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The Role of Product Owners

An Empirical Investigation of the Role of Product Owners and Challenges in
Agile Scrum Projects

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Abstract

Within Scrum framework the role of the product owner is critical for the success of a Scrum project. Today, there exist little empirical evidence of how the role of product owner is practiced and the challenges they are faced with. This research seeks through a multiple-case study approach to explore the role of product owners. The aim of the research was to investigate the existence of a gap between theory and practice in terms of the product owner role. Qualitative data collection consisted of eight semi-structured interviews with product owners and agile coaches which then was analyzed according to what theory of the role suggests. Results showed partly multiple factors confirming a gap, for example regarding vision, prioritizing and communication, and challenges that arise from the gap, for example concerning decision-making.

Keywords: scrum, product owner, agile, software development, agile project management

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1. Introduction

In this opening chapter information regarding the background for this thesis, the problem formulation, objectives and research questions are explained. Additionally, delimitations are discussed, and contributions are motivated.

1.1. Background

Information systems development have in recent years observed a shift towards an emerging paradigm of agile software development methodologies. Such methodologies, originating from practitioners, contrast the lack of flexibility amongst traditional plan-based approaches e.g. Waterfall Model (Royce, 1987), by producing business value early on for customers and responding to changing project requirements (Ågerfalk, Fitzgerald & In, 2006; Nerur, Mahapatra & Mangalaraj, 2005). An increase in business competitiveness in new product development has made speed and flexibility vital (Takeuchi & Nonaka, 1986).

Agile methods develop software incrementally, with frequent releases, having high degree of collaboration between customers and developers, require less formal training, and are modifiable and adaptive (Abrahamsson, Salo, Ronkainen, & Warsta, 2002). Many of these agile development methodologies have in recent years gained popularity (Dingsøyr, Nerur, Balijepally, & Moe, 2012, Conboy & Fitzgerald, 2007). While certain agile methodologies, such as eXtreme Programming (XP) (Beck, 2000) mainly focus on development practices, Scrum on the other hand focus on agile project management (APM) practices (Schwaber & Beedle, 2002). There exists a debate whether agile methods should be fully adopted to be effective or if the methods are suitable for tailoring, where certain parts are chosen and implemented as needed (Conboy & Fitzgerald, 2007). Research by Conboy and Fitzgerald (2007) indicate that the nature of Agile methods can be difficult to tailor, because of tightly coupled practices. However, other research suggests that indeed they can be tailored if practices are carefully evaluated (Fitzgerald, Hartnett, & Conboy, 2006). Scrum is the most popular AMP in the software development industry, and multitude other industries have adopted it as well (VersionOne, 2017). Evidence of success with agile methods have been reported by practitioners but limited empirically validated studies are backing such claims (Abrahamsson, Salo, Ronkainen, & Warsta, 2002) as well as the experience of such methods.

A systematic review of agile software development benefits and limitations found studies predominantly investigating XP (Dyba & Dingsøyr, 2009), yet empirical research on Scrum and other agile project management methods still warrant further attention (Abrahamsson, Salo, Ronkainen, & Warsta, 2002; Dybå & Dingsøyr, 2008; Dyba & Dingsoyr, 2009; Dingsøyr et al., 2012). For example, a systematic review of empirical studies of agile software development by Dybå and Dingsøyr (2008) only found one research article addressing Scrum.

Scrum as a method is well-documented (Schwaber & Beedle, 2002; Sutherland & Schwaber, 2017). Within a Scrum project, individuals are assigned between three primary roles; product owner, scrum master or development team member. Scrum depends on small, cross-functional teams for development, ranging between five to nine developers per team. The team should work in an environment that promotes self-organizing work. The team is coached by a scrum master, ensuring that practices, rules, and values are held up. Other important responsibilities of this role are to monitor the progress and remove any impediments the development team might have. Schwaber and Beedle (2002) state that the product owner “is one person, not a committee”, emphasizing the importance of this role as a leader for deciding what the team should prioritize regarding work, arguing that conflicting work prioritization might otherwise arise. The product owner collects and manages requested work from various stakeholders, interpreting requirements and forming a so-called product backlog for the development team (Schwaber & Beedle, 2002). This role possesses the business perspective and is responsible for strategic decisions (Moe, Aurum, & Dybå, 2012), while the development team focus more on tactical and operational decisions. In the end, the product owner is mainly responsible for the project outcome.

However, many software projects tend to fail because of the existence of collaboration problems between stakeholder expectations and software development efforts. The 2015 CHAOS Report by the Standish Group studied 50,000 software development projects of varying sizes. Results showed that 52% of the projects were considered “challenged” in terms of meeting scope, time, and budget. 19% of the projects failed and 29% were measured successful (Standish Group, 2015). Some of the most common factors reported in literature regarding software project failure are; unrealistic or unarticulated project goals, poor reporting of the project’s status, unmanaged risks, poor communication among customers, developers, and users, poor project management, stakeholder politics, commercial pressures, and vague requirement specifications (Charette, 2005). Several of these factors such as unrealistic or unarticulated project goals and vague requirement specifications are closely related to the role of product owners, since they

act as a link between stakeholders that are in need of a solving a problem, and the development team, that provide the solution.

1.2. Problem Formulation

Although, it is clear that the product owner is a critical role for the success of a Scrum project, the role has not been given much attention in academic research. Limited empirical evidence regarding how their role is practiced and challenges they are faced with exist. Moreover, as above-mentioned research has found, practice set against theory of the role of product owners seem to have a gap. The aim of this study is to provide a greater understanding of the nature of the product owner in Scrum projects and as a result this could provide valuable insight for understanding how the role is practiced in the industry, and the challenges they are faced with. The reason for choosing Scrum is motivated by the fact that it is the most popular agile methodology in the software development industry and investigating the role of the product owner is important, given that their role is central, connecting business stakeholders and the development team, where many of the factors for software project failures originate or could be relieved.

1.3. Research Objectives

By investigating the role of product owners in a natural setting, this research will contribute with empirical evidence to an area that needs further to be explored. The first objective is to explore if their actual duties and capacities are aligned to as theory suggests, it is assumed that there exists a gap between practice and theory. The second objective is to explore issues and challenges product owners experience in collaboration between business stakeholders and the Scrum team.

RQ1: What are the challenges arising from the contrast between the supposed stakeholder position of a product owner and their actual duties and capacities?

In order to answer the main research question above, two sub-questions have been formulated.

- *Is there a gap between the supposed stakeholder position of a product owner and their actual duties and capacities?*
- *What are the challenges caused by this gap?*

1.4. *Delimitations*

It is important to mention that there exist several delimitations in this study. Firstly, this study delimit itself to investigate the role of product owners within organizations in Sweden, and only focus on investigating the particular role within the Scrum team. Additionally, product owners that were participated in this study were dedicated product owners, rather than being customer representatives. Furthermore, one limitation of the study is that there existed varying degrees of adherence towards Scrum framework which might affect how Scrum and its respective roles are implemented. Upon implementation of Scrum framework, tailoring is common, finding organization that have completely adopted Scrum framework is rarely the case, some deviations are often found.

1.5. *Contributions*

For the field of information systems development this study contributes with knowledge in the context of agile software development and project management. Specifically, this study contributes with empirical evidence of product owners' actual role in Scrum projects. As research has shown, this role is rarely investigated, despite its importance for the success of a Scrum project. This study also contributes with motivations for further studying issues related to product owners.

2. Literature Review

This chapter serves as a theoretical foundation for the rest of this research. The content of this chapter consists of literature on the following topics; traditional- and agile software development are explained, the Scrum framework is explained, the role of product owner is clarified. Lastly, relevant research relating to the role of product owner is addressed.

2.1. Traditional Software Development and Agile Software Development

Information system (IS) development or software engineering, the terms are often used interchangeably, however the former also considers IS impact on human, organizational and social aspects and not merely technical concerns (Oates, 2005). Building software has been a subject for several decades, and paradigms and methodologies have been developed and reinvented through this time. Authors Nandhakumar and Avison (1999) argue that “traditional IS development methodologies are treated primarily as a necessary fiction to present an image of control or to provide symbolic status” and in a sense “too mechanistic”, suggesting that too much of strict method can be counterproductive.

One of the most significant advances have been the adoption of a linear sequential development models, such as the Waterfall Model (Royce, 1987) in figure 1. The workflow in the Waterfall model is highly structured. The aim of the *Requirements* and *Analysis* phases is to produce system specifications. This is done in collaboration with the end-users who define the goals, services, and constraints of the system. In the *Design* phase, requirements that relate to hardware and software are used to create the system architecture, including abstract designs and relations between components. *Implementation* and *Testing* consist of constructing the system based on the design and verifying it against the requirement specifications. *Delivery* and *Maintenance* is where the system is deployed in practical use and continuously improved by e.g. correcting errors and modifying functionality (Sommerville, 2011).

In traditional plan-based software development, stakeholders were primarily involved in the first phases (requirements, analysis, design) (Huo, Verner, Zhu & Babar, 2004), the idea was that most user requirements (functional and non-functional) are able to be elucidated in the beginning of a project and would not change significantly as the project progresses. While being sequential, in practice the Waterfall Model accounts for changes and provide feedback between phases, but as the project progresses the amount of requirement changes that can be made

reduce significantly and at one point must be frozen in order to continue with implementation (Huo, Verner, Zhu & Babar, 2004). In the Waterfall Model in figure 1., the workflow is highly structured.

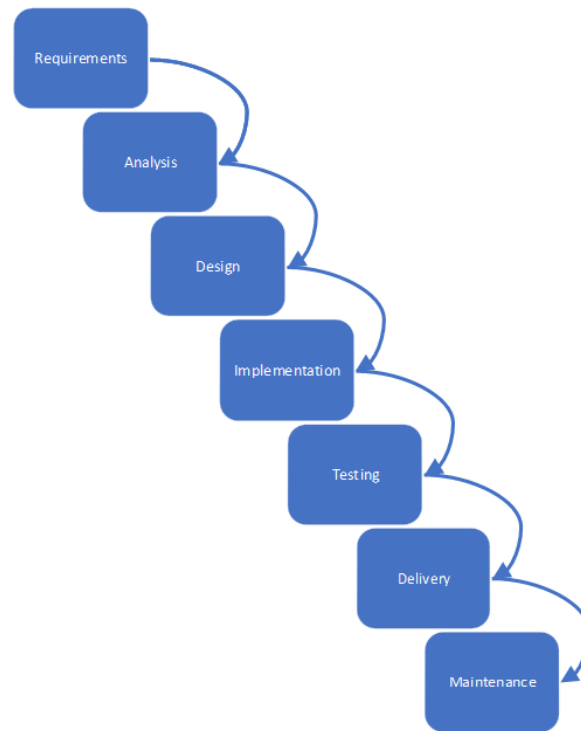


Figure 1. The waterfall model. Adapted from *Software Engineering* by Sommerville (2011, p. 30)

However, this top-down approach is not reliable as initially thought for several reasons (Parnas & Clements, 1986), as experience has shown new product development quite distinguishes itself from predictive manufacturing, which has caused practitioners and academics to seek new ways to develop software. Acknowledging that business organizations often operate in a constant changing environment, formulating fixed specifications of end products becomes difficult. New ways of dealing with uncertain and changing requirements has led to the adoption of iterative and incremental development (IID) methods. IID lies as a groundwork for agile methods (Larman, 2004). Other than working iteratively and delivering working software incrementally, what characterizes IID most profoundly is the customers' involvement during the entire development process. Some of the numerous agile methods used today are; Scrum, XP, Crystal Method, Agile Modeling (AM), and Feature-Driven Development (FDD) (Larman, 2004). What these above-mentioned agile methods and others have in common is that they are guided by certain values and principles.

In 2001, The Agile Manifesto was created as a response to address the difficulties with traditional approaches and consist of four core values showed below, the left-hand side represent agility and is valued more than the right-hand side (Agile Manifesto, 2018).

The Agile Manifesto

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Additionally, twelve principles were stated that support the core values (Agile Manifesto, 2018). The principles described in the Agile Manifesto are summarized below.

- Software should be developed and delivered in shorter iterations, with a focus on the customers' needs in order provide valuable software.
- A focus on changing customer needs during the development of software is crucial and should be seen as an advantage.
- The development team and business people should be able to work daily throughout the development phases.
- Face-to-face communication is preferred throughout daily work, as well as giving trust to individuals to get work done.
- Flexibility and agility to adapt to changes is promoted by good technical designs, as to minimize any additional work.
- The work should be organized around self-directed teams, who should reflect on their work as to become more effective.

Similarly, to the Waterfall model, the agile philosophy has also been criticized. A literature review by Mirsa, V. Kumar, U. Kumar, Fantazy and Akhter (2012) identified and summarized criticisms of the usefulness of agile software development. Some of the found claims are; can impact quality because methods are less rigor, difficulties in involving right people, limited support for distributed development with large teams, limited support for complex and safety-critical software. However, the authors argue that the claims are debatable and are lacking support in literature. Evidence from the 2015 CHAOS Report shows that software projects between 2011 and 2015 that used an Agile method were more successful (39%) compared to

traditional Waterfall development (11%). However, for both approaches over half of the projects found it challenging to meet expected satisfaction, within budget, and on time (Standish Group, 2015). Some of the key success factors were found to be having support from encouraging and assisting executives, involving users in decision-making and feedback, that the product owners and the development team have the right skills for the agile method, and generating a common understanding of the project by having clear business objectives (Standish Group, 2015).

2.2. Scrum Framework

Initially the name for Scrum was inspired by the work of Takeuchi and Nonaka (1986). The definition of Scrum refers to a method that formations of teams use when restarting a play in Rugby (Scrum, 2018). Jeff Sutherland and Ken Schwaber originally presented Scrum framework at a workshop 1995 in Austin, Texas (Sutherland, 1995) and during the coming years Scrum has evolved and been revised several times (Scrum Guide, 2018) and has today become the most adopted agile method (VersionOne, 2017). Compared to other IID methods, Scrum puts emphasis on providing project management practices rather on development practices. However, it is possible to complement Scrum with other methods (Larman, 2004). According to Sutherland and Schwaber (2017), Scrum is” lightweight, simple to understand, and difficult to master”. Furthermore, the authors see it as a framework, rather than a process, technique or method. Within literature one can find many synonymous terms used to label the process. Consequently, in this study terms above are used interchangeably.

2.2.1. Empirical Process Control

Scrum is aligned with the Agile Manifesto and its principles. The Scrum framework is an empirical approach that according to Schwaber (2004) originates from industrial process control theory. Having defined processes for complex software projects is difficult and therefore an empirical approach is advocated (Schwaber, 2004). Schwaber (2004) describe three key aspects of empirical process control as; visibility, inspection, and adaption. Visibility refers to that aspects of the process that affect the outcome should be clear to those individuals involved in the process so that they can judge its validity. Frequent inspection of the process enhances the process itself through detection of unacceptable variances. Unacceptable variances could be aspects of the process that are outside acceptable limits, hence the third key aspect, adaptation is when the process is adjusted to avoid deviation. Abovementioned key aspects uphold the Scrum process and is illustrated in figure 2.

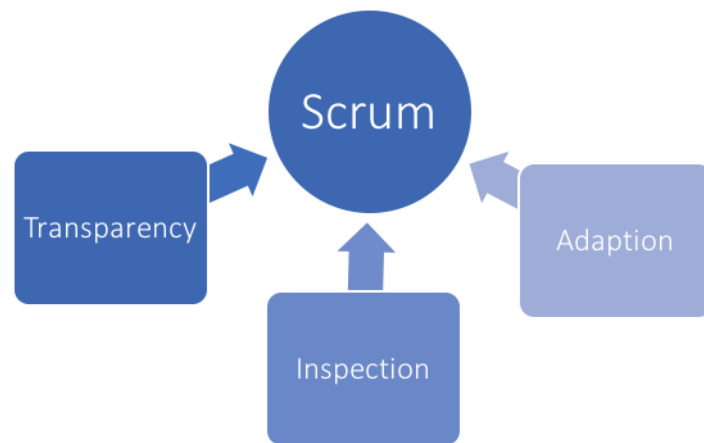


Figure 2. Transparency, Inspection, and Adaption (Source: own representation)

Visibility or transparency in Scrum characterized by having a common understanding of the process between those involved. Those involved in creating the product and those who inspect the work need to share a common understanding of when it is considered “done”. Inspection and adaptation in Scrum are part of the frequent inspection of the events, artefacts and the team composition, if unacceptable variances occur necessary corrections need made to hinder deviation.

2.2.2. The Scrum Process – Events, Artefacts and Team Composition

The core events, artefacts produced, and team composition of Scrum are illustrated in figure 3. and explained below.

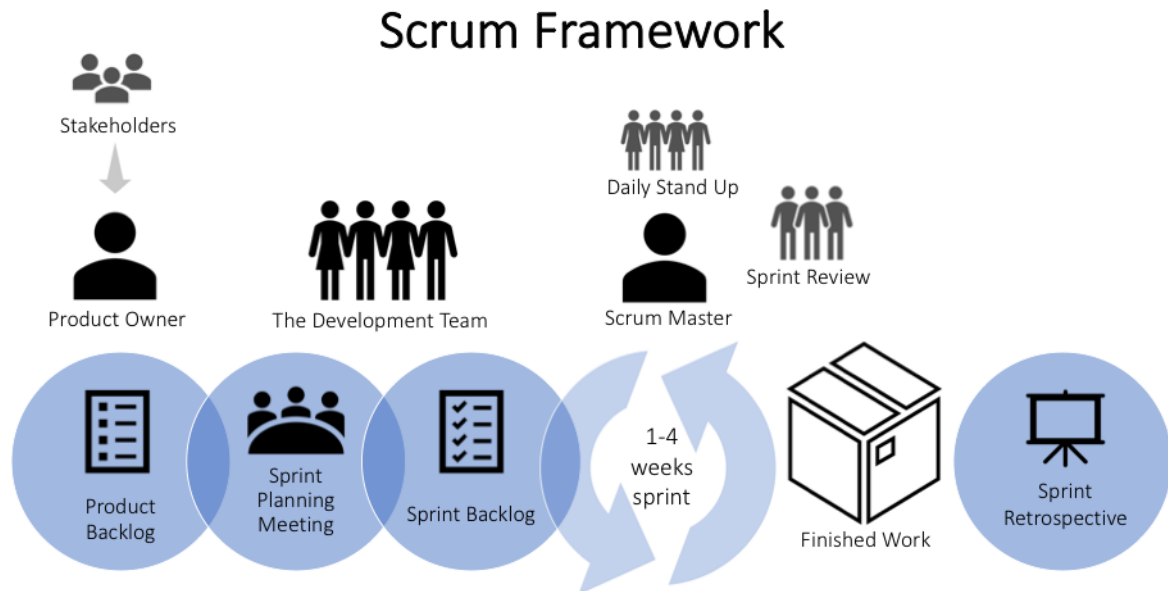


Figure 3. Scrum framework (Source: own representation)

The Scrum master is a management role with authority over the Scrum process. The Scrum master reinforces the development team and ensures that Scrum is realized, and that practices, rules, and values are held up. Other important responsibilities of this role are conduct sprint reviews, monitor the progress of the sprints and remove any impediments the development team might have by participating in the Scrum events. The Scrum master negotiates decision and resolves issues, working closely with the product owner and management (Larman, 2004; Schwaber & Beedle, 2002). In contrast to a traditional project manager whose responsibility among other things also includes defining and managing work, a Scrum master is primary responsible for the implementation and adherence of the Scrum process (Schwaber, 2004).

Scrum depends on small, cross-functional teams for development, ranging between five to nine developers per team. The team should work in an environment that promotes self-organizing work. Limiting the team size is done since a too small team will lead to interaction and productivity loss, and having a larger team becomes more difficult to coordinate because of increased complexity, however creating additional teams is a solution. The teams would then separate the backlog items between each other (Schwaber & Beedle, 2002; Sutherland &

Schwaber 2017). Once the team commits to a fixed amount of work, they are let alone to decide how the work will be completed within one to four-week (common) time-boxed iterations, so-called sprints. The product backlog contains a prioritized list of work that is necessary for producing the end-product. The list is dynamic and is continuously modified throughout the project. Items are not only limited to represent functional and non-functional requirements but could include a variety of needs related to the project (Pichler, 2010). During sprint planning, the developers select features from the prioritized product backlog and form a sprint backlog. When a sprint starts, the sprint backlog is considered frozen, additional work is generally not added. Daily Scrum meetings help team members assess the current progress and address issues, generally three important questions are answered by the developers; What have I done since the last Daily Scrum? What am I going to do between now and the next Daily Scrum? What is preventing me from doing my work? (Schwaber, 2004)

The sprint planning meeting is conducted prior to starting a sprint. It can be divided into two parts. The first part can be considered more strategic oriented, this is where the product owner presents the current prioritized product backlog to the development team and discuss its content so a common understanding of what remains to be done can be generated, then the development team select a certain number of items they commit to deliver by end of the sprint. The second part of this meeting is where the development team make tactical decisions on how to turn the sprint backlog into an increment (Schwaber, 2004). Tactical decision can refer to how a sprint backlog item should be decomposed into tasks and how the work should be distributed within the team.

At the end of each sprint, a sprint review is conducted where the members of the project demonstrate, often with a demo (potentially releasable part of final product) to key stakeholders what they have accomplished and what resides to be completed in the next sprint. This event is important, since it validates whether the project is on its right course, the team get valuable feedback from the product owner and other stakeholders.

A sprint review is followed by a sprint retrospective where the team reflects on their work and seeks to find improvements (Schwaber & Beedle, 2002; Sutherland & Schwaber 2017). The product owner represents the link between the Scrum team and various stakeholders and is explained more in detail in the following chapter.

2.2.3. The Role of Product owner in Scrum

Identifying relevant individuals for filling the role of a product owner and Scrum master can be difficult, certainly for organizations transitioning to Scrum (Cohn, 2010). While management responsibilities can be distributed among team members, only one product owner should exist within a project (Schwaber, 2004) and preferably within one team (Cohn, 2010). The product owner role is defined by Schwaber (2004) as:

“The product owner is responsible for representing the interests of everyone with a stake in the project and its resulting system. The product owner achieves initial and ongoing funding for the project by creating the project’s initial overall requirements, return of investment (ROI) objectives, and release plans. The list of requirements is called the product backlog. The product owner is responsible for using the product backlog to ensure that the most valuable functionality is produced first and built upon: this is achieved by frequently prioritizing the product backlog to queue up the most valuable requirements for the next iteration.”

Contrasting the role of a product owner with traditional roles such as product manager or project manager reveals some differences, some of which depend on the environment the product is developed in. The product owner role involves the authority and responsibility that were traditionally distributed across separate roles. The boundaries of the role are often determined by the project size and complexity (Pichler, 2010).

Pichler (2010) describe five aspects that compare traditional project management and APM as:

Table 1. Traditional Project Management versus APM (Pichler, 2010, p. 26)

Traditional project management	APM
Several roles (product marketer, manager and project manager) share the responsibilities for a product.	A product owner is responsible for the product and directs the project.
Product managers tend to not work directly with the development team.	The product owner is working within the Scrum team and collaborate closely with the Scrum master and developers.
Extensive project research, planning and analysis is done up front.	A vision about the end-product is created that guides the project as it progresses.
Requirements of the product are generally frozen when initially defined.	Requirements evolve throughout the project; the product backlog is dynamic, and change based on feedback from stakeholders.
Customer feedback is received late in the project.	Scrum practices ensure that customer feedback is generated throughout the project (e.g. sprint reviews) which guide the project further.

The product owner should represent everyone with a stake in the project or product. The concept of stakeholders and identification of stakeholders have been widely researched in management literature and often end up in multiple definitions (Mitchell, Agle & Wood ,1997). Freeman (1983) well-known definition define a stakeholder as “a stakeholder in an organization is any group or individual who can affect or is affected by the achievement of the organization’s objectives”. This definition is quite broad as it might encompass anyone who can “affect” or is “affected” by the organizational work. A narrower definition related to software development is given by ISO (2008) as “an individual or organization having a right share, claim or interest in a system or in its possession of characteristics that meet their needs and expectations”. Furthermore, ISO (2008) define a customer as “organization or person that receives a product or service” and a user as “individual or group that benefit from a system during its utilization”.

Schwaber (2004) use the definition “someone with an interest in the outcome of the project, either as she or he has funded it, will use it, or will be affected by it”.

The Scrum framework does not explicitly define who the product owner should be in a project (Sutherland & Schwaber, 2017) however, as a key stakeholder in the project, this can generally be a lead user of the system (Product Owner, 2018). This gives room for several interpretations and scenarios. A stakeholder who is a customer representative or end-user might be the product owner. In another case, this role might be filled with an internal employee (Pichler, 2010). The product owner is responsible for the ROI of the project, consequently this person should try to maximize the value of the product through the use of the Scrum team within a certain amount of time. While being responsible for product backlog management in figure 4., the Scrum framework provide the possibility to distribute some work to other members in the project. However, the product owner remains accountable that the work gets done (Sutherland & Schwaber, 2017).

The Product Owner is the sole person responsible for managing the Product Backlog. Product Backlog management includes:

- Clearly expressing Product Backlog items;
- Ordering the items in the Product Backlog to best achieve goals and missions;
- Optimizing the value of the work the Development Team performs;
- Ensuring that the Product Backlog is visible, transparent, and clear to all, and shows what the Scrum Team will work on next; and,
- Ensuring the Development Team understands items in the Product Backlog to the level needed.

Figure 4. Product Backlog Management responsibilities of the product owner (Scrum Guide, 2018, p. 6)

In order to create a product that matches the desired stakeholder expectations, the product owner need to generate a product vision or define a goal in collaboration with customers, users and other stakeholders. The product backlog should be guided by the vision and contain prioritized features to be developed that provide most business value for the customer. This is essentially the minimum starting point of a Scrum project (Schwaber, 2004) and is evolved, validated and refined throughout the project (Pichler, 2010). A product vision should guide the development team in the right direction, yet not limit their ability to be creative. Pichler (2010) describe approach where a “minimal marketable” product is achieved by envisioning the minimum amount of functionality desired by stakeholders. Feedback can then be generated and validated against the vision. The Scrum master and development team should support the product owner

in activities related to product backlog management, such as refining (adding, removing, modifying, estimating) tasks. (Pichler, 2010)

Pichler (2010) describe the role as a leader, providing guidance and direction to everyone involved in the project, thus a certain amount of decision-making authority within the organization is needed. Being able to make strategic decisions (e.g. deciding upon needed functionality) and, on the other hand, the product owner should also be a coworker collaborating with the Scrum master and developers regarding tactical decisions (e.g. sprint goals, work distribution), however without imposing formal authority over them (Pichler, 2010). Cohn (2010) explain that the product owner also has the responsibility to set boundaries of the vision, e.g. constraints of when certain work needs to be completed and when it's considered "done". It is important that the product owner can carry out their responsibilities and as well be available to the team when needed, co-locating all Scrum team members is consequently preferred (Pichler, 2010).

In order for the team to commit to a sprint goal during the sprint planning, the product owner has the responsibility to organize the product backlog so that it promotes self-organizing work, as well as attending the meeting, since any clarifications of "what" needs to be done might be needed, as well as when it is considered "done" (Pichler, 2010). Cohn (2010) discuss the issue of who should create the product backlog, meaning that while the responsibility of its existence falls on the product owner, other members of the team can be entrusted to implement it. This is also in accordance with what Sutherland and Schwaber (2017) suggest. What is important is that the vision of the product is communicated so that misunderstandings can be reduced. During sprints when daily Scrum meetings are conducted it could be beneficial as a product owner to attend these, since impediments could as well be resolved by the product owner. The visibility of progress of the development team during the sprint could be showed through easily accessed "task boards" and "sprint burn down charts". (Pichler, 2010)

The sprint reviews provide the transparency of the progress of the project to key stakeholders. As a product owner, this meeting serves as an opportunity to compare the product increment against the sprint goal. Investigating the product increment should involve either approving or rejecting developed functionality based on definitions of "done". Furthermore, key stakeholders are able to judge and provide feedback (Pichler, 2010). During the sprint retrospectives, the development team can review and reflect on how their tactical work have been conducted in order to seek to find future improvements. Attending this meeting as a product owner gives an

opportunity to understand issues and challenges that the team is experiencing. Pichler (2010) note that this could also be beneficial since issues regarding unapproved functionality during sprint reviews could bring up the root causes which then should be addressed.

2.3. *Related Work*

Information regarding the role of product owners exists however, few academic studies have investigated the challenges product owners face. Mann and Maurer (2005) investigated the effects of introducing Scrum in an industrial setting. The study was conducted over the course of two years and the effect was measured before and after Scrum was introduced. The result showed that customer satisfaction increased, and overtime decreased after Scrum was implemented. Closer collaboration between stakeholders and the Scrum team was seen as a driver for this. The stakeholder involvement in Scrum events such as daily reviews, sprint planning meetings, and retrospectives improved the transparency and coordination of the project. Issues regarding the sprint planning meetings were identified and related to the product owner/project manager not being prepared enough before the sprint planning meeting. This led developers later during sprints to struggle with making decisions on what functionality should be developed, which should have been done in the planning phase in collaboration with the stakeholders.

In another study Moe, Dingsoyr and Dybå (2010) investigated the introduction of Scrum in a company over the course of nine months. Their study focused on human sense making and teamwork. Issues affecting the development team such as to not knowing what to develop, ending up working with tasks not planned in the sprint planning or having a clear vision of the end product were observed. This was also noticed by the product owner who described the challenges of “giving clear direction, support, and structure” to the developers. The developers felt somewhat excluded in the sprint planning meeting, saying that the communication mostly occurred between the Scrum master and product owner. Managing the sprint backlog was difficult, since unanticipated tasks that were discovered after the sprint planning meeting. This was a consequence of the need to adapt to changing project requirements.

In an attempt to study the role of product owners in comparison between theory and practice Sverrisdottir, Ingason and Jonasson (2014) found that responsibility of the product owners varied across organizations and rarely as the Scrum method prescribes, furthermore participants used project management practices that they perceived fitted their processes, indicating that there exists a divergence between how theory is practiced regarding this role. Factors found to

influence the success were organizational culture, nature of project, management approach and inter-team communication. Paasivaara, Heikkilä and Lassenius (2012) studied challenges related to scaling of the product owner role in globally distributed Scrum projects. They found solutions that seemed successful to be having site-specific product owners, which in turn would lead to frequent communication between the development team and product owner. Creating a product owner team would aid in inter-team coordination, for example if different development sites are working on related features. Clear prioritization of features by the product owners were found to be important to avoid disagreements.

Drury, Conboy and Power (2012) examined decision-making within Scrum across an iteration cycle. Through a focus group of 43 attendees', decisions that were considered to be made over iteration planning, iteration execution, iteration review and iteration retrospective were documented. Later, the focus group discussed issues and obstacles hindering decision-making in an iteration. The authors identified six main reasons hindering decision-making. The reasons related to; (1) team members having a lack of commitment towards making decisions because of uncertainties (2) conflicting priorities from stakeholders made it difficult for the team to prioritize work (3) team members becoming unavailable during an iteration, leading to less resources available. (4) lack of communication regarding changed requirements affect the team's adaptability and possibly the end-product. (5) Ownership and accountability of decisions are not addressed. (6) Team empowerment can diminish experts' knowledge.

Lehtinen, Virtanen, Heikkilä and Itkonen (2015) research focused on the difference between the expectations of product owners and the actual outcome of development teams. Their single-case study focused on a large distributed software organization applying Scrum. Reasons for not meeting expectations was lack of collaboration between customers and development teams. Because of vague requirements, the product owners experienced difficulties prioritizing the product backlog items and communicating them to the developers. The main reasons for not meeting expected outcomes was that the product owner role was not applied in accordance as the Scrum framework prescribes. For example, the product owners themselves were not involved in the elicitation and defining requirements but were done by third-parties. The product owners were co-located customer representatives, however their participation in majority Scrum events were described occasional and passive.

3. Methodology

In this chapter, the methodological approach behind this research is presented and motivated. The chapter explains the philosophical stance this research adopts, the research strategy, the data collection methods, and the chosen technique of analysis. Lastly, a discussion regarding the reliability, validity and ethics of the research is made.

3.1. Methodological Approach

Since the problem statement of this study concerns a critical role in Scrum, and has rarely been investigated, this study adopts an interpretative philosophical stance and is exploratory. Oates (2005, p. 292) describes interpretative research as “interpretative studies do not prove or disprove a hypothesis, as in positivist research, but try to identify, explore and explain how all the factors in a particular social setting are related and interdependent”. This decision is motivated by objectives of this research by exploring the role of product owners in practice as well as to gain better understanding of challenges they face in Scrum projects.

Further, Oates (2005) describes six characteristics of interpretative research as; (1) multiple subjective realities, (2) dynamic, socially constructed meaning, (3) research reflexivity, (4) study of people in their natural setting, (5) qualitative data analysis, and (6) multiple interpretations. (1), refers to that individuals perceive their world based on their own knowledge and beliefs, hence different individuals and groups of individuals might or might not share the same views. (2), whatever is perceived as reality for individuals or groups are transmitted through social constructs such as language and shared meanings. (3), researchers must strive to be neutral throughout the research process, they must acknowledge their ability in which their own assumptions, beliefs, and values can influence the outcome of the research. (4), studying participants in their natural setting and from their own perspective. (5), qualitative data analysis is favored such as words, metaphors, and mental models they share in various ways. (6), it is expected to end up with multiple explanations for phenomena.

The chosen research strategy for this study is case study research and the unit of analysis are product owners in Scrum projects, a case study is preferred when research is exploratory, and can include both single- and multiple-case studies (Yin, 2014). Further, Yin (2014) explains that case studies are done when researchers want to investigate a contemporary phenomenon in-depth, within its real-world context and when the researcher has little or no control of contemporary set of events. The strength of a case study approach lies within its ability to deal

with diverse evidence, such as documents, artifacts, interviews, and observations (Yin, 2014). Regarding the applicability of case study research within different philosophical paradigms, an interpretivist stance is suitable when “acknowledging multiple realities have multiple meanings” (Yin, 2014).

3.2. *Data Collection and Analysis*

The data generation method in this study were of qualitative nature and the technique used was interviews. Interviews are suitable when researchers want to obtain: detailed information, ask complex questions, and explore experience of individuals which could not be easily be observed through e.g. a questionnaire (Oates, 2005). The interviews were semi-structured and consisted of open-ended questions. Having open-ended questions opens up the possibility for the researcher to identify additional information not anticipated in the beginning, since interviewees can diverge into other issues. Since questions asked to respondents were open-ended, having semi-structured interviews were preferred over structured interviews, since respondents at times continued in to discussing topics that were related to another section of the interview protocol. Being flexible and able to adapt the order of questions asked to interviewees gives a natural conversational flow during the interview as well as ability for interviewees to introduce new issues of their own that might be of interest for the researcher (Oates, 2005). Interviews do however possess some disadvantages in contrast to other data generation methods. Conducting interviews is time consuming, and in many cases the recorded audio is often transcribed. This also typically leads to less data being collected compared to quantitative efforts such as surveys and questionnaires’, however is favorable for exploring phenomena with fewer instances but rather more in-depth. There is also a risk of artificial answers when recording interviewees which can impact the outcome of the research (Oates, 2005).

3.2.1. Interviews

During the period of data collection, a total of eight interviews were conducted, and each of them took roughly one hour. The researcher opted to interview both product owners in practice and agile consultant/coaches with experience as product owners. The reason for including agile consultant/coaches amongst interviewees is because they possess another perspective of how the product owner role is practiced, as often they are assigned to coach product owners. To find suitable interviewees research was done using web search engines in order to locate organizations that explicitly state on their website that they are practicing Scrum. Organization

that explicitly stated they followed Scrum were contacted through e-mail with information of the study taking place.

A total of eight interviews were made, five respondents worked during the time as product owners in different companies. Three respondents worked as agile consultant/coaches with varying work experience as product owners. The interviewed product owners were asked to reflect on their current work situation while the agile consultants/coaches were asked to reflect upon their latest product owner employment as well as additional experiences working with other product owners. Three interviews were conducted face-to-face with interviewees (2 product owners and 1 agile coach), the rest of the five interviews were conducted through telephone. It was preferred to conduct all interviews face-to-face however, it was not possible for a number of reasons. Long location distances between respondents and the researcher, and interviews booked tightly, as well as the respondent's ability to meet in person were limiting factors. Before establishing a booking with the respondents, each of them was provided with information of the aim of the study and what data would be collected and how it would be treated.

Below in the table 2., an overview of the interviewees. Information regarding their roles, company industry sector, and type of product is presented.

Table 2. Interviewed respondents

Respondent	Product owner/Agile coach	Company Industry Sector	Product
PO1	Product owner	Media	Digital Magazines
PO2	Product owner/Scrum Master	Municipality	GIS-platform
PO3	Agile consultant/coach	Consultancy	Banking solution
PO4	Product owner/Scrum Master	Financial	Shareholding service
PO5	Product owner	Software	Infrastructure platform (cloud)
PO6	Product owner	Financial	Pension and insurance service
PO7	Agile consultant/coach	Consultancy	Web platform (websites)
PO8	Agile consultant/coach	Consultancy	Banking solution

Each of the above conducted interviews were audio recorded and later on transcribed, this was done continuously after each interview was completed. In order to be able to conduct a thematic analysis, it is preferred to get the data into a suitable reading format, as coding data extracts is a process during such analysis.

3.2.2. Thematic Analysis

Since the data collection considers qualitative data, the natural choice of analyzing the data was decided to be through thematic analysis. Thematic analysis is used to identify themes or patterns within the collected data (Oates, 2005; Braun & Clarke, 2006). There exist a various of different

techniques within thematic analysis, but their purpose is the same. For this study, the choice of type of thematic analysis was following a general six-step process by Braun and Clarke (2006) which has been widely used in psychology and other fields. One of the advantages of using thematic analysis is that the method itself is independent from theoretical or epistemological assumptions (Braun & Clarke, 2006). Below an overview of how the thematic analysis was conducted is presented through explaining the six steps.

The first step involves familiarizing oneself with the data. In this step, the audio recordings were re-listened and transcribed. After transcribing all interviews, the complete data corpus was reread, and an initial understanding was established of the content.

The second step was to take each interview transcription and generate initial codes for that particular data set. Data extracts from the interview transcriptions were organized in tables with what they were coded for. Since the research involved exploring how the product owner role is practiced in the industry, and theory regarding the responsibilities of the role are known, codes were to a degree theory-driven (Braun & Clarke, 2006).

The third step involves reflecting on the initial codes developed in the second step. Similar data extracts and codes were organized, and initial candidate themes were formed.

During *the fourth step* candidate themes that had been developed in the previous phase were refined and reviewed in terms of their applicability. Reviewing was done on two levels; the first level of revision was done on data extract level and the second was done on theme level. This was done to ensure that the data within themes cohere yet are different on theme level (Braun & Clarke, 2006).

The fifth step involves additional refinement and reviewing of the emerged themes as to ensure that they would fit well together but do not overlap so to making it easy to identify the core of each theme (Braun & Clarke, 2006).

The last and *sixth step* involves finalizing the report, including providing enough evidence in the form supporting data extracts for a given theme and phenomena. Other than this above, empirical data should go beyond presenting results but also put them in relation to theory and essentially the research question.

3.2.3. Gap analysis

The intention of a gap analysis is to generate understanding if there exists a gap between a current state versus a desired state. When a gap has been identified to exist, shortcomings that have been identified to cause the gap can be addressed to close the gap. Gap analysis as a technique has been used in variety of areas. For example, Bunse, Vodicka, Schönsleben, Brühlhart and Ernst (2011) used a gap analysis to address that there exists a gap between practice and theory and the implementation of energy management in production and Winch, Usmani and Edkins (1998) used it to understand challenges of managing projects. In the context of agile software development Rauf and AlGhafees (2015) used a gap analysis between theory and practitioner experiences to investigate benefits and issues to adoption of agile practices. The application of such a method suits when investigating actual state versus desired state or expectations versus experiences.

3.3. Reliability, Validity and Ethics

Reliability within research is often centered towards how reliable the results of a study is in terms of replicability and reproduction of results. Such mindset is often linked with positivist research. Interpretivist research on the other hand argue that phenomena are social constructions by individuals, hence different individuals will have varying mental models. Such mental models are influenced by several factors and can change during time or be influenced by the researcher. Interpretative researchers conducting the same study will therefore unlikely produce the exact same results (Oates, 2005). To support reliability of this study and increase the trustworthiness, the process of how the data was gathered and analyzed is explained, motivated and factors that might impact the research are discussed.

Oates (2005, p. 293) describe internal validity as “the extent to which findings are accurate, match reality and measure it correctly, that is, whether the researchers are justified in saying that A causes B and a causal relationship exist ‘in reality’”. Contrary to positivistic views and as mentioned in section 3.1 *Methodological Approach*, interpretative research accept that multiple subjective realities exist, and specially in individual real-life occurrences such can be difficult to benchmark against (Oates, 2005). To increase internal validity, any uncertainties during data collection were explored, e.g. when asking respondents to clarify or elaborate answers. Furthermore, to increase internal validity the literature review, related research on the topic and qualitative data collection were triangulated.

External validity is described by Oates (2005, p. 294) as “the degree to which to which findings are generalizable to different people, settings, and times, and depends on how representative the research samples are”. Transferability of findings within interpretative research may be generalizable, despite often having unique contexts, there is a possibility that generalization can be done based on providing adequate descriptions, and the readers judgement (Oates, 2005). To increase external validity the researcher chose to both collect information from product owners in practice and agile consultants/coaches. In order to further increase external validity, more data would be beneficial to collect, which during the fixed time frame of conducting the study was not possible.

Oates (2005) describe responsibilities of ethics when conducting research. In this study ethics in the form of the rights of participants and responsibilities of the researcher has been addressed. Participants had the right to give informed consent prior to conducting the interview. Information regarding the nature of the research was provided and included the purpose of the research, information of the researcher, that the interview would be audio recorded and transcribed, that they may be quoted, and that they could be guaranteed anonymity and confidentiality. At any time during the interview the participants had the opportunity cancel participation and leave without any further explanation. During the booking of interviews, some participants requested anonymity, consequently a decision was made by the researcher to anonymize each of the interviewees, their organizations and other personal information that may be linked to them. Anonymizing such information was determined to not affect the research outcome in any way.

4. Description of Cases

In this chapter, each respondent case is presented as to support Chapter 5 Results. A brief introduction of the organization, participant role, product, team structure, and degree of Scrum framework implementation is given.

PO1 works as a product owner and owns several digital products in an organization within the media and advertising sector. The organization provide both physical and digital products in the form of magazines. While the physical products have corresponding digital products, the content within each of them may not be completely identical. Due to shifts in the market and lower physical sales, digital products have been given more attention in recent time. The respondent explains that the Scrum team consist of nine members and is divided across two separate office locations. Having four developers (of which one developer is Scrum master) and two product owners at one office, and at the other office one product owner and two developers. While the product owners have individual portfolios of digital products they manage, they work collectively and decide together regarding all products. Regarding Scrum practices, the respondent explains that Scrum has been implemented for at least three years and that the team follow two-week sprints. Daily stand-ups are practiced. Sprint planning are held before starting the sprint and reviews and retrospectives are held after a sprint is finished.

PO2 works as a product owner within an organization in the public sector. In terms of the product in relation to Scrum, the respondent explains that the product is a GIS-Object which is accessed and used by various end-users (external and internally to the organization). While working as a product owner, the respondent also has the role of a Scrum master. Scrum has been quite newly implemented for approximately six months prior to conducting the interview. The Scrum team consist of eight members, product owner (also working as scrum master) and seven developers. The Scrum team is part of a larger IT-staffing within the organization. Regarding practices followed the respondent tells that daily stand-ups are practiced three times a week. The sprints are generally set to three-weeks, and sprint planning and reviews are part of it.

PO3 works currently as an agile consultant/coach and within change management within a consultancy organization providing services related to agile method coaching e.g. change management within IT and product owner/scrum master assignments. The respondents most recent work experience as a product owner was at a bank. The product owned by the respondent was a part of a banking solution (desktop/Android/iPhone) applications, to the best of knowledge of the respondent, eight other product owners worked with other parts of the product. Scrum had been implemented for at least one to two years. Each Scrum team had two appointed product owners (one mainly responsible, one assisting), both product owners had mutual and exclusive project within the team they managed. The development teams consisted of two outsourced teams consisting of between seven and eight developers, the product owners were not co-located with the development teams. Regarding Scrum practices, the respondent explains that all practices described in the Scrum framework were implemented, sprints were set to two-weeks.

PO4 works as a product owner and a Scrum master in an organization within the financial sector providing shareholding services. The agile mindset and in particular Scrum have slowly been implemented over the course of two and a half years. Considering Scrum practices, the respondent explains that daily stand-ups and sprint planning are practiced, however that they way of working is similar to Kanban where sprints sometimes are omitted and instead a continuous workflow is used to be able to release software whenever needed. Retrospectives are sometimes practiced, primary when the team considers some part of their work needs to be improved. The development team consist of ten members divided between back-end and front-end. The respondent explains that the back-end division is working less agile since such work is less flexible compared to the front-end part where work can be divided into smaller releases.

PO5 works as a product owner within an organization within the software sector providing business systems, the product itself is the technical infrastructure platform. The respondent describe that the organization is mature in terms of practicing Scrum, however that while Scrum has been practiced it has been tailored with Kanban. Instead of sprints, work is continuous with a fixed reconciliation at the end of each week. Daily stand-ups are practiced daily, sprint retrospectives are practiced at two-week intervals where the team reflect on their work. Within the Scrum team there exist one product owner, nine developers, one chief of development, one Scrum master and two testers.

PO6 works as a product owner in an organization within the financial sector. The product owned by the respondent is a pension and savings insurance service provided online. Scrum has been implemented for several years, and to the best of knowledge of the respondent approximately for five years. Sprint reviews are not practiced regularly, since the development team is quite back-end heavy and e.g. demos are not always suitable. Daily stand-ups are practiced, as well as sprint planning and sprint retrospectives. The sprints are generally nine days long to cope with the frequent releases of software. The Scrum team composition consist of one product owner, six developers (of which one is a Scrum master) and one product specialist.

PO7 is an agile consultant/coach and currently work as a Scrum master and agile coach at a customer site, coaching the product owners at the organization. PO7 latest assignment working as a product owner was at an organization providing a web platform and the product was the web platform itself as well as four web sites. The team structure consisted of one product owner, nine developers (of which one was a Scrum master). PO3 explains that Scrum has been implemented for four years. Regarding the Scrum practices, all of the defined practices in the framework were practiced. The development team followed a three-week sprints schedule.

PO8 works currently as an agile consultant/coach. The most recent assignment as a product owner was at an organization within the gambling sector, providing various casino games. To the best of respondent's knowledge, Scrum had been implemented approximately six months prior to the employment of the respondent. Regarding the Scrum team composition there existed one product owner, five developers (of which one was a Scrum master), and five graphic designers, as well as two testers. The defined Scrum practices within the framework were practiced, sprints were two-week long.

5. Results

In this chapter, analyses and results from the emerged themes are described. The emerged themes cover; product owner responsibilities, challenges with the role of product owners, authority as a product owner, product vision, relation with the product, and importance of an agile transformation.

5.1. Responsibilities

Majority of the respondents described their role as product owners as standing or acting as a hub between the operational side of the organization and the development side, by representing and carrying on the request and needs from stakeholders to the development team. One respondent expressed also a responsibility to represent the stakeholders towards the development team and vice versa, acting as a channel of communication, expressing needs from both sides e.g. if an implemented feature needs to change after implementation or the team needs more time during implementation. Another respondent expressed also that being a product owner is in a sense as being a filter between the operational side and the development side, since they should be able to work in their pace and not be overwhelmed with work.

“It is important that I can solve some things myself, and not bring everything to the development team, /.../ so that developers are aided and only matters which need technical expertise are brought to them. /.../ I think it’s important that there is a filter between development and the organization, otherwise they will be overwhelmed with things to do all the time.”

PO1

The product owners express that their responsibilities include meeting with various stakeholders in the organization and bringing in their needs, managing them and weighing each stakeholder needs in relation to each other, prioritizing them and explaining those needs to the development team.

“/.../ To make sure that my product delivers as much value as possible in every iteration, and that value is decided by me in relation to the whole business or organization. As a product owner, I need to communicate with stakeholders on a regular basis to be able to decide /.../ what the customer value is, /.../ business

value /.../ and make an assessment of the prioritization towards the development team.”

PO7

The way to elucidate the needs from stakeholders is primary done through meetings with internal stakeholders or conducting workshops. In one case, the product owners relied upon primary using a case management system to communicate with stakeholders. Stakeholders could create matters expressing their needs regarding the products, since product owners owned several products and stakeholders were distributed across two offices this was one way of organizing their requested needs.

The respondents' work includes prioritizing and decision making regarding what should fit in the product backlog and preparing the product backlog before sprint planning sessions. Some respondents explained that the prioritization is affected by what work needs to be done on both short and long-term span for the product, in order to make a plan for the developers. Amongst the respondents prioritizing needs by business value was seen as the most important criteria since revenue could be generated. Customer feedback, user value and product health were also considered, but to a less degree compared to business value. Some respondents stated that the prioritizing needs sometimes involved relying on one's gut feeling and using common sense, since the decision was based on what is was thought the user or customer wanted.

”/.../ there could be a mix between gut feeling and aggregation between different stakeholders, and in a bank that could range from a vice president just wanting something, and to feedback that have been submitted from customers.”

PO3

To be able to motivate for the developers why certain works needs to be done was seen as important amongst all the respondents in order to avoid any misunderstandings and to make the developers understand the business perspective of a need, since developers were more technically oriented. All of the respondents had responsibility maintaining the product backlog which included managing the content of the product backlog, modifying it on an ongoing basis, e.g. through refining or grooming the product backlog. This was done either by the product owners themselves or by also involving the team.

Regarding the management of needs and expressing them in the product backlog, the degree of strategic and tactical involvement amongst the respondent varied. It was common amongst respondents to describe their role as more strategically oriented, planning and explaining what needs are most important to focus on and motivate that to the team. Some respondents were due to having experience and possessing domain knowledge in software development able to be involved in detailing out the requirements and acceptance criteria. One respondent stated it involved being a mix of both strategic work and tactical work. Strategic in the sense of deciding on things that have to be developed by team members and tactical by trying to view him or her-self as an end-user of the product, if it was good enough or needed changes. Others relied on the team to further take the initial needs and product backlog items to a more technical level.

”/.../ I do not at all possess the insight that the [developers] have and the competence so I need sometimes that someone takes the matter to another technical level and specify it more.”

PO1

One respondent emphasized focus on being present during team activities and ceremonies, that is prioritizing the team. Being co-located and present was described as making the team more secure and to increase the team cohesion. Several respondents shared the thought of questions and issues to be solved faster if the product owner was available and present. Some expressed the ambition to be more present as the ball-planking solves problems.

” I try to be present at all time. /.../ I think it helps our unity as a team, to not feel unconfident. /.../ Often, the developers have questions regarding some projects, which is why I think it is important for me to be available as much as possible.”

PO1

One respondent stated having their desk closely to the team and expressed positively towards not having other responsibilities or duties. It was explained to help a lot since the product owner was able to answer possible questions directly.

“Sometimes having a product owner that is not available more than 30-40 % of the time is a problem. It results in developers waiting for answers while stuck with the issue.”

PO4

The majority of the respondents described the problems of product owners being unapproachable. Some described it as the more the product owner was on other meetings, the more he or she distanced him- and herself from the team, both physically and mentally. One respondent explained the importance of participating in events e.g. sprint retrospectives despite not saying anything in order to catch questions and concerns and of participating in late night development and reviews to show dedication and involvement.

5.2. Challenges

The respondents expressed that the role of a production owner is at its own a very challenging role for several reasons and that prioritization is the only tool one really has which can be challenging in e.g. situations where product backlog items become mutually exclusive, where implementing one product backlog item would totally rule out the other one. Majority of the respondent felt the need to both satisfy the operational and development side of the organization, and as well users of the product which can be challenging.

“It can be difficult to satisfy everyone /.../. One wants to do good, /.../ and sometimes it can be difficult to determine what needs are most acute.”

PO1

One respondent discussed the issue of how the role is actually described within the Scrum framework. The respondent means that the Scrum framework is quite implicit regarding how the product owner role should be performed.

“/.../ My perception has quite some time been that Scrum was created by developers for developers in some way /.../ the [product owner] role is relatively good but it has been developed as “now one person comes in and knows everything and tells how it should be done” /.../ one has not cared a lot about describing [how] it should be done or [how] the [product owner] should get all the information to be able to make such decisions.”

PO3

The challenge of having the right amount knowledge to make right decisions regarding the product was brought up by several other respondents. Having the right domain knowledge is difficult and in order to become a good product owner, one needs in a sense to be a domain expert to be able to make decisions. A consequence of not having right domain knowledge

would as one respondent describes lead to one falling in the knees of other people who all want different things, and then it becomes difficult to make sound decisions, and yet as a product owner one is in the end responsible for the project or product.

One respondent stated that the lack of domain knowledge in certain areas of the product being developed affected how the product owner role became dependent on other roles within the Scrum team who possessed knowledge how the product would be visualized.

“It becomes very difficult for me to make decision regarding things that I do not possess any competence of, /.../ then it led to me relying on and including the [Art Director] as much as possible, /.../ the [Art Director] became as part of a product owner over the graphical parts.”

PO8

The biggest challenge expressed by respondents was to generate an understanding of what work was most important to be done and how it should be prioritized in the product backlog. The needs coming from stakeholders can sometimes be difficult to understand if information regarding the need has been lost in the chain of communication through the organization or from end-users till they come to product owners. This can happen if a product owner is not directly communicating with the stakeholders. The consequence expressed would then lead to maybe not understanding the root cause of the need.

“/.../ the real needs will always, or at least often, come from somewhere on the floor /.../, it may be a supporter or a customer manager requesting something, which then is passed to another level in the organization /.../ which is where the needs later come from, /.../ and when the needs come to us they have been altered resulting in us not having complete information, making it difficult to identify which problem is requested to be solved.”

PO5

Some respondents expressed challenges related to stakeholders rather than coming with needs in terms of problems they want to solve often focus on expressing needs in terms of solutions, thus being more solution oriented. This is related to stakeholders not being able to have an overview of their how their needs will affect the product and other stakeholder needs. The solution may not be suitable for the product for various reasons. What the respondents want instead is stakeholders to express needs in terms of a problem to be

solved and expressing the business value of a need. As a consequence of now knowing exactly the root cause of a need might lead to implementing some feature that in the end did not get used very much or provided any business value.

“/.../We have implemented things which have been said are going to be used a lot and but in end actually two persons used it. Then if you take the development effort versus the benefit there is a mismatch”

PO5

“/.../ I mean in the end it could be that this function shouldn't exist at all, that is the problem, not that it is a bit wrong /.../ that's definitely one of the hardest challenges /.../ to make the [stakeholders] that who came with “you need to implement this” /.../ make them understand that it's going to become better if you let me follow the problem to the source.”

PO3

Another prevalent issue amongst the respondents was the responsibility as a product owner to prioritize the product backlog when the development team is faced with maintenance needs of the product as new needs are scheduled to be implemented. Maintenance tasks can be in the form of resolving e.g. critical bugs or other modifications to the product which can conflict with original plans.

“/.../ there are always needs coming [from the management] and that is challenging, /.../ which means that we must do new things, that is new development, and maintain the thing they already have, /.../ including the maintenance in a good way in the sprints can be difficult.”

PO2

5.3. Authority

All of the respondents stated that they are accountable and responsible for the product backlog. However, when it comes to what the product backlog includes and who has the authority to decide the content, the ultimate decision was by the majority defined to be reached in collaboration with others. That is by some of the respondents described as a process that includes a discussion between the product owner and several different participants opinion.

“We always [decide the content of the backlog] with the operational side. We often have workshops together with developers and the operational side, /.../ the operational side often have needs [with deadlines], /.../ and the developers may throw in some ideas for it with other needs or deadlines, so we create a solution together.”

PO4

One respondent explained the relation between the product owner’s responsibility of the product backlog and the operational sides authority stating that the operational side always decide what should be included in the backlog, while the product owners, in cases of discovers of e.g. critical bugs, sometimes themselves take responsibility to prioritize these critical bugs as they see them as obvious that it should not be necessary with a decision by the operational side regarding them.

” I do [have the responsibility of the backlog prioritizing], but it is always the operational side that decides what should be done, in discussion with me. But it is me that collect needs from the whole operational side, then we take a shared decision about what should be prioritized.”

PO4

Some respondents also expressed the managements authority to decide and influence the product backlog, resulting in a need of the product owners to adjust accordingly.

“I have the responsibility, but our management group is also involved. /.../ the management group can decide to start and focus on a big project, making me adapt to it. In that case, I know that all things concerning the project should be prioritized. /.../ I can also put things that I myself think is appropriate.”

PO1

On the other hand, some respondents expressed that the discuss and decisions regarding the product backlog are mainly in the product owners’ hand except for cases of big projects, in which steering groups are consulted in needs of input on the product backlog.

“I am the object leader, /.../ and as an object leader I am responsible for this GIS object on the IT-side, and then here is a counterpart on the operational side. Us two are the ones with the authority of deciding what should be in the backlog. If

something should be re-prioritized or should be picked in or off, it is us deciding it together.”

PO2

“If it concerns a big thing, we have a steering group. In that case, we leave a decision basis to [the group] and then [the group] takes the decision.”

PO2

However, one respondent stated that the decision of consulting a steering group is on the product owner itself. The existence of a steering group was rather described as a support for the product owner’s own decision making.

“Yes, [I decide what should be included and prioritized in the backlog], and then we also have a steering group, which is from where I can get help and support to double-check what the operational side is expressing as the most important.”

PO5

5.4. Product Vision

Some respondents stated that the products owner’s role does not include involvement or reflection upon a product vision for the product. One respondent even explained that the product owner does not look at the envisioning as something that is assigned the product owner. What guided the product was rather the needs coming from various stakeholders and was seen as work to be done. No additional reflections of any vision among product owners were seen as a responsibility. Another respondent defined the product owner as more operative and not as strategic and visionary, which included different duties.

Another respondent explained that the product owner is not directly involved with generating and communicating the vision for the product. Vision and direction for the product was rather communicated on a much higher level in the organization. The majority of the respondents shared the view that the vision should be managed by the management and not by the product owner. One respondent shared the thought that the product owner is not responsible for creating the vision, but rather remembering it and frequently reminding others of the vision. That was sooner explained as an attempt to not reduce the management.

“/.../ I think that the management should have the vision, and that it is the product owner’s role to remember the vision, not necessarily to create it, I think. Because

if you use Scrum or any other method or philosophy, you push the management away, /.../ which can be quite problematic and controversial. I rather think that the management should create the vision, /.../ but I absolutely think that the product owner should pay attention to the vision or a part of the vision.”

PO3

However, one respondent expressed that the vision of the product is in the head of the product owner at all times. The vision may though vary, especially when the project is taking longer time. The envisioning was described as a challenge as the vision is a mutual thought. Another respondent described the product vision as something that is created collectively between the product owner and the chief of the development team and that is continuously coordinated.

“One can have a vision of how the work should be done, so we sit down and discuss at regular intervals, /.../ both me and the steering group discuss how I think we should work. I often speak to the chief of the development and we even discuss with the Scrum Master”.

PO5

The product vision was by one respondent described as something that the product owner has a part of. The respondent explained that the product vision earlier was made by the product owner and the development team together. Nowadays, the product vision is pitched by the product owner and introduced to the development department.

One respondent described the visioning as a part of the prioritizing process. The respondent stated that deciding upon implementing a need because of potential business value might be affected by the vision of the product, e.g. the questions if that need will fit in in terms of a longer period of time. The communication of the vision to the developers was explained during backlog refinement and sprint planning.

5.5. *End-product relationship*

Of all the eight respondents, four respondents considered him- or herself as an end-user of one or more products. One respondent explained that the products were by him or her consumed both during work as well as on free time. The respondent expressed positive attitude and advantage to have a product owner and end-user relationship, including discovering new opportunities with the products.

“As with other products one works with on a daily basis, one learns a lot about it and becomes more genuinely interested of it. Each morning I tested [the product] for 15-30 minutes, partly to see how the product has progressed from the day before, partly to help the testers.”

PO8

A common statement was that not all products were able to be used by the products owners. One respondent explained it by highlighting the issue that the product owner is not allowed to use the products in specific industries. However, the product owner was in some cases able to use the product during work in test environments. Another respondent explained that the product developed simply was not suitable for the product owner as a consumer.

Being able to use the product was described as an opener for new opportunities to help the team, testers and develop a genuine interest of the product. One respondent explained that being an end-user of the product is an advantage but still brings difficulty in being objective about the product.

“If there would have been a product that I myself consumed, I think that it would have been easier, at least in the beginning. /.../ I absolutely think that being an end-user is an advantage, but it does not have to mean that one cannot do the same [good] work if one is not an end-user. /.../ but I can also believe that it can be difficult at times, as one is not as objective.”

PO8

5.6. *Importance of an agile transformation*

Amongst the respondents who also had long work experience as agile coaches' certain aspects of how the role is performed, influenced and restricted by the organizational structure and management were brought up. This was described as the need for the whole organization to make a paradigm shift. It was viewed crucial that the organization has fully understood what an agile mindset of working involves and how it should be implemented with Scrum. The organization need to be ready to trust and give the right amount of authority to the product owner. One respondent described a common reoccurring issue in the industry of product owners not actually owning the product.

“[Organizations] not realizing that the [product owner] must own the product /.../ rather the product owner becomes some sort of spokesperson /.../ who has some authority but someone who you could trample over if necessary /.../ and as soon as it is done, the magic disappears.”

PO3

The respondents shared the view of organizations wanting to make a transformation towards some agile mindset and in particular with Scrum by focusing on implementing the roles and following the practices but not considering the what kind of organizational change that would actually need. The respondents mean that organization needs to consider how their current structure and way of working need to adapt in order to get full effect of Scrum. This would mean that in a traditional organization with a hierarchy with decision making and authority spread across several roles, such as project leaders and product managers need to be considered and changed when transitioning to Scrum and that often the product owner role is appointed to someone without closer consideration.

“/.../ there is a big difference in an organization where there exist good product owners, unlike where they have taken previous project leaders or product managers and said, “you will have O instead of an M in your title” /.../ and then you carry on your product ownership as you were a project leader or product manager. /.../ that is one of the hardest parts for organization to understand since it leads to one having the same clumsy mandate structure.”

PO7

“/.../ most of the time I would say the organization, the structure, forces the product owners to become project leaders /.../ they become slightly someone who come in and whip up the team and “we should have been finished, why aren’t we?” /.../ instead of being the person who do the prioritization and at least the first part of acceptance testing /.../ splitting up things into pieces and making sure that they produce value /.../ it feels often that the organization squeeze together the frames so one becomes a project leader and less of a product owner.”

PO3

One respondent even question whether traditional project leaders should even be involved after transitioning form a waterfall like development towards working agile stating that a

product owner is something completely different, it is that domain expert who should be able and have authority to decide what is best for the product.

“/.../ it has nothing to do with project leading /.../ which is often what it becomes, the answer may be that a project leader needs to retrain and unlearn a lot of what one is used to, in order become a good product owner. And that is often difficult for organizations to understand.”

PO3

6. Analysis and Discussion

In this chapter, analysis and discussion will be made towards theoretical chapter.

Within the Scrum framework the product owner should be the solely responsible person for managing the Product Backlog (Scrum Guide, 2018). While all the respondents expressed that one of their responsibilities is owning and managing the product backlog, the degree to manage and decide what the product backlog contain varied across the respondents. As some of the respondents expressed deciding completely on own if certain needs should be included or not can be difficult and either done in collaboration with other product owners and stakeholders, in other cases such was already decided by the management in the organization. In some cases, the respondents expressed willingness to verify with colleagues if whether their decisions were right. This can be related to the complexity of the environment the product owners operate in, having the right domain knowledge and combining it with gut feeling to make sound decisions is at times difficult. Prioritizing needs amongst the product owners were done primary through the business value expressed by stakeholders, but the product owners also reflected upon user value, the product health in terms of any technical debt, and feedback from customers. Schwaber and Beedle (2002) discuss product owners not being one person, rather a part of a committee deciding upon matters. The consequence of such can lead to issues relating to conflicting work prioritization. However, this in turn means that while there exist stakeholders who represent a committee with interests, a product owner should be able to represent those interests but with authority of the product backlog. Pichler (2010) discuss the involvement of a product owner regarding strategical by deciding on functionality but as well be involved with the team regarding tactical decisions. How strategically and tactically the product owners were involved varied across the respondents. Those who had more technical experience and came from a developer background were more involved in detailing out the requirements and defining acceptance criteria's and in other cases that was done in collaboration with developers.

As expressed by respondents, the role of a product owner can be overwhelming to fulfill completely without rely on other persons within the organization for decision making. Schwaber (2004) and Cohn (2010) describe that only one product owner should exist within one project or team. In the case of the respondents, majority of them worked with one product or within one team, except for two cases. In the first case, the product owner was responsible for several products and within the team two other product owners were involved in decision making. In the other case two product owner were part of one team and had mutual and

exclusive projects, one product owner was mainly responsible, and one was assisting. Pichler (2010) highlights the importance of product owner's availability while carrying out their responsibilities, and co-locating team members. Majority of the product owners were completely co-located with the Scrum teams. This ensured that they could attend meetings with members of their teams. Working closely to the team ensured questions or issues could be resolved with greater speed. Some respondents provided experiences with not being co-located and the challenges coming with it.

There are challenges that product owners experience during their work that impact their duties and capacities. As a product owner one should be responsible for the outcome of a project or product however, a challenge that arise is when a product owner is facing decisions but are not possessing the domain knowledge enough to make such decisions themselves and need to rely on others. Another experienced challenge was identifying the root cause for a need. This happens when product owners not directly are able to communicate with the source of a need, and as one product owner referred to as the "real" stakeholders. When there is a long communication chain involving passing information regarding a need from end-users through an organization, information might have been lost or altered till it arrives to the product owner. A consequence of not understanding what problem is supposed to be solved, could in turn lead to implementing something that should not exist. This was also found in the study of Lehtinen et al. (2015). Another issue that is important to discuss are situations where it is unclear to the product owner who the actual end-user or customer is, if the product e.g. is an infrastructure platform and will be further built on by other teams. Another challenge is communicating with stakeholders when they become solution oriented. Rather than coming to product owners with a problem needing to be solved, they tend to come with ideas of a solution. The solution might not be ideal, compatible with the current product or conflict with other stakeholder needs. Amongst the product owners handling unanticipated tasks that are discovered during a sprint was a prevalent issue. This is in relation to what also Moe, Dingsøyr and Dybå (2010) identified in their study. This relates to balancing new product development activities and maintenance needs of the current product e.g. bugs or prioritizing to improve the product health due to technical debt.

Pichler (2010) explain that product owners need to have a certain amount of decision-making authority, and should be a leader, providing guidance and direction to everyone involved in the project. Amongst the respondents the decision-making authority within the organization was expressed to varying degrees. Accountability for the product backlog was stated by all

respondents, however the degree to have the authority to decide upon the content of the product backlog varied. In some cases, amongst the product owners, the prioritization of what needs was highly influenced by stakeholders and often done collectively. Not deciding solely upon prioritization of work was due to wanting to confirm with other involved parties, managements last say, and not being sure if it was right for the overall product.

The Scrum framework define the role of a product owner as someone who should together in collaboration with customers, users and other stakeholders define a product vision which would guide the product backlog (Schwaber, 2004). This statement is also supported by Pichler (2010). However, in the case of generating the vision for the product, amongst the product owners none thought in terms of having a responsibility to create a vision that guides the product. The vision of the product was rather created much higher level in the organization and in some way reflected through the needs of stakeholders. Other thought of a vision of way of working rather than a generating a vision for the product. The common understanding amongst the product owners were that it was not directly a responsibility of a product owner. However, in one case a product owner was involved in creating a vision which was then pitched to the development team.

All interviewed respondents were considered dedicated product owners within organizations and not customer representatives, but only some of the respondents considered themselves end-users of the product they own. Out of the respondents that considered themselves as end-users a greater understanding was generated regarding the product and possible ways enhance it. For others, the possibility to be end-users was limited or impossible for various reasons such as being forbidden the use of the product by the organization or since the product was considered a part of an end-product, thus making it not usable alone. Scrum framework does not explicitly define who the actual product owner role should be appointed to, however could generally be a lead user of the system or someone with great knowledge of the product and its users (Product Owner, 2018).

The agile consultants/coaches that were a part of this study provided valuable insight of how they experience the product owner role is practiced in the industry. In terms of adopting an agile philosophy and following an agile methodology an organization need to consider their current way of working and the steps needed to make an agile transformation. What was experienced by the agile consultants/coaches and that limited the product owners to practice the role as intended according to its definition in the Scrum framework was the structure and management

of the organization. A general understanding was that organizations did not provide enough authority to the product owner to own the product and lead the work, rather the role was implemented as some sort of “spokesperson” who could be overruled if necessary. This was also related to that just implementing Scrum with its roles and practices would not be effective as intended if the mindset of the management and organization did not change. Another common understanding amongst the agile consultants/coaches was that traditional roles such as project leaders, and product managers often were appointed a product owner role without reflecting upon the change in their duties and responsibilities. Pichler (2010) contrasts how traditional project management differs from AMP through having a central role, the product owner, who is responsible for the product instead of distributing responsibility across several roles. Organizations transitioning to Scrum need to consider their current structure of roles to not limit the boundaries of the product owner role. An understanding of the role’s responsibility, duties and authority should be clear to all. However, the boundaries of the role are also as Pichler (2010) describes influenced by the project size and its complexity.

7. Conclusions and Further Research

In this chapter, the purpose and the research questions are revisited, conclusive remarks are made, and motivations for further research is presented.

The purpose of this study was to study the product owner role in a natural setting and explore if their actual duties and capacities are aligned to as theory suggests. It was assumed that a gap would exist between practice and theory. In order to answer the main research question, two sub-questions were defined.

RQ1: What are the challenges arising from the contrast between the supposed stakeholder position of a product owner and their actual duties and capacities?

- *Is there a gap between the supposed stakeholder position of a product owner and their actual duties and capacities?*
- *What are the challenges caused by this gap?*

Through conducting this research and exploring product owners across organizations in various sectors, with diverse products and Scrum team compositions, knowledge of how the role is implemented and practiced was generated. Within theory, the role of a product owner is described as a key member within a Scrum team. The product owner is most responsible for the outcome of a product. This single person is intended to be a leader for the development team and being part of the creation of a vision for the product. Apart from managing the product backlog and working with stakeholders on various levels and gathering their needs, the product owner also works closely with the developers. It can be concluded through this research that the product owner role as described in theory differ from how it is being practiced in the industry, hence a gap exists. The stakeholder position of a product owner as a leader, guiding the development team with a vision of the product found to differ in reality. The product owners in reality did not think in terms of defining a vision for their products. The vision was rather created and communicated elsewhere in the organization and reflected through the stakeholders rather than the product owners having an active participatory role in it. The decisions what work should be done in terms of the product and how it should be prioritized was also found to varying degrees to be influenced by others. There also exist a gap between how communication of needs occurs between the product owner and the stakeholders. The product owner tends to not be involved with end-users of the product, nor were themselves lead users of the products. In some of the cases the product owner had responsibilities of several products or shared

responsibilities. Another difference that is relevant to address is that some of the respondents had the responsibility and role of a Scrum master as well, although that role should be separate since they have different responsibilities and duties. The identified challenges of the product owner are related to identifying, determining, and satisfying needs of the various stakeholders within the organization. There exist challenges where the product owners do not directly themselves communicate with stakeholders during elicitation of needs. The consequence of such may result in that information gets lost or get altered till it arrives to the product owner making it difficult for the product owner to know what actually is needed to be solved. Another identified challenge is the product owner's possession of enough domain knowledge to be able to make right decisions. Lack of such knowledge can result in wrong and ineffective decision making. While the role of a product owner is very critical to the success of agile development project very little attention is given within Scrum framework to describe the role. Despite of the responsibilities that come with it and that is should be a single person and not a "committee". While there are a lot of factors influencing how the role is implemented in organizations, it is very difficult to find someone who can fulfill the duties and responsibilities of the role as envisioned. Particularly if the appointed person is faced with above challenges or having other duties and responsibilities along the role of a product owner.

7.1. Further Research

This study focused on identifying a gap between the supposed stakeholder position of a product owner their actual role and thereby identifying challenges caused by this gap. This study confirmed a gap and challenges caused by the gap. Further research could be focusing on how such gap and challenges could be mitigated.

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Appendix 1 – Semi-structured Interviews

General information

Can you briefly introduce yourself, organization and current project/product?

Scrum

How would you describe that Scrum is implemented within your organization?

How long have Scrum been practiced?

What Scrum events are practiced?

Can you describe the Scrum team composition?

Is there anything that is not implemented from Scrum framework?

Product owner

According to you, what is your main responsibilities as a product owner?

Do you experience any challenges with being a product owner?

How is it decided what is included in the product backlog?

To which extent do you have authority to make decisions regarding the content of the product backlog?

Do you see yourself as a stakeholder or end-user?

How would you describe your availability to the Scrum team? What team activities are you present at?

Product Backlog

How is the value implemented from the product backlog communicated to stakeholders?

How is the product backlog managed to maximize value?

Do you experience any challenges with managing the product backlog?

Stakeholders

How do you identify and communicate with stakeholders?

Do you experience any challenges with identifying and communicating with stakeholders?

Product Vision

How is the vision for the product created and communicated within the team?

Development Team

According to you, what responsibility does the development team have towards the product owner?

Scrum Master

According to you, what responsibility does the Scrum master have towards the product owner?