The Application of Scalable Agile in Dutch Government

[Bachelor Thesis]

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ABSTRACT

This research looks into the possibility of implementing Scalable Agile Framework (SAFe) within Dutch government IT projects. The Large Solution configuration of SAFe is used for analysis. Besides literature research, IT professionals with experience within Dutch government IT projects have been interviewed. Required cultural changes within Dutch government have been identified and an analysis was made of different types of projects within the Dutch government. Not all Dutch government IT projects will be able to fully implement SAFe, but some features can still be implemented. Dutch government would benefit from implementing SAFe, or Agile in general.

Keywords

Dutch government, IT project management, Scalable Agile, SAFe, Agile

1. INTRODUCTION

On the 14th of October 2014 a Dutch House of Representatives (Tweede Kamer) committee (Commissie Elias) presented a report [14] on IT projects within the Dutch government. The report describes a variety of Dutch government IT projects and why these projects tend to be unsuccessful. They recommend a few changes with regards to the execution of Dutch government IT projects and introduce improved auditing of the projects. A new committee, Commissie BIT (Bureau ICT-toetsing), was founded to audit all major Dutch government IT projects (projects with a budget exceeding five million euro).

On the 10th of April 2018 the Dutch Council of Justice (Raad voor de Rechtspraak) announced a reset of their digitalization project Kennis en Innovatie (KEI) [26]. The project surpassed its budget by over two hundred million euro and was still not finished [20]. The KEI project has not been the only Dutch government IT project struggling to complete on time and within budget since the release of the 2014 Commissie Elias report. A considerable amount of these (failed) projects still made the same mistakes mentioned in the 2014 report. Not only Dutch government, but government agencies all over the world are struggling with IT projects [12].

Most IT-based companies are not struggling as much with their IT projects. This is partially due to the IT specialized project management methodologies these companies apply. Most of which covered under the umbrella term Agile [11]. Agile development is volatile and has a tendency to have a high turn around in a small amount of time. Due to this, it is suited to smaller scale projects or project teams. Dutch government IT projects are very large scale project, not featuring simple small teams, thus initially not very fitting to Agile.

To achieve Agile within bigger organisations new methods have been introduced, these scale the standard Agile features to fit bigger scale projects or project teams. The methodologies are covered under the term Scalable Agile. The two biggest Scalable Agile methodologies are Scrum of Scrums and SAFe. Scalable Agile is much more suited to the Dutch government.

In this paper we will focus on SAFe as this is a more structured approach to Scalable Agile [13], thus more suited to the structured organisation of Dutch government.

2. PROBLEM STATEMENT

Dutch government IT projects are struggling to complete on time and within budget. Out of the twenty nine projects audited by the Commissie BIT; since its inception, only three projects were classed as satisfactory projects that were not required to make any adjustments.

This is partially due to the (traditional) management structure of Dutch government authorities. A key example of this traditional management is state ministers having to sign off on a complete project plan before the project starts, thereby limiting the overall agility of the project. Most successful IT projects are executed making use of Agile project management methods, however these are tailored to smaller scale projects and thus not very suited for the (often) big scale IT projects Dutch government authorities work on.

A possible solution would be to combine both worlds to ensure better future results in Dutch government IT projects using Scalable Agile.

To test the feasibility of this possible solution the research question is as follows;

What factors or changes are vital to implement Scalable Agile framework SAFe in Dutch government IT projects?

To be able to answer this question we will look at the following three things;

• What is SAFe?
• How are Dutch government IT projects organised?
• How can SAFe be implemented in Dutch government IT projects?
3. METHODOLOGY

Both the fields of Scalable Agile (and SAFe) and Dutch government IT projects are small fields with a very limited amount of scientific research. Due to this, most information with regards to the functionalities of SAFe has been collected from the official SAFe website and from the organisation behind it; Scaled Agile Inc.

To retrieve more information, about practices within Dutch government IT projects, free form interviews were held with IT professionals who work or have worked on Dutch government IT projects. Both IT professionals from Dutch government authorities and a major IT supplier have been approached. All information gathered during these interviews has been anonymised, including information about specific Dutch government IT projects. Information presented about Dutch government IT projects has been gathered through publicly available channels.

The interviews were approximately 60 minutes long and covered multiple subjects as discussed in this paper. All interviews were recorded to be able to review them in detail. Interviews were held with four IT professionals employed by a major IT supplier;

- **Interviewee 1** - Currently working as project manager on a non-Agile law-based project at a Dutch government authority implementing a new IT system. The project started as a Agile project. Previous experience at a major Dutch societal influential authority.
- **Interviewee 2** - Project manager on two major Dutch government IT projects. One of these projects executed using Agile methodologies.
- **Interviewee 3** - Currently working as consultant with a Dutch government authority to implement a form of Agile. Previous experience at a Dutch supervising authority (toezichthouder).
- **Interviewee 4** - Currently working as project manager on an Agile project at a foreign government. Previous experience as project manager at one Dutch government project, two projects for a European secondary government authority, and previous experience at major Dutch societal influential authorities.

An example of a societal influential authority is KPN. Interviewees were approached using the network of my supervisor (Jos van Hillegersberg) and myself. Employees of multiple Dutch government authorities were approached, employees of one major IT supplier were approached. All parties were approached through digital, textual, communication channels.

A literature study has been executed on the topics of Agile, Scalable Agile, and government IT projects. Articles been gathered through Stopus. Appendix A features a table with the used search terms, potential additional limitations, the amount of results, and the amount of papers consulted for the creation of this paper. References in the papers and citations of the papers were used to find additional relevant papers.

Lastly, a literature study was executed on SAFe case studies.

This paper will first explain the basics of SAFe, followed by the findings based on the interviews, then three SAFe case studies will be discussed.

4. SAFe

The Scalable Agile framework, SAFe, was based on concepts in *Scaling Software Agility* by Dean Leffingwell [18]. SAFe was first documented in *Agile Software Requirements: Lean Requirements for Teams, Programs, and the Enter-

prise (ASR)* by Dean Leffingwell [19]. The framework is based on a wide array of research within the field of Agile, Lean, and other existing Agile IT project management methodologies [33]. This paper discusses SAFe version 4.5 released June 22, 2017 [32].

SAFe has a total of four configurations;

- **Full SAFe**
- **Large Solution SAFe**
- **Portfolio SAFe**
- **Essential SAFe**

Large Solution SAFe is the configuration most relevant for government authorities [30], therefore the Large Solution SAFe configuration will be discussed. A visual representation of the Large Solution SAFe model can be found in Appendix B.

Large Solution SAFe consists of three levels;

- **Large Solution Level**
- **Program Level**
- **Team Level**

For an easier understanding of Large Solution SAFe, it will be explained from the bottom upwards.

4.1 Team Level

The team is a cross-functional Agile group of five to eleven members. Team members have the responsibility to define, build, test, and deploy solutions on a short iteration cadence. At the end of each iteration a demo is held to present the created solutions. A team is able to developed, test, and release fully working software and systems.

A team consists of;

- **Development team** - Develops and tests solutions. It consists of developers, testers, engineers, and other potentially required specialists.
- **Scrum Master** - Is the coach of the team and helps them keep on track. Communicates with other teams and management.
- **Product Owner** - Is the link between the team and the users. Is responsible for determining the priority of features and when they have been completed.

4.2 Program Level

The program level contains the Agile Release Train (ART), in which all teams and team solutions are incorporated. Each ART consists of about five to twelve Agile teams. The ART functions similarly to an Agile team, but instead of individual team members it consists of multiple Agile teams.

All ARTs use the same iteration cadence, the **Program Increment (PI)**. All team in the ART are synchronised to the PI cadence to allow optimal collaboration. Multiple team iterations fit into the PI iteration. The PI (usually) consists of four development team iterations and one Innovation and Planning iteration. The Innovation and Planning iteration is used to reflect on the last PI, plan the next PI, innovate, and resolve project impediments.

Besides the Agile teams, as mentioned on the team level, an ART requires a few extra roles;

- **Business Owners** - Represents key stakeholders and bears responsibility for the business outcome of the project.
- **System team** - Supports the teams in building, maintaining, integrating, and testing their solutions.
- **System Architect/Engineer** - Defines overall system architecture and defines major system elements.
- **Product Management** - Bears responsibility for cre-
ated solutions, works together with product owners and customers to ensure a satisfactory solution.

- **Release Management** - Has the overview and approves all releases, usually a combination of different ART team members.

- **Release Train Engineer (RTE)** - The servant leader of the ART. Focuses on the health of the ART, keeping track of risks, dependencies, impediments, and other ways of improving the ART.

To support the teams in the ART, a **Shared Services** team is introduced. This is a team of specialists vital to the success of ARTs. Shared Services team members are, for example, security specialists, database administrators, and information architects.

The ART is contained by the **Continuous Delivery Pipeline**. The pipeline makes sure solutions are delivered to users frequently. The frequency depends on many factors. Incomplete solutions are never released.

The pipeline is split into a Continuous Exploration cycle, a Continuous Integration cycle, and a Continuous Deployment cycle.

**The Continuous Exploration** cycle determines and defines the backlog. This cycle also defines how features should be tested and when they are deemed successful.

Features in all different backlogs are prioritized using the **Weighted Shortest Job First (WSJF)** model. WSJF produces the maximum economic benefit for the project. WSJF prioritizes jobs to ensure the lowest costs over time. Jobs are arranged relatively to each other.

**In the Continuous Integration** cycle new features are developed, tested, and integrated into the existing system.

**In the Continuous Deployment** cycle all features that have completely passed through the previous two cycles are deployed to staging, testing, and production environments and are made ready for the final release.

A last segment of the Continuous Delivery Pipeline is the **Release on Demand** process. This handles the release of features to users. Tactical planning of releases can have real benefits to the agility of an enterprise.

With Release on Demand the release of features is decoupled from any iteration cadence. It considers when to release features, which features to release, and to which users these features should be released.

The Release on Demand process allows for an optimal economic benefit of the release of features.

### 4.3 Large Solution Level

On the Large Solution level the work of multiple ARTs and potential other suppliers is combined. Secondly, the large solution level ensures compliance with rules, regulations, and standards. Lastly, the large solution level houses the final overarching instance in Large Solution SAFe, the **Solution Train**. Large Solution SAFe consists of teams (Agile teams), teams-of-teams (ARTs), and teams-of-teams-of-teams (Solution Train). Managing all those separate teams, and their activities, takes place on the Large Solution level.

The Solution Train houses the collection of all solutions created in the project. The Solution Train is usually a system of systems, a big collaboration between multiple developed systems. The Solution Train has its own cadence, to which all underlying ARTs (and in turn Agile teams) are synchronised. During each iteration, the Solution Train integrates as many of the solutions as possible. Just like ARTs and Agile teams the Solution Train demos the completed integration at the end of the iteration.

The Solution Train, ARTs, and Agile teams all operate using the same basics, development methods, planning methods, and releasing methods.

All information in this section about SAFe has been gathered from the SAFe main website [31], thus based on Dean Leffingwell’s research [19].

### 5. DUTCH GOVERNMENT

In 2017 Dutch government spent €2.6 billion on IT. That includes both project expenses and other expenses. In 2017, thirteen new IT projects were started, twenty-nine were finalized, and one was canceled.

In total the Dutch government reported on 125 IT projects. 33% of these projects had a budget under ten million, 28% of projects had a budget between ten million and twenty million, and eight projects had a budget over one hundred million. €633 million in total was spent on these 125 reported projects at the end of 2017. It is estimated that another €1.2 billion will be spend on the still running projects after 2017 [22].

IT projects have a high priority for Dutch government, in a fast moving digital world. The government IT systems have impact on most of the Dutch citizens. In case Dutch government IT systems go down, the consequences could be quite severe. Therefore, it is of high priority to keep systems functioning [5].

Within Dutch government IT projects it is quite common for projects to run over budget and over the time limit [20] [21] [23] [24] [26] [34].

To prevent projects from failing, all IT projects with a budget over five million euro have to be audited by Commissie BIT. Out of the thirteen projects audited by the Commissie BIT in 2017, only two projects had no major remarks and were expected to release on time and within budget.

Not only Dutch government is struggling with IT projects, governments all over the world are struggling with IT projects. With only 15% of IT projects succeeding [15] [16].

There is a wide range of reasons for government IT Project failure. Examples are, a need to do more beta testing and better user training [9], or technology, management, politics, and finance [8].

Identified as problems within Dutch government IT projects by Commissie Eliaas are [14]:

- Ambitions being too big
- A lack of control over projects
- Decentralized IT management
- Ambiguity
- A lack of portfolio management
- A lack of insight in project finances
- A lack of internal knowledge of IT projects
- Weak project management
- A perverse tendering process
- Unprofessional contract management
- An inability to learn from previous mistakes

Other research concludes more generally that the problems in IT projects arise in the IT project management process [27].

Dutch government has a monopoly on their IT systems. This results in a limited rush to release new additional features and a low priority for a user friendly system. The focus is on features originating from political decisions and discussions. Together this results in a diminished need to improve or innovate [5].
5.1 Comparing with private sector
To be able to get a better feel of the way Dutch government handles their IT projects, the differences between Dutch government IT projects and private sector IT projects are discussed. Due to the lack of research comparing government with the private sector the interviewees were asked about it. The following remarks were made, which will be expanded upon;

- Dutch government employees are hesitant to take risks and fear making mistakes, this greatly limits project progress and effectiveness.
- Dutch government keeps a tighter grip compared to the private sector on projects.
- There is a lacking sense of urgency within Dutch government due to lacking IT expertise at decision-making level.
- Dutch government has difficulty prioritizing features.
- Dutch government IT projects involve a lot of different Dutch government authorities and systems, making projects more complicated than private sector projects.
- Dutch government authorities tend to focus only on their own projects, and not focus on the big societal picture.
- Strict current (European) tendering rules make it difficult to implement Agile in Dutch government IT projects.
- Dutch government IT projects implementing laws are less suited for Agile due to strict deadlines and boundaries.
- There is no difference between Dutch government and the private sector in risk analyses made by the supplier.

Politics
Naturally, Dutch government IT projects have to deal with a large amount of politics and (unwanted) political influence. None of the people in government want to be the one responsible for a failure, or even a slightly bad decision, as that could greatly influence their career. Whereas, usually in the private sectors people are encouraged to take some risks or make mistakes as they can all learn from that.

Due to this, on most Dutch government IT projects risky decisions are being avoided, resulting the project to stall [3]. The private sector is more likely to request funding for a project, because a departments funding for a next year is based on the money they spent the last year, the more the better. However, within government less money spent is better [2].

To prevent additional risks, government is more likely to keep close track of progress and to make a problem out of small deviations from initial planning [5].

Due to attempts to minimize risk, most government authorities and employees want to keep a tight grip on the supplier, to know exactly what will happen, how it will happen, and when it will happen.

IT knowledge & prioritization
Government is not the most popular market for IT professionals to work in [35] and government employees tend to be older than in the private sector [17]. These older employees are the ones in control at government authority, employees with little seniority (anything less than ten years of employment history at Dutch government) have barely any influence or say in what happens at the government authority [5].

Secondly, most decision-making level employees within Dutch government authorities have little knowledge of IT considering the large amount of IT systems the Dutch government has. This results in a lacking sense of urgency with regards to a digital government, whether this is renewing or refurbishing existing systems, or digitalizing manual workflows [5].

Due to the lack of IT knowledge and experience it is more challenging for government to prioritize features or capabilities of a system, they simply want all the features [2].

Multiple IT systems & authorities
Dutch government IT projects have to deal with a lot of different systems from a lot of different government authorities. All those systems have to co-exist and communicate.

There is a long list of applications and systems to consider when developing Dutch government applications. Something that is not as common for the private sector [4]. Each Dutch government authority focuses on its own systems and functionalities. However, Dutch government authorities should learn to overstep organisational boundaries and work together closely. Saving money at one authority could mean higher costs at another authority. Dutch government authorities need to look at the big societal picture [7].

Tendering
The European Union imposes strict tendering rules for all member states. These are not beneficial to suppliers in the market. Many suppliers will compete for a project, but only one supplier will work on it. The suppliers responding to a tendering process invest a lot of money, but have only a limited chance of working on the project.

As a whole, the suppliers market will make a loss, with only one supplier making a profit. Due to this, some (high-end) suppliers retract from the market of government projects [4].

During the tendering process the government authority presents a very clearly set-out version of the project to ensure the resulting supplier can, and will, actually deliver what they want. After a supplier is chosen they will have to follow this clearly set-out version of the project, even when everyone would agree a different methodology works better. This is due to legal complications and the risk of litigation by other suppliers if the requirements of the project suddenly change. Dutch government employees want to exercise more flexible tendering rules, but suppliers constantly litigate when losing a tender. Due to that, the Dutch government can not exercise more flexible tendering, which in turn results in more litigation. A never ending circle [5].

Summarized, attempts to acquire the right supplier with the right credits during the tendering stage of a project greatly limits the freedom in later stages of the project.

Laws
The final hurdle of Dutch government IT projects involve the implementation of laws. Failure of a law based IT project to complete in time would result in the government authority overseeing the project to be breaking the law. Other situations could involve no longer being able to use an existing system due to a change in laws, thus having to completely replace that system by the starting date of the new law [3]. Strict deadlines and boundaries go against the main views of Agile.

Risk Analysis
Suppliers of the Dutch government make risk analyses for all the projects they work on. Contradictory to most other findings discussed in this section the risk analyses of Dutch government IT projects bear no particular differences to the risk analyses of IT projects in the private sector [4].
5.2 Agile complications

A few differences as mentioned in the previous section have influence on the ability to implement SAFe into Dutch government IT projects. The interviewees were asked about their thoughts on complications for implement Agile within Dutch government. Main complications were politics, dated processes, law based IT projects, and ERP systems. Some interviewees expanded on their experience with Agile at Dutch government.

Political attempts to keep a tight grip on all aspects of projects limits the agility of the project. It limits the possibilities to change plans frequently. In case government officials are not able to loosen their grip, implementation of Agile will be near impossible [6].

A secondary issue arising in the world of politics and IT is the contracting of projects. To be able to have a grip on a project contracts are made particularly strict. Transitioning to Agile would mean a big change in contracting and completely different, potentially less effective, ways to keep a grip on suppliers [3].

Most Dutch government processes and methodologies are quite dated. Even within some Dutch government IT projects that started utilizing Agile methodologies the projects were still assessed using old testing methods that do not fit Agile projects [3].

Both politics and the dated methodologies require a big cultural change to allow for Agile.

Dutch government IT projects with strict deadlines determined by laws challenges a core feature of Agile by strictly limiting the boundaries of the project. Therefore law based projects will have great difficulty implementing Agile [6].

A high amount of large scale IT projects involve the implementation of package based solutions, usually ERP packages. The startup phase of such projects is a period in which Agile releasing is not very common and not very effective either. During a startup phase the solution is installed and default setup has to be executed.

An example time given of a start up phase was around five months. After this startup phase, the focus changes to the customizable parts of the solution, here Agile releasing is effective. Package based solution projects usually go underground during the startup phase and after the startup phase initiate Agile releasing.

Secondly, package based solutions consist of multiple large interfaces which can not be created within one sprint [4].

Some Dutch government authorities have started transitioning to Agile like methodologies [3]. However, within all these methodologies dated values and systems are still in place limiting the agility, making it impossible to make optimal use of Agile.

Secondly, already existing projects initiated before this transition to Agile would still fall under a strict contracting and under the strict tendering regulations. Therefore those projects can not make the transition to the new Agile working methods, this results in the authority working with a mix methodology of both Agile and traditional methodologies.

One of these methodologies as applied by Dutch government authorities is referred to as AgiFall.

Transitioning to a new methodology does not instantly grant satisfactory results. After a transition employees will need to get used to a new way of working, new processes, and their own new roles. Initially a decrease in productivity will be noticed, before the benefits of Agile will begin to show [1].

6. SAFe IN GOVERNMENT

Hardly any research has been done in the field of SAFe and government.

The SAFe website features a collection of case studies. One paper was found with regards to implementing SAFe in the private sector.

6.1 SimCorp

In 2017 Jan Pries-Heje and Marlene M. Krohn researched the implementation of SAFe at Danish company SimCorp. SimCorp had about 500 employees in four countries. SimCorp is not a government authority, but an internationally oriented company. SimCorp was struggling with:

- A lack of visibility within the organisation
- Early commitment to design that does not work
- Late delivery of working features
- Late discovery of issues
- High complexity
- Distributed teams

These issues bear similarities with Dutch government IT projects issues.

SimCorp stumbled upon three major challenges with their implementation of SAFe:

- Waterfall functions became obsolete and were replaced with SAFe functions, impacting employees.
- Difficulty to let go of dated methods and embrace SAFe methods.
- Implementing SAFe outside of the IT department in supporting departments like sales, legal, and finance.

After the implementation SimCorp reviewed their process and came to the following conclusions:

- It is important to provide support from upper management for the change. Someone to take charge, help, and motivate the entire organisation to change.
- Allow for uncertainty. In some cases it is not possible to know what the influence will be, just try and see what happens.
- You need to have a diverse team working on the transition to assure a good transition.
- A lot of knowledge is required to be able to implement SAFe on such a scale, do not be afraid to hire external consultants to aid in the implementation.

Looking back, SimCorp identified a few situations which they should have handled differently:

- More focus should have gone to the ability to continuously integrate new features into their old legacy systems. The developers toolbox could have been improved.
- Dedicate more focus to what changes after completion of the transition, the impact for employees when they transition to new roles.

The researchers concluded that SAFe solved most issues that SimCorp identified at the start of the transition. The transitions impact on employees lasted longer than initially expected, but other than that no real issues were found [25].

6.2 National Health Services

British National Health Services Blood and Transplant (NHSBT) handles blood and transplant donation for hospitals across the United Kingdom.

Their systems and processes involve collecting, testing, processing, storing, matching, and delivering blood, plasma,
and tissue and matching, allocating, auditing, and analyzing organ donations.

NHSBT wanted to replace their aging IT infrastructure, migrate their systems, and replace critical operational applications all whilst ensuring continued activities and compliance with external regulations. NHSBT systems have to work together with many other systems from government authorities or health services.

Implementation started within a sub program of NHSBT (ODT), which would function as a pilot. The ODT program would allow understanding of SAFe for upper management, which in helps to roll it out through the organisation. Roles within the ODT program were adapted to SAFe and training was given to the team members. During the ODT pilot the rest of the organisation made slow transitions to SAFe, by using new methods of planning and informing other employees of SAFe. The ODT program spent the first Program Increment learning how to work effectively as teams, yet still managed to complete most of its PI backlog. Initially it was difficult to integrate the business side of NHSBT into the change, but after a few sessions they discovered the benefits of SAFe.

NHSBT is still expanding on their SAFe experience, slowly introducing more teams and sections of the organisation to the framework [29].

6.3 Australia Post

Australia Post wanted a sustainable lasting change to renew their organisation. They used SAFe to drive that change. Australia Post started training employees for roles within SAFe. At the start of the process this already involved supporting departments like finance, marketing, and sales. All teams were synced to the same cadence from the start of the transition, even when they were not working with SAFe yet. Due to this already existing cadence it became easier to transition the teams to fit SAFe and ARTs.

Australia Post identified four focus points:

- Cross-functional teams
- Culture change
- Technological enablement
- System of work

Initial focus was on the teams and the culture change, to allow the implementation of ARTs. Greatest traction in the transition was achieved when the business side of Australia Post realised the benefits of SAFe and put their confidence in the new delivery model.

Australia Post transitioned to SAFe with five ARTs, only 30% of features are purely digital and the remaining 70% include (at least) a partial technological change. Australia Post has achieved [10] [28];

- A higher throughput of business outcome
- Improved its first time delivery of features
- Reduced infrastructure costs by 98%
- ARTs consistently deliver 80% or more of their objectives
- Customer satisfaction improvement by 8%
- More employee engagement

7. DISCUSSION

7.1 Implementing SAFe in Dutch government

The Large Solution SAFe configuration should be suited to governmental organisations. The SAFe website has case studies on four successful implementations within government organisations. The interviewees indicated that it is certainly possible to implement SAFe, but there are still some challenges to overcome.

Cultural Change

The main difficulty for a Dutch government transition to SAFe, as mentioned by the interviewees, is the required cultural change. A low level of IT expertise on decision-making level makes initiating an IT driven change difficult. Secondly, the strong need to control the suppliers of projects greatly limits the SAFe implementation abilities. This is partially due to dated systems for testing and evaluating which the existing employee base of most government authorities are holding onto [6]. A second cultural issue, is the unwillingness to take responsibility or take risks. This is a result of society wanting to keep our government officials under control and accountable. Resulting in government employees not wanting to make any mistakes, as those could have grave consequences for their career.

A better understanding should be created on the environment of IT projects and the influence certain factors would have on the result of those projects. It is expect that results of Dutch government IT projects would be considerably better if employees were willing to take a risk and take charge on the IT front, however there is currently no research to support this claim. Political opposition would need to understand, that sometimes mistakes have to be made to achieve results, or achieve a benefit in the bigger societal picture. However, to be able to achieve a change of this size, the knowledge of IT and IT projects would need to increase for those on the decision-making level.

Practicality of SAFe

All interviewees think Agile can have great benefit for Dutch government IT projects [6]. Especially frequent releases could prevent an all-or-nothing approach at the end of a project. In case a system is developed and released, all in one, at the end of the project, it will inevitably be turned down. Releasing the solution at smaller increments during the project and acquiring feedback on the progress prevents this by adapting to feedback early on. [6].

Due to strict deadlines of law based Dutch government IT projects, it will be challenging to implement SAFe. However, more frequent releases could greatly benefit law based projects just as much as any other project. To utilize frequent releases without the risk of agility during law based project it is possible to implement a Scrum Waterfall methodology. Combining a Waterfall based project planning, an Agile method of communication, and frequent releases. Scrum Waterfall would include the iteration cadence based deployment of features to ensure timely feedback, and a satisfactory final product [6].

Transitioning to SAFe

A transition to SAFe would require decision-making level of a Dutch government authority to initiate the transition. However, all interviewees agree it is vital to build the transition from the bottom up, to achieve a satisfactory and efficient transition. Secondly, the transition does not have to tightly adhere to a predetermined framework like SAFe. Most importantly, a transition to Agile is about finding a best practice for the organisation.

An initial plan should be made to align ideas and have
a clear spot on the horizon for the organisation to work towards. The transition should start with a singular application or team, guided and supported by management, and expanded upon fitting to the organisation [6]. SimCorp identified many issues similar to issues at Dutch government. After the implementation of SAFe most issues were resolved. NHSBT had IT systems incredibly vital to society, which could not stop functioning, and had to incorporate many other systems into their own. NHSBT successfully transitioned to SAFe, by slowly implementing it and building it from the bottom up. Lastly, Australia Post had to work through a cultural change, transitioned successfully to SAFe, and achieved many benefits from the transition.

7.2 Limitations of the research
The amount of IT professionals interviewed (four) was quite low. This amount could have been higher if more follow-up emails were sent and if the time-frame of this research allowed it. Secondly, all four interviewed IT professionals were employees of a supplier. In case IT professionals from the side of Dutch government would have been interviewed they might have been able to provide new or conflicting insights.

There is a limited amount of research available on Scalable Agile, SAFe, and government IT projects, especially Dutch government IT projects, therefore it is difficult to draw clear definite conclusions.

All information on SAFe was gathered from one source, however this singular source is the framework itself, and thus holds authority on the subject.

SAFe will most likely not report on unsuccessful stories on their own website. SAFe is not an impartial judge for the NHSBT and Australia Post projects. SimCorp was researched by independent researchers and therefore much more trustworthy.

Due to the factors mentioned above, the research and its conclusions might not be definite. To be able to have more certainty on this subject more IT professionals should be interviewed and more research would need to be done in the field of both Scalable Agile, SAFe, and government IT projects.

8. CONCLUSIONS
All interviewees deemed it very useful for Dutch government IT projects to be executed using Agile methodologies. Due to the size of the projects a Scalable Agile methodology would be required. SAFe could prove to be a structured solution for Dutch government IT projects. However to transition Dutch government IT projects to a Agile methodology, a major cultural change would be required. This is a challenging, long, and costly process, but the end result will be beneficial to the Dutch government IT projects [6]. In the next sections the research questions will be answered.

8.1 What is SAFe?
SAFe is a structured Scalable Agile framework. SAFe introduces a supportive setup for all teams working within the framework. The Large Solution SAFe configuration consists of a team of teams of teams. The lowest level of teams are Agile teams. Agile teams are united in an Agile Release Train. Agile Release Trains are united in a Solution Train. SAFe utilizes iteration cadences and an optimized frequent release of features. SAFe is a combination of many Agile and Lean components.

8.2 How are Dutch Government IT projects organised?
Many Dutch government authorities have IT departments and many of these are working on their own project. The Dutch government IT market involves €2.6 billion. In 2017 Dutch government reported on 125 IT projects, these involved about €633 million. Due to an old base of employees and lack of IT expertise at decision making level, most Dutch government IT projects are executed using dated methodologies. Dutch government IT projects involve a wide array of systems that all need to function together and keep functioning together. Additional regulations on Dutch government IT projects, legacy systems, and old standardized methodologies limit agility.

8.3 How can SAFe be implemented in Dutch government IT projects?
The Large Solution SAFe configuration is commonly used and fitting for government IT projects. SAFe identifies four successful examples of implementation of SAFe at governmental organisations.

A lot of cultural changes are required for the Dutch government to be able to properly implement SAFe. The decision-making level of Dutch government has a lacking IT expertise, and dated methods for testing and evaluating conflict with the Agile mentality.

The second cultural change needs to involve an environment in which government employees are able to take responsibility and risks. Lastly, the grip on suppliers needs to be loosened or changed, including tendering processes, contracting, and during the duration of the project.

To implement SAFe, initiative needs to come from the decision-making level within a government authority. However, the changes need to be implemented starting at the bottom of the organisation on the team level and expanded upwards to be able to perfectly fit the government authority. SAFe needs to be implemented starting at the bottom of the organisation, and the top of the organisation should facilitate it. Most importantly, the Dutch government authority should try and find their own best-practice.

Law based Dutch government IT projects pose issues due to strict limitations on project boundaries. These will most likely be most effective using traditional project management methodologies, with the addition of Scrum through Agile communication and the frequent releasing of features.

8.4 What factors or changes are vital to implement Scalable Agile framework SAFe in Dutch government IT projects?
The most vital factor for a successful implementation of SAFe, or any other Agile methodology, is a cultural change within Dutch government IT projects. This includes a change in tendering processes, contracting, environment for employees, and letting go of existing methods.

Dutch government authorities should work together more closely to be able to benefit from each other. Employees at the decision-making level of Dutch government will require more IT expertise to be able to lead to a Agile organisation and fully benefit from it. Employees at the decision-making level need to understand the benefit
of Agile project management, and the uncertainties this could result in. With this understanding the pressure to avoid uncertainties with regards to IT projects might be lifted. Benefiting projects, and society, in the long run.

9. REFERENCES
[1] Information acquired as a presented experience by multiple of the interviewed it professionals.

[2] Information acquired as a presented experience by one of the interviewed it professionals.

[3] Information acquired as a presented fact by multiple of the interviewed it professionals.

[4] Information acquired as a presented fact by one of the interviewed it professionals.

[5] Information acquired as a presented observation by multiple of the interviewed it professionals.

[6] Information acquired as a presented opinion by multiple of the interviewed it professionals.

[7] Information acquired as a presented opinion by one of the interviewed it professionals.


[30] Scaled Agile, Inc. What is SAFe?


[33] Scaled Agile Inc. SAFe contributors, Mar 2018.


APPENDIX
A. SCOPUS SEARCHES AND RESULTS

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Used abbreviations in the table:
COMP: Limited to the field of computer science

B. LARGE SOLUTION SAFE CONFIGURATION