

## Open and closed technology and collaboration

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### Introduction

Intranets have become a prevalent part of organisational structure and, to varying degree, an aspect of organising and collaboration. While many organisations are currently grappling with how to realise the promises of Sharepoint, (and how to keep a reasonable budget while doing so) others look skywards, and see the cloud as an ever more viable alternative. Some use traditional email, calendars and document processing, but Google style – as a service – to meet the needs previously believed to call for intranets. Others, reportedly, even use combinations of facebook and Google docs, as their user-administered “intranet”. In this article, I present some cases of such traditional and novel approaches to IT-supported collaboration, and analyse the organisational consequences of the chosen solutions.

### The case Q

Q was a small company developing a computer based model for systematic trading with financial instruments.<sup>1</sup> In 2010, Q had a handful of employees working from Linköping, Växjö and Tokyo. This geographical dispersion posed problems and demands that made them turn to ICT supported processes to satisfy their communication and coordination needs. They actively explored new web-centric solutions and moved data and applications into the cloud where they found it appropriate – not just for the sake of appearing modern.

SCRUM played a central part in their processes. It has become known as an agile method for organising and conducting software development (for a rich example, see Fedorov, 2009). Two central concepts are creating and organising issues in *sprints* and the daily coordination meetings called *scrums*. A sprint is an assignment of limited, prioritised development tasks to be completed in the next couple of weeks or possibly a month. At the end of a sprint period, the team evaluates the sprint and creates a new similar list of delimited development issues for the coming period. In the daily scrum meetings, everyone in the team answers three questions: What did you do yesterday?; What will you do today?; and What, if anything, is blocking your progress? By answering these questions, SCRUM tries to force problems to the surface and make sure everyone is progressing. It also tries to enforce a team attitude where everyone jointly is responsible for delivering working software at the end of every sprint.

### *The ICT tools and their use in Q*

To solve the communication and coordination needs, Q employed a wide selection of software that was either free or universally available at a low cost. In Table 1 the dark blue shading means that that

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<sup>1</sup> This case builds on an unpublished description authored by Petter Cesarini, Richard Widén, Carl-Magnus Sandenskög and Henrik Widforss and on discussions with Henrik Widforss, who has worked in Q.

method is used for that type of communication. (The white and the light blue are alternating background colours to help distinguish the rows of the table.)

Communication method	Function of method	Internal communication				External communication
		Daily Scrum	Weekly SCRUM	Day-to-day communication	Documentation	
<b>Skype</b>	VoIP					
	Chat					
	Video					
<b>Google</b>	Wave					
	Doc					
	Email					
<b>Exchange: outlook</b>	Email					
<b>Adobe Connect</b>	Screen sharing					
<b>EditGrid</b>	Spreadsheet					
<b>Fileserver</b>	Fileserver					
<b>Face-to-face</b>			1			
<b>JIRA Studio</b>						
<b>Telephone</b>						
<b>Fax</b>						

1) Each week, the manager travels to Växjö to meet and work with the employees there.

Below, the tools and their use is described.

**Skype** contained VoIP (Voice-over-IP) enabling conference calls with up to 25 people, Video for two-part video conversations, and a chat. Because of the restriction to two parties, the video function was not used.

**Google Wave** was an online software application product from Google for personal communication and collaboration. It allowed for several people to simultaneously collaborate on a single document.

**Google Docs** was a Web-based word processor, spreadsheet, presentation, form, and data storage service offered by Google. It allowed users to create and edit documents online while collaborating in real-time with other users. One of the best features, according to the CEO of Q, was the global search. This was a feature enabling a user to search for a specific word or phrase within all documents stored within Google Docs.

**Email:** both Google's Gmail and Microsoft Outlook were used, depending on personal preference of the employees. Email was primarily used for external communication.

**Adobe Connect** was a conference call and desktop-sharing tool, enabling a person to share her computer screen with collaborators. That way, team members could communicate their ideas visually, for example as images or Power Point presentations. The conference call feature was not used since Skype's solution was deemed more suitable.

**EditGrid** was an Online Spreadsheet service which delivered Data on Demand. It was used in place of Google Docs Spreadsheet since it had more advanced features.

**Fileserver:** Q had an Internet-connected shared server where the employees could store and access files. Everything from software and documentation to photo history of the company was stored on the server.

**JIRA Studio** from Atlassian was software development management software available as software as a service. It had integrated source control, issue management, workflow management and project collaboration and was strongly integrated with a SCRUM way of working.

### ***SCRUM meetings***

There were two types of meetings, daily scrums and weekly sprint meetings. Being a small company, all employees participated in the daily meetings from their workplaces (or wherever they were), using Skype, Google Wave and Adobe Connect. They typically took 20 minutes. Once a week, an evaluation and planning meeting took place, using the same tools, but in addition having the manager travel from his normal Swedish location to the other site, to meet face to face with the employees there. At these meetings, the current progress and backlog would be reviewed and the next sprint planned. The weekly meetings also served the purpose of aligning the team members' long-term vision.

At the meetings, Skype was the primary tool, using VoIP and chat. Skype permitted everyone to remain at their workplace, with full access to the computer, and thus possibility to share and co-edit material during the meeting. Google wave was used for documentation, with each sprint having its own wave and each daily meeting its own section. Here, the meeting participants co-created the meeting documentation, each one adding what they found pertinent to them. This written document served both as a reminder in the daily work and as a basis for review at the next meeting or the weekly sprint meeting. To complement the text-based Skype chat, AC was used to share graphical representations of the issues discussed. Finally, JIRA Studio was used to track issues, milestones and project details. An issue could be features or bugs someone deemed important enough to be developed or fixed. During the meetings, the team would identify issues and the originator of an idea would create a ticket for that idea in the sprint backlog. The originator writing the ticket was deemed to avoid misunderstandings of the idea on its way from mind to database.

Although the range of tools enabled considerable virtual contact, the team members still considered face-to-face meetings superior, with a somewhat lower level of miscommunication and misunderstandings.

In between meetings, the employees worked on their assigned tasks. When a task was completed, it would be signed off in JIRA studio and a new ticket selected. If problems with certain tasks arose, you could turn to the wiki section in the program to look for solutions, or contact a colleague in order to solve it together. The typical tool for such communication would be Skype – both VoIP and chat. Skype would also be the preferred medium for sorting out misunderstandings. If more formal communication was deemed necessary, email would be used. Telephone was only used if Skype for some reason was not available to a party.

The files server was used to store files and programs, but that solution was judged inferior to a cloud solution, such as Google docs with its search facilities, and the intention was to phase it out. Google Docs and EditGrid were both used for creating and sharing documentation. EditGrid was also used for communication between human and machine (for example to set up parameters for different kinds of runs of the company's software).

### ***Concluding remarks on cloud ICT at Q***

The use of cloud services at Q aimed both at increasing productivity by matching needs with the currently most appropriate software available. Being a small company, with members widely dispersed geographically, Internet-accessible tools were a must. Cloud-based tools relieved the company of the task of installing and maintaining installations of software, thus creating no extra administrative burden when choosing to use a wide range of software rather than a couple of multi-function packages. The choice to use free or low-cost software also supported, and perhaps to some degree necessitated, the extensive “best-of-breed” strategy of software utilisation. Likewise, the use of SCRUM at Q was a way of dealing with the geographical dispersion, which in turn necessitated the extensive use of ICT support.

On the other hand, communication is not as good as it would be if all members were collocated. For example, the members cannot accidentally catch each other doing the wrong thing or going in the wrong direction. Also, the wide range of tools employed, where many of them have similar capabilities, risks creating uncertainty as to which tool should be used for which purpose. The continuing exploration of possible alternative tools creates its own kind of administrative overhead – although this exploration is something undertaken voluntarily by the members as part of their IT consultant role perception, rather than being assigned as regular work tasks. It could be claimed that the geographical spread provides the members with opportunity for exploring tools that they want to try out.

The cloud reliance also creates a type of vulnerability, increased by the reliance on free or low-cost alternatives. If an SaaS supplier decides to discontinue the provision of a tool, there is no way for Q to influence that decision (which they might if they were a high-paying, important customer) or to continue using the tool (which they could have, if they had been using software installed and running on server controlled by Q). The close-down of Google wave exemplifies that this risk is real, even when using cloud services from large companies that promote the specific tool as a central product in their product range.

### **Internal communication at S, P and F**

S, P and F are three large Nordic companies. S is in **S**oftware development and implantation, P in **P**ower generation and distribution and F in **F**ood production. All three rely on communication tools supplied by central IT departments and typically running on company-operated servers. None of them employ cloud-based SaaS as a central component and none of them use free software or services. The employees are not encouraged – or even allowed – to explore and use free cloud services. The main modes of communication are face-to-face, sometime supported by PowerPoint presentations, e-mail, telephone, video conferencing and company intranets. All three intranets also contain the contact databases where an employee can look up other employees, profiles, e-mail and telephone.

Important information is seldom shared exclusively via the intranets, and if it is deemed important that data should not be accessible by outside parties, high-security servers are used instead of the intranet. “If it is on the intranet, it is public” is a comment I hear in many organisations. However, all three companies have administrators who have as their main task to update the intranets with information of interest to the whole company. In each of the three companies, there are also pages for each department where local information is made available.

But the intranet is not a highly effective way of spreading information. Many employees do not use it daily, not even if they spend their days in front of a computer screen. Both company S and P have tried using instruction videos for sharing knowledge that is difficult to convey in text, but have found it difficult and it has not become a widespread type of use. The centralised and local pages can in principle help spread information, instructions, etc, in a hierarchical fashion, but it is poorly suited to lateral communication. For example, in company F, a clever solution developed in one department took more than a year to reach other relevant parts of the company after having been posted on the originating department's local intranet pages. In company P, the ICT-assisted routine developed for sharing locally developed knowledge with the rest of the company uses the hierarchical structure. Experience meetings at local operating level are summarised in PowerPoint presentations, which in turn are presented in face-to-face meetings at higher levels in the organisations. The higher levels then decide if anything deserves a wider spread in the organisation.

In S, there is support for two-way communication, there are individual pages to strengthen the social connections between employees, and there is a web 2.0 forum for knowledge exchange that is judged to have increased the lateral communication between employees, even internationally. Still, given its wide accessibility, it is used for nice-to-have rather than crucial knowledge (which is not made generally available just in the hope of someone finding it useful).

In both P and F, employees have asked for more flexible and efficient two-way communication and knowledge sharing, but such initiatives still await central authorisation.

### ***Concluding remarks on ICT-mediated communication in S, P and F***

The centralised provision and control of ICT communication alternatives in S, P and F control, though managed in a deliberate and structured way, neither encourages nor supports substantial free-format ICT-supported communication and coordination. The main tool for user-initiated ICT-based communication is therefore still e-mail. In addition, security concerns make those in charge of the ICT platforms reluctant to turn to the SaaS alternatives that more and more take hold in private and small-company communication. Given the communication alternatives available within the companies, face-to-face meetings and seminars account for much of the important communication, and the frequent daily contacts are largely restricted to the collocated workgroups. Though perhaps efficient for standard work, it lends little support to the spread of innovations or cross-group or cross-discipline contacts outside the limits of the "normal" contact nets.

### **ICT-aided knowledge management in customer support at O**

O is providing customer support to telecom operators. The work is traditionally organised in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> line support. At 2<sup>nd</sup> line support, the issue tracking system, running on O's own servers, is more used to superficially log the calls (which is required), rather than documenting the problems and solutions, although it has such functionality and was originally intended to be used also for knowledge management. But retrieval of useful information is difficult for those who have not developed smart search strategies and the lack of management focus on documentation behaviour makes the knowledge management part of the system a possible rather than a central tool in many employees' work.

The main form for knowledge sharing at 2<sup>nd</sup> line support is the free communication and overhearing of people within the collocated workgroup. Telling each other stories based on interesting calls or discussing problems during coffee breaks or lunch, and posing direct questions to the group in general along the lines of “has anyone met this before?”, are often-employed means. In addition, e-mail is often used for recording and sharing problems and solutions in some workgroups. Here, the focus is on a specific problem and how to solve it, rather than the issue tracking system focus on the specific customer, the customer-specific problems and their resolution.

Some people also use the e-mail system to store information about logins and passwords, where to find contact persons at a specific customer and other knowledge useful in the daily work practice. To organise the material, they invent hierarchical folder structures that make sense to them. When a new member joins the team, he or she will typically be forwarded all these e-mail folders. Others collect similar useful pieces of information in PowerPoint slides or Excel sheets.

### ***Concluding remarks on ICT-use at O***

Again, this is an example of a traditional, centrally provided proprietary ICT system that does not fully meet the coordination and communication needs of employees, who then turn to other channels and tools at their disposal to meet their needs. The verbal, informal communication is neither surprising nor something that should be replaced. However, the e-mail solutions (and PowerPoint and Excel) are interesting in their lack of elegance and task-specific functionality, yet provide needed support stemming from the very widespread use of e-mail (PowerPoint and Excel) and the possibilities of end-user customisation that need no central authorisation.

## **Discussion**

There are a number of differences in the use of ICT for coordination and communication in the example organisations. Only one of them, Q, makes systematic use of cloud solutions. The others – S, P, F and O – rely on classical ICT hosted on their own servers as the organisationally supplied solutions. These are then complemented by face to face meetings and telephone contact with or without supporting ICT and more innovative or more traditional uses of email in order to satisfy communication and coordination needs experienced by members of the organisation.

What could be the reasons for the observed differences? An obvious difference is that Q has a geographically widely dispersed workgroup whereas the other organisations typically have rather collocated workgroups – although there may be other communication and coordination needs in time and space than those stemming from the constant day-to-day collaboration within a workgroup. This would call for more extensive ICT use in Q than in the others.

Below, I express further possible explanations to the observed differences as hypotheses and point at how they conform with the five cases.

Hypothesis 1: large organisations have a professionalised provision of ICT support promoting standardisation, supplier-end efficiency and well-known and tried solutions.

Q, the seemingly “modern” cloud user is a small company. There is no IT department, no organisational division into ICT users and ICT suppliers. The other four organisations are all large, with IT departments that strive to be “professional”.

If you are a handful altogether, organisational standardisation is no great issue. Changing from one tool to another, or trying out a tool is no great, complicated project. If a tool does not meet expectations, it could easily be supplanted by an alternative. To an IT department, providing high-quality services would include only offering services that have a demonstrated or systematically evaluated fit with a specified demand profile.

To Q, installing and running software would be an administrative task detracting time and attention from the customer-focused work. For a traditional IT department, installing and running software is part of the typical, traditional tasks. Thus, cloud services would appeal to Q, but would carry uncertainties, and even threaten some of the established work tasks of an IT department.

In Q, the users are also the decision makers regarding ICT tools. What feels useful or interesting to a user is adopted. In the large organisations, the users and the providers are in different departments. The suppliers try to meet what they believe are relevant user needs, and the users may or may not try (hard) to express their needs to the suppliers. However, decisions typically rest with the IT department, and they will find it easier to see the supplier than the user perspective on the tools provided in the organisation.

Hypothesis 2: security concern is likely to be higher in a large organisation than in a small because security concern will be somebody's important job in a large organisation, but most likely not in a small one.

In Q, there appears to be no concern over entering company data into cloud solutions, although that entails giving someone outside the organisation the technical possibility of accessing it. The practical risk is probably quite small, and the perceived benefits from not having to spend time and energy on installing and hosting applications are larger. In a larger organisation, the risk of loss or disclosure of data due to it "leaving" the organisation would be a typical risk that a risk manager would note and try to avoid or at least reduce.

Hypothesis 3: cost perceptions differ in large and small organisations

Whereas cost in Q to a large extent is viewed as ICT acquisition and operation, the IT departments in the large organisations most probably view search for and evaluation of potential solutions as a cost to include in the equation. User training and support would be another sizeable cost that they would recognise. In Q, those activities are rather viewed as natural competence development and environmental scanning that are part of the individual or professional profile, rather than a factor in choosing which ICT tools to use.

Also, in an organisation with many users, installing and running software would be a type of overhead that would be shared by many users, and therefore probably be rather small per user. In a small organisation, few users share the overhead, making the cost per user larger. Cloud solutions would therefore tend to seem more attractive to a small than to a large organisation, provided that the large organisation can host and run software efficiently.

Hypothesis 4: the best tool is the tool you know how to handle

In Q, the members make it their business to explore and use new ICT solutions, especially cloud and free tools. They see a point in knowing how to handle many tools, become adept at learning new ones and task. In the other organisations, knowing how to handle tools is not seen as an end in itself. If needs can be solved with centrally supplied solutions that you learn how to handle, fine. If need are not met by such solutions, a way of meeting the need will be searched for either outside the ICT area, or among the ICT tools already at your disposal. PowerPoint, excel and email are widely spread discretionary office automation tools where the user has considerable control over the use. They are then likely to be prime choices for people who are either not interested in learning new tools per se, or who want to communicate with others without calling for these others to learn new tools. Even a cumbersome use of a known and widely used tool could then seem preferable to the process of trying to influence a central ICT provider to find and supply a tool, and support the use of the tool, to meet the communication or coordination needs experienced.

In this exploratory article, formal incentive systems and a focus on group versus individual performance are perspectives that have not been explored, but could be expected to also influence the patterns of adoption and use.

## **References**

Fedorov, Stepan (2009) Agile software development methods: Benefits and problems from applying Scrum. LIU-IEI-TEK-A-- 10/00740—SE, Linköping University.