The process of modernizing statistics production from the Child Welfare Service

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Over the last years, different parties, typically decision makers in the public administration and data users like students and researchers, have expressed needs for dissemination of official statistics on Child Welfare Services (CWS) in Norway more frequently than Statistics Norway (SSB) has done so far. To meet these needs would, among other things, imply a more automated data collection from the CWS offices located in the 356 municipalities of Norway. SSB is currently publishing official statistics from the CWS as well as other KOSTRA (Municipality-State-Reporting) statistics following this time schedule: 1) Unrevised figures are published in KOSTRA on the 15th of March every year, 2) Revised figures are published in KOSTRA on the 15th of June every year, 3) More detailed statistics are published every year at the end of June/beginning of July.

DigiBarnevern (DBV) is the name of a project that SSB has been heavily involved in since 2020 to better meet user needs for child welfare statistics. DBV works with shaping the new way of importing data more frequently from the CWS using a cloud solution.

The development processes use agile methodology. In short, this means that the tasks at hand and the problem solving are organized in so-called 'sprints', each lasting 14 days, where a scrum team with both IT and statistics competence have worked together to complete the goals of the sprints in collaboration with The Norwegian Directorate for Children, Youth and Family Affairs (Bufdir). Bufdir finances the project and is the owner of the data from the Child Welfare Services. This has probably enabled necessary resources to complete the DBV project.

The paper aims to highlight the benefits of working together in sprints, as well as revealing downsides and challenges, and will provide valuable insight for future collaborations/processes.
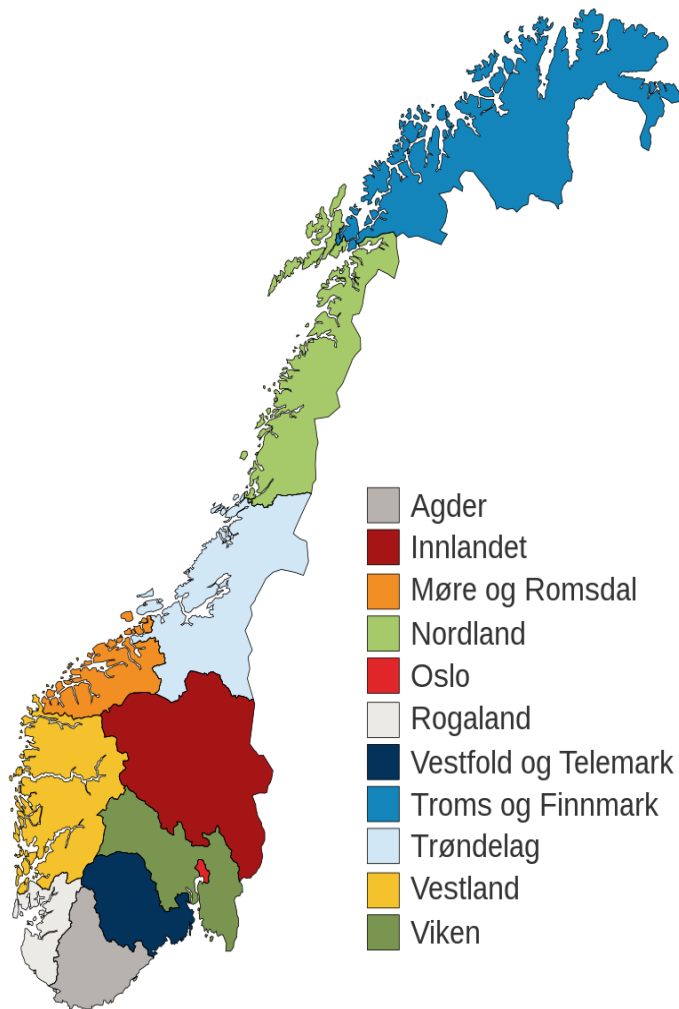
1. Introduction

The DigiBarnevern project (DBV) was initiated already in 2016 by The Norwegian Directorate for Children, Youth and Family Affairs (Bufdir). In 2021 Bufdir gave *Statistics Norway* (SSB) the leading role in developing a new technical solution for municipal data reporting as well as building a national register of Child Welfare Data from the CWS in Norway.

This paper addresses the process of developing a product and at the same time establishing an agile team using agile methodology. Advantages and disadvantages connected to teambuilding using agile will be addressed. The paper also describes how the product is developed using tools such as roadmap, product backlog, where epos and user stories describe the needs for the product.

Official statistics based on reporting from municipalities

SSB releases official statistics from Child Welfare Services (CWS)[1] on a yearly basis based upon KOSTRA. KOSTRA is a Municipality-State-Reporting system where SSB is receiving and processing all data from the now 356 municipalities. KOSTRA reporting involves a huge number of services: social assistance, child welfare, public housing, nursing and care, agriculture and much more. The purpose is to receive better service information about the municipalities both for local and central governments. KOSTRA is a coherent system and useful for comparing services between different municipalities. Norway consisted of 356 municipalities (11 counties, see the map below) in the beginning of 2022, the number has been higher but due to a municipality and county reform in 2020, the number of municipalities and counties decreased.

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[1] https://www.ssb.no/en/sosiale-forhold-og-kriminalitet/barne-og-familievern/statistikk/barnevern

Agder	
Innlandet	
Møre og Romsdal	
Nordland	
Oslo	
Rogaland	
Vestfold og Telemark	
Troms og Finnmark	
Trøndelag	
Vestland	
Viken	

The official KOSTRA statistics comes out in two rounds. The unrevised figures based on the data from Child Welfare services are published on the 15th of March, while revised figures are published on the 15th of June. For more information on KOSTRA, see https://www.ssb.no/en/offentlig-sektor/kostra

Broader and more efficient data collection

The reports on Child Welfare Services are collected by Statistics Norway on behalf of the Ministry of Children and Families. Statistics Norway has the role of producer of official statistics in the area, as well as supplier of CWS data to different users for the purpose of public planning, research and studies, education and public debate.

Norwegian Directorate for Children, Youth and Family Affairs (Bufdir), subject to the Ministry of Children and Families, is the regular customer of the CWS data. The data are used for further analysis due to public planning, as well as they are included in

the collection of indicators published in Bufdir's own statistics, municipality monitoring.

Bufdir collects more information from the municipalities on CWS's capacity, legal use and fulfillment of legal requirements on a semi-annual basis.

All in all, the needs of Bufdir for a broader knowledge base on CWS's work are covered today by two reporting systems, both delivered by municipalities and their chosen IT-system. These reporting systems are independent of each other, delivering partly overlapping data at different time intervals and with a different aggregation level.

By consolidating reporting from municipalities on CWS's data, Bufdir, as an assignee in the project, aims to ease the reporting burden for the municipalities by transition to only one, but more frequent reporting. Assuming reporting frequency affects the frequency of error feedback, the data quality will potentially improve. At the same, streamlining the granularity of the reported data, will improve the data quality of semi-annual reporting.

2. About the study

In this paper we have analysed the experiences with a project at Statistics Norway using agile methodology from the point of view of the authors. Further the paper addresses the process of developing the products on the project DBV, as well as working in a team based upon an agile process.

The assignment

SSBs interest in the project is primarily as a producer of official statistics. Since we are already receiving all municipal data from the CWS through the KOSTRA portal, SSB was interested in developing a more modernized production for the official statistics of the CWS's. At the beginning of 2021, SSB entered into an agreement with Bufdir, a so-called *Standard agreement for research and report assignments (R & D agreement).* The R & D agreement defined the goals of the product in two steps:

> *Step 1 consisted of establishing a more frequent reporting system from the Child Welfare Services (CWS) in Norway without increasing the burden of reporting in the municipalities.*

Step 2 focused on facilitating reporting with a data capture that gives more value regarding quality and topicality (machine to machine). 31.12.2022 is the deadline for Step 1 and 2 in the assignment.

There was a long negotiating process between SSB and Bufdir before concluding the R & D agreement. Subject of the negotiating between the partners, was step 2 which SSB wanted to include in the assignment. It was important for SSB that we reached a mutual understanding of the dedication to Code of Practice (CoP) in accepting the content of goals in the R & D agreement.

Practical implication of this process was to firstly, implement an effective and a general or common technical solution which can be reused by others in the organization. Secondly, improve data quality, enable more frequent dataflow from municipalities and investigate the needs for more frequent dissemination of CWS statistics, exploring event-based data collection and data storage solution.

In addition to the role of official statistics producer, the assignment gives SSB a role as a developer of a new data reporting system for the needs of an administrative authority, like Bufdir.

Cooperating parts in the project

Municipalities are reporting through their IT-system, specially developed by suppliers for local registration and processing of data related to the municipality's CWS tasks. There are only two different suppliers in the market. To make sure that the new reporting system developed by Statistics Norway's retrieves data properly, the project cooperates with both suppliers and a pilot municipality.

Bufdir has an extraordinary position in the project. Being an assignee, Bufdir has designed the assignment and formed user-needs that the project has committed to in the R&D agreement. At the same time some representatives from Bufdir have a more permanent role in the project team to secure Bufdir's needs, while other contributors are involved as required.

The product

SSB's task is to develop and establish a new reporting system for the Child Welfare Services in Norway and to build a central, national child welfare register for Bufdir.

The new reporting structure and system must make it possible to facilitate efficient reporting of (CWS) data from the municipalities to the state and better data for use in knowledge building through statistics and analysis, which come through machine to machine, modernized and more frequently disseminated.

The project secures the new data source being developed will be able to meet the needs for more efficient and more frequent data collection as well as the needs for better data quality and more efficient data structuring for future cloud-based statistics production process. Statisticians involved in the project get the opportunity to gain experience with cloud technology and new programming languages for future development of cloud-based statistics production.

The project uses a pseudonymizing routine in order to follow the principles of the processing and storing of personal data defined in the General Data Protection Regulation (GDPR). The pseudonymizing routine encrypts defined person identifying information when stored in the register. For the best possible security, the project uses reputable third-party solutions. If the need arises, the system is able to reverse the process and access person identifying information. The project recommends introducing strong access regulation. The preference is to use API-extracting solutions instead of direct user access to the stored data.

However, using cloud technology imposed several concerns. To address these security concerns in the context of Schrems II judgement[2] Statistics Norway is conducting a risk and vulnerability analysis to prove its adequate safeguard of the chosen cloud-based [3] platform for processing and storing data.

The product team

The product team consists of knowledge needed to develop and maintain the product. In our case consisting of product owner, scrum master, statistician(user), customer(user), analysts at Bufdir, developers, enterprise architect, suppliers of

[2] https://www.gdprsummary.com/schrems-ii/

[3] https://cloud.google.com/dlp

reporting system, and stakeholders(municipalities), which means the team is cross-functional.

"*A cross-function team has the skills required to provide a product, feature, or component.*" (Pichler, 2020, p.30).

The process
Agile methodology

"*Agile methodologies feature self-organized teams that are empowered to achieve specific business objectives. Agile methodologies focus on rapid and frequent deliverables of partial solutions that can be evaluated and used to determine next steps*" (Mountaingoadsoftware.com)

SSB has a strategy to stimulate more interdisciplinary cooperation and adopt modern development methodologies where more responsibility can be delegated to self-managed teams. Hence, the team chose agile methodology as a working approach. In addition, SSB also focuses on being able to constantly develop and improve products and services due to rapid technological development and high external expectation (ssb.no). For the statisticians in this team this was a new way of working together. The developers, scrum master and enterprise architect of the team had more experience with this methodology.

The team started by going through the description of needs addressed in the assignment agreement (R & D agreement), then we divided them into epics and user stories and established the backlog. Thereafter we created the road map for the product. These were done through a couple of workshops where all team members participated with slightly different understanding of the needs as the main purpose of the workshop.
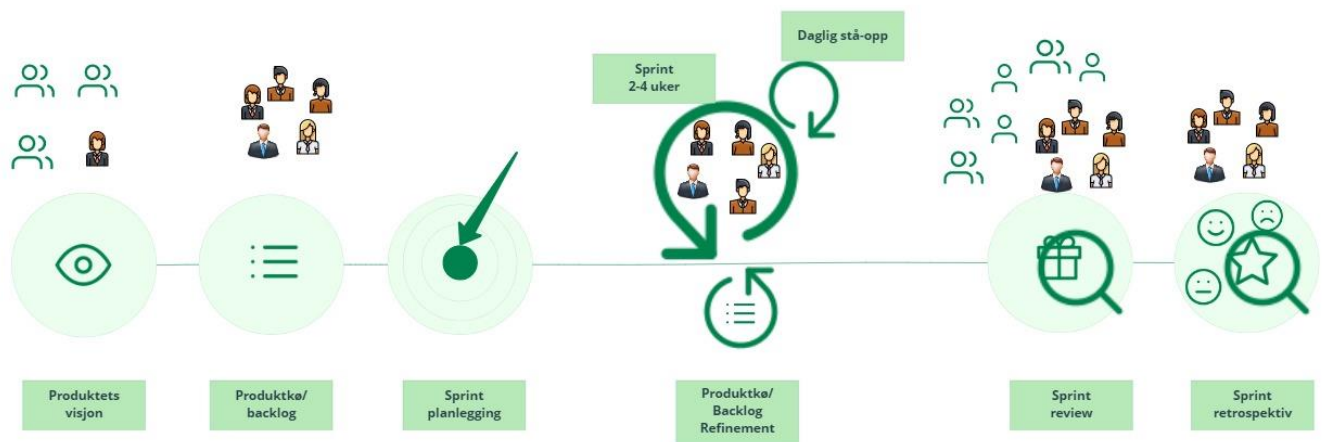
Scrum framework

At the same time, the team got an introduction to what agile is and was introduced to the scrum framework. Scrum[4] consists of Product Owner (PO), Scrum master (SM) and team members (developers, business people, users), who work together for certain periods call sprints. Each sprint consists of ceremonies/events such as sprint planning, daily scrum also called as stand-up, backlog refinement, sprint review and sprint retrospective.

PO makes sure that the product backlog, which consists of problem to be solved, is updated, visible, and most of all understood. PO is also responsible to maximize the value of the product. Additionally, The PO needs to spend time with the team, provide the necessary information to understand the user needs and make sure that the team doesn't get off track. *"..guide the individuals to ensure that your product creates the desired value for the users and business"* (Pichler, 2020, p.39).

It is important for Scrum master to keep a holistic view on the development team, giving the team introduction and guidance in the process. Further facilitate for team

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[4] Scrum.org

efficiency, through continuous improvement and help removing impediments. SM has close cooperation with PO on finding ways for effective goal, product backlog management, and helps explaining the needs for the team, Partner with the Scrum Master: (Pichler, 2020, p.25) .

The team agreed on two weeks sprints although some of the IT-members wanted longer sprints and use of Kanban[5] based on their previous experiences.

The concept of product management.

As previously mentioned, the team processes were based on an agile approach. The product owner had the main responsibility for the Vision, roadmap and backlog.

The vision:

- *A better knowledge base that will contribute to better decisions and in the long run a better child welfare*
- *Provide a better data base on child welfare services than is available today, and which will form the basis for better management information, statistics and research*
- *Simplify and streamline the municipalities' reporting to the authorities*

Roadmap

The roadmap was created based on description of needs described in the R & D agreement.

As SSB already uses Atlassian JIRA[6], we established the roadmap there. This made it easier to follow up on how we were progressing along the way.

Product backlog

Retrieved from description of needs and the road map we set up epos and user stories in good scrum manner, which formed the product backlog. Additionally, we used a minimum viable product approach as we formed the product backlog

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[5] Kanban consists of a design, manage and improve flow system for work. This is done through visualizing the work flow and limiting work in progress. Unlike scrum the work flows through the system instead of timeboxing.

[6] Atlassian JIRA https://www.atlassian.com/software/jira

> *"A minimum viable product (MVP) is a version of a product with just enough features to be usable by early customers who can then provide feedback for future product development.*[1][2] *»*

Sprint

As the team went for sprint with two weeks iteration, the PO had the responsibility to set up the sprint goal and sprint backlog. On sprint planning the team got through the sprint goal and sprint backlog with focus on understanding the user stories and decomposing the user stories into smaller tasks to follow up.

The whole team had a stand up (daily scrum) twice a week while the developers had a technical stand up twice a week in addition. Along the way the team used both Jira and Confluence[7] to document decisions and necessary information. Through this we knew where we stand in the process, which means that we spent less time on recapping everything if one person was absent for a while and less risk of an unpredicted incident occurring. *"Facilitating the open and authentic communication that shines the light on problems, mistakes and opportunities for improvement and increases the sharing of knowledge and ideas*" (Edmondson, 2019, p.8-9).

Every sprint ended with a review of the work done during the past two weeks to the whole team, users, suppliers and stakeholders.

> *"…Invite the players to attend the sprint review meetings in Scrum and operations meetings in Kanban at least once per month as a rule of thumb. This allows the individuals to see for themselves how the product is progressing, offer their feedback, and share any concerns, thereby making it more likely to create a product that can be effectively marketed, sold, serviced, and operated…"* (Pichler, 2020, p.45).

Every second week there were sprint retrospectives to evaluate the team and work done through the past four weeks. Miro[8] was used as working tool.

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[7] Atlassian JIRA https://www.atlassian.com/software/confluence
[8] miro.com

In some circumstances we decided to set up workshops. It could either be because of backlog refinement or after the sprint we found that the user story was too large and needed to be broken down into smaller more manageable pieces.

Psychological safety

> *Psychological safety exists when people feel their workplace is an environment where they can speak up, offer ideas, and as questions without fear of being punished or embarrassed (Edmondson, 2019, p.15-16).*

In our team we created the atmosphere of openness, especially on sprint retrospective and sprint planning. Through sprint retrospective we explored how the team was doing and how we were collaborating with each other. The team worked on treating each other with respect, and that it is okay to disagree. We had the mindset of doing something together rather than a you and I approach.

> "*A team with members located in multiple geographic regions might struggle to coordinate. Studies show that psychological safety makes it easier for teams to manage such challenges. When people can speak up, ask questions, and get the help they need from each other to sort things out, they are more likely to overcome the barriers created by working together across diverse disciplines or time zones*" (Edmondson, 2019, p.29-30).

Pandamic situation was sub-optimal due to different geographical location where team members were located in three different places in Norway: Finnsnes (remote), Kongsvinger and Oslo. The team experienced some misunderstanding and miscommunication due to communicating through the Teams channel (digital). It was much easier to talk and explain when the team members were in the same room physically.

To check up on how team members were doing the team had Health check[9] with follow up of the result. The scrum master practised one-on-one meetings with the team members. Until now we've done health check twice.

3. Discussion - lessons learnt

Important challenges facing us at the beginning of the process as we were coming together as a team. Since the solution shall cover different and wide needs in the

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[9] https://engineering.atspotify.com/2014/09/squad-health-check-model/

assignment (R&D agreement) the team had to become heterogenous. Consolidation process lasted longer when it came to secure necessary expertise, transparent working routines, free information float and mutual understanding:

a) How to find **time and necessary resources** for the project? Most of the people needed to develop the product were already 100% busy with other tasks outside the project. Hence, we had to cope with getting enough resources from the team members due to conflicting tasks that led to losing important team members in the development team. This was due to maintenance and statistics release outside the team and project. Which means that some of team members also were responsible for disseminating official statistics on the Child Welfare Services (CWS). Balancing between their ordinary work as well as participating in the product team was always a challenge. Expert resources from IT to develop the new IT solutions, such as expertise around cloud computing was also needed.

b) **Adjusting the Agile Methodology:**

- The understanding of scrum and ceremonies such as sprint backlog refinement, sprint planning, sprint review and sprint retrospective. Several people found it time consuming to spend time on ceremonies. The ceremonies have been adjusted along the way and the retro ceremony ended up as the main feedback arena for evaluating each sprint. We had to work hard to gain the understanding that one should not have ceremonies for the sake of ceremonies, but they should rather benefit the team. This was met through focus on the user stories we are to solve, concretizing them as much as possible and allocating dedicated resources for solving them.

- We experienced that close co-operation as agile methodology enables between PO and SM was also crucial. We had weekly meeting where we discussed ongoing obstacles and improvements to be implemented

- Concentrating on smaller parts made us better understand the needs and concentrate on one thing at a time. This detected errors and misunderstandings faster and made it easier to make adjustment, for example where we came to conclusion that we should pay attention to on-prem solution.

- Costs/limitation due to the structure in the organisation: Agile is a tool that prescribes a team to be autonomous. We have experienced that this is an idealistic approach and not totally realistic due to the organizational structure in SSB that we had to consider. Trying to be an autonomous team is therefore quite challenging due to the hierarchic structure in the SSB.

c) **Biggest dilemma**: Reaching a common understanding for people with IT and statistics competence which makes sense for both **mindsets** was challenging. After a while we discovered that despite working together with the same epos and concepts we still lacked a common understanding. We sat up a workshop physically, where the agenda was to address the common understanding. We learned that it takes a lot of time to enable people from different departments such as IT and statistics to understand each other's views as well as work methods.

d) **Flow of information**: An optimal information flow and sharing was a difficult task due to the team members different needs and different knowledge and skills. As Edmondsen (2019, p15-16) put it: "*How psychologically safe a person feels strongly shapes the propensity to engage in learning behaviours, such as information sharing, asking for help, or experimenting*", we had to create this environment in the team.
  - Introducing simplified visualizing of product scheme made it possible for statisticians to place IT-members' activity on the roadmap and relate ongoing tasks to understandable sub-goals and statistical needs.
  - Communicating internally and externally: Agreeing on which tools to use internally to communicate with each other was an important method. As the team members were physically located at three different places, and had a pandemic situation to deal with, it become important to have common communication method. IT preferred slack, and statisticians preferred Microsoft teams. We agreed on Microsoft teams when scrum ceremonies and bigger discussion were involved while slack was convenient to communicate with when there were smaller, sprint related conversations.
  - SSB and Bufdir had a workshop where we agreed on a plan for communicating about the DBV-project to key stakeholders. It was also

important that SSB had internal meetings/workshop without Bufdir to discuss internal business needs.

- Defining decisions (Decision making) in the team: After working together for a while it came up that it was necessary to explicitly highlight **What is an important decision**? This became more important when the different choices affected the work of the others. In building consensus in the team about what characterizes an important decision, we agreed that when it affects others in the team than those making the decision an explicit highlight was needed. The decision could be mostly on business and technical matter, but also on the process. This would have been difficult to deal with if it wasn't for agile thinking.

- Making use of a glossary page defining terminology used by IT-members and statisticians, made it easier to understand the subject of discussion when presenting status, demoes or objectives

e) **Working cross-organizational**: Several objectives needed involvement of professionals outside the product team.

- Although suppliers, pilot municipality and stakeholders were participating in sprint review, we experienced a lack of information sharing.

- We experienced very challenging communication with suppliers who stood outside the team who was working agile as those weren't part of the scrum sprints other than that they participated on sprint review. To overcome impediments, we started to set up user stories in sprint backlog where we could set up extra meetings, but we are still struggling with communication and different expectations.

- One other thing was to verify specification of the content and the structure of the data (=XSD[10]) to be sent to the new reporting solution. The project set up a group called XSD-council involving experts from both SSB and Bufdir. Participation across organizations addressing the issue ensured informed, secure and qualified decision making in the project.

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[10] XSD: XML Schema Definition. https://www.w3schools.com/xml/schema_intro.asp

f) **Role of the product owner**:
- In the project we needed the participation of the section leader, with the authority of personnel and budget, to be an active product owner in the team. Other Nordic countries therefore should know that the agency's organization sets some limitations to the more idealistic approach of Agile

g) **Technical solutions**: Fail fast and learn fast. The benefit of using agile methodology we experienced is fail fast and learn fast as all of the previous bullet points address. As we worked on sprints of two weeks period we discovered issues and errors sooner rather than later.
- Empirical approach on suppliers reporting solution. For example, the team developed two alternative solutions for reporting as proof of concept, which was API and FIKS-IO.
- The resolution due to legal and strategical manner. As the solution is based on cloud computing we encountered issues related to authentication to SSB's network for Bufdir. The original plan was that Bufdir could enter the SSB-network and retrieve the data whenever needed. SSB decided on a legal view that Bufdir can only retrieve needed data through an API -solution.
- Concerning Speed. The need to slow down on the speedometer was apparent as we reached the important decision to have two pipelines in the value chain:
    i. on prem and
    ii. in the cloud simultaneously.
- Addressing General Data Protection Regulation
    i. Exploring new technology pseudonym rotating is not an obstacle.
- Different working pace between IT and statisticians: during the sprint IT members worked continuously on the product and whenever clarification was needed and when necessary, the statisticians were involved or consulted. To keep up with the pace of IT, statisticians had to dedicate more time to be involved in technical stand-ups. Closer connection to the technical part of the project turned out to be crucial to

capture the need for the expertise of statisticians in time and for securing their needs

Through working agile and using scrum we got more efficient, but at the same time as you can see the scrum framework didn't cover all our needs. Working agile gives the benefits of changing the course and addressing the issues while proceeding with development of the product. As you can see we have solved some of the challenges, while we will have to work on other challenges continuously in the future. Our main challenges will be on information flow and communication.

4. References

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