users, customers and development teams.
10	**How to Test it**	Registers a description of any test that helps to assert that the story is really executed. It is used as a basis to automate tests, if appropriate.

Table 2: Product Backlog User Story Attributes, Adapted from (Torrecilla-Salinas et al., 2015)

Highsmith (2009) suggests the concept of the 'Agile Triangle' which changes the vision of the main constraints of a project: value (value points and return-on-investment), quality (product quality and process quality) and constraints (cost, schedule and scope). Highsmith recommends estimating and tracking the value delivered by the project by means of the 'Value Points Technique' (2009).

Hannay et al. (2016) propose that it is useful to estimate business value as 'benefit points'. Without an assessment of business value teams are likely to make decisions based on cost alone. Benefit points can be used to assess how much an epic contributes to the objectives in the business case and likewise how much user stories contribute to the value identified for the epics.

However, value is usually not completely independent of effort and cost (Gillain et al., 2016), therefore, it needs to be assessed at the same time. The customer may consider one feature more valuable than another *per se*, but if there is a substantial difference in cost, they may change their opinion. One practical approach is to assess both value and cost. This enables a greater differentiation between features which can aid decision making. Value points (Highsmith, 2009) or benefit points (Hannay et al., 2016) can be used to concretise and order business value in projects. They are used similarly to the way that story points are used with user stories or epics. However, whereas story points indicate the cost required to implement a story, benefit points indicate the value that can be derived from the story. Benefit points can be assigned to epics and stories at the same time as story points are added, and are identified in relation to the project's business case. The scoring mechanism for benefit points can be comparative rather than absolute, similar to those typically used for story points, for instance, the Fibonacci numbers: 1, 2, 3, 5, 8, 11, or T-shirt sizes: XS, S, M, L XL. Using a combination of benefit points and story points allows teams to identify the relative return-on-investment and hence compare user stories, see Figure 3 below. This chart will help teams to identify quick wins, the stories in the dark orange zone which are high value and low cost, and to identify good value stories, the stories in the adjacent medium orange zone which will take longer but still provide high value.

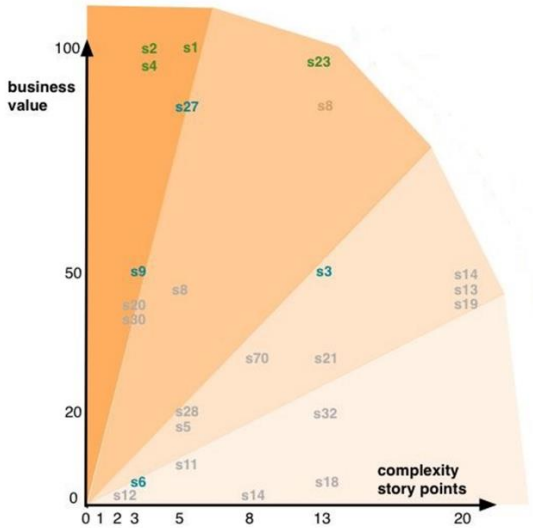

Figure 3, User Story Assigned to Story Point 'Complexity' and Benefit Point 'Business Value', Source (Pointet and Botton 2012).

Logue and McDaid (2008) studied the Agile release planning process, not only to embrace the viewpoint of developers, but also the business value proposed by customers. Their work, based on XP's planning game, also suggests the use of a business value attribute for each story. In this case, customers suggest

three estimates (optimistic, pessimistic and most likely) for the business value of each story. The development team does the same for the size of each story. Once the estimates are made, a Monte Carlo simulation is carried out to distinguish how the combined size and business value of the stories are distributed. In this way all participants know the likelihood of each potential release plan. The drawback with this proposal is that it increases the planning overhead, and that could discourage revisiting the plan once the project starts.

6 The next steps

The research team ran a project feedback and retrospective session in December 2017 with members of the project team. During the two hour meeting the researchers presented their findings and summarised relevant ideas from the literature. This was followed by more detailed discussion.

The project team reflected that as one small team it was hard for them to see the bigger picture of the whole council. One challenge for them during this project was having to work with both a third party software provider and the city council, neither of whom worked in a particularly agile way. It was also difficult getting customers involved during development. Another challenge was how to measure the value they achieve from their projects in monetary terms.

At the end of the project the team made two decisions about moving forward. One was to engage with tenant digital champions during future projects in order to improve their understanding of what customers want and to collect feedback about user experience. Another was to investigate using benefit points to help them to capture and track business value more explicitly in future projects.

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