Knowledge Sharing in a Large Agile Organisation

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1 Summary

Knowledge sharing is the process of transferring information, skills or understanding between people and organisations. Crucially, it contributes towards organisational learning. Agile organisations rely on knowledge as a core resource that underpins all products and services.

This paper presents the results of a survey on organisational knowledge sharing in an Agile context and offers recommendations for knowledge sharing based on suggestions from literature. The survey was organised by the Agile Research Network (ARN)[1] and was conducted in a multinational company operating in the UK, USA and India. The company are already a learning organisation but they want to continually improve. They therefore chose to concentrate on knowledge sharing in order to understand what is working and what needs improvement. The aim of the survey was to understand and identify how knowledge sharing currently takes place in the company. The survey focussed on three aspects of knowledge sharing: within Agile teams, beyond the team with company colleagues, and with customers. It concentrated on knowledge sharing practices, ease of knowledge sharing and motivation for knowledge sharing.

Eighty-one employees completed the survey the majority being software developers. The following list summarises the main findings.

- Informal discussions are the most common way of sharing knowledge within project teams and with company colleagues
- Meetings are the most common way of sharing knowledge with the customer
- Knowledge sharing is easier within project teams than with company colleagues or customers
- Staff are motivated to share knowledge because they want to rather than because the company asks them to
- The more Agile practices staff use, the easier they find knowledge sharing with team members
- The more Agile practices staff use, the more frequently they share knowledge within teams and with customers

We suggest the following for improving organisational knowledge sharing:

- Enable a knowledge sharing culture with flat management organisation, trust, respect and rewards for sharing
- Balance the use of technology, processes, expertise networks and physical space in knowledge sharing
- Build on existing successful knowledge sharing networks, both official and unofficial
- Create efficient and successful mechanisms for knowledge sharing beyond the team with management, peers and different specialists

1 The Agile Research Network (agileresearchnetwork.org) is funded by the Agile Business Consortium (ABC) Board, The Open University and University of Central Lancashire. The model operated by the network is that ABC members propose the challenge they'd like to investigate, and then work closely with the research team to understand the causes and consequences of the challenge and to identify alternative ways of working gleaned from published literature.

2 Introduction

Knowledge is awareness or understanding of something such as information or skills [6]. Knowledge has value only when it is applied [2], cited in [9], and the value of knowledge often increases when shared [20]. Organizational knowledge sharing aims to transfer to the organization information, skills and experience gained by a person [11]. This is essential for sustaining the development of quality in software intensive companies [11]. Knowledge is the core resource for Agile development companies that is transformed to products and services in the development process [4]. Moreover, Biao-wen [4] claims that the software industry requires more knowledge management than any other sector.

Knowledge sharing contributes towards putting knowledge into practice in various ways and towards creating new knowledge, i.e. organisational learning [26]. It is a core practice for continuous improvement and innovation. It helps to increase organisational success, enhances creativity, and optimises learning [6]. Knowledge can be *tacit* (personal, context specific) or *explicit* (transmittable in formal, systematic language) [18], cited in [15]. The two main strategies for knowledge sharing are *codification* and *personalisation*. The first systematises and stores information (people-to-documents) the second relies on information exchanges in the company (people-to-people) [12].

Agile methods facilitate knowledge sharing in the team but offer limited support for knowledge sharing outside the team [7], [13]. Agile methods tend to support tacit knowledge shared informally using face-to-face communication (personalisation strategy) in contrast to traditional knowledge management practices [10]. This can present challenges for organisations where Agile methods are only used for IT development. On the other hand, the lack of knowledge sharing practices beyond the team can hinder organizational learning and impair sustaining organizational knowledge in Agile organisations [13].

Four main factors can endanger the permanence of sufficient organizational knowledge [11].

1. an organization might not be able to *attract* a knowledgeable workforce.
2. knowledge can be *lost* via high turnover rates and retirement.
3. an organization can suffer from knowledge *hoarding* when individuals do not share their knowledge with others.
4. the pace of technology *change* can outstrip the time developers have to update their knowledge.

Knowledge hoarding might happen due to interpersonal issues but often it is a cultural problem if the organization has not built a knowledge sharing climate. It can endanger development quality and even the company's ability to compete with rivals if developers cannot keep their technological knowledge current.

3 The Company and the Context

The company in which the survey was conducted is an IT service provider who

primarily develops software for UK customers. The majority of their workforce is based in India and they have a major presence in several countries worldwide. Most development teams in the company are assigned to a specific customer account and thus have a customer-centric view of their job and day-to-day responsibilities. The collaboration between the company and the research team (ARN) was framed by the company's aim to continually improve as an Agile and Lean organisation.

The purpose of the survey was to understand and identify how knowledge sharing currently takes place in the company. In order to achieve the goal of being a continuously learning, lean, and Agile organisation, it is crucial for the company to gain insights into existing knowledge sharing practices that have led to some silos. The company can then use those insights to identify future solutions.

4 Investigation

The survey addressed practices, motivation and ease of knowledge sharing with team members, company colleagues and with customers. The survey was open from May to July 2016 and 81 completed responses were collected from company employees. The main job responsibility of the respondents was as follows: software development 42%, architecture 16%, project management 15%, software testing or quality 7%, business or system analyst 6%, design or UX design 4%, configuration / support 1% and other roles 9% (coaching or training or a mixture of development and design roles).

The company utilises a variety of Agile methods and practices, Scrum being the most prevalent method (Figure 1). Consequently, Scrum practices including daily stand up, prioritised backlog, retrospectives, sprints and sprint planning are often used (Figure 2). Multiple responses were possible in both questions.

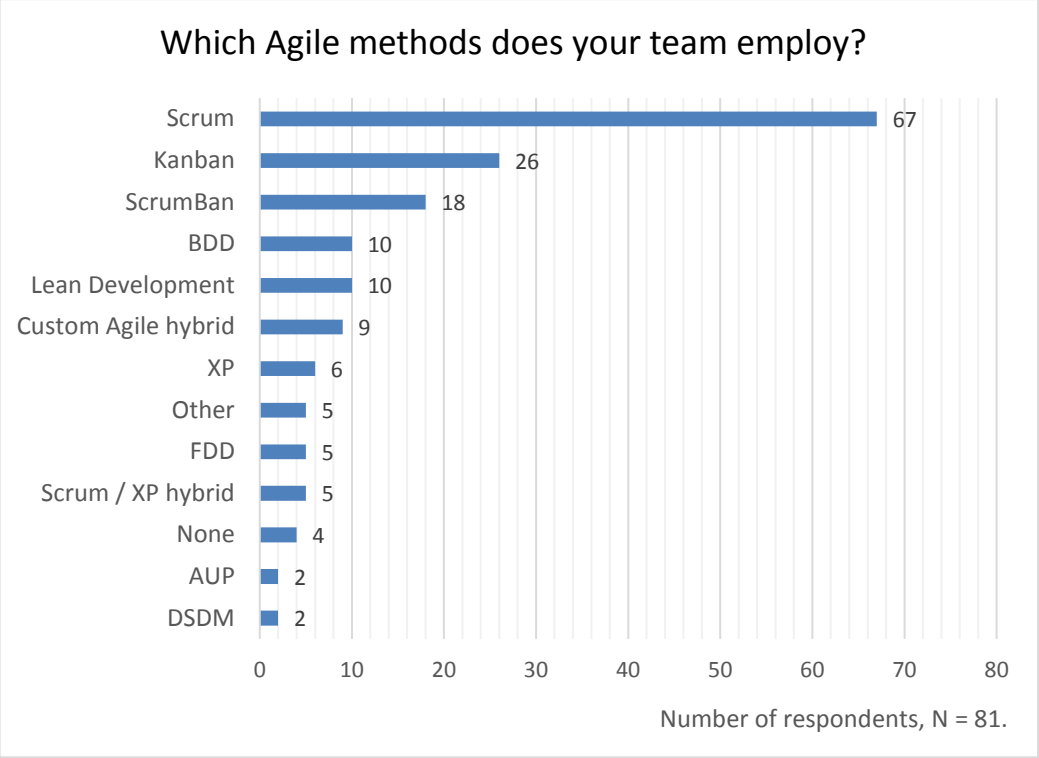

Figure 1: Agile methods employed.

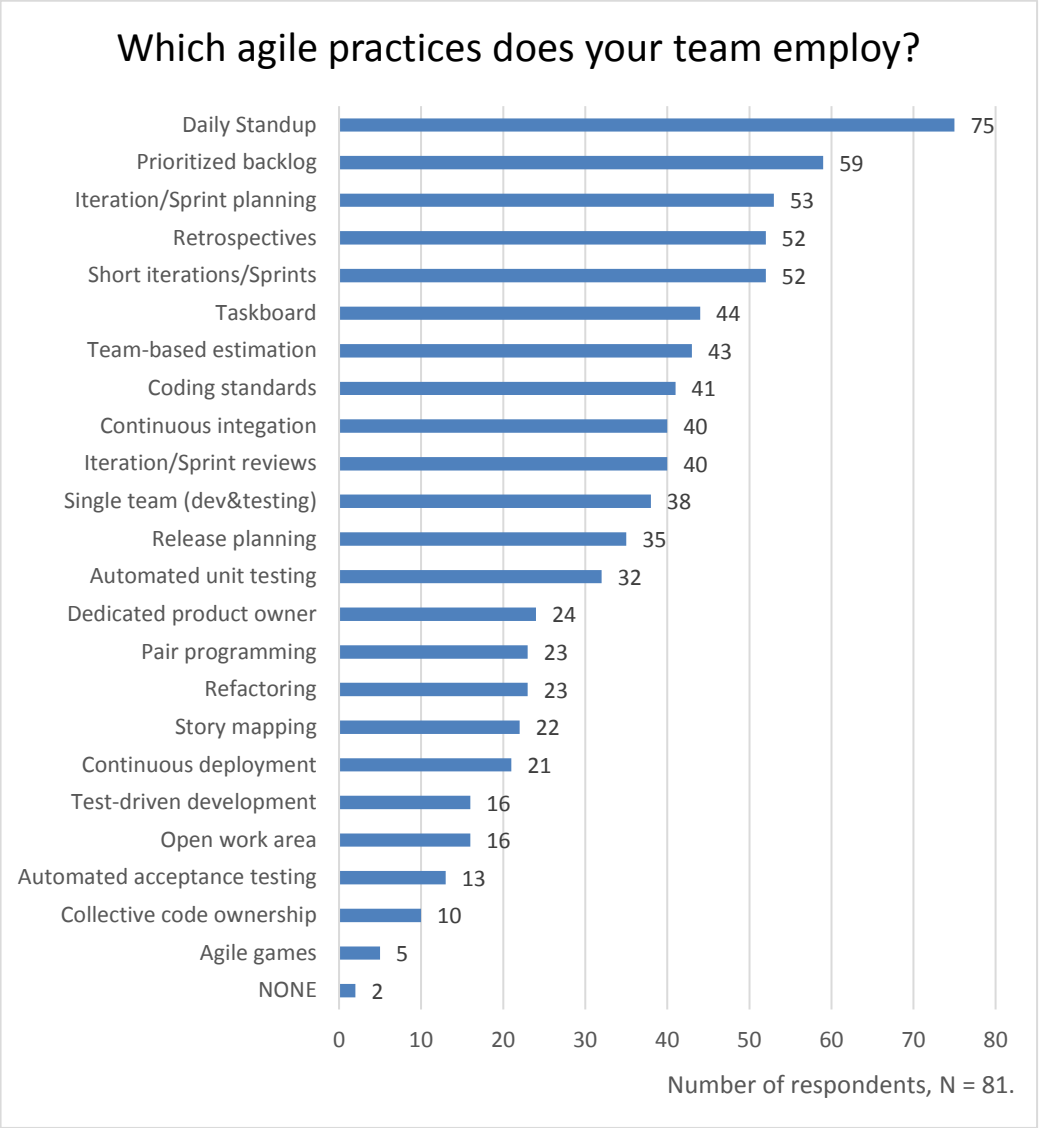

Figure 2: Agile practices employed.

5 Knowledge Sharing in the Company

Six main findings emerged from the survey:

- Informal discussions are the most common way of sharing knowledge within project teams and with company colleagues
- Meetings are the most common way of sharing knowledge with the customer
- Knowledge sharing is easier within project teams than with company colleagues or customers
- Staff are motivated to share knowledge because they want to rather than because company asks them to
- The more Agile practices staff use, the easier they find knowledge sharing with team members
- The more Agile practices staff use, the more frequently they share knowledge within teams and with customers

5.1 Knowledge sharing is Informal with Colleagues, Formal with Customers

Sharing knowledge with colleagues was most often done informally, whereas when sharing knowledge with customers meetings were most frequently used (Figure 3). Both methods represent a personalisation knowledge sharing strategy (people-to-people). The next most common knowledge sharing practices with customers were email and through the project lead or a senior member of the team. In general, knowledge sharing was more frequent within teams than with customers or company colleagues outside the project team. The most common practices for knowledge sharing in general were informal discussions, meetings, and email.

Figure 3: Mean frequency of use of knowledge sharing practices in team, in company and with customer. N = 81

5.2 Knowledge Sharing is Easier with Team Members than with Company Colleagues or with Customers

Knowledge sharing within teams was reported to be easy whereas knowledge sharing beyond the team and channels for knowledge sharing with company colleagues were less easy. These issues might relate to the knowledge hoarding phenomenon which can be improved with practices that foster a knowledge sharing culture, for example by rewarding sharing.

61% percent of respondents strongly agreed that knowledge sharing with team members is easy whereas only about 25% of respondents strongly agreed that knowledge sharing with customers or with company colleagues is easy. Knowledge sharing with customers was considered easy slightly more often than with company colleagues. Only 9% did not agree that knowledge sharing with team members is easy whereas 30% did not agree that knowledge sharing with

customers is easy and 33% did not agree that knowledge sharing with company colleagues is easy (Figure 4).

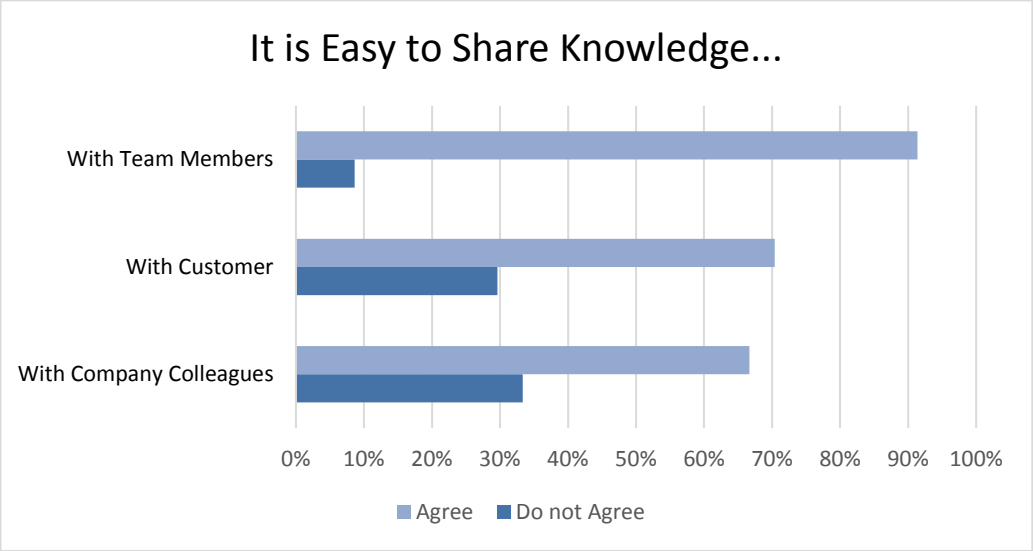

Figure 4: Ease of knowledge sharing with team members, with customer and with company colleagues. N = 81

Thirty-six employees suggested improvements for organisational knowledge sharing in an open-ended question. Almost all the suggestions were about knowledge sharing with company colleagues outside the project team. Of the respondents, 36% suggested having small informal sessions among interested individuals to share knowledge, for example, about architectural solutions or new technologies (Figure 5). Also, 36% of respondents suggested either creating new knowledge bases, or repositories, or using the current ones more efficiently. More efficient use of the current platforms could include having a larger number of people creating content and ensuring the coverage of architectural solutions and new technologies. Those might be the most technologically sophisticated and rapidly changing topics and thus they demand a lot from knowledge sharing channels. Other ideas included fostering the company culture to embrace knowledge sharing. Such culture builds on trust and encourages people to share their knowledge instead of making them fear they are replaceable if they share.

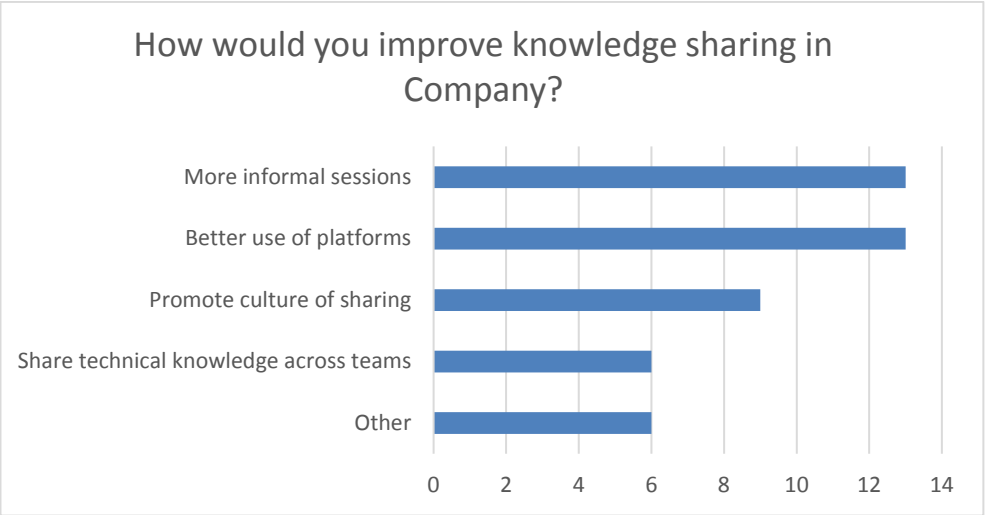

Figure 5: Mechanisms to improve organisational knowledge sharing. N = 36

5.3 Enjoyment and Strengthening ties are the Biggest Motivators for Knowledge Sharing

Employees are clearly motivated to share knowledge intrinsically rather than extrinsically (Figure 6). Previous research confirms that intrinsic motivation is important for efficient sharing while extrinsic reasons alone are not adequate motivator of knowledge sharing [24]. With team and company colleagues, the most common motivator is enjoying sharing with others. With customers, the most common motivator for knowledge sharing is strengthening ties with other people.

Figure 6: Motivation sources for knowledge sharing with team members, customer and company colleagues. N = 81

5.4 The more Agile practices staff use, the easier they find knowledge sharing with team members

In this data, there is a direct statistically significant association between experienced ease of knowledge sharing with team members and the number of Agile practices used. The association was found by regression analysis. Ease of knowledge sharing with company colleagues or with the customer does not have a similar association. If we assume that agility increases with the number of employed Agile practices, the result means that there is an association between the degree of agility and the experienced ease of knowledge sharing with team members.

5.5 The more Agile practices staff use, the more frequently they share knowledge within teams and with customers

In this data, there is a direct association between the frequency of use of knowledge sharing practices and the number of Agile practices used. However, this holds only for knowledge sharing with team members and with customers (and not with company colleagues). If we assume that agility increases with the number of employed Agile practices, the result means that agility has an

association with the frequency of use of knowledge sharing practices with team members and with customers.

6 Improving Knowledge Sharing

Since Agile focuses on collaborative teams, a lot of knowledge sharing happens within the Agile team while knowledge sharing beyond the team can be challenging [13]. In effect, knowledge needs to be shared in the organisation beyond the team with peers, interdisciplinary specialists, and management. Both the shared content and the enabling practices need to be adjusted for the audience.

6.1 Methods for Agile Knowledge Sharing

Agile approaches favour the so-called *personalisation strategy* for knowledge sharing (face-to-face or direct knowledge sharing) rather than the *codification strategy* (use of knowledge sharing tools and repositories). Inter-team personalisation strategies include Scrum of Scrums, project member rotation, communities of practice and open fishbowl sessions [21] (Table 1). However, Agile approaches also use *codification strategy*, for example by storing collective tacit knowledge in a repository such as an intranet, wikis, mailing lists and blogs [21].

Table 1. Organisational knowledge sharing practices that use personalisation strategy

Method	**Description**
Scrum of Scrums [22]	Coordinating cross-project sub-teams
Communities of Practice [25]	Self-organizing informal communities
Open fishbowl sessions [21]	Shared interest topics in large groups
Ecosystems [8]	Dynamic interactions of individuals and teams
Project members' rotation	Transferring people from one team or project to another
Pairing	Two people working closely together
Apprenticeship [11]	Pairing between seniors and juniors
Shared specialists [7]	Visiting security, usability etc. specialists
Review meetings [22]	Demonstrating a feature to stakeholders
Marathons	Intensive projects lasting a few days
Coding dojos [21]	A get-together for programmers to learn and share experiences

Practices listed in the table can be roughly divided into knowledge sharing practices among peers (e.g. communities of practice, pairing, coding dojos), among different specialists (shared specialists, interdisciplinary pairing, marathons), and among stakeholders and managers (scrum of scrums, review meetings).

6.2 Improvement Practices

The following approaches/strategies can be used to improve knowledge sharing in the company.

Build a knowledge sharing culture. Trust, respect and care are important enablers of a knowledge sharing culture whereas seeing knowledge as power

and fear of losing one's position when sharing hinder knowledge sharing [27]. An agile knowledge sharing culture necessitates a flat management hierarchy. Establishing and ensuring a common vision and language promote interpersonal trust [1]. Also, rewarding sharing, rewarding teams instead of individuals and giving company-wide incentives can help to build a collaborative knowledge sharing culture [3], [23].

Build on existing knowledge sharing networks. When an Agile company wants to improve organisational knowledge sharing, it can be beneficial to identify their current formal and informal knowledge sharing networks beyond the team and build on those [17]. For instance, the surveyed company already had Centres of Excellence (CoEs, facilities for knowledge sharing, training and competence building) for knowledge sharing between peers and based on the survey results they decided to study how knowledge sharing through CoEs could be improved.

Balance between the use of technology, processes, expertise networks and physical space in knowledge sharing. Using several knowledge sharing mechanisms often increases the total shared knowledge and creating a knowledge sharing network can be the most efficient approach [21]. Thus, an approach where the use of technology (e.g. repositories), processes (e.g. retrospectives), expertise networks (e.g. CoPs) and physical space (visual boards) are balanced can be effective [19], cited in [21].

Create efficient mechanisms for knowledge sharing beyond the team with management, peers and different specialists. Knowledge sharing between management and team can be challenging especially when the company is partially agile and partially traditional since these two approaches have different management styles. A flat organisation with collaborative leadership is ideal from an Agile perspective. Collaborative leadership in itself promotes knowledge sharing both between management and teams, and by affecting individuals' attitudes towards sharing [27]. However, flat management requires collective responsibility and a change from traditional manager roles to coaching and leadership [16], [27]. Scrum of Scrums and review sessions are examples of practices that can foster knowledge sharing between management and teams.

Organisational silos is another common challenge that hinders knowledge sharing with different specialists or between peers in different departments. Expertise networks, common goals, pairing, project members' rotation and shared specialists help in breaking down the barriers of silos. CoPs, Ecosystems and master-apprentice approaches are often used for knowledge sharing between peers [21]. Knowledge sharing between different specialists is more challenging than with peers. Having partially overlapping competence areas can help in creating common ground and language [14].

7 Next Steps

We will continue to work with the company to investigate organisational knowledge sharing beyond the team. The focus will be on knowledge sharing between peers outside the team since that was the area the survey respondents mostly wanted to improve. The company has established communities of excellence (CoEs) for peer to peer knowledge sharing. During the next stage, we will work collaboratively with the CoEs to understand their current ways of working, suggest improvements, and evaluate changes made. Also, other organisations might be surveyed later.

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