

## **The Project Kanban Wall: Combining Kanban and Scrum for Coordinating Software Projects**

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### **Introduction**

Many businesses that build their reputations and profits on IT technologies, such as modern telecommunication enterprises, survive and grow in competitive markets by applying Project Management Offices (PMOs) and Software Developmental Departments (SDDs). One of their greatest challenges is to coordinate the flow of projects from the PMO to and through the SDD, ensuring quality for customers, as well as effective and efficient project workflows.

In the search for an appropriate solution to this problem, the book *Kanban and Scrum, making the most of both*, aroused our interest. Its authors, Henrik Kniberg and Mattias Skarin, describe how two management methods, Kanban and Scrum, can be used in a combined way (Kniberg & Skarin, 2009).

We decided to put the idea into practice by designing what we call a Project Kanban Wall, which illustrates the progressions in project-flows rather than task-flows, along with the use of Scrum as a software development tool. The aim was to investigate if, and then how, such a combination might solve the PMO/SDD workflow of IT product development projects within a typical telecommunication company that professes to be a forward-looking service provider.

This paper looks at the implementation of the combined Scrum/Kanban method in the PMO/SDD of one such company. The company selected was Siminn hf, an important telecommunication provider in Iceland, a country of approximately 320,000 people. Even though the company is small compared to bigger players in the global telecommunication business, the essential challenges faced by its project flows through the PMO and SDD are universal, and mirror those in larger companies.

The new Project Kanban Wall that was trialed is an updated version of the more conventional Kanban Wall. It is tailored to optimize the flow of IT projects and to enhance the communication between the SDD and the PMO. In addition, the necessary criteria that must be put in place for the Kanban system to work are discussed.

The research questions were:

- How can the use of a Project Kanban Wall give a better overview of the flow of projects between the PMO and the SDD?
- Did the use of a Project Kanban Wall improve the execution of projects at Siminn PMO/SDD offices?
- Is it wise to use a combination of Scrum (at task level) and Kanban (at project level)?

The article shows how a Project Kanban Wall — a wall that defines a workflow progression at a project level — was implemented within a telecommunication company. Furthermore, it shows how the people within the PMO/SDD experienced the improvements in workflow due to the implementation of the new approach.

## Theory

The trend to move from linear and more conventional development approaches to agile development approaches in software development is well-established. Leybourn concluded in his paper on improvisation and agile project management that agile project management is an extension of traditional project management models, rather than a dramatically different way of carrying out project-based work (Leybourne, 2009). Many practitioners relate project management to a linear approach with phased stages. However this was not so in the beginning. The roots of project management lie in novel technical projects — such as the *Manhattan project* — with a defined idea of desired outcome but rather unclear ways of how to reach that outcome. The linear way of thinking is therefore a relatively recent development. For example, the authors Lenfle and Loch have discussed how project management came to lose its roots and settle on a phased approach, thus compromising its ability to lead change in modern enterprises (Lenfle & Loch, 2009). Originally, therefore, project management was more flexible than is often presumed.

Lean management practices are important in the modern business environment, putting the focus on systematic removal of what is wasteful, so that any process or task that does not deliver value to the customer is considered waste and should be omitted. Toyota, in particular, has been a leader in the successful implementation and use of lean management approaches.

In recent years the so-called *agile* — the word means “mentally quick” and “flexible” — philosophy has gained momentum and is now a widespread practice in the IT sector. Agile as a management approach entails a variety of project management tools and methods. One such method is Scrum where the focus is on developing and delivering, through sophisticated iterations, a functioning software in close collaboration with the client. Scrum is now a widely-used method in software development.

Recently Kanban, a well-known production flow and production control method, has drawn increasing attention within the agile community. Originating in Japan and used in

the Toyota production system (Liker, 2004), Kanban creates a visible workflow in a process, showing all the steps of the process, omitting all that are unnecessary, and focusing on maximizing value for the customer.

If Scrum and Kanban are “googled”, the number of results gives some idea of the extent of their usage and application.

Search words on Google	Results (April 2010)	Results (Jul 2012)
Agile	16.200.000	101.000.000
Scrum	5.180.000	26.700.000
Kanban	1.590.000	8.870.000

Table 1: *Search Words and Hits on Google.*

Table 1 shows that the term Kanban gives fewer result than the term Scrum, indicating that Kanban is a more recent term within the agile community. In the period April 2010 - July 2012 all the numbers have increased by more than 400%.

A number of agile software development methods have been developed in the last 20 years, designed to facilitate change in project definition (Abrahamsson, Salo, Ronkainen & Warsta, 2002). A few examples can be given here: Dynamic Systems Development Method (DSDM) (Stapleton, 1997), Extreme Programming (XP) (Erickson, Lyytinen & Skarin, 2005; Lindstrom & Jeffries 2004), Rational Unified Process (RUP) (Kruchten, 2000), Adaptive Software Development (ASD) (Coburn, 2000), and finally Scrum (Schwaber & Beedle M., 2002). Leybourne (2009) pointed out that agile project management literature is relatively immature and that the limited current extant literature is not especially empirically grounded.

### **Scrum**

The term Scrum originates from rugby and is a method of restarting the game after, for example, a minor infringement. In a management context, the idea behind Scrum surfaced in 1986 when Hirotaka Takeuchi and Ikujiro Nonaka introduced a new approach to increase speed and flexibility in product development (Takeuchi & Nonaka, 1986). Their idea focused on teams working together towards common goals. They compared this approach to a rugby team where, even though the individual players throw the rugby ball to one another, the whole team is aiming for one goal. In 1995, Ken Schwaber and Jeff Sutherland were working on Scrum as a software development method and presented it as a management method in its current form (Sutherland, 2007).

Scrum is a method that is easy follow. The basic roles in Scrum are product owner (PO), team and Scrum master (SM). The PO can be one person or a small team, whose responsibility is to maintain and prioritize a *product backlog* for the product under development. The SM is the representative of the project team and is responsible for

making sure that the team complies with the Scrum methods. The SM organizes *sprint planning meetings* where the team arranges the next working progression — a *sprint* — which usually lasts two to four weeks. During the sprint planning meeting, the tasks with the highest priority are reviewed and broken down into smaller units that can be executed within the sprint. The SM and the team along with the PO prepare the *sprint backlog*, which is the list of tasks the team will execute during the next sprint. The SM observes the progress of the sprint through *daily sprint meetings*, where each team member discusses what they did the day before, what they are going to do today, and if there are any obstacles. Such meetings are good for the team as they ensure that everyone is clear on the progress. This makes it easier to react to any obstacles. The sprint concludes with a presentation of the product by the team, which the PO can then either accept or make corrections to if there have been any misunderstandings. Before the next sprint starts, there is a *sprint retrospective*, where the main purpose is to learn from the last sprint. The team looks back and discusses what went well and what could have been done better.

The progress for each sprint is represented through the use of a *burn down chart*, which shows how much work is still to be completed. This demonstrates if the team is on, ahead of, or behind schedule. The burn down chart is updated every day, after the sprint meeting (Schwaber, 2004).

### **Kanban**

Kanban is a Japanese word meaning card or label. Kanban, as a management method, uses cards as visual symbols to trigger and control flow through a production process. In this way Kanban helps to define a value stream in the production process. It is a “pull” system, where the objective is to have a visual workflow, showing all the steps of the process. Unnecessary actions and waste are eliminated, and the emphasis is on maximizing value for the customer by maintaining an even flow of work. The visibility of the flow makes it easier to spot any flaws, such as bottlenecks, when too many projects are accumulated in one part of the process. The pull system and the work in progress system help to maintain the appropriate speed for production (Liker, 2004).

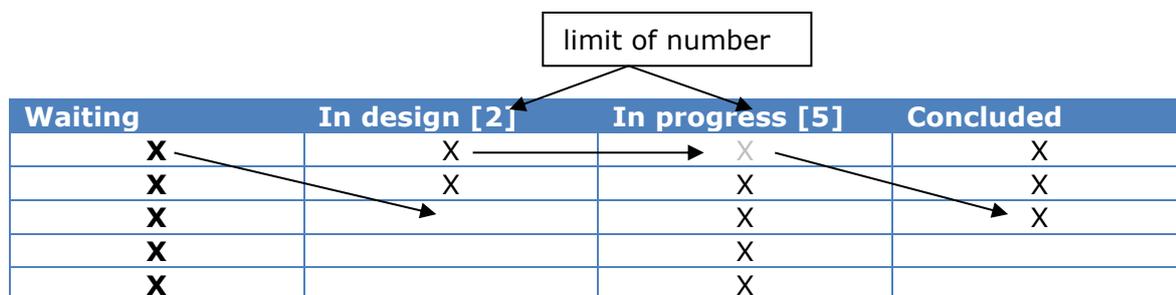


Figure 1: Kanban pull system.

Figure 1 demonstrates in a general way how the system works. It is not possible to move a label (an X, which symbolizes, in our case, a product/project) to the next position to the right unless there is available space for it. This means that there is a limit

to how many labels can be put straight into the "In progress" column, as a label can only be moved towards the right if there is an empty space. The movement takes place when an X in the "In progress" column is moved to the "Concluded" column. As a consequence, there is a free space in the "In progress" column and one X can be moved from "In design" to "In progress". The empty space thus created in the "In design" column can now be filled with an X from the "Waiting" column. In the "In design" and "In progress" columns, there is a predetermined, and limited, number of spaces available.

Kanban is thus a simple tool that can be used to obtain some of the main objectives of lean management; it can be applied to tasks or whole projects. In software development, Kanban can help to avoid the following (Ladas, 2008):

- Including features that are not required.
- Writing more demands/tasks than can be coded.
- Writing more code than can be tested.
- Testing more code than can be sent to market.

Kanban is a general method, applicable in a variety of sectors. Its implementation should not require any modification of actual work, and by making the Kanban Wall visual, it is easy to spot bottlenecks and see what can be improved in the present process (Anderson, 2009).

Measurements in Kanban are based on continuous flow and accumulative flow diagrams to measure the time that the flow takes from beginning to end. The accumulated flow diagram provides a visual representation of the work in progress and of any bottlenecks to be found in the flow.

### ***Scrum and Kanban***

Schwaber (2004) presented a "complexity assessment graph", a simple visual method to categorize projects according to their intricacy. He concluded that software development projects are either "far from agreement" in terms of requirement complexity, and/or "far from certainty" in terms of technological complexity. As a consequence, he stated that most software projects are complex. Schwaber argues that agile works well for this kind of project and, as the problems deal with project flow, Kanban is also a handy tool.

Some practitioners have stated that Scrum and Kanban are quite different. Ken Schwaber wrote in his blog in June 2010: "God help us. People found ways to have slack in a waterfall, to rest and be creative. With Lean and Kanban, those hiding places are removed. We now have a progressive death march without pause." (Schwaber, 2010). Dan Anderson wrote in his blog in June 2010: "Kanban is not a project management or software development lifecycle method. It is an approach to change management — a framework for catalyzing change in an organization. So it differs from Scrum in that it cannot be used as a process to get work done. It needs to be applied to an existing process." (Anderson, 2010). Thomas Björkholm discusses in his paper whether Scrum or Kanban is better; he looks at this from the perspectives of both methods, and reviews

the pros and cons. His main critique of Scrum is that it is too defined and strict, forcing the user to perform operations that may not be necessary in all situations. On the other hand, he concludes that Kanban is a much more open method with fewer rules (Björkholm, 2010).

It is, however, not the purpose of our paper to choose between the methods, but rather to investigate the prospects of using both methods in a joint and coherent way. We do not see it as an interesting question to consider if Kanban is in general a better management tool than Scrum, and *vice versa* — and in fact that might also depend on the nature of the task or project at hand. Scrum is not suitable in tasks where there is no point in using sprints. The fact, however, remains that many of the IT people we have worked with find that Scrum is more rigorous than Kanban, and that it is easily scaled and adjusted to different needs. Kniberg (2010) has pointed out that Kanban is suitable for processes; whereas agile might be more suitable for projects. Combined, however, they might fit perfectly when the process is about moving projects through “the production line” where the challenge is to both provide good service and guarantee an apt (and not overwhelming), efficient and effective workflow. Software development projects in a modern telecommunication company as Siminn hf are therefore a good example of a procession of IT projects where a combination of Scrum and Kanban can be applied.

Scrum	Kanban
Timeboxed iterations prescribed	Timeboxed iterations optional
Team commits to a specific amount of work for this iteration	Commitment optional
Uses velocity as default metric for planning and process improvement	Uses lead time as default metric for planning and process improvement
Cross-functional teams prescribed	Cross-functional teams optional. Specialist teams allowed.
Items broken down so they can be completed within 1 sprint.	No particular item size is prescribed.
Burn down chart prescribed	No particular type of diagram is prescribed
WIP limited indirectly (per sprint)	WIP limited directly (per workflow state)
Estimation prescribed	Estimation optional
Cannot add items to ongoing iteration.	Can add new items whenever capacity is available
A sprint backlog is owned by one specific team	A Kanban board may be shared by multiple teams or individuals
Prescribes 3 roles (PO/SM/Team)	Doesn't prescribe any roles
A Scrum board is reset between each sprint	A Kanban board is persistent
Prescribes a prioritized product backlog	Prioritization is optional

Table 2: *Overview of the Differences between Scrum and Kanban*  
 (Kniberg & Skarin, 2009).

We concluded that a case study would be an appropriate method for this research, being the preferred method where the investigator has little control over events and where contemporary phenomena are investigated within a real-life context (Yin, 2009). We followed the general case study process suggested by Yin, including a planning, design, preparation, collection, analysis and share stage.

## The case: Siminn hf and the implementation of the Siminn Project Kanban Wall

Siminn hf (Siminn) is a project driven telecommunication company with a PMO and SDD. It is the largest telecommunication company in Iceland, with a turnover in 2010 of 153 million euro, almost twice as much as Vodafone Iceland, as can be found in an annual report on the 300 largest companies in Iceland (Hauksson, 2011). The following statement from the company website describes the company's business areas: "Síminn is always ready with the latest telephone, mobile and data transmission solutions for companies and for individuals" (Siminn, 2012).

Siminn is a small telecommunication company in an international context. However, it is a technologically advanced company. The advantage of using Siminn is, for example its innovative culture, which is shown, for instance, in the management's encouragement of the use of pioneering management tools. Reporting on the GLOBE cluster classification of societies Gupta et al (2002) state that the Nordic cluster is culturally similar to the Germanic cluster, showing rather strong practices of uncertainty avoidance, future orientation and institutional collectivism. In other words, there is an emphasis on certainty, social unity and cooperation. Szabo et al (2002) also base their research on the GLOBE project and point out that a focus on co-determination and works councils lead to participative leadership and are the distinguishing features of the Germanic cluster. It is fair to assume that the general findings from a case study based on Siminn should be relevant, for example, to telecommunication organizations in the Nordic and Germanic cluster.

The organogram of Siminn is shown in Figure 2.

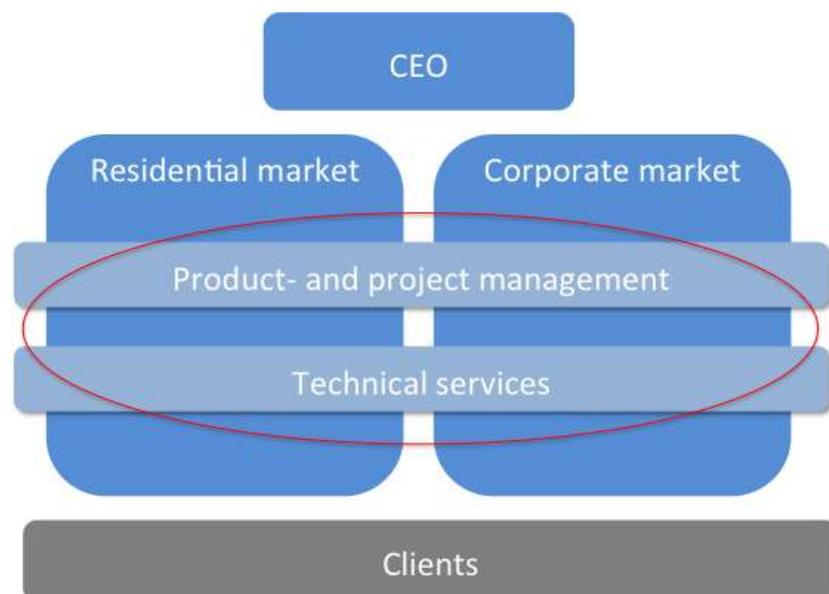


Figure 2: The organogram of Siminn.

The PMO uses Prince 2, which has been tailored to meet the specific needs of the organization. Product managers define products that might create value and projects

are prioritized by the Siminn PMO, but the final decision whether to execute or not is made by management. If projects are selected, they are sent to the SDD, which also has to handle a variety of infrastructure projects which do not necessarily stream through the PMO.

One of the main challenges for the Siminn PMO/SDD has been to have a reciprocal overview of the status of projects in progress and projects in waiting. For instance, the PMO is not always aware of infrastructure projects in progress within the SDD. It is inevitable that appropriate managerial cooperation between the two necessitates an overview of the project flow — to understand the situation, define boundaries, and work within the constraints of the system. Siminn management requires maintenance projects to have the highest priority, as they may often deal with unplanned complications and can also create value. The SDD has a good overview of the status of older hardware and this can be an influencing factor in the project selection process.

Siminn operates in a very competitive environment; the organization must be able to respond quickly to the moves of its competitors. Product development must, therefore, be fast and new products be put to market speedily; the SDD is constantly pressured to respond swiftly and deliver results quickly, effectively and efficiently.

Many projects in the Siminn SDD are complex, poorly defined and open-ended. The reason for this is that it is always possible to improve the service to the customer and do better. This also means that many of the projects do not have a clear beginning or end. In addition, project priority can change at short notice, making it still more difficult to define projects clearly.

Implementing a Project Kanban Wall at SiminnPMO/SDD is an attempt to influence the way the product development teams define and prepare the projects that are in progress.

Before the implementation of the Project Kanban Wall, the product development managers created product initiation documents (PID), which became working documents for the PMO/SDD. As a part of the implementation, the PID document was extended; and a new chapter was added for the SDD. A more specific description and summary of what the SDD needed to do was also added. It was hoped that this would generate a better understanding and definition of the projects.

The Project Kanban Wall defines steps along the project-flow progression. It was, therefore, possible at each step to add conditions that were appropriate or needed to be in place at each step for a project to be allowed to proceed. These are the gates along the way and the flow along the wall is restricted in such a way that a project does not go through a gate unless it has fulfilled the set conditions. Such conditions are called *Definitions of done*. These reduce the risk of having incomplete or poorly defined project ideas being pushed too far, or in unsuitable forms, along the Project Kanban Wall.

An important part of the implementation process was to create a team to prepare and supervise this project. The team consisted of a project manager from Siminn PMO, a

Scrum master and a business analyst from Siminn SDD, all with extensive experience of projects at the company and representing the interested parties that will be using the Project Kanban Wall.

The company has been using the Jira project management system (Atlassian, 2011) to keep track of all projects. The first stage was to look at the present system and define the current flow, and project it to a Kanban Wall. This enabled the team to assess the process, look at what might be done better and identify bottlenecks. The first Kanban Wall that emerged is shown in Figure 3. It showed immediately that the "In progress" column was much too large compared to the other columns, indicating that this might be a bottleneck. Scrum was the method used for projects that had reached the "In progress" column.

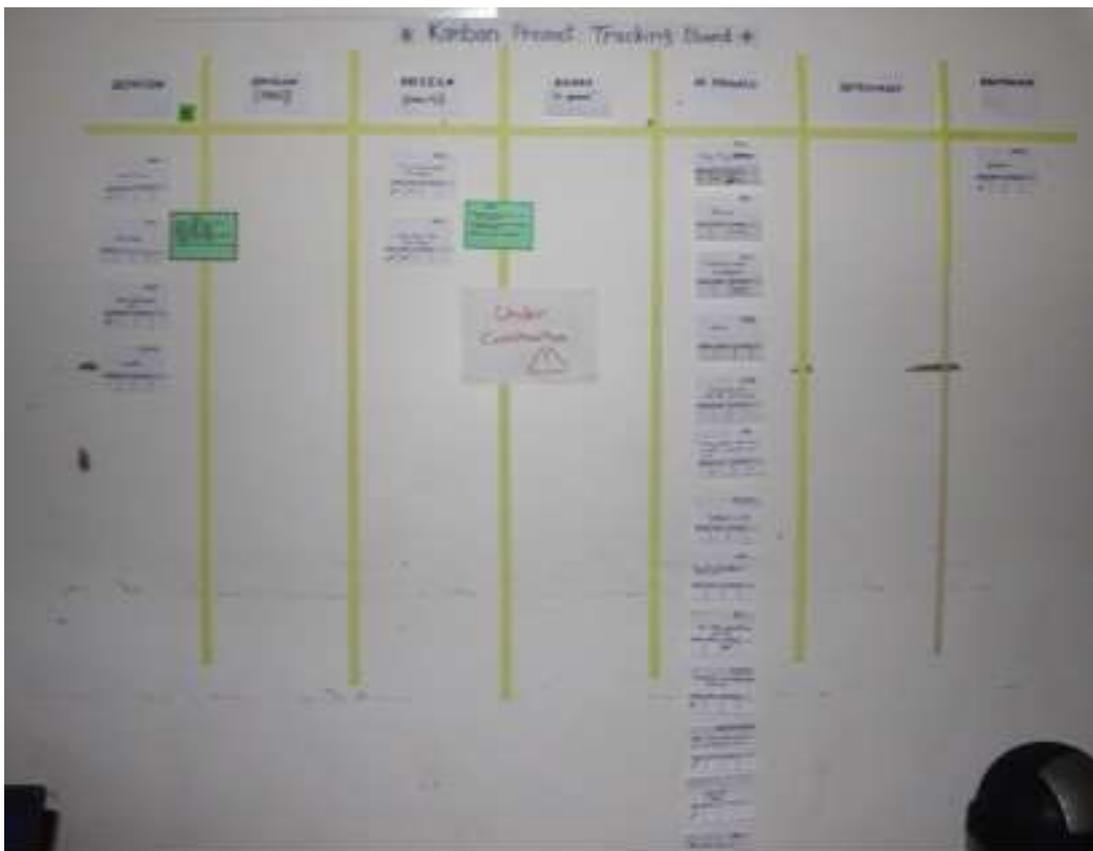


Figure 3: 1<sup>st</sup> version of the Siminn Project Kanban Wall;  
"In progress" column indicates a bottleneck.

As it was known that projects are sometimes too large when they entered the SDD, the objective was to break them down even further and define them more clearly. As a criterion, the *minimal marketable feature* (MMF) was used. This is defined as "a chunk of functionality that delivers a subset of the customers' requirements that is capable of returning value to the customer when released as an independent entity" (Denne & Cleland-Huang, 2004). MMF was used to define the allowed size of projects to be demonstrated on the wall. A larger project would be broken down to become one or more minimal marketable features.

Inevitably, a flow in a Kanban Wall for projects is much slower than the flow in a Kanban Wall for tasks. As a consequence, it can be expected that the MMF is of a scale of 2 weeks - 4 months.

A few versions of the Project Kanban Wall were defined where columns were added or dismissed. Interested parties were summoned on a regular basis to express their views, and the creation of the final version of the wall was thus an iterative process. As an example, the SDD wanted to be able to measure the time it takes to analyze the projects: how many projects are assessed and what different types, i.e. product development projects and maintenance projects.

In order to simplify the classification, three processes were defined in the Jira system and one in the MMF process, namely the process that demonstrates undertakings by the SDD to start work on a particular project. The processes are made visible in the meeting room of the Siminn SDD.

A condition for taking a project for assessment is that it fulfills the *definition of done* conditions, and an MMF ticket cannot be written until a project fulfills these conditions, which is in turn a condition for taking the project through to execution.

A definition of done in the assessment of a product development project is as follows:

- Project decryption ready.
- MMF's list ready.
- Business Case ready.
- Business rules ready.
- Product architecture ready.
- Risks, security and legal issues assessed.
- High Level Design.
- Resources and work duration estimation ready.

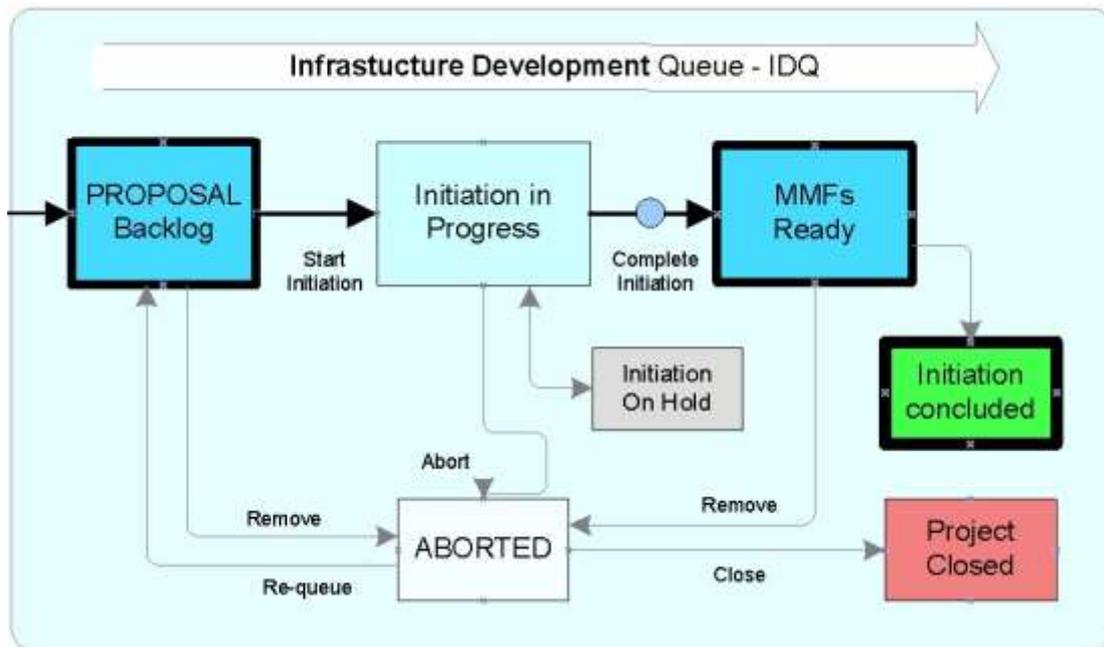


Figure 4: Product development process.

Figure 4 shows the product development process for Siminn and indicates where the definition of done takes place. Three main steps of the assessment process are shown. The product managers are supposed to register the projects for the next quarter in a *proposal backlog*. Once the PMO assessment starts, the project is moved on the Project Kanban Wall to the "initiation in progress" column. This is where the analysis takes place to fulfill the definition of done conditions above. From this work, one or more MMF tickets can emerge, depending on the scope of the project. Each box in Figure 4 is defined in the Jira system, and all changes and measurements of how much time the project has spent on each step is monitored.

The manager of the PMO meets representatives of the SDD monthly to discuss the status of the projects. This meeting takes place at the Project Kanban Wall and is similar to meetings that are known as daily status meetings in the Scrum method. Here a PMO/SDD dialogue — on the projects in progress and projects in waiting — takes place, and agreements are made on which projects should move forward to the MMF process. The PMO decides the priority of product development projects, but other parties are involved so as to prioritize the infrastructure projects.

Within the MMF process, there are also definitions of done:

#### *Definition of Done for Design*

- Workable user stories list ready.
- Acceptance criteria defined.
- Business rules reviewed.

*Definition of Done for Deployment*

- Deployment orders ready in Jira.
- Product is deployed to the test box and makes it to staging.
- Training manuals are available for users.
- All tasks for the release are completed and accepted.
- The release does not have any level one bugs.

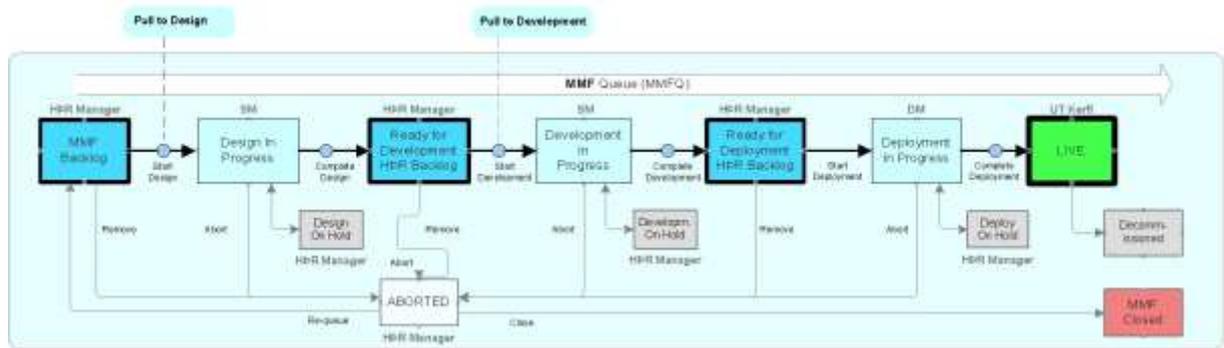


Figure 5: MMF process.

Figure 5 shows how the waiting lines are interpreted in the Jira system. The Project Kanban Wall reflects this process and the representatives of SDD meet weekly in front of the wall and update the status of the projects.

A final version of the Project Kanban Wall is shown in Figure 6 and its columns are explained in Table 3.



Figure 6: Final version of the Project Kanban Wall.

Definition of columns	
Product categories	Defines the product
Proposal	Project proposals
Initiation	Assessment work
MMF Ready	Assessment work delivers one or more MMF
MMF Backlog	MMF the SDD has committed to process
Design In Progress	Final design of MMF
Ready For Development	MMF is ready for development
Development In Progress	Development of MMF, usually with Scrum
Ready For Deployment	MMF ready for deployment
Deployment In Progress	MMF in process of being deployed
Live	MMF concluded

Table 3: *Final Version of Project Kanban Wall Explained.*

On the Project Kanban Wall, different colors are used to separate product development projects from maintenance projects. If a project is stopped because of external influences, a pink note is used. The first three columns on the wall have horizontal lines; the product managers can then prioritize their projects within each product. As Siminn has many product categories there is a horizontal line for each product that symbolizes the assessment part.

In the MMF process, horizontal lines are not necessary, as the projects are now prioritized within the columns. The priority of each product is very different and thus the ticket - taken from the assessment process and put into the MMF process - varies. When an "MMF ready" ticket is moved to the MMF backlog column, this means that the SDD has committed to finishing the definition of this MMF. A single individual is always made responsible for each step so that it is clear who will pull the project to the next column at the next opportunity. When an MMF ticket enters the "development in progress" column, the actual execution of the project starts. Here the projects are usually executed in Scrum teams - making it possible to follow even more closely the progress of the MMF by visiting the teams and investigating their *burndown charts*.

The projects became somewhat smaller than before, and better defined when taken on by teams, but no changes were made to how the teams use Scrum to execute the projects.

## Method

Two intertwined research methods were used to answer the research questions put forward at the beginning of this paper.

### ***Method A: Surveying the perception of interested parties.***

A survey, based on semi-structured interviews, was designed, and interested parties participated and expressed their views on the experience of applying the combined Scrum/Kanban method. In Figure 2 — the organogram for the Siminn hf — the red line

demonstrates the area where the Kanban Wall had its strongest influence. Nine representatives from these crucial organizational divisions were chosen: product managers, project managers of the PMO, the head of PMO, the head of SDD, department managers and Scrum masters at the SDD.

The questions in the survey are shown in the results section. The survey was carried out on two occasions. First, one month after the implementation of the wall, and then again eighteen months after the implementation of the wall. In the first case, the survey was in the form of interviews and no specific effort was made to accumulate the results statistically. In the second case, the survey consisted of 6 statements that participants answered using a five-step Likert scale, ranging from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree).

***Method B: Measuring throughput of projects in each quarter.***

Information on the flow of projects through the SDD is gauged and compared to the situation before the Project Kanban Wall was implemented. The variable studied in this context was simply the number of projects completed in the SDD during each quarter.

**Results**

***Results from method A: Perception of crucial parties one month after implementation***

Below are the survey questions and excerpts of the answers.

Question 1: Does it create extra work to register each project both in Jira and on the Project Kanban Wall?

Participants all agreed that the *Project Kanban Wall* with different color codes improved the overview of projects being processed through the system. Overall, respondents agreed that it would be better to be able to print the labels directly from Jira instead of handwriting them. Participants all agreed that their employees understood well the different roles involved in the Project Kanban process and also how Jira was the basis for measuring the project flow and essential for the documentation of projects. The participants from PMO realized that since the wall was made for projects (not tasks), registering in Jira and on the Project Kanban Wall did not create extra work.

Question 2: Is it wise to run Kanban and Scrum in parallel?

All the participants agreed that this arrangement was good and one quote from the head of the SDD was: "No question; on the Kanban Wall you get a complete overview of the projects that flow to the SDD and through the team; the Scrum walls then show how particular MMFs are progressing."

Question 3: Will the weekly and monthly status meetings be more focused if they take place in front of the Project Kanban Wall?

Before implementation of the Project Kanban Wall, the weekly status meetings took place in front of a monitor connected to the system, with the Jira system open. All the interested parties agreed that this new way of doing things made the meetings more focused and more fun. The head of the PMO said, "Yes, and in fact I think that this has already been demonstrated, even now only a month after implementation."

Question 4: How convenient, on a scale of 1 (very inconvenient) to 5 (very convenient), do you think it is to have the project status visible on the Project Kanban Wall?

8 participants said that this was either convenient or very convenient (7 convenient, 1 very convenient) and 1 was neutral. One department manager in SDD said "it is extremely convenient to get an overview of the status in just a few seconds."

Question 5: Do you think that the Project Kanban Wall will make it easy for the people from SDD to see what projects are next in line?

All respondents agreed that the Project Kanban Wall would make it easier for the people in SDD to see what projects are coming up. It was, however, also pointed out that this was no magic solution and that it was the responsibility of the employees to find out what was coming up, i.e. to take the time to look at the Kanban Wall.

Question 6: How likely on a scale of 1 (very unlikely) to 5 (very likely) do you think it is that the new arrangement with MMF will increase the capability (throughput) of SDD?

8 of the participants said it was likely or very likely that the new arrangement would increase throughput (5 said likely, 3 said very likely); 1 was neutral. 1 believed that the new arrangement would help to maximize the workforce and the new *definition of done* meant that projects were better defined and when they were sent to execution most questions had already been answered. This would mean less time lost for those executing projects.

Question 7: How important is it to put an upper limit on the number in each column in the Project Kanban Wall for the SDD?

Most respondents thought it was important to put an upper limit but they did not agree on how to do this. One said that this limit should be a reference rather than a rule; another said that there would be a need for limits for some, but not all, columns; some said that it would be difficult to apply limits to the development in progress column, as some of the MMF are done by Scrum teams but others are done by individuals.

Question 8: Do you think that the projects of SDD will change (in terms of scope, time and requirements) as a consequence of the Project Kanban Wall?

Most respondents thought that the projects would not change much. Some, however, thought that the new arrangement would mean that project definition would be clearer as projects are broken down to MMF. A department manager from the SDD said, "The project will be better defined and broken down to MMF with clear goals and

expectations. This will enable us to deliver the product the client is asking for and on time.”

Question 9: Will the Project Kanban Wall make it easier for the PMO to keep an overview of ongoing projects within SDD?

All replied to this question with a yes. One participant said that the wall would help the PMO in the same way as it would help the SDD.

Question 10: Is anything missing or would you like to modify anything in the new/present arrangement?

There were no suggestions for changes and respondents were, in general, happy with the present situation. They agreed that all the implementation should be reviewed after a longer trial period.

Question 11: Could the Project Kanban Wall be of use to other organizations? All respondents said yes.

Question 12: Was anything special or unexpected revealed in the process of implementing the Project Kanban Wall and starting to use it?

It was said that it came as a surprise how positive all participants seemed to be about this change, as it is often difficult to modify people’s work procedures. One project analyst of the SDD said: “The projects of the team are different but the wall demonstrates this in a simple way by using different tracks, different colors, etc. It came as a surprise how a simple two-dimensional wall with a modest use of colors can give a good overview of the projects, as compared to Jira, which works in one dimension.”

### ***Results from method A: Perception of crucial parties eighteen months after implementation***

The results of this survey are shown in Table 4.

Question	Average	Standard deviation
I think it is convenient to run Kanban and Scrum parallel as we are doing today.	4.67	0.50
I think that weekly/monthly status meetings are more focused since we implemented this method.	4.67	0.50
How convenient is it (scale 1 to 5) to have the project status visible on a wall?	4.11	0.33
The Kanban wall makes it easier for the SDD staff to see what projects are coming up next.	3.89	0.78
To what extent (scale 1 to 5) do you think the new arrangement (MMF) has increased the capacity of SDD?	3.33	1.12
The Kanban wall enables the PMO to keep an overview of the projects that are going on within SDD.	4.63	0.52

Table 4: Results From Survey Conducted 18 Months After Implementation.

Examples of comments submitted by the participants:

Perspectives of project managers of the PMO:

- “This new arrangement has improved the overview of the project managers, made communication with the SDD easier and reduced the number of e-mails, telephone conversations, meetings, etc.”
- “Scrum and Kanban can work well together; there is a clearer prioritization of projects with this arrangement.”
- “This is a magnificent tool and I don’t understand how we could cope without it.”

Perspectives of people from the SDD:

- “This method is under constant development but after we started, the overview and control of projects has greatly improved. We have much better data on our operations and better understanding of our work.”
- “Kanban is good for managing workflow, Scrum is good as a framework for software development. These methods work very well together. This arrangement might improve the throughput of the development process still further.”
- “Meetings are more focused. We reduce waste and our projects are better defined. We have a much better overview.”

**Results from method B: Throughput of projects through the SDD**

The throughput of projects through the SDD for each quarter of the years 2009, 2010 and 2011 is shown in Figure 7.

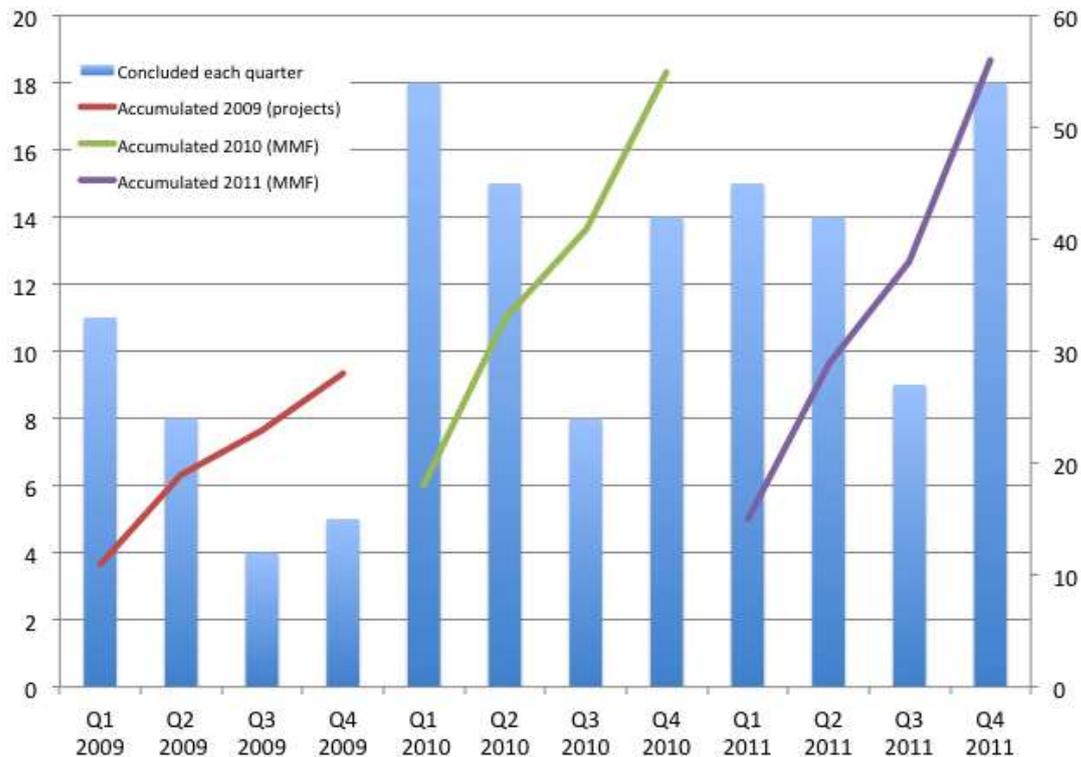


Figure 7: Throughput of projects through the SDD 2009-2011.

Concluded projects each quarter on the first axis and accumulated projects for each year on the second axis. The Project Kanban Wall was implemented in the first quarter of the year 2010.

It should be noted that the Jira system was used similarly before and after the implementation of the Project Kanban Wall. However, one aspect of the new work arrangement is a more specific breakdown of projects through the MMF, as explained above.

### Discussion and Conclusion

Using a Kanban Wall to reflect workflow could benefit organizations of all kinds. Siminn had been controlling its project workflow by the Jira system, but the projection of this flow to a Project Kanban Wall seems to have greatly improved the overview of project progression for all the relevant parties. Kanban does not define any rules on how work should be done, or not done, and therefore it makes perfect sense to use Scrum for the actual development work. This research shows that the implementation of Project Kanban Wall did not affect Scrum in any way; it simply made the overall projects stream more naturally from the PMO through the SDD and to the project owner.

After implementation of the Project Kanban wall, the teams continued to use Scrum as before. The only change was that projects were better defined when they were given to

the Scrum teams, and everyone involved gained a better overview of each of the projects as well as the collective flow of all the projects through the system.

The Project Kanban Wall is shown to have increased the throughput of projects through the SDD. This change is partly attributed to a more specific breakdown of projects using the MMF system, but in general more projects are being completed faster in the SDD after the implementation of the new method. All interested parties and all of the participants in the survey were pleased with a better overview, more focused communication and better work, as a consequence of the new arrangement. This perception was strong one month after implementation of the Project Kanban Wall, and was even stronger 18 months later.

It was clear from interviews that all participants believed that such a wall would be of use for other organizations. It is the belief of the authors of this paper that Kanban will gain even more attention in the agile community in the future.

The Project Kanban Wall at Siminn has now been transferred to an electronic format through the Green Hooper utility, which is an add-on to the Jira system. This is a benefit since all projects are registered in Jira. Experience, however, has shown that this digital Project Kanban Wall does not replace the traditional Project Kanban Wall where paper cards are used. The physical wall is thus an essential part of the method; it is also evident that it is important for meetings and dialogue between interested parties to take place in front of the physical Project Kanban Wall.

The overall conclusion is that the Project Kanban Wall can make the overview of projects and their execution easier; and it makes communication between interested parties more efficient and effective. The combined use of Scrum and Kanban has been flawless in this project and the new method has been a success from its onset until now. The capacity of the SDD team has increased considerably as a direct consequence of the implementation of the new method.

Finally we wish to point out the limitations of this case study. We studied a single organization, basing our research on quantitative data about the throughput of projects, and qualitative and quantitative data from surveying a limited number of key interested parties within the organization. The organization studied is a large company in Iceland, but small in an international context.

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