

# **Success factors for agile self-service analytics**

**Ketterän self-service-analytiikan menestystekijät**

Bachelor's thesis

## ABSTRACT

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**Title: Success factors for agile self-service analytics**

**Year: 2019**

**Place: Lappeenranta**

Bachelor's thesis. LUT University, Industrial Engineering and Management.

43 pages, 7 figures, 1 table and 2 appendices

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**Keywords:** analytics, business intelligence, BI, self-service analytics, agile development, success factors

Many organizations have begun to recognize the value of data as a critical business asset. To maximize the value, data and analytics can be democratized through self-service analytics (SSA). However, many organizations have been struggling to succeed in utilizing SSA.

The objective of this study is to define success factors for agile SSA. The study examines the factors that affect the success of SSA. Since agile approach is found to be one of the success factors for SSA and is new for the case company, it is studied in more detail. The findings of requirements for agile approach are combined with success factors for SSA to create a framework of success factors for agile SSA. The framework is then used to study how case company has taken into consideration the success factors for agile SSA.

The research methods of the study are literature review and case study. Literature review is used to build a base for the case study, which includes one semi-structured interview and two structured short interviews. The findings of the literature review suggest that there are many success factors for agile SSA, and most of them are related to people and process. Although case study indicates that most of the success factors are well taken into consideration in case company, some factors need further attention.

## TIIVISTELMÄ

**Tekijä:** Noona Jantunen

**Työn nimi:** Ketterän self-service-analytiikan menestystekijät

**Vuosi:** 2019

**Paikka:** Lappeenranta

Kandidaatintyö. LUT-yliopisto, Tuotantotalous.

43 sivua, 7 kuvaa, 1 taulukko ja 2 liitettä

Tarkastaja: Antti Ylä-Kujala

**Hakusanat:** analytiikka, liiketoimintatiedon hallinta, self-service-analytiikka, ketterä kehitys, menestystekijät

Monet organisaatiot ovat alkaneet ymmärtää datan hyödyntämisen arvon liiketoiminnalle. Arvon maksimoimiseksi data ja analytiikka voidaan demokratisoida self-service-analytiikan (SSA) avulla. Monet organisaatiot ovat kuitenkin kohdanneet haasteita SSA:n hyödyntämisessä.

Tutkimuksen tavoitteena on määrittellä ketterän SSA:n menestystekijät. Aluksi tutkimuksessa selvitetään tekijät, jotka vaikuttavat SSA:n menestykseen. Koska ketterä menetelmä todetaan yhdeksi SSA:n menestystekijöistä ja se on yritykselle uusi toimintatapa, sitä tutkitaan tarkemmin. Tässä tutkimuksessa luodaan viitekehys ketterän SSA:n menestystekijöille yhdistämällä ketterän menetelmän vaatimukset SSA:n menestystekijöiden kanssa. Viitekehystä hyödynnetään tapaustutkimuksessa, jossa tutkitaan, kuinka case-yritys on ottanut ketterän SSA:n menestystekijät huomioon.

Kirjallisuuskatsauksen avulla luodaan perusta tapaustutkimukselle, joka hyödyntää puolistrukturoitua haastattelua sekä kahta strukturoitua lyhyttä haastattelua. Kirjallisuuskatsauksessa ketterälle SSA:lle löytyy monia menestystekijöitä, joista suurin osa liittyy ihmisiin ja prosessiin. Vaikka tapaustutkimus osoittaa, että menestystekijät on otettu pääosin hyvin huomioon case-yrityksessä, joihinkin tekijöihin tulee kiinnittää erityistä huomiota.

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# 1 INTRODUCTION

## 1.1 Background

Due to the rise of big data and analytics, organizations have begun to recognize the value of data as a critical business asset. However, data itself does not provide value, but it has to be transformed into information and insight to enable organization to gain value and potentially achieve competitive advantage. To enhance the value-add to organization, data and analytics can be democratized through self-service analytics (SSA).

Organizations have been planning to deploy SSA already for many years, and according to Business Application Research Center's (2018, pp. 23) survey covering 2,679 professionals' opinions, SSA deployment is still a top tree priority in 2019. However, the deployment rate of SSA has not experienced expected rise. The deployment is considered to be difficult and organizations have been facing challenges and even failed in deploying SSA (Lennerholt et al. 2018).

According to Eckerson et al. (2018), SSA is expected to see a resurgence mainly enabled by the SSA tools' vendors investments in developing their tools to be more intelligent and easier to use. Using state-of-the-art SSA, users can do more than just view a report – filtering, pivoting, redesigning and sharing is made easy and quick without the need to leave the BI tool.

## 1.2 Objective and limitations of the study

The objective of the study is:

*To define the success factors for agile self-service analytics*

The study aims to give reader a good understanding of SSA and introduce the success factors for SSA with agile approach. In addition, the study demonstrates how a global case company has taken into consideration the success factors for agile SSA. The purpose is to examine literature of success factors for SSA as well as requirements for agile approach and combine them into a framework of success factors for agile SSA. Empirical research data is then

compared with the created framework to get a good insight of how case company has taken into consideration the success factors for agile SSA.

To guide the study, following research questions are studied:

1. *What are the success factors for self-service analytics?*
2. *What are the requirements for agile approach?*
3. *How are the success factors for agile self-service analytics taken into consideration in case company?*

Since the results of the study are not tied to a specific technical solution of SSA, it is excluded from the study. The created framework of success factors for agile SSA is examined only from the case company's perspective, which has to be taken into account in the interpretation of empirical results.

### **1.3 Research methods**

The study was conducted using qualitative research. To be more specific, research methods of the study are literature review and case study. To gather theory and build a base for the case study, industry literature and scientific publications were studied. Because of the novelty of SSA, also commercial references were used to get a good insight. Literature search began with the keywords and search terms presented in Table 1. The search of definition and concept for agile SSA did not result in many relevant results. Therefore, it was not searched with more detailed keywords but SSA and agile approach were searched separately.

**Table 1** Keywords and search terms used

	<b>Self-service analytics</b>	<b>Agile approach</b>	<b>Agile self-service analytics</b>
<b>Definition and concept</b>	“self-service” AND (“analytics” OR “business intelligence” OR “BI”)	“agile” AND (“approach” OR “development” OR “methodology”)	“agile” AND (“self-service analytics” OR “self-service business intelligence” OR “self-service BI”)
<b>Positive aspects</b>	(“advantages” OR “benefits” OR “possibilities”) AND (“self-service analytics” OR “self-service business intelligence” OR “self-service BI”)	(“advantages” OR “benefits” OR “possibilities”) AND “agile”	
<b>Negative aspects</b>	(“risks” OR “challenges” OR “pitfalls”) AND (“self-service analytics” OR “self-service business intelligence” OR “self-service BI”)	(“risks” OR “challenges” OR “pitfalls”) AND “agile”	
<b>Success factors</b>	“success factors” AND (“self-service analytics” OR “self-service business intelligence” OR “self-service BI”)	“success factors” AND “agile”	

Empirical research was conducted using qualitative data collection method of semi-structured interview and structured short interviews. The interviews were conducted in Finnish and the translations for the interview questions can be found in appendices. The semi-structured interview was conducted with one representative from the case company, the Lead of Reporting and Analytics. In addition to the interview questions (Appendix 1.), discussion with the representative included how case company has taken into consideration the success factors of the created framework. The structured short interviews (Appendix 2.) were conducted by email with two representatives from the case company, Concept owner from the Reporting and Analytics team and power user of the SSA tool.

#### **1.4 Thesis structure**

The thesis is divided into five chapters. After the introduction follows a chapter of SSA. The chapter begins with defining SSA and the user groups of SSA, and then it concentrates on evaluating benefits as well as risks and challenges of SSA, followed by defining the success factors for SSA. The third chapter studies agile approach including its concept and benefits, how it can be applied to business intelligence and what is an agile framework of Scrum about. Finally, the chapter evaluates requirements for agile approach.

The fourth chapter is a case study in which empirical research data discusses the findings of the second and third chapters. The chapter concentrates on studying how the success factors for agile SSA are taken into consideration in case company. The fifth chapter answers the research questions by concluding the most important findings of the study.



## 2 SELF-SERVICE ANALYTICS

### 2.1 Definition

SSA is a form of business intelligence (BI) (Gartner 2019b), which in turn is a subset of analytics (Caldwell 2017). Therefore, to define SSA, the terms of BI and analytics are first clarified. There is no clear definition for analytics, but in general it is about using data in terms of conducting analysis (Caldwell 2017). Whereas, BI is an umbrella term referring to infrastructure and tools as well as best practices which enable analyzing information in order to make better decisions and improve performance (Gartner 2019a). According to Caldwell (2017), the terms are often used interchangeably, and while both terms describe using data to make better decisions, BI can be used when producing a report or a dashboard. Whereas, analytics should be used instead of BI when basic BI capabilities are not enough, and information and data are used in helping to become highly effective at getting a job done.

SSA enables business users to query data and get the needed information as they want to see it in order to make decision (Gartner 2019b). Users can then analyze the data and make decisions based on it. The purpose of SSA is that all this is possible to do without or with minimum assistance from information technology (IT) people. Therefore, responsibility of analytics is moving from IT to business users – the people that will actually utilize it in their decision-making. (Leonard 2015)

In practice, SSA is often used through BI tools that are simple to use and have basic analytic capabilities with an underlying data model which has been simplified or scaled down to make understanding easier and to ensure straightforward access to data. (Gartner 2019b) According to Eckerson et al. (2018), nowadays SSA covers also data preparation, visual discovery and advanced analytics.

SSA is often referred also as self-service BI and the terms are used interchangeably (Izenda 2017). However, SSA is a further developed form of self-service BI. Self-service BI enables business users to access information easier than with traditional BI. Whereas, SSA is more analytically intelligent, self-learning and capable of making intelligent suggestions. (Röniger

2018) According to Izenda (2017), self-service BI tells what is happening to the business, while SSA enables determining why it is happening and what is expected to happen in the future.

## **2.2 User groups**

Typically, the users of SSA are divided into three groups, which in reality overlap and vary by the current task. Majority of the users are so called casual users making up around 70 percent of all BI users. They are usually business users with reasonably limited BI skills, and their SSA needs can usually be covered with analyzing dynamic reports and dashboards. (BI-survey 2019)

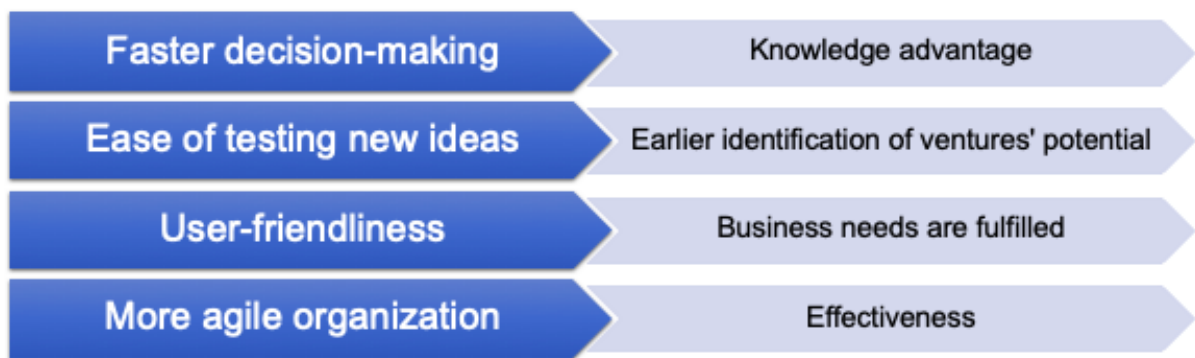
The so-called power users make up roughly 25 percent of all users – and usually a lot less in larger BI environments. They have good BI skills and they work with data daily to solve their business problems with which they need a lot of flexibility and functionality from the SSA tool. In addition to analyzing data, they should be able to change existing reports and dashboards – or even create new ones. (BI-survey 2019)

According to BI-survey (2019) the smallest user group of SSA is business analysts which make up 1 to 5 percent of all users. Keller and Seidler (2018) in turn, suggest that business analysts share the 2 to 10 percent share of BI and data warehouse system users with data scientists. According to BI-survey (2019), the smallest user group includes the ones with the most advanced BI skills and the highest requirements for their SSA solutions in terms of flexibility and functionality. Their SSA tasks include data exploration, modeling and deploying a sandbox environment for special use cases.

Keller and Seidler (2018) agree with BI-survey and annotate that business analysts and data scientists are the key people for data innovation and extremely important to business. Their advanced analytical know-how is utilized to mix requirements from SSA with those from data discovery or data visualization and often also from advanced analytics or data mining. Data discovery is a user-driven, iterative process used to find patterns and abnormalities in data.

### 2.3 Benefits

Utilizing SSA in decision-making brings many benefits to organizations, as shown in Figure 1. SSA enables more efficient producing of information and insight by skipping the business requirements' lengthy translation process (BI-survey 2019). Thereby, SSA also enables faster decision-making and shorter reaction times strengthening the role of a carefully planned and complete information base. Thus, companies can gain knowledge advantage through SSA and hence generate benefits for themselves by responding faster to market changes. (Keller and Seidler 2018)



**Figure 1** Benefits of self-service analytics

In addition to faster decision-making, business users are able to easily test new ideas against data models as what-if-scenarios. Thereby, the potential of ventures can be identified at earlier stage. That enables dropping unsuccessful ventures before wasting too much time and resources, whereas the successful ones can be expanded earlier. (Leonard 2015)

Through SSA tools, the needs of a business user are taken into account better than with traditional BI tools. According to Keller and Seidler (2018), without SSA it would be a stroke of luck if the user got exactly what they wanted when asking IT to generate a report. However, with SSA tools the users in specialist departments can perform the first evaluations on their own and then make their requirements clearer and more concrete. (Keller and Seidler 2018)

SSA can also be seen as an enabler of organization's agility. As Weber and Wiegmann (2018) state, a dashboard created using SSA tools can replace PowerPoint presentations containing hundreds of slides. Therefore, the reporting process can be improved and the associated manual

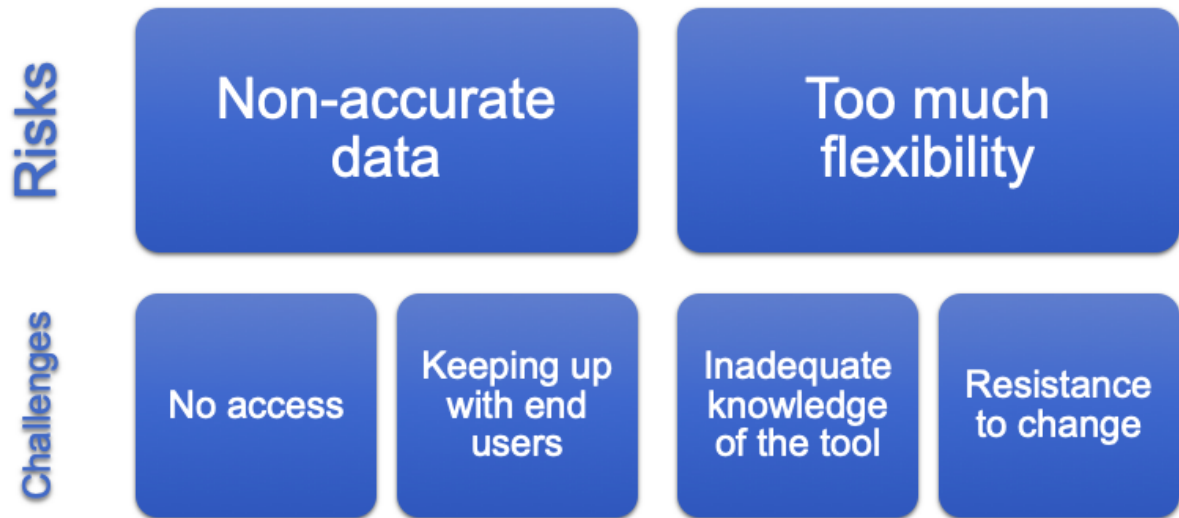
updating effort can be reduced. In addition to the advantage of saved time and effort of not making the figures manually, the dashboard can be real time while the figures in the presentation are already outdated when presented.

In addition to the mentioned benefits of SSA, there is an indirect benefit not resulting from the utilization of SSA but from the decreased workload of IT. When business users do not need to rely on IT on their daily work, IT's work load for simple tasks reduces. Therefore, IT department is able to concentrate better on tasks that produce higher value to organization. (BI-survey 2019)

SSA tool market is evolving all the time and new capabilities are offered for data preparation, visual analysis, statistics, machine learning and artificial intelligence to automate the systems and workflows as much as possible (Keller and Seidler 2018). According to Eckerson et al. (2018), evolved SSA tools act almost like extensions of user's mind enabling new questions to be asked and answered in real time. Keller and Seidler (2018) conclude that the automatization and increased intelligence of BI systems will result in improved analysis efficiency through reduced manual operations and shorter analysis time.

## **2.4 Risks and challenges**

SSA comprises certain risks and challenges, as shown in Figure 2. A significant risk for SSA is that data is not accurate enough to be used in decision-making. Consequently, the users are likely to make poor decisions but worse than that, it can damage the entire adoption of SSA. (Leonard 2015) According to Wise Analytics (2015, pp. 6), if users do not trust the validity of the data, adoption of SSA will be low, and the entire analytics will always be critically observed. Leonard (2015) also agrees that if the data is found inaccurate even once, the user is likely to start questioning the accuracy of data also in the future cases. If the trust for the data is lost, it is difficult to build up again.



**Figure 2** Risks and challenges of self-service analytics

However, in reality the data is never 100 percent accurate, and that is the reason why decisions should not be made only relying on the data. It is found that to properly support decision-making, data is good enough if its accuracy is between 80 and 90 percent. Accordingly, while it is important to make sure that the data is at least 80 percent accurate it is also important to emphasize the purpose of SSA to its users: Not to make decisions leaning only on that but to support gut feeling of the decisions. (Leonard 2015)

Some argue that SSA is too flexible leaving too much space for individual interests. Therefore, according to Weber and Wiegmann (2018), there is a danger that everyone has their own dashboards – and even the same measures are viewed from a different perspective giving a different perception. This is seen to lead to inefficient discussion and slowed decision-making in leadership team meetings (Weber and Wiegmann 2018). Eckerson et al. (2018) agree that with too much freedom business users may cause harm to the system; if they can access and publish data in an ungoverned way, data silos and fragmentation might follow. This in turn, if not prevented, may create a dystopian environment where there is no single version of truth, but people only trust the data sets they created themselves.

According to Harvard Business Review (2016, pp. 9-10), the biggest data-related challenge in business decision-making is that the needed data cannot be accessed. A typical reason for this is that the data is buried in departmental silos, and users are not able to access the data of another department even though they need it in their decision-making. Roughly one third of users claim

their organization is not doing well with granting access rights to all the needed reports. Another restricting factor of accessibility is that information is stored in different systems and formats, and in that case intersystem integration is needed to bring all the information together.

Another significant factor hindering business decision-making is that decision-makers do not understand how to use existing tools to support data analysis (Harvard Business Review 2016, pp. 10-11). Clarke et al. (2016) point out that is a challenge possibly applying to also SSA if users are not proficient enough to validate their business rules because they lack understanding the interface of the tool. Burke et al. (2016) annotate that the way data is presented is not always aligned with the user's skills for understanding it, and that is one of the top reasons for SSA not to succeed.

According to Eckerson et al. (2018), a challenge that organizations continue to face if they are willing to take advantage of SSA is keeping up with their end users. Since SSA tools continue to focus on making everything easier for the user, users want to expand the ways to utilize BI in their daily work. Moreover, many SSA users have experience from ad hoc data exploration and data visualization from using a fitness-tracking product, health analyzer or some other internet-connected device in their personal lives. Because they learn to expect more based on their daily interactions with their own personal data, they are willing to have more capabilities to create and filter data.

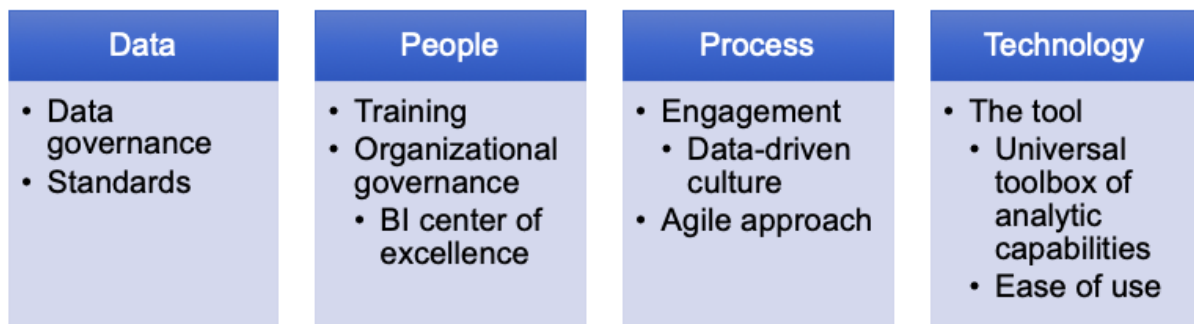
Although Eckerson et al. (2018) state that users want to expand the ways to utilize BI in their daily work, they also recognize a possible challenge that may hinder utilization of SSA. The adoption of SSA, or any other tool, is likely to be a challenge since most people do not like change. If they have always used Excel and are comfortable with it, they may have difficulties to adjust to a new BI tool, even if it was built for the purpose of their work.

In addition to the risks and challenges of SSA, it should be considered how report and dashboard's ownerships are managed. As Microsoft (2018, pp. 97) states it is not recommended to centralize all report and dashboard creation in the IT department but to let power users create reports and dashboards on their own. Centralizing the creation of reports and dashboards may hinder many of the beneficial aspects of SSA. Every report and dashboard must have owner to maintain them after they are published. According to Keller and Seidler (2018), when a business

user is the author of a report or dashboard but the solution results in regular reporting, the ownership of the report or dashboard should be transferred to a secure environment, either to BI Center of Excellence (BI COE), IT or other suitably trained unit. BI COE is introduced in the next sub-chapter as one of the success factors for SSA.

## 2.5 Success factors

Although there are many risks and challenges to SSA, by taking into account success factors for SSA, it is still possible to achieve successful SSA. According to Gartner (2018), the success factors for SSA can be divided into four categories: Data, People, Process and Technology. The success factors are presented in Figure 3.



**Figure 3** Success factors for self-service analytics

### Data

To achieve successful SSA, it is important to build a good foundation for information management – data must be utilized and governed properly. Data governance is crucial, especially when SSA is used in a large scale because of the big number of users, different types of data and different types of analysis. (Gartner 2018) Data governance encompasses management of data in terms of data principles, data quality, metadata, data access and data lifecycle (Khatri and Brown 2010). Data governance policies for SSA should be carefully defined so that SSA is able to increase speed without compromising trust in data (Gartner 2018).

As mentioned, the flexibility of SSA can be seen as a risk, but Weber and Wiegmann (2018) and Eckerson et al. (2018) agree that with proper governance the problems caused by flexibility of SSA can be avoided. Nevertheless, because part of governance is restricting user rights, but

SSA is about encouraging users to query data as they want it, the idea is to find a balance between governing SSA and giving people the freedom to query data (Gartner 2018). Keller and Seidler (2018) agree that the right balance between freedoms and restrictions is crucial for the success of SSA.

When finding the balance, it is important to guarantee access for right people to right information and at the right time. In addition, it is essential to make sure that users can access the data in a way they understand it – otherwise SSA adds no value to decision-making. (Gartner 2018) According to Weber and Wiegmann (2018), for SSA to contribute to better decisions, standards and guidelines are needed for its use. Eckerson et al. (2018) agree that to truly empower business users with SSA, organization needs standard data, standard tools and standard processes. The rules and standards give business users the freedom to use the SSA tool however they like but safely.

## **People**

While data is important in SSA, also people are in key role. To achieve success with SSA, it is essential to develop and maintain the talent of utilizing it both among the BI department and outside of it. And as SSA is developing continuously, to keep up with the competition of utilizing it – or ahead of it – technology breakthroughs in machine learning and artificial intelligence should be experimented and integrated. Therefore, organizations should invest heavily on training of SSA. (Eckerson et al. 2018)

According to Weber (2013) to deliver sustainable SSA there are four levels of governance that need to be aligned. Governance refers to how organization or groups within it, organize in order to make decisions (Institute on Governance 2019). To clearly differentiate this governance from before mentioned data governance, this governance is referred to as organizational governance. According to Weber (2013), organizational governance has to be effective in all BI activities: C-level leadership as mandator, BI executive governance group as owner, BI operational governance group as executor and BI champions and power users as the ones to embrace it.

C-level enterprise leadership is not directly a part of BI organization, but they are the executives eventually running the business and setting the objectives and strategy for the organization.



When the organizational objectives and strategy set by C-level is understood, the governance is likely to be aligned. BI executive governance group is often referred also as the BI steering group, and it has to include C-level leaders responsible for the BI program. The group also includes managers from the BI team and cross-functional executives and managers having the “stake in the outputs of BI”. BI operational governance group governs the daily operational functioning of BI. It consists of cross-functional, operational and technical representatives – including representatives from BI team and stakeholders as well as BI champions. The group of BI champions and power users are the key drivers of adoption of the BI solution, they spread and support the deployment of BI to business departments. The members of the group also identify requirements, opportunities and problems that should be escalated to operational governance to take care of. This group should be formed so that it includes both dedicated BI team members and users from other business departments. (Weber 2013)

In order to succeed with SSA, Burke et al. (2016) introduce a solution of BI Center of Excellence (BI COE), which is composed of individuals who understand where information resides and are skilled to validate it and tailor the results for consumption. Typically, the needed excellence is rather built within organization than acquired from outside. If outsourcing – even partly – is considered, it should be taken into account that the people doing the work most possibly lack the strategic insight and legacy knowledge. Thereby, requirements need to be defined more formally than without outsourcing. Whether the individuals come from the inside or the outside of the organization, they must have a guided purpose and be provided appropriate technical training and architectural governance to successfully form organization’s BI COE.

To compare BI COE to the organizational governance model introduced by Weber (2013), BI COE can be seen as part of BI operational governance. The strategic core of BI COE should be formed of individuals that are able to identify, extract and deliver the right information to decision makers in an understandable and easy-to-apply form. Those people combine logical thought processes with the capability of merging information needed for decision-making. For the support of those people and the rest of the organization, there should be an operational team to develop, validate data, execute operational testing and give technical support. To deploy this solution in a large-scale, outsourcing is likely to be used for part of or all of the operational tasks related to supporting BI modeling efforts. (Burke et al. 2016)

According to Burke et al. (2016), with BI COE the organization can avoid the common issues causing the failure of SSA. Centralization enables that standard models and technologies can be leveraged and thereby doing the same work twice, or even more, across the organization can be avoided. Through centralization, organization is also able to adapt quickly to technology tools' changes, and sustainability of data and technology can be ensured.

## **Process**

The third category of success factors for SSA, process, refers to the process of enabling fact-based decision-making with the support of SSA (Gartner 2018). The success factors that enable people to become active users of SSA utilizing it in their decision-making are engagement, data-driven culture and agile approach. Therefore, the success factors make up the process of enabling fact-based decision-making with the support of SSA.

The most important factor in enabling decision-making supported by SSA is engagement; when people are engaged with SSA, they are more likely to trust it and the data. Thus, by engaging business users with SSA trust is built also towards IT. It is important to foster two-way trust between IT and the business users to embed SSA in people's everyday routines. Business users should be engaged to use SSA but also to help define the data. (Gartner 2018)

Because of the general resistance to change, engaging people to new tools is not easy. Consequently, organizations must invest a lot in engagement of SSA. Eckerson et al. (2018) state that BI COE is in the key role in promoting adoption of SSA. They suggest that a good way to promote SSA is making success stories public, since they are difficult to argue against. Gartner (2018) agrees that capturing anecdotes about measurable benefits and successes promotes engagement of SSA and builds trust by proving to add value. It annotates that part of the successful SSA becomes from the communication and marketing effort.

According to Court (2015), a key component in engaging people with analytics is a data-driven culture. Many organizations have recognized the need for data-driven culture but struggle in creating one. According to NewVantage Partners' (2018) survey covering responses from Fortune 1000 companies' executives, 98.6 percent of companies aspire to a data-driven culture but only 32.4 percent has achieved it. In spite of the increased investment towards data-driven

culture, the number of companies succeeded in creating one has decreased to 31.0 percent (NewVantage Partners 2019). Court (2015) argues that if an organization is willing to have a data-driven culture, it should invest in creative adaptations to build a foundation of analytics in its culture.

According to Gartner (2018), SSA should be deployed and developed using agile approach. When users have explored a self-service technology, they often come up with new and different requirements. Therefore, agile approach is a good fit to SSA enabling users to explore the data and thereby changing the requirements already during the project. (Sodder 2016) Williams et al. (2017) agree that using agile approach organizations are capable of meeting continuously changing requirements of BI.

## **Technology**

The fourth category for success factors for SSA is technology. People tend to think about appropriate technological tool as the most important part of SSA, even though it is not. However, technology is still important, but everything else should be in place before technology steps in and enables the use of SSA. (Gartner 2018) Regarding the technological tool, it is better to have only one tool for the organization. However, it is more common to have more than one, but the governance and standardization of SSA becomes more difficult, the more complex the infrastructure is. (Eckerson et al. 2018)

Weber and Wiegmann (2018) and Gartner (2018) state that SSA should be used so that the reports are not pre-defined, but users should be provided with a universal toolbox of analytic capabilities with which they can build their individualized reports. However, as referred, casual users often have limited BI skills and they may be satisfied with analyzing dynamic reports and dashboards. Power users, in turn, need a lot of flexibility and functionality from SSA tool. Therefore, they should be provided with a universal toolbox of analytic capabilities.

To success of SSA is highly dependent on how easy to use the SSA tool is; ease of use contributes strongly to achieving the wanted results with SSA (Imhoff and White 2011). Weber and Wiegmann (2018) also promote the SSA tool's ease of use as an enabler for utilizing analytics and concentrating on relevant information on their work without consulting anyone.

SSA tool vendors are continuously developing their products to be easier to use. For example, need for manual processes have decreased through intelligence usage in selecting the chart type based on the nature of the underlying data. (Eckerson et al. 2018)

## **3 AGILE APPROACH**

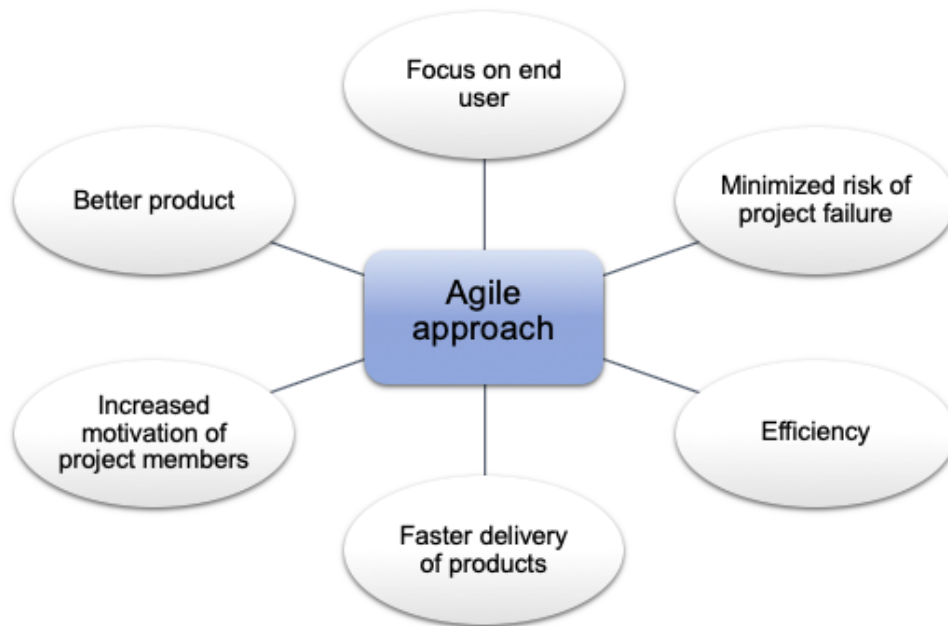
### **3.1 Concept**

Agile is an approach to project management, which uses iterative process in developing the project, rather than a pre-set plan. Agile is a fast growing and popular approach to software development, but it can easily be applied to other projects and processes as well. (Vandersluis 2014) Agile approach is based on four values, which are presented in chapter 3.2.

Agile approach differs from traditional waterfall project management process by including user interaction frequently throughout the project. The requirements of the project are changed and adapted on a regular basis based on user input. Thus, planning of the project mostly occurs not before but during the project. (Williams et al. 2017) According to Kenney (2015) as much as 80 percent of the planning is done during the project. This is enabled in agile approach by employing a series of shorter development cycles instead of employing a strict and intensive requirements and design phase before beginning of development.

### **3.2 Advantages**

There are many advantages of using agile approach, as presented in Figure 4. According to Maassen's (2018) study, the most observed advantage of using agile approach is better focus on end users. The enabler for this is the direct involvement of end users in development process, whereupon they can experience a version of the product, deliverable of the project, sooner than in traditional waterfall methodology. Thereby, end users can provide feedback of existing functionalities and suggestions for further development. This, in turn, allows efficient monitoring of improvements and execution of end user's suggestions directly. This is a significant advantage compared to traditional waterfall methodology in which end user gets to explore the product only when it is ready. (DeSarra 2012) In SSA development, product is typically a report, dashboard or a set of them.



**Figure 4** Advantages of agile approach

By letting end users experience a version of the product and welcoming changes throughout the development of the product, measurable value for end users is delivered quickly and efficiently. Moreover, in the end, end users receive a better product with all the requirements they came up with when experiencing the product during the development. (DeSarra 2012) Continuous planning and involvement of end user also enable, errors to be identified earlier, and thereby the project's risk of failure is minimized (Picek 2009). Because planning should be stopped only when the end user is satisfied with the product, enhancement of end user satisfaction is ensured (Pereira et al. 2007).

The usage of agile approach in the projects makes projects more efficient. Agile approach guides to build only what the end user values and nothing more. That is achieved by developing and tailoring products according to end user input continuously throughout the project. (Pereira et al. 2007)

According to Pereira et al. (2007), one of the advantages using agile approach is that it creates an environment where defining requirements and innovating throughout the project is easy. The methodology also enhances collaboration between Development Team and end users which, in turn, improves productivity. Thereby, products are delivered faster while also meeting end

users' expectations better. A study carried out by Maassen (2018), confirms that a shorter time to market is seen as one of the biggest benefits of using agile approach.

Agile approach is also seen to facilitate project management through increased integration and commitment of the team which also leads to the team being more motivated (Pereira et al. 2007). Maassen's (2018) study proves that using agile approach can increase project members' motivation; nearly half (46 percent) of respondents find that their chance to express and deploy their own ideas suggested to managers or customers has improved. The same percentage of respondents find that their possibility to learn from people of other departments has increased. Nearly one third of respondents also see as an advantage the possibility to create monthly improved products.

### **3.3 Applying agile to business intelligence**

According to Manifesto for Agile Software Development (2001) there are four values for agile software development, and DeSarra (2012) states that they can be applied to BI. The first of the four values is "Individuals and interactions over processes and tools". Traditionally in BI, processes and tools play a big role in solving development challenges. However, that approach eventually creates silos among business and IT teams. As a result, each team silo concentrates only on their own responsibilities and goals ignoring the overall project goal. With agile approach to BI everyone involved in the project work together as one team with common goals. To achieve this, organizations often form hybrid teams and a BI COE (DeSarra 2012), which is also found to be a success factor for SSA by Burke et al. (2016).

The second value is "Working software over comprehensive documentation". In traditional BI with a big-bang approach there is a lot of weight put to detailed documentation of all the important information regarding the project. Nonetheless, there is a possibility for the organization to fail a project by focusing on the documentation so much that the connection to business and the problems the project was supposed to solve is lost. While agile approach to BI values working software over comprehensive documentation, it does not mean that detailed documentation should not be created. The focus of documentation should be more on emphasizing the vision and scope as well as the architecture for future support. In agile BI, instead of solving every problem at once, the purpose is to deliver functionality in pieces small

enough to manage within a development cycle and to document each cycle as it happens. (DeSarra 2012)

The third value is “Customer collaboration over contract negotiation”. While agile approach to BI values collaboration with end users over contract negotiation, it does not mean that the budget or tolerance for changes is unlimited. Instead, it means that the changes made in the latest development cycle can be reviewed to make sure that the expectations and goals are met throughout the project. In traditional BI, functional documents are used to discuss what the solution will look like and how it will function. This approach often leads to a situation where the user imagines a solution different to the real one, and the project derails because of the subjective expectations. Agile approach, in turn, uses prototypes in every development cycle, and thereby the business users and other stakeholders are able to see throughout the project how the solution looks like and how it will function. (DeSarra 2012)

The fourth and the last value is “Responding to change over following a plan”. When agile approach is used, traditional BI projects with enormous project and resource plans are replaced with shorter development cycles which welcome changes continuously. The purpose of those cycles is to include changes more effectively and to keep the project team focused and conscious. When prototypes are used, it is easier for the users to propose changes which make the final solution better. However, agile BI projects still use a plan, but it is short, manageable and changeable based on experiences of the prototype. Changes are discussed at every stage of the project collectively by business sponsors, users and IT professionals. (DeSarra 2012)

### **3.4 Scrum framework**

There are many different agile frameworks, including Scrum, Extreme Programming, the Dynamic Systems Development Method, Crystal, feature-driven development and lean software development. The frameworks differ in terminology and practices, but they all share most of the four values of agile. (Elbanna and Sarker 2016) One of the best-known agile frameworks is Scrum.

As agile approach is about responding to change over following a plan, Scrum enables the team to react and adapt to changes quickly. Therefore, it is a suitable framework for complex



environments with changing requirements. Scrum framework is not only effective, but it enables delivering high-value end products. Scrum is an empirical, iterative and incremental approach that seeks to control the risks of product development process. (Gonçalves 2018) According to Schwaber and Sutherland (2017, pp. 6), the purpose of Scrum is also to keep flexibility, creativity and productivity in an optimal level. Scrum is used – as agile approach in general – to deliver products iteratively and incrementally so that feedback can be given throughout the project.

Key roles of a Scrum Team are Product Owner, Development Team and Scrum Master. Scrum Teams are not directed by anyone outside the team, but they choose by themselves how to accomplish their work. The teams are also cross-functional in a way that all competencies needed are found from the team members so that the work can be accomplished without depending on people outside the team. (Schwaber and Sutherland 2017, pp. 6)

The Scrum Team operates in sprints of typically two weeks. The sprints can be shorter or longer, but their length has to be decided in the beginning and should not be changed. In every sprint, there is different working sessions: Sprint Planning Meeting, Daily Scrum, Sprint Review Meeting and Sprint Retrospective Meeting. For each sprint, the team sets new priorities. (Williams et al. 2017)

Typically, the Product Owner is a functional owner or member from business who understands the purpose of the project and how it aligns to and enables business strategic goals. Product Owner should be either senior themselves or eminently supported by management. They determine the focus area of Development Team's efforts and accept (or reject) products that the team produced. (Williams et al. 2017) In addition, Product Owner's responsibility is to maximize the value of the product that the Development Team works with. The execution of this may vary depending on the organization, Scrum Team and individual. (Schwaber and Sutherland 2017, pp. 6)

The Product Owner is also responsible for managing the product backlog, which is an ordered list of all features, functions, requirements, enhancements, and fixes for the product. Product Owner can do all the work related to backlog management themselves or have the Development Team do it. Nonetheless, the Product Owner remains accountable for it in any case. The entire

organization have to respect Product Owner's decisions regarding the content and ordering of the product backlog. (Schwaber and Sutherland 2017, pp. 6)

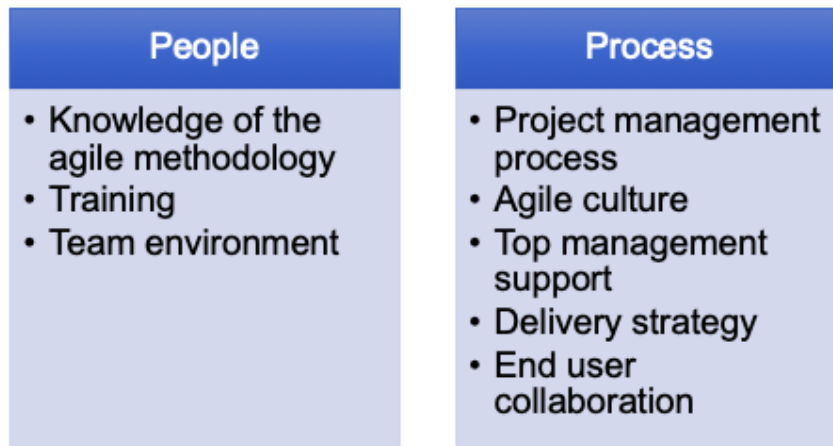
The Development Team consists of cross-functional members with necessary skills to create an increment of "done" product in each sprint. A "done" increment is required at the end of each sprint at the Sprint Review. (Schwaber and Sutherland 2017, pp. 7) In addition to creating the product, Development Team understands what they are able to produce in a sprint (Williams et al. 2017) and they determine themselves – not with Scrum Master nor with Product Owner – how to turn Product Backlog into Increments of potentially releasable functionality (Schwaber and Sutherland 2017, pp. 7).

Development Team members do not have titles nor has the Development Team any sub-teams, regardless of the tasks being performed by a person or persons. Accountability belongs to the entire Development Team, even though team members may have specialized skills or areas of focus. The size of Development Team should be between three and nine members. Thereby, it is small enough to remain nimble but still capable of completing significant work within a Sprint. (Schwaber and Sutherland 2017, pp. 7)

The Scrum Master's responsibility is to promote and support Scrum. To perform this, Scrum Master helps everyone understand the theory, practices, rules and values of Scrum. They also help people outside the Scrum Team to understand the helpfulness of their interactions with the Scrum Team. Consequently, the interactions can be changed in order to maximize the value the Scrum Team creates. (Schwaber and Sutherland 2017, pp. 7)

### **3.5 Requirements**

There are many process-related requirements for agile approach. Moreover, as agile is a people-centric approach to development in a project, there are also people-related requirements. The requirements for agile approach are presented in Figure 5.



**Figure 5** Requirements for agile approach

### Process

For agile project to succeed, it is essential to select an appropriate project management process (Chow and Cao 2008). The selected process has to empower the project team and direct the Development Team's talents in order to achieve agility of the project (Sheffield and Lemétayer 2013). Although selecting an appropriate project management process is important, the team does not need to follow any agile methodology strictly, but they should have the freedom to tailor the methods to make a good fit to their particular needs. A good practice is to have agile-based process model continuously tailored also in the organizational level. (Pikkarainen et al. 2012)

For the agile project management process to work, it is important that the organizational culture supports agile development by being able to dynamically respond to the frequently occurring changes within the development project (Misra et al. 2009). According to Wan and Wang (2010), organizational culture should not include overtime work, low-level trust in employees and lack of mutual collaboration, since they are likely to harm agile development.

According to Pikkarainen et al. (2012), important requirement for agile approach is that the organization's management is committed and supports it. Livermore's (2007) study proves that there is significant correlation between methodology implementation success and management involvement and support. He also states that the result is obvious, and management involvement and support is a factor that is likely to improve any business project. Hobek et al. (2009) agree

that for any project the support from top management is critical. They support the statement by adding that the top management sets the direction for the organization and employees' focus will be drawn there, and therefore support from top management is likely to correlate to engagement. In addition, they recognize that many BI deployments fail because of the lack of support from top management.

Chow and Cao (2008) state that delivery strategy is important factor in agile projects. For the strategy to be effective, it has to take into account two important premises; a version of a working product must be delivered frequently, and the most important features of the product has to be delivered first. Aldahmash et al. (2017) annotate that everyone participating the project needs to be familiar with the delivery strategy and know their own role in it.

Agile approach is about valuing people over processes, and one of the most important people are end users. According to Aldahmash et al. (2017), without customer collaboration – and in this study, end user collaboration – in the agile development process, it is difficult to execute the delivery strategy and deliver frequent releases of working product, neither can the changes in the requirements be made without the end user. Thereby in collaboration with end user, communication is in key role. Accordingly, Misra et al. (2009) state that only involving customer – or end user – is usually not enough, but they have to be committed and willing to collaborate for agile development to work optimally.

## **People**

To gain the advantages of agile approach, being familiar with the selected agile methodology plays a vital role. Everyone participating in the project has to know the tools, ideas and terminologies of the selected method before beginning to use them. (Stelzmann et al. 2010) A case study conducted by Pikkarainen et al. (2011) supports the importance of knowledge of the selected agile methodology, as the lack of it is found to be one of the reasons for the failure of adopting agile approach.

Knowledge of the selected and implemented agile methodology should also be maintained. According to Livermore (2007) and Misra et al. (2009), there is a significant relationship between successful agile methodology and continuous training of the project members on the

implemented agile method. Misra et al. also (2009) emphasize the value of informal training and learning from each other's over formal training. Aldahmash et al. (2017) state that the needed training and empowerment has to be ensured for all members in order to reach high levels of trust which in turn leads to success on the agile method.

In addition to the support from organizational culture and top management, team environment has to support agile approach. For agile to work, teamwork has to be coherent and self-organized. Ideally, the whole team is physically in the same location, and there should not be any project with multiple independent teams, but the team should all work together. (Chow and Cao 2008) According to Chow and Cao (2008) the project team should be small. However, a large-scale survey-based study conducted by Misra et al. (2009) indicates that even though literature suggests an agile team size to be small, there is no significant correlation between team size and success of agile project.

## 4 AGILE SELF-SERVICE ANALYTICS IN CASE COMPANY

### 4.1 Case background

Due to sensitive information, the name of the case company is not mentioned, but it is referred to as Company in this chapter.

Company has an ongoing big digitalization program which aims to improve end-to-end efficiency of the whole supply chain. Vision of the program is to execute business processes without reading and creating paper documents or emails and to use human intervention in the automated processes only to improve performance or to solve exceptionally complex cases. SSA is part of the digitalization program among robotic process automation and other more specific projects. In key role of the program is implementation of agile way of working for the entire Company.

At the moment Company is using SSA for visualization and dashboarding in a small scale and is broadening the usage to company-wide covering all the businesses and functions. The set-up for agile SSA consists of Steering group, Core delivery team, Business core roles and Vendor on-site team. Steering Group consists of Sponsor, Product Owner and Project Manager. Vendor on-site team consists of experts for areas under development, including expert for the modern cloud-based tool. Scrum Master comes from Vendor team.

The SSA development will mostly be based on modern cloud-based tool with the above set-up. However, part of the development is done with the vendor's off-site team instead of on-site team. In case of off-site team, Concept owners serve as Product Owners for their own responsibility area.

The Reporting and Analytics (R&A) team of Company form the core delivery team of SSA. The team is a hybrid team consisting of Concept owners, IT people and business people. Each Concept owner is responsible for their own area in reporting and analytics. The team is responsible for lifecycle management of reporting, analytics and data warehouse.

Company's SSA is divided into three different approaches: self-service, business-driven and company-driven. Self-Service approach is utilized independently by power users with the so-called universal toolbox of analytic capabilities to play with. Business-driven approach is owned by Company's business or function. The reports and dashboards of this approach are used within the business or function. Company-driven is a centralized company-owned approach where the owner of data is R&A team. Whereas, the reports and dashboards are owned by business and functions and used company-wide. According to the Lead of R&A, business-driven and company-driven approaches are so-called guided SSA approaches, where a lot of content is created centrally, and the end user can view and consume the information according to their need for the aspect. Power users along with R&A team are the enablers of these approaches to casual users.

Agile approach is not yet used in the development of SSA. The agile methodology to be implemented is Scrum – most likely not clean Scrum but tailored one. Two weeks has been chosen for the length of sprints based on experience by vendor and another function of Company. Experience from Scrum gathered in another function of Company also shows that it is a good practice that a member of vendor's onsite team serves as Scrum Master.

Success factors for SSA and requirements for agile approach are combined to create a framework of success factors for agile SSA, as shown in Figure 6. The framework includes many success factors of which most of are related to people and process. The category of process includes two processes that proceed together in Company: agile process and the process of enabling fact-based decision-making with the support of SSA. Top management support was presented as a requirement for agile approach, but since it was found to be important for BI projects and it contributes to engagement, it is presented under engagement in Figure 6. In the following sub-chapters, it is discussed how Company has taken the success factors for agile SSA into consideration.

	Data	People	Process	Technology
Self-Service Analytics	<ul style="list-style-type: none"> <li>• Data governance</li> <li>• Standards</li> </ul>	<ul style="list-style-type: none"> <li>• Organizational governance</li> <li>• BI center of excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Agile methodology</li> </ul>	<ul style="list-style-type: none"> <li>• The tool</li> <li>• Toolbox of analytic capabilities</li> <li>• Ease of use</li> </ul>
Both		<ul style="list-style-type: none"> <li>• Training</li> </ul>	<ul style="list-style-type: none"> <li>• Engagement</li> <li>• Data-driven culture</li> <li>• Top management support</li> </ul>	
Agile Methodology		<ul style="list-style-type: none"> <li>• Knowledge of the agile methodology</li> <li>• Team environment</li> </ul>	<ul style="list-style-type: none"> <li>• Agile culture</li> <li>• Delivery strategy</li> <li>• Project management process</li> <li>• End user collaboration</li> </ul>	

**Figure 6** Success factors for agile self-service analytics

## 4.2 Data

As Gartner (2018) mentioned, data governance is crucial for the success of SSA. According to the Lead of R&A team, data governance in Company is centralized for a specific team. In addition to the centralized team, business is responsible for accepting new elements of core data, for example customer. The acceptance is carried out by business-specific owners for the data. Company has recognized the importance of data governance and has chosen to have a specific team responsible for data governance.

Company's SSA access management is divided into two approaches: Access to reports and dashboards and access to underlying data rows. Users can apply for accesses through a centralized access management portal. In addition to granting accesses, access management covers access removals. Access management has high priority when personal data and other sensitive data are concerned. If reports containing sensitive data are made available for wrong users, characters of crime may be fulfilled, and direct or indirect damage may be caused for Company.

Before publishing reports and dashboards to larger audience, they are tested and reviewed against Company's 'Informational Core' and GDPR guidelines. Power users, that have helped



in defining the requirements when reports were developed, shall also perform the tests and reviews. That is to ensure data quality and that any content changes have been conducted as agreed. If business-driven report or dashboard is started to use company-wide, it will be changed to company-driven and the ownership of the data will be transferred to R&A team while business will remain as owner of the report or dashboard. As Gartner (2018) suggests, data governance policies seem to be carefully defined in Company.

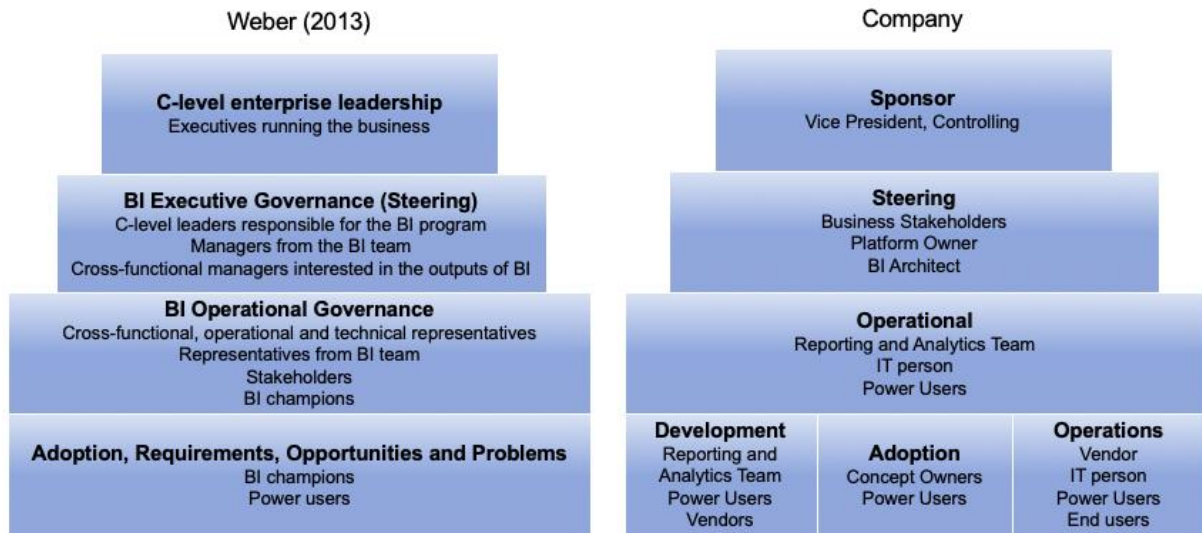
The importance of standards introduced by Weber and Wiegmann (2018) and Eckerson et al. (2018) has been recognized in Company, and the Lead of R&A team mentions that Company has started to standardize whenever viable. As Eckerson et al. (2018) state for the need of organizations, Company has standard tools and processes for SSA as well as standard data. Standardizing is also practiced through pre-defined report layers for casual users and standardized data sets from which power users can create their own reports and dashboards. However, in the industry of Company, SSA is needed in analyzing a significant number of custom solutions. The Lead of R&A emphasized that naturally the strategy is to create centralized data models that can be copied to different purposes. The importance of standards is well taken into consideration in Company and its standards are likely to contribute to better decision-making.

### **4.3 People**

Company knows that as Eckerson et al. (2018) state, continuous training is essential for the success of SSA. Company is also aware that agile SSA is dependent on knowledge of the selected agile methodology, as Stelzmann et al. (2010) state. Therefore, it needs to invest heavily on training for both SSA and the agile methodology. According to the Lead of R&A, tailored trainings have been started and will continue according to plans. SSA trainings are mostly organized by vendor but R&A team organizes part of the trainings for casual users. Agile trainings are organized on company-level as part of the digitalization program. Company has systematic plans for the trainings and the importance of them is understood.

As mentioned, Weber (2013) introduces the four levels of organizational governance. As shown in Figure 7, Company has a similar kind of governance framework with four levels: Sponsor, Steering, Operational and the lowest level including Development, Adoption and Operations.

In addition, as Burke et al. (2016) promote the BI COE, the R&A team can be seen as a BI COE for the Company. Therefore, the organizational governance is structured according to the findings of literature review.



**Figure 7** Organizational governance

As referred to Chow and Cao (2008), team environment is important in terms of agile development. Ideally, the entire project team is physically in the same location and there are no multiple independent teams, but everyone should work together. Company's set-up for SSA is more complex including two parallel agile development processes and in part of the development, vendor's off-site team. This may cause challenges in the daily operation and management regarding SSA. The Lead of R&A states that Company has recognized the challenges related to the set-up and work continuously for finding solutions for them.

#### 4.4 Process

Company has recognized the importance of engagement with SSA. In addition, it has recognized the need for long-term support of SSA users. Therefore, it has created a vision of building a strong user community and champion network to foster sharing of know-how and continuous value-add and learning. The Lead of R&A sees engaging business users as a possible challenge. Therefore, the demand for power user type of roles in businesses and functions are recognized and deployed to contribute to strong engagement and to enable an active community and professional knowledge sharing. The Lead of R&A emphasizes that the

key drivers of SSA adoption are power users and concept owners. Even though there is no significant proof yet of the success of engagement because of SSA's novelty in Company, if it gets to its vision, engagement of SSA is likely to succeed. Company can use the user community to publish success stories of measurable benefits to drive the engagement, as suggested by Eckerson et al. (2018) and Gartner (2018).

As Court (2015) states, to engage users with analytics a key component is data-driven culture. According to the Lead of R&A, Company aims to achieve data-driven culture as part of its ongoing digitalization program. In addition, an analyst network is being built to promote the culture. One of the targets of the digitalization program is also to achieve the organizational culture for agile company-wide. Because an agile methodology has been used in one of the functions of Company, already gained internal experience can be utilized in creating and promoting the culture for the rest of Company.

The key component of agile approach, end user collaboration, has been recognized in Company. According to the Lead of R&A, power users and key stakeholders are strongly involved in defining epics, chunks of work that have a common objective and usually cannot be accomplished within one sprint. Because power users and key stakeholders are strongly involved and collaborate with project members, according to Aldahmash et al. (2017), it will contribute to success of Company's SSA projects.

Agile approach is supported by top management through the digitalization program which aims to implement it company-wide. According to the Lead of R&A, in addition to a vice president serving as a sponsor for SSA, there is an indirect link to top management through the digitalization program, of which SSA is a part of. Because Pikkarainen et al. (2012) and Livermore (2007) state that the support from top management is crucial for the success of agile approach, it is good that agile approach has the support of top management. Moreover, as Livermore (2007) and Hobek et al. (2009) state, top management support is critical for any project, SSA is supported as part of the digitalization project. However, since Hobek et al. (2009) find that many BI deployments fail because they lack in support from top management, to ensure the success of SSA, it would be better to have direct support for the SSA from the top management.

As Gartner (2018) suggests, the development of Company's SSA will be agile. The Lead of R&A states that Scrum has been chosen for the project management process based on Company's other function's and vendor's experience. The roles of Scrum are allocated but the framework has not yet been implemented. However, the process will not follow the rules of Scrum strictly, but it will be tailored, as Pikkarainen et al. (2012) suggest. According to the Lead of R&A, the actual methodology to be used is not yet defined completely but it will include the sprint model from Scrum with the sprint length of two weeks and the delivery strategy will be to at the end of each sprint deliver minimum viable product (MVP). In this case MVP is typically a set of reports and dashboards with the critical content but which is intended to develop further. Therefore, Company's delivery strategy fits for the effective delivery strategy defined by Chow and Cao (2018). Since one function of Company has used Scrum before, it could share its experiences of tailoring Scrum and the rest of Company could adapt them according to their needs. As Pikkarainen et al. (2012) state, Company should tailor the agile approach continuously in organizational level.

#### **4.5 Technology**

While the actual technological solution is not in the scope of the study, there are few general success factors for the technological aspect of SSA to consider. As Eckerson et al. (2018) state, optimal solution is to have only one SSA tool. According to the Lead of R&A, Company has two tools in company-level in addition to tools for process mining and advanced analytics. This is likely to lead to more difficult governing of SSA. However, the Lead of R&A states that the challenge of governing multiple tools has been recognized and collaboration and frequent cross checks of needs will be used to mitigate the challenge. As Weber and Wiegmann (2018) and Gartner (2018) state that SSA reports should not be pre-defined, Company's reports are not. Every user can view the data as they like by filtering and drilling the data. In addition, power users have the so-called universal toolbox of analytic capabilities in their use, which is good in terms of maximizing the benefits of SSA.

According to the Lead of R&A, the SSA tool is easy to use. Especially the version of the tool that the casual users use is easy to adopt because it is more like a service for viewing, filtering and drilling data of pre-defined report layers. Because power users and Concept owners use another version of the tool, which has much more features and analytic capabilities, its ease of

use is studied more in detail. The ratings for ease of use are based on interviews, and 6 is really easy and 1 is really difficult. One of the power users finds the SSA tool rather easy (rated 4 out of 6) to use and somewhat easy to adopt. However, they claim that some features of the tool are more difficult to use compared to some other non-self-service tools. In addition, they state that editing the source data is quite difficult at first. One of the Concept owners, in turn, finds visualization with the SSA tool easy (rated 5 out of 6) and quickly adoptable, but data modelling rather difficult (rated 3 out of 6) requiring more specialized skills. However, they state that utilizing the tool is learnable by making reports, and there is a lot of material in internet to ease and support learning. Based on the small but unanimous sample of users it can be assumed that the tool is rather easy to use. Moreover, as mentioned, SSA tool vendors are continuously developing their tools especially in terms of ease of use. Thereby the tool is likely to be easier to use in the near future.

## 5 CONCLUSIONS

The object of the study was to define success factors for agile SSA. The success factors were first studied for SSA, followed by studying the requirements for agile approach. The requirements were then allocated under the categories of success factors for SSA to create a framework of success factors for agile SSA. Finally, the study examined how case company has taken the success factors into consideration. The study answers the research questions as follows:

### *1. What are the success factors for self-service analytics?*

The analysis proves that companies will benefit significantly from SSA – and will benefit even more in the future. However, there are many risks and challenges found for SSA, which supports the argument of SSA deployments' high failure rate. Most of the risks and challenges found can, however, be avoided by taking into account the success factors for SSA. The success factors are related to data, people, process and technology, and the most crucial ones are data governance, engagement and ease of use because of their significant impact on the success of SSA. With lacking engagement and ease of use, users will not adopt SSA and it will be of no value for the organization. Whereas, without appropriate data governance, organization is likely to run into risk of making poor decisions and engagement is likely to suffer through the lack of trust for data and SSA.

### *2. What are the requirements for agile approach?*

Agile approach is found to bring many advantages to projects, and even though it is mostly used in software development projects, it can easily be applied to business intelligence. Findings of the study suggest that there are many requirements for agile approach, but the most important ones are knowledge of the agile methodology, top management support and customer collaboration. Without the knowledge of implemented agile method, agile cannot be actively and effectively in use, which means that the benefits of it cannot be achieved and it is of no value for the organization. Top management support, in turn, is in key role of engaging people with agile as people's attention tends to be drawn where top management directs it. End user

collaboration is important as it enables most of the benefits of agile approach, including better outcome of the project.

*3. How are the success factors for agile self-service analytics taken into consideration in case company?*

The created framework of success factors for agile SSA indicates that even though SSA is about democratizing data with technology as an enabler, success factors for agile SSA are mostly related to people and process, rather than data and technology. That is the effect of agile approach to SSA. Findings of the case study suggest that most of the success factors for agile SSA are well taken into consideration in case company, but there are some factors that need further attention.

Case company's complex set-up for SSA may cause challenges in managing the SSA projects. The challenges are recognized in case company and the work for finding solutions is ongoing. Another factor that needs attention is that having more than one tool makes governing SSA more complicated. However, case company has recognized the challenge and is prepared for it. The third factor needing attention is top management support, which is found to be one of the most important success factors for agile SSA. While agile approach is supported by case company's top management, SSA is supported through company's digitalization program and has a vice president as a sponsor but is not supported directly by top management. To ensure better success of agile SSA, also SSA should be supported directly by the top management.

## REFERENCES

Aldahmash, A., Gravell, A. M. & Howard, Y. 2017. A Review on the Critical Success Factors of Agile Software Development. Proceedings of the 24th European Conference on Software Process Improvement. pp. 504-512.

Business Application Research Center. 2018. BI Trend Monitor 2019. 70 pp.

BI-survey. 2019. Self-Service BI: An Overview. [Online document]. [Accessed 27.2.2019]. Available at: <https://bi-survey.com/self-service-bi>.

Burke, M., Simpson, W. & Staples, S. 2016. The Cure for Ailing Self-Service Business Intelligence. *Business Intelligence Journal*. Vol. 21, No. 3, pp. 33-40.

Caldwell, Charles. 2017. Business Intelligence vs Analytics: What's the Difference? [Online document]. [Accessed 4.4.2019]. Available at: <https://www.logianalytics.com/bi-trends/business-intelligence-vs-analytics-whats-the-difference/>.

Chow, T. & Cao, D.-B. 2008. A survey study of critical success factors in agile software projects. *The Journal of Systems & Software*. Vol. 81, No. 6, pp. 961-971.

Clarke, P., Tyrrel, G. & Nagle, T. 2016. Governing self service analytics. *Journal of Decision Systems*. Vol. 25, No. 1, pp. 145-159.

Concept Owner. 2019. Global case company. Interview. 9.4.2019.

Court, David. 2015. Getting big impact from big data. McKinsey Quarterly. [Online document]. [Accessed 27.3.2019]. Available at: <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/getting-big-impact-from-big-data>.

DeSarra, P. 2012. BI Dashboards the Agile Way. *Business Intelligence Journal*. Vol. 17, No. 4, pp. 8-16.



Eckerson, W., Hiltbrand, T., Jackson, M. & Yonce, C. 2018. Have We Finally Gotten Selfservice Right? *Business Intelligence Journal*. Vol. 23, No. 1, pp. 39–45.

Elbanna, A. & Sarker, S. 2016. The Risks of Agile Software Development: Learning from Adopters. *IEEE Software*. Vol. 33, No. 5, pp. 72-79.

Gartner. 2018. Achieve self-service analytics at scale. [Webinar]. [Accessed 5.3.2019]. Available at: <https://www.gartner.com/en/webinars/3878709/achieve-self-service-analytics-at-scale>.

Gartner. 2019a. Business Intelligence (BI). [Online document]. [Accessed 22.3.2019]. Available at: <https://www.gartner.com/it-glossary/business-intelligence-bi/>.

Gartner. 2019b. Self-Service Analytics. [Online document]. [Accessed 15.1.2019]. Available at: <https://www.gartner.com/it-glossary/self-service-analytics>.

Gonçalves, L. 2018. Scrum. *Controlling & Management Review*. Vol. 62, No. 4, pp. 40-42.

Harvard Business Review. 2016. Analytics That Work: Deploying Self-Service and Data Visualization for Faster Decisions. 16 pp.

Hobek, R., Ariyachandra, T. & Frolick, M. 2009. The Importance of Soft Skills in Business Intelligence Implementations. *Business Intelligence Journal*. Vol. 14, No. 1, pp. 28-36.

Imhoff, Claudia. & White, Colin. 2011. Self-service Business Intelligence, Empowering Users to Generate Insights. [Online document]. [Accessed 17.3.2019]. Available at: <https://tdwi.org/articles/2011/09/20/self-service-bi-empowerment.aspx>.

Institute on Governance. 2019. What is Governance? [Online document]. [Accessed 13.4.2019]. Available at: <https://iog.ca/what-is-governance/>.

Izenda. 2017. How Self-Service Analytics Improves Operational Performance, Application Value. [Online document]. [Accessed 5.3.2019]. Available at: <https://www.izenda.com/how-self-service-analytics-improves-operational-performance-application-value/>.

Keller, P. & Seidler, L. 2018. Agiler entscheiden mit Self-Service BI. *Controlling & Management Review*. Vol. 62, No. 2, pp. 38-44.

Khatri, V. & Brown, C. V. 2010. Designing Data Governance. *Communications of the Association for Computing Machinery*. Vol. 53, No. 1, pp. 148–152.

Lead, Reporting and Analytics. 2019. Global case company. Interview. 26.3.2019.

Lennerholt, C., van Laere, J. & Söderström, E. 2018. Implementation challenges of Self Service Business Intelligence: A literature review. Proceedings of the 51st Hawaii International Conference on System Sciences. pp. 5055-5063.

Leonard, John. 2015. The revolution in self-service analytics starts now. [Online document]. [Accessed 17.1.2019]. Available at: <https://www.computing.co.uk/ctg/analysis/2400840/the-revolution-in-self-service-analytics-starts-now>.

Livermore, J. 2007. Factors that impact implementing an agile software development methodology. Proceedings 2007 IEEE SoutheastCon. pp. 82-86.

Maassen, M. 2018. Opportunities and Risks of the Agile Software Development Management in the IT Field. Case study: IT Companies between 2009-2018. *Revista de Management Comparat International*. Vol. 19, No. 3, pp. 234-243.

Microsoft. 2018. Planning a Power BI Enterprise Deployment. White Paper. 188 pp.

Misra, S. C., Kumar, V & Kumar U. 2009. Identifying some important success factors in adopting agile software development practices. *The Journal of Systems & Software*. Vol. 82, No. 11, pp. 1869-1890.

NVP. 2018. Big Data Executive Survey 2018. NewVantage Partners, Boston.

NVP. 2019. Big Data and AI Executive Survey 2019. NewVantage Partners, Boston.

Pereira, P., Torreão, P. & Maçal, A. S. 2007. Entendendo Scrum para Gerenciar Projetos de Forma Ágil. *Mundo PM*. Vol. 14.

Picek, R. 2009. Suitability of Modern Software Development Methodologies for Model Driven Development. *Journal of Information and Organizational Sciences*. Vol. 33, No. 2, pp. 285-295.

Pikkarainen, M., Salo, O., Kuusela, R. & Abrahamsson, P. 2012. Strengths and barriers behind the successful agile deployment—insights from the three software intensive companies in Finland. *Empirical Software Engineering*. Vol. 17, No. 6, pp. 675-702.

Power user of the self-service analytics tool. 2019. Global case company. Interview. 9.4.2019.

Röniger, O. 2018. Self-Service Analytics Unlimited. *Controlling & Management Review*. Vol. 62, No. 2, pp. 14-23.

Schwaber, K. & Sutherland, J. 2017. The Scrum Guide, The Definitive Guide to Scrum: The Rules of the Game. 19 pp.

Sheffield, J. & Lemétayer, J. 2013. Factors associated with the software development agility of successful projects. *International Journal of Project Management*. Vol. 31, No. 3, pp. 459-472.

Stelzmann E., Kreiner C., Spork G., Messnarz R. & Koenig F. 2010. Agility Meets Systems Engineering: A Catalogue of Success Factors from Industry Practice. Proceedings of the 17th European Conference on Software Process Improvement. pp. 245-256.

Vandersluis, Chris. 2014. Apply agile methodology to non-software enterprise projects. [Online document]. [Accessed 5.3.2019]. Available at: <https://www.pmi.org/learning/library/apply-agile-methodology-nonsoftware-enterprise-projects-9273>

Wan, J. & Wang, R. 2010. Empirical Research on Critical Success Factors of Agile Software Process Improvement. *Journal of Software Engineering and Applications*. Vol. 3, No. 12, pp. 1131-1140.

Weber, J. & Wiegmann, L. 2018. Self-Service BI – Fluch oder Segen? *Controlling & Management Review*. Vol. 62, No. 2, pp. 24-31.

Weber, M. 2013. Keys to Sustainable Self-Service Business Intelligence. *Business Intelligence Journal*. Vol. 18, No. 1, pp. 18-24.

Williams, M., Ariyachandra, T. & Frolick, M. 2017. Business Intelligence- Success Through Agile Implementation. *Journal of Management & Engineering Integration*. Vol. 10, No. 1, pp. 14-21.

Wise Analytics. 2015. Understanding The Role of Data Governance To Support A Self-Service Environment. White Paper. 12 pp.

## Appendix 1. Interview questions

1. Have people adopted SSA?
2. Have you faced any challenges?
3. Have there been trainings for all roles?
4. How frequently is SSA used? Is it analyzed if the frequency makes sense?
5. Have people adopted SSA naturally or have they been taught where to use it?
6. Is an executive level commitment visible?
7. Have I understood right that you are the Product Owner for SSA? Are there other Product Owners?
8. You are planning to use Scrum?
9. How about acceptance? Do you accept everything or is it delegated?
10. Is there only one Scrum Team and one sprint at a time?
11. Are the team members naturally matched to the roles?
12. If the planned sprint seems to be failing, will the product be transferred to the next sprint or will the team solve it somehow (e.g. overtime hours)?
13. Why two-week sprint has been chosen?
14. Are you going to have daily Scrum meetings?
15. How is it your model differing from the Scrum model?

## Appendix 2. Short interview questions

1. How easy to use have you experienced the self-service analytics tool on a scale of 1-6?  
(1 is really difficult and 6 is really easy)
2. Do you think the self-service analytics tool is easy to adopt or does it require lot of training at the beginning?