Graduation thesis

A project manager’s journey towards agile project management

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"It is not the strongest of the species that survive, nor the most intelligent, but rather the one most adaptable to change"

- Charles Darwin
PREFACE

While this report explores the journey of a project manager towards agile, writing this thesis has been a learning journey in itself for me. This journey learned me a lot about the changing world we are living in, the importance of software for today’s businesses, and the increasing need for organisations and projects to be agile. On the other side of this learning path, emphasis was on the role of project manager. I found the people-oriented focus of this research very attractive, because I personally believe that the success of projects lies in its people. The current search of project managers on their exact role in agile project management, formed an extra drive for me to perform this research; the strong connection with practice further increased my enthusiasm and gave me a lot of energy.

I want to thank my graduation committee for their supervision and guidance during this graduation thesis, this research would not have been possible without them. Marian, thank you for your guidance and advise, you were always willing to make time for me. During our meetings, I appreciated you as an excellent sparring partner with a strong understanding and deep knowledge, you were a very valuable sounding board for discussion, my questions and ideas. Hans, thank you for your clear guidance during the committee meetings, your focused vision and valuable feedback. Jolien, I really appreciated working with you, your insights guided me through some difficult topics and gave me a different perspective on my research. Many thanks to Martijn, who introduced me to KWD Resultaatmanagement and the world of software development projects. I appreciated our substantive discussions on Friday afternoons, your valuable advice on the research process, as well as your excellent feedback on my research and personal guidance.

Also I would like to thank the people working at KWD Resultaatmanagement; from the very beginning I felt very welcome. I really appreciated the informal discussions, sharing knowledge, providing me with insights, and learning about (agile) project management. Your enthusiasm about the topic and sincere interest in the outcome motivated me even more to do this research. Thank you for the opportunity!

A special thanks to all the project management practitioners who were willing to contribute to this research. Not only were these interviews valuable for my research, the case studies also provided me with a unique outlook on the world of project management within software development projects performed by various organisations. This experience learned me a lot, but above all, I really enjoyed these visits and interesting conversations with interviewees.

Last but not least, I would like to thank everyone who was there for me during this graduation research. It is extremely valuable to have family, friends and fellow graduate students supporting me, working together with me or providing a bit of welcome distraction.

Annelot Verbruggen

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EXECUTIVE SUMMARY

INTRODUCTION
Nowadays, organisations are exposed to complex and rapidly changing requirements, technologies and market conditions. Change is inevitable and the pace of this change will only increase in the future. In dynamic uncertain environments such as the information technology (IT) sector, dealing with change is crucial. Not properly managed IT systems can threaten the existence of a company. Nevertheless, IT projects often face poor performance and the failure rates are high. Flexible approaches, such as agile development could offer a solution for the challenges organisations are dealing with. Agile embraces change, by seeing it as an opportunity to increase the value of a product. In addition, Agile might offer a solution for ambiguous user requests, speeding-up the time-to-market and developing IT faster through shorter lead times.

In their quest to become more flexible and agile, the software industry recognises the need for agile project management. Agile project management brings new challenges for project managers; new agile roles and agile practices might have an impact on the current established notions of the role of project manager. In general, existing scientific literature emphasises the importance of the project manager role in projects and their significant role in project success. For this reason, the following research objective was stated: Explore the changing role of the project manager in an agile project management approach compared to a traditional project management approach; within software development projects.

Furthermore, this research aimed to enrich existing scientific literature about the role of project manager when changing from a traditional to an agile project management approach. In addition, this research intended to make a contribution to practice since project managers are interested in, and in search of, their “new” role in an agile approach. This led to the following research question:

How does the role of a project manager change, comparing an agile project management approach to a traditional project management approach in software development projects?

This research was initiated by KWD Resultaatmanagement, in their quest to improve project management and understand the role of project manager in agile project management. This initiative is an interesting observation in itself since it shows that professional project managers are in search of what should be their role in agile project management.

THE RESEARCH DESIGN
This research can be characterised as an explorative and descriptive research on the changing role of a project manager. A theoretical view was formed through an extensive literature review, which served as the starting point for obtaining empirical data in practice. An empirical view was obtained by investigating the actual situation of project managers within software development projects. Qualitative data was collected by exploring the individuals’ view on the role of the project manager through in-depth interviews with professionals. The research design will be elaborated below.

With the aim of developing sensitizing concepts, a theoretical framework was established. The developed sensitizing concepts resulted in an interpretive framework, these concepts formed the starting point of the collection of empirical data and guided the data analysis. The research design included a holistic multiple-case study, which is a suitable research approach for exploring the role of the project manager in the context of agile project management and gaining deeper insights in practice. The case selection resulted in ten software developments projects; eight projects used an agile approach and two projects a traditional project management approach. The traditional cases served as a control group. During the case study preparation phase, a group interview with agile experts was conducted which contributed to the case study set-up. This research is primary based on semi-structured interviews with 25 respondents. With the aim of gathering different perspectives on the role of project manager, several interviewees were selected within each case. The validated anonymous interview transcripts led to a case report for each individual case, a cross-case overview and an assessment of the agility of the cases. The data was cross-case analysed by making use of qualitative content analysis. Observed patterns which were inductively derived from the text data led to categories that were grouped within the interpretive framework of the sensitizing concepts.
THEORETICAL FRAMEWORK – developing sensitizing concepts

The aim of the literature review was to gain an initial understanding of the role of project manager in an agile approach, and to develop sensitizing concepts which form a point of departure for empirical data gathering. Prior literature has explored the role of a project manager in agile project management to a limited extent. A literature review was conducted into (1) the differences between a traditional and agile project management approach, (2) the definition of a role according to scientific literature, and (3) the role of project manager according to well-known traditional project management standards and agile methods. The literature review on these topics is described below.

A theoretical framework was established for comparing agile and traditional project management. This framework consists of five main themes: (1) philosophy, (2) organisation and management, (3) development process, (4) people and team, and (5) technology. Although the role of project manager in an agile approach is sparsely researched, several managerial differences were identified; collaboration with the team, decision making and authority, leadership and management style, and managing resources and value delivery. Research on role theory provided general insights on how to define a role. A role can be described by identifying the hard elements (e.g. activity, responsibility, tasks) and the soft elements (e.g. behaviour, competences, attitude). Moreover, the literature research aimed to get an overview of the well-known project management standards (e.g. Prince2) and agile methodologies (e.g. Scrum). The “traditional” role of project manager is often defined by activities as initiating and closing phases, executing, controlling, planning, reporting, communication with stakeholders and monitoring the scope, quality, time schedule, budget, resources, and risks. In contrast, established agile methodologies such as Scrum do not mention the role of project manager.

Four sensitizing concepts were developed based on this in-depth literature review: (1) the project management approach, (2) the hard elements of the role, (3) the soft elements of the role, and (4) the changing role of the project manager. These concepts formed the starting point of data collection and guided the data analysis; the results are presented in the next section.

RESULTS – cross-case analysis of the sensitizing concepts

This research presented data from a multiple-case study with the aim to develop understanding of the changing role of project manager in an agile approach. This research highlighted the various implementations of an agile approach in practice; agile project management methods are tailored and customised to project- and organisational structures. Moreover, the majority of the agile cases included non-agile elements in their project management approach. This often results in a unique hybrid combination of several traditional and agile project management approaches; there is no “one-size-fits-all” solution. The findings within the four sensitizing concepts are outlined below.

With regard to the (1) project management approach, this research highlighted that the type of project and the project context do have a large impact on the implementation of agile project management and the role of project manager. Subsequently, implementation of an agile approach impacts the “traditional” role division, since new agile roles are included in the project governance structure. The role of project manager is situational and adapts to these new circumstances by tending towards the agile roles that are unfulfilled.

With regard to the (2) hard elements of the role of project manager, the findings presented the core responsibilities and accountability of the project manager: (1) starting up and closing the project, (2) long-term planning of the project (e.g. roadmap on themelopic level) and monitoring progress, (3) stakeholder management with the base organisation (reporting to the project board), (4) the total end-to-end software development process of delivering acceptable products, and (5) the project delivery of the result/output (not the solution definition). In addition to these responsibilities which are to a large extent similar to the “traditional” project manager role, findings suggested that the role of project manager may have a tendency towards various directions, namely; (1) the agile project manager, (2) the chief scrum master or (3) strategic product owner. Moreover, the role can changes to a larger extent due to the transition towards an agile approach. Possible directions of the shifted project manager role are: (1) the facilitating leader, (2) the agile transition manager and (3) the road manager.

In terms of the (3) soft elements of the role of project manager, eight changing behaviour aspects were identified for the role of project manager in an agile project management approach: (1) the traditional project manager becomes a facilitating human-centric leader, (2) the project manager as connecting link, changed to a facilitating project manager connecting people, (3)
pursuing transparent value-related communication instead of planning-related communication, (4) from individual ownership to shared ownership, (5) finding a new balance between creating conditions and creating room for the teams, (6) communication through planning documentation changed to regular face-to-face communication, (7) intensified collaboration on definition and distribution of the work, (8) formal influencing towards informal influencing of the project manager. The findings of this research emphasised the significant impact of an agile approach on the behaviour and attitude of the project manager. Although human-centred approach is not limited to agile project management. In an agile approach this is essential and cannot be excluded, while this is not explicitly incorporated in a traditional plan-driven project management approach.

With regard to (4) the changing role of project manager: two scenario’s for the implementation of agile development were distinguished. (1) Vertical agile integration impacts the project- and organisational structure, and therefore has a major impact on the traditional role of project manager. (2) Horizontal agile integration involves the integration of various stages of the software development cycle; shifting from a project-oriented view to a product-oriented view as a project manager.

Next to these four sensitising concepts, the (5) organisational context was indicated an additional sensitising concept. A refined sensitising concept framework was established which showed the relation between the role of project manager, the project and the organisational context. From a more general point of view, three situations can be identified. (1) The traditional situation: a “traditional” project manager is required in projects which are embedded in a traditional organisational context (project-based organisation). (2) The hybrid situation: an agile project in a traditional context often results in a hybrid form of the project manager’s role; acting as a buffer between both approaches. (3) The agile situation: in case the organisation transforms into an agile enterprise the temporary structure of a project is no longer compatible, which makes the traditional role of project manager no longer required.

CONCLUSION
As mentioned before, the following research question was stated: How does the role of a project manager change, comparing an agile project management approach to a traditional project management approach in software development projects? The results indicated several changes for the role of project manager. In addition to the four initial sensitising concepts, a fifth sensitising concept was identified: (1) the project management approach, (2) the hard elements of the project manager role, (3) the soft elements of the project manager role, (4) the changing role of project manager, and (5) the organisational context.

Based on the findings of ten case studies, the importance of being agile and flexible as a project manager in the transition towards agility is highlighted. Agility as a project manager is required since the role is situational and highly dependent on the context in an agile approach. Although the core responsibilities are to a large extent similar to the “traditional” project manager, this research showed that in an agile approach the project manager often tends towards several other (agile) roles; this requires again a high agility-level of the project manager. Moreover, the project manager needs to have an agile mindset and attitude; this research identified behavioural changes for the project manager’s role in an agile project management approach. Scenario’s for the future of the project manager are identified in which the project manager needs to be agile and be open for a possible career change towards new agile roles. Moreover, in the light of agile organisations, traditional defined projects and the traditional role of the project manager are no longer compatible with an agile organisational structure; this makes the project manager no longer required. In a rapidly changing world where agility is key, there is a strong need for a more agile view on the traditional role of the project manager; only agile project managers who are willing to change, survive in an agile approach.

RECOMMENDATIONS
This exploratory research led to a large number of possible future research directions, three main directions for further research are identified: (1) Additional research on the changing role of project manager in an agile project management approach. (2) Understanding an agile project management approach at project-level. (3) The impact of agile development on organisations. Furthermore, six main recommendations are provided for project managers in their journey towards an agile approach:

1. Be aware that an agile approach is not for everyone
2. Be agile as a project manager
3. Be an agile expert as a project manager
4. Be creative in agile methods tailoring
5. Be aware of your behaviour and attitude as a project manager
6. Be open for an agile future and change in function
SAMENVATTING

INTRODUCTIE
Vandaag de dag worden organisaties geconfronteerd met complexe en snel veranderende vereisten, technologieën en marktomstandigheden. Verandering is onvermeden en de snelheid waarin deze veranderingen elkaar opvolgen zal alleen maar toenemen in de nabije toekomst. Omgaan met verandering cruciaal in dynamische en onzekere omstandigheden zoals die van de informatietechnologie (IT) sector. Niet goed beheerde IT systemen kunnen zelfs een bedreiging vormen voor het bestaan van een organisatie. Opvallend is daarom dat IT projecten vaak slecht presteren en de faalpercentages hoog zijn. Een flexibele aanpak, zoals een agile ontwikkelingsaanpak kan een oplossing bieden voor huidige uitdagingen van organisaties mee kampen. Een agile ontwikkelingsaanpak omarmt verandering door het als een kans te zien om de waarde van het product te verhogen. Daarnaast kan agile ontwikkeling een oplossing bieden voor onduidelijk gedefinieerde gebruikerswensen, en de ontwikkeling van IT verbeteren door middel van een kortere doorlooptijd en het realiseren van een verkorte time-to-market.

Vanuit het streven om flexibeler en meer agile (wendbaar) te worden, erkent de software industrie de behoefte voor agile projectmanagement. Agile projectmanagement brengt echter uitdagingen met zich mee; nieuwe agile rollen en werkwijzen kunnen een impact hebben op de huidige opvattingen over de rol van project manager. Onderzoek naar mogelijke veranderingen voor de rol van project manager is daarom relevant. Daarnaast toonde eerder onderzoek aan, met betrekking tot projectmanagement in het algemeen, dat de rol van project manager belangrijk is voor het behalen van project-success. Om deze reden is het volgende onderzoeksdoelstelling opgesteld: Het verkennen van de veranderende rol van projectmanager in een agile projectmanagement aanpak vergeleken met een traditionele projectmanagement aanpak binnen software ontwikkelingsprojecten.

Dit onderzoek beoogt om de bestaande wetenschappelijke literatuur te verrijken, met betrekking tot de veranderende rol van project manager binnen de transitie van een traditionele naar een agile projectmanagement aanpak. Daarnaast heeft het onderzoek als doel om een bijdrage te leveren aan de praktijk; aangezien project managers geïnteresseerd zijn in, en zoekende zijn naar, hun ‘nieuwe’ rol in een agile aanpak. Dit heeft geleid tot de volgende onderzoeksvraag:

Hoe verandert de rol van project manager, in een agile projectmanagement aanpak vergeleken met een traditionele projectmanagement aanpak binnen software ontwikkelingsprojecten?

Dit onderzoek is geïnitieerd door KWD Resultaatmanagement, vanuit een continu streven om de kwaliteit van projectmanagement te verbeteren. Het ontstaan van dit onderzoek is daarom een interessante observatie an sich, aangezien het laat zien dat professionele project managers zoekende zijn naar wat hun rol zou moeten zijn in een agile aanpak.

ONDERZOEKSMETHODE
Dit onderzoek kan worden gekarakteriseerd als een exploratief en beschrijvend onderzoek naar de veranderende rol van project manager, waarbij een agile projectmanagement aanpak vergeleken wordt met een traditionele projectmanagement aanpak. Vanuit een theorethisch oogpunt werd er een uitgebreid literatuuronderzoek uitgevoerd, de bevindingen vanuit de literatuur diende als startpunt voor het vergaren van empirische data. Vanuit een empirisch oogpunt, werd er empirische data verkregen met betrekking tot de project manager in software ontwikkelingsprojecten in de praktijk. Diepte-interviews met deskundigen werkzaam binnen software ontwikkelingsprojecten, leidde tot kwalitatieve data en verkenning van het perspectief van de individu op de rol van project manager. De gehanteerde onderzoeksmethode zal hieronder worden beschreven.

Een theorethisch kader was opgesteld met het doel om sensitizing concepts (richtinggevende concepten) te ontwikkelen. De gegenereerde sensitizing concepts resulteerde in een interpretatiekader, dit kader vormde de basis voor het vergaren van empirische data en fungeerde als beginpunt voor het uitvoeren van de analyse. Door middel van een meervoudige case studie is de veranderende rol van project manager onderzocht in tien geselecteerde software ontwikkelingsprojecten. Een
case studie is een passende onderzoeksmethode voor exploratief onderzoek naar de rol van project manager in de context van een agile projectmanagement aanpak, aangezien er binnen deze methode diepgaande inzichten verkregen kunnen worden. Twee van de tien projecten hanteerden een traditionele projectmanagement aanpak (de controle groep), de overige acht voerden het project uit op basis van een agile aanpak. In de voorbereidingsfase van de casestudies is een groept interview uitgevoerd met agile professionals, dit droeg bij aan de opzet van de case studie. De data is verzameld door middel van semistuctureerde interviews met 25 kandidaten. Een aantal kandidaten werden geselecteerd per case, met als doel om de case te kunnen analyseren vanuit verschillende perspectieven. De gevalideerde interview verslagen zijn geanonimiseerd en hebben geleid tot afzonderlijke case rapporten. Vervolgens is er een cross-case analyse uitgevoerd en de agility van de cases is beoordeeld. Tijdens de cross-case analyse is gebruik gemaakt van een kwalitatieve data-analyse methode om de data te onderzoeken. De data is op een inductieve wijze geanalyseerd, de geïdentificeerde patronen hebben tot categorieën geleid, welke vervolgens zijn gegroepeerd binnen het vastgestelde interpretatiekader van de sensitizing concepts.

THEORETISCH KADER – de ontwikkeling van de sensitizing concepts
Het doel van het literatuuronderzoek is om een eerste inzicht te verkrijgen over de rol van project manager in een agile aanpak. Daarnaast was het hoofddoel om sensitizing concepts te ontwikkelen. Momenteel is de rol van project manager in een agile aanpak nog maar beperkt beschreven in bestaande literatuur. Het literatuuronderzoek bestond uit een aantal hoofdonderwerpen: (1) het verschil tussen een traditionele en agile projectmanagement aanpak, (2) de definitie van een rol volgens wetenschappelijke literatuur, en (3) de rol van de project manager volgens breed gehanteerde traditionele projectmanagement standaarden en veelgebruikte agile methodes. Een theoretisch kader was ontwikkeld voor de vergelijking tussen agile en traditioneel projectmanagement. Deze vergelijking is opgebouwd uit vijf hoofdthema's; (1) filosofie, (2) organisatie en management, (3) ontwikkelingsproces, (4) mensen en team, en (5) technologie. Ondanks dat de rol van project manager maar beperkt onderzocht is in de literatuur, werden er verschillende bestuurselijke verschillen geïdentificeerd op het gebied van: het samenwerken met het team, besluitvorming en autoriteit, leiderschap en management, en management van middelen en waarde oplevering. Bestaand wetenschappelijk onderzoek op het gebied van role theory gaf inzichten over hoe een rol gedefinieerd kan worden. Een rol kan beschreven worden door de harde aspecten (activiteiten, verantwoordelijkheden, taken etc.) en zachte aspecten (gedrag, houding, competenties etc.) te definiëren. Daarnaast zijn bekende projectmanagement standaarden onderzocht (zoals Prince2), en agile methodologieën (zoals Scrum). Een “traditionele” project manager kan beschreven worden door activiteiten als: initiëren en afsluiten van fases, uitvoeren, controleren, plannen, rapporteren, communiceren met belanghebbende en monitoren van de scope, kwaliteit, tijd, budget, middelen en risico’s. Daarentegen, wordt de rol van project manager opvallend genoeg niet beschreven in agile methodes zoals Scrum.

Vier sensitizing concepts zijn ontwikkeld vanuit het uitgebreide literatuuronderzoek, namelijk: (1) de projectmanagement aanpak, (2) de harde aspecten van de rol van project manager, (3) de zachte aspecten van de rol van project manager, en (4) de veranderende rol van project manager. Deze concepten vormen een startpunt voor de verzameling van data en data analyse; de resultaten van dit onderzoek worden nader toegelicht in de volgende paragraaf.

RESULTATEN – de cross-case analyse van de sensitizing concepts
Het onderzoek is gebaseerd op een meervoudige case studie en heeft als doel om kennis te ontwikkelen over de project manager in een agile aanpak. Dit onderzoek benadrukt dat er in de praktijk diverse implementaties van agile project management benaderingen worden toegepast; agile methodes worden gevormd naar bestaande project- en organisatie structuren. Het merendeel van de agile projecten past niet-agile elementen toe in de gebruikte projectmanagement aanpak. Dit resulteert in een hybride situatie waarbinnen zowel traditionele als agile methodes gecombineerd worden. Dit onderzoek laat zien dat er geen uniforme oplossing is voor het implementeren van agile methodes; er is geen “one-size-fits-all” oplossing. De bevindingen met betrekking tot de vier sensitizing concepts zullen hieronder worden beschreven.

Betreft (1) de projectmanagement aanpak, laat dit onderzoek zien dat het type project en de context een significante invloed hebben op de ontwikkelde agile aanpak en de rol van project manager. Daarnaast zorgt een agile aanpak voor een andere rolverdeling binnen het project; de aanwezigheid van nieuwe agile rollen resulteert in een veranderende project

xii
governance-structuur. De rol van project manager is situationeel en hij geeft invulling aan de rollen die niet door anderen bekleed worden.

Met betrekking tot (2) de harde aspecten van de rol van project manager, geeft dit onderzoek uitkomst over de kern verantwoordelijkheden, namelijk: (1) het opstarten en afsluiten van een project; (2) de lange-termijn planning van een project (bijv. roadmap op thema/epic level) en het monitoren van voortgang, (3) stakeholder management met de organisatie (rapporteren aan de project stuurgroep), (4) de totale end-to-end software ontwikkelingsproces van het leveren van acceptabele producten, en (5) de aplevering van een resultaat (niet de definitie van de oplossing). Deze genoemde verantwoordelijkheden zijn grotendeels overeenkomstig met de ’’traditionele’’ rol van project manager. Echter, in een agile aanpak kan de rol veranderen doordat er een tendens is naar verschillende (agile) rollen, namelijk: (1) de agile project manager, (2) de chief scrum master of (3) de strategische product owner. Door de agile transitie, kunnen er ook andere rollen vervuld worden door de project manager die verder afstaan van de originele rol, zoals: (1) de faciliterende leider, (2) de agile transitie manager en (3) de road manager.

Een analyse naar (3) de zachte aspecten van de rol van project manager heeft geleid tot het vaststellen van acht gedragsveranderingen die gerelateerd zijn aan een agile projectmanagement aanpak: (1) de traditionele project manager wordt een faciliterende mens-georiënteerde leider, (2) de project manager als verbindende schakel verandert in een faciliterende project manager die anderen verbindt, (3) het realiseren van transparante waarde-gerelateerde communicatie in plaats van planning-gerelateerde communicatie, (4) van individueel eigenaarschap naar gedeeld eigenaarschap, (5) het vinden van een nieuwe balans tussen het creëren van kaders en ruimte voor de teams, (6) communicatie door middel van planning documentatie, verandert naar regulmatige rechtstreekse communicatie, (7) verandering naar een meer intensieve samenwerking betreft de definitie van de werkverdeeling, en (8) van formaal beïnvloeden naar informeel beïnvloeden door de project manager. Ondanks dat een mensgerichte aanpak zich niet noodzakelijk beperkt tot een agile aanpak, laten de bevindingen van dit onderzoek significante houdingen en gedragsveranderingen zien voor de rol van project manager. Binnen een agile projectmanagement is een mensgerichte aanpak essentieel en kan dit niet weggelaten worden, terwijl dit niet expliciet is opgenomen in een traditionele plan-gedreven projectmanagement aanpak.

Daarnaast is de (4) de veranderende rol van project manager geanalyseerd en twee toekomstscenario’s zijn vastgesteld. (1) de verticale agile integratie betreft een wijziging in de project- en organisatie structuur; dit brengt een grote verandering te wegen voor de project manager. Daarnaast gaat (2) de horizontale agile integratie in op de integratie van diverse onderdelen binnen het softwareontwikkelingsproces; vanuit de project manager is er een verandering noodzakelijk van project-georiënteerde focus naar product-georiënteerde focus.

Naast deze bevindingen, kan er een vijfde sensitizing concept geïdentificeerd worden gebaseerd op inzichten die verkregen zijn binnen dit onderzoek: (5) de organisatorische context. Het raamwerk van sensitizing concepts is herdefinieerd en dit heeft tot een diagram geleid die de relaties weergeeft tussen de project manager, het project en de organisatie. In het algemeen kunnen er drie situaties beschreven worden. (1) De traditionele situatie: een “traditionele” project manager is nodig binnen projecten die uitgevoerd worden binnen een traditionele context (project-based organisation). (2) De hybride situatie: een agile project in een traditionele context vraagt om een hybride vorm van de rol van project manager; hij fungeert als een buffer tussen beide aanpakken. (3) De agile situatie: de tijdelijke organisatie structuur van een klassiek gedefinieerd project is niet langer toepasbaar, in een situatie waarin een organisatie transformeert naar een agile organisatie; dit maakt de rol van project manager overbodig.

CONCLUSIE
Zoals eerder vermeld, betreft de onderzoeks vraag van dit onderzoek; Hoe verandert de rol van project manager, in agile projectmanagement aanpak vergeleken met een traditionele projectmanagement aanpak binnen software ontwikkelingsprojecten? De resultaten van dit onderzoek geven een aantal veranderingen aan voor de rol van project manager. Aanvullend op de vier initiële sensitizing concepts werd er een vijfde geïdentificeerd: (1) de project management aanpak, (2) de harde aspecten van de rol van project manager, (2) de zachte aspecten van de rol van project manager, (4) de veranderende rol van project manager, en (5) de organisatorische context. Met behulp van deze concepten is er een antwoord op de hoofdvraag geformuleerd.
Gebaseerd op de bevindingen van tien case studies, benadrukt dit onderzoek het belang van agile en flexibel zijn als projectmanager binnen de transitie naar een agile aanpak. Agile zijn als een project manager is cruciaal aangezien de rol situationeel is en sterk afhankelijk van de context. Ondanks dat de kern verantwoordelijkheden van de project manager in een agile aanpak grotendeels gelijk zijn aan die van een traditionele aanpak; wijst dit onderzoek uit dat de project manager naar verschillende andere (agile) rollen kan neigen. Dit vraagt om een hoge mate van agility van de project manager. Verder heeft de project manager een agile mindset nodig; dit onderzoek laat de veranderingen zien op het gebied van houding en gedrag voor de rol van project manager in een agile projectmanagement aanpak. Daarnaast, worden er mogelijke scenario’s voor de toekomstige ontwikkeling van de project manager geïdentificeerd; de project manager moet ook hier “agile” zijn en open staan voor een mogelijke carrière switch naar nieuwe agile rollen. Bovendien, vanuit het perspectief van een agile organisatie, is een klassiek gedefinieerd project en de “traditionele” rol van project manager niet verenigbaar met een agile organisatie structuur; dit maakt de rol van project manager niet meer nodig. In een snel veranderende wereld waarbinnen agility essentieel blijkt, is er een sterkte behoefte ontstaan voor een meer agile zienswijze op de traditionele rol van project manager; alleen “agile” project managers die bereid zijn om te veranderen, zullen een richting weten te vinden op de weg naar een agile aanpak.

AANBEVELINGEN

Dit exploratieve onderzoek heeft tot een breed scala aan mogelijke nieuwe onderzoeksrichtingen geleid, deze richtingen voor toekomstig onderzoek zijn onder te verdelen in drie hoofdstromen: (1) Aanvullend onderzoek naar de veranderende rol van project manager in een agile projectmanagement aanpak. (2) Het verkrijgen van een dieper inzicht van een agile projectmanagement aanpak op project-niveau. (3) Het onderzoeken van de impact van agile ontwikkelingsmethodes op organisaties. Daarnaast worden er zes concrete aanbevelingen gedaan voor project managers met betrekking tot de transitie naar een agile aanpak.

1. Wees je bewust dat agile niet voor iedereen is weggelegd
2. Wees agile als een project manager
3. Wees een agile expert als project manager
4. Wees creatief in je agile aanpak
5. Wees je bewust van je houding en gedrag als project manager
6. Wees open voor een verandering van de functie en een agile toekomst

xiv
# Table of Contents

1 INTRODUCTION .................................................................................................................... 3  
   1.1 THE NEED FOR AN AGILE PROJECT MANAGEMENT APPROACH: SETTING THE CONTEXT .......................................................... 3  
   1.2 THE RELEVANCE OF INVESTIGATING THE ROLE OF PROJECT MANAGER ............................................................................... 4  
   1.3 KWD RESULTATATMANAGEMENT ................................................................................................................................. 5  
   1.4 PROBLEM STATEMENT .................................................................................................................................................... 6  

2 RESEARCH DESIGN .................................................................................................................. 9  
   2.1 RESEARCH OBJECTIVE .................................................................................................................................................. 9  
   2.2 RESEARCH QUESTION ................................................................................................................................................... 9  
   2.3 RESEARCH SCOPE ....................................................................................................................................................... 10  
   2.4 RESEARCH STRATEGY .................................................................................................................................................. 11  
   2.5 READING GUIDE ......................................................................................................................................................... 15  

3 THEORETICAL FRAMEWORK ............................................................................................... 19  
   3.1 TRADITIONAL AND AGILE PROJECT MANAGEMENT .................................................................................................. 19  
   3.2 THE ROLE OF THE PROJECT MANAGER ACCORDING TO ROLE THEORY ............................................................................ 27  
   3.3 THE ROLE OF PROJECT MANAGER ACCORDING TO THE STANDARDS ............................................................................... 30  
   3.4 DEVELOPING THE SENSITIZING CONCEPTS ................................................................................................................... 34  

4 CASE STUDY SET-UP ............................................................................................................. 39  
   4.1 EXPLORING THE FIELD .................................................................................................................................................. 39  
   4.2 CASE PROTOCOL ....................................................................................................................................................... 41  
   4.3 CASE SELECTION AND SELECTION OF RESPONDENTS .................................................................................................. 42  
   4.4 DATA COLLECTION AND ANALYSIS .......................................................................................................................... 44  

5 CASE RESULTS ..................................................................................................................... 49  
   5.1 CASE DESCRIPTION 1: THE REPLACEMENT AND DEVELOPMENT OF A TRANSPORT APPLICATION ......................................................... 49  
   5.2 CASE DESCRIPTION 2: THE DEVELOPMENT OF A NEW DIGITAL WORKING ENVIRONMENT .......................................................... 51  
   5.3 CASE DESCRIPTION 3: THE DEVELOPMENT OF A SYSTEM FOR THE COLLOCATION OF DATA ..................................................... 52  
   5.4 CASE DESCRIPTION 4: THE DEVELOPMENT OF A SYSTEM FOR REGISTRATION OF PERSONS AND THE MIGRATION INTO THIS NEW SYSTEM .......... 54  
   5.5 CASE DESCRIPTION 5: TRANSPORT PLANNING SOFTWARE APPLICATION ........................................................................... 56  
   5.6 CASE DESCRIPTION 6: THE DIGITALIZATION AND AUTOMATION OF PROCEDURES ................................................................. 57  
   5.7 CASE DESCRIPTION 7: DEVELOPMENT OF AN APPLICATION FOR RECEIVING, PROCESSING AND CONTROLLING DECLARATIONS .................................................................................. 58  
   5.8 CASE DESCRIPTION 8: DEVELOPMENT OF DATA ANALYTICS APPLICATIONS ........................................................................... 60  
   5.9 CASE DESCRIPTION 9: THE DEVELOPMENT OF AN INFORMATION SYSTEM FOR PERSONAL DATA .................................................. 61  
   5.10 CASE DESCRIPTION 10: THE TRANSITION TOWARDS A NEW THE FINANCIAL SYSTEM ............................................................... 62  

6 CROSS-CASE ANALYSIS ..................................................................................................... 67  
   6.1 SUPPORTING FRAMEWORK ............................................................................................................................................. 67  
   6.2 CROSS-CASE OVERVIEW ............................................................................................................................................ 68  
   6.3 THE PROJECT MANAGEMENT APPROACH .................................................................................................................... 74  
   6.4 HARD ELEMENTS OF THE ROLE OF PROJECT MANAGER .................................................................................................. 79  
   6.5 SOFT ELEMENTS OF THE ROLE OF PROJECT MANAGER .................................................................................................. 83  
   6.6 THE CHANGING ROLE OF PROJECT MANAGER: A GLANCE INTO THE FUTURE ............................................................................. 88  
   6.7 ADDITIONAL FINDINGS .................................................................................................................................................. 89  
   6.8 LINKING BACK TO LITERATURE .................................................................................................................................... 92  
   6.9 CONCLUSION OF THE CROSS-CASE ANALYSIS ................................................................................................................ 94  

7 DISCUSSION .......................................................................................................................... 99  
   7.1 DISCUSSING THE FINDINGS ............................................................................................................................................ 99  
   7.2 DISCUSSING THE IMPLICATIONS ..................................................................................................................................... 106  
   7.3 DISCUSSING THE LIMITATIONS ..................................................................................................................................... 109  

xv
LIST OF FIGURES

FIGURE 1. The research scope ................................................................................................. 10
FIGURE 3. Formulating questions for an interview guide (Bryman, 2012) ................................................................. 13
FIGURE 4. Research approach (own illustration) ................................................................... 14
FIGURE 5. The relationship between stakeholders and the project (Project Management Institute, 2001) .................. 28
FIGURE 6. Project management team structure – adopted from PRINCE2 ............................................................... 30
FIGURE 7. Blending PRINCE2 and Agile – adopted from AXELOS (2015, p. 17) .................. 31
FIGURE 8. Developing sensitizing concepts based on the literature review (own illustration) ........................................ 32
FIGURE 9. Chain of evidence of the case study (own illustration) .......................................... 44
FIGURE 10. Supportive framework of the cross-case analysis (own illustration) .................. 67
FIGURE 11. Schematic illustration of the case selection (own illustration) ............................ 74
FIGURE 12. Schematic illustration of the division of Scrum roles in projects with multiple development teams .... 75
FIGURE 13. The roles in the product delivery process of agile project management approach (own illustration) ............ 76
FIGURE 14. The role of the project manager in agile project management (own illustration) .... 79
FIGURE 15. Vertical and horizontal integration of agile development (own illustration) .......... 88
FIGURE 16. Redefined sensitizing concepts for analysing the role of project manager (own illustration) .................... 90
FIGURE 17. The relation between the project manager, project and organisational context (own illustration) .......... 91
FIGURE 18. Different organisational structures (Davies, Brady, & Hobday, 2006, p. 125) ........ 103
FIGURE 19. Organisational structure in an agile enterprise (own illustration) ..................... 103
FIGURE 20. The traditional and agile iron triangle - adapted from (Owen & Koskela, 2006a) ...... 105
FIGURE 21. Three research directions for further research (own illustration) ......................... 119
FIGURE 22. Project characteristics quadrants - adapted from (Wysocki, 2011) .................. 134
FIGURE 23. Project Life Cycle Models – adapted from (Wysocki, 2011) ......................... 134
FIGURE 24. Changing from traditional to agile project management - adapted from (Owen & Koskela, 2006a) ...... 135
FIGURE 25. Two examples of respondents doing the role division card game (own pictures) ..... 153

xvii
# List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>The Agile Manifesto: Principles (Beck et al., 2001; Griffiths, 2015)</td>
<td>21</td>
</tr>
<tr>
<td>Table 2</td>
<td>Agile and traditional project management comparators framework (own overview)</td>
<td>23</td>
</tr>
<tr>
<td>Table 3</td>
<td>Traditional management and agile leadership (Parker et al., 2015)</td>
<td>26</td>
</tr>
<tr>
<td>Table 4</td>
<td>Aspects of interest when analysing the changing role of project manager (own table)</td>
<td>26</td>
</tr>
<tr>
<td>Table 5</td>
<td>Responsibilities project manager according to PRINCE2 (Axelos, 2009b)</td>
<td>31</td>
</tr>
<tr>
<td>Table 6</td>
<td>Comparing responsibilities of the project manager in PRINCE2 with the Scrum roles (own illustration)</td>
<td>33</td>
</tr>
<tr>
<td>Table 7</td>
<td>Characteristics of group interview technique</td>
<td>39</td>
</tr>
<tr>
<td>Table 8</td>
<td>Participants of the group interview</td>
<td>40</td>
</tr>
<tr>
<td>Table 9</td>
<td>Selection criteria case studies</td>
<td>42</td>
</tr>
<tr>
<td>Table 10</td>
<td>Overview of the selected projects</td>
<td>42</td>
</tr>
<tr>
<td>Table 11</td>
<td>Criteria for three groups of respondents based on categories of PRINCE2</td>
<td>43</td>
</tr>
<tr>
<td>Table 12</td>
<td>Overview of the selected respondents</td>
<td>43</td>
</tr>
<tr>
<td>Table 13</td>
<td>Project information case 1</td>
<td>49</td>
</tr>
<tr>
<td>Table 14</td>
<td>Project information case 2</td>
<td>51</td>
</tr>
<tr>
<td>Table 15</td>
<td>Project information case 3</td>
<td>52</td>
</tr>
<tr>
<td>Table 16</td>
<td>Project information case 4</td>
<td>55</td>
</tr>
<tr>
<td>Table 17</td>
<td>Project information case 5</td>
<td>56</td>
</tr>
<tr>
<td>Table 18</td>
<td>Project information case 6</td>
<td>57</td>
</tr>
<tr>
<td>Table 19</td>
<td>Project information case 7</td>
<td>59</td>
</tr>
<tr>
<td>Table 20</td>
<td>Project information case 8</td>
<td>60</td>
</tr>
<tr>
<td>Table 21</td>
<td>Project information case 9</td>
<td>61</td>
</tr>
<tr>
<td>Table 22</td>
<td>Project information case 10</td>
<td>63</td>
</tr>
<tr>
<td>Table 23</td>
<td>General information of the selected cases</td>
<td>68</td>
</tr>
<tr>
<td>Table 24</td>
<td>Assessment of Agility – Philosophy</td>
<td>69</td>
</tr>
<tr>
<td>Table 25</td>
<td>Assessment of Agility – Organisation and management</td>
<td>70</td>
</tr>
<tr>
<td>Table 26</td>
<td>Assessment of Agility – Development process</td>
<td>70</td>
</tr>
<tr>
<td>Table 27</td>
<td>Assessment of Agility – People and team</td>
<td>71</td>
</tr>
<tr>
<td>Table 28</td>
<td>The Agility of the selected cases (own illustration)</td>
<td>72</td>
</tr>
<tr>
<td>Table 29</td>
<td>Assessment of Agility – Technology</td>
<td>73</td>
</tr>
<tr>
<td>Table 30</td>
<td>Outcome of the post-IT session (in Dutch)</td>
<td>138</td>
</tr>
<tr>
<td>Table 31</td>
<td>Responsibilities project manager according to PRINCE2 – translated in Dutch</td>
<td>151</td>
</tr>
<tr>
<td>Table 32</td>
<td>Roles and responsibilities of Scrum, adapted from (Schwaber &amp; Sutherland, 2016)</td>
<td>152</td>
</tr>
</tbody>
</table>
### List of Definitions and Abbreviations

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agile release train (ART)</strong></td>
<td>Long-lived self-organizing collection of agile teams that deliver valuable solutions.</td>
</tr>
<tr>
<td><strong>Backlog</strong></td>
<td>Prioritized ever-evolving list of work that is derived from a roadmap and its requirements.</td>
</tr>
<tr>
<td><strong>Backlog grooming</strong></td>
<td>Review of items on the product backlog, this refinement session can include: re-prioritizing, assigning estimates to stories, decomposing stories.</td>
</tr>
<tr>
<td><strong>Daily stand-up</strong></td>
<td>A time-boxed meeting with the development team, in which team members align the stories they are working on. Also known as a daily scrum or stand-up meeting.</td>
</tr>
<tr>
<td><strong>Demo</strong></td>
<td>The presentation of the working software by the development team to the customer / product owner, at the end of a sprint. Also known as an iteration review or sprint review.</td>
</tr>
<tr>
<td><strong>DevOps</strong></td>
<td>The DevOps is used to refer to the collaboration between development and IT operations (hence, the name).</td>
</tr>
<tr>
<td><strong>Epic</strong></td>
<td>A large body of work or a large story, which contains multiple stories. An epic can span across multiple sprints.</td>
</tr>
<tr>
<td><strong>Feature</strong></td>
<td>A service provided by the system. A story can include several features, features can be broken down in tasks.</td>
</tr>
<tr>
<td><strong>Impediment</strong></td>
<td>An obstacle preventing the team for completing the work.</td>
</tr>
<tr>
<td><strong>Increment</strong></td>
<td>A small piece of functionality that is completed and potentially releasable at the end of a sprint.</td>
</tr>
<tr>
<td><strong>Information Technology (IT)</strong></td>
<td>The field of IT is broader than technology alone, the developed technology is often a part of management science. One can think of computer hardware and telecommunication equipment but IT also covers the techniques and devices regarding collecting, storing, processing and distribution data or information.</td>
</tr>
<tr>
<td><strong>Iteration</strong></td>
<td>A single development cycle of work.</td>
</tr>
<tr>
<td><strong>Kanban</strong></td>
<td>Kanban is a development method for visualising and managing work.</td>
</tr>
<tr>
<td><strong>Legacy system</strong></td>
<td>Outdated computer system or application program, often the system is in need of replacement.</td>
</tr>
<tr>
<td><strong>Pair programming</strong></td>
<td>Programming in pairs.</td>
</tr>
<tr>
<td><strong>Product owner (PO)</strong></td>
<td>The product owner is the onsite customer with an complete overview of the product, responsible for managing the product backlog and outcome.</td>
</tr>
<tr>
<td><strong>Roadmap</strong></td>
<td>A plan of action for how a product or solution evolves over time.</td>
</tr>
<tr>
<td><strong>Refactoring</strong></td>
<td>Improving the internal structure of an existing program’s source code.</td>
</tr>
<tr>
<td><strong>Retrospective</strong></td>
<td>A time boxed meeting held at the end of a sprint in order to discuss the last sprint. Points for discussion are: what went well? what went wrong? what can we do differently to improve?</td>
</tr>
<tr>
<td><strong>Scaled Agile Framework (SAFe)</strong></td>
<td>SAFe is a knowledge base which provides guidance for lean-agile development at enterprise scale.</td>
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<tr>
<td><strong>Scrum master (SM)</strong></td>
<td>The scrum master is responsible for ensuring agile values and principles are understood by the team and following the processes and practices.</td>
</tr>
<tr>
<td><strong>Scrum of scrums</strong></td>
<td>A communication forum of multiple scrum teams.</td>
</tr>
<tr>
<td><strong>Sprint</strong></td>
<td>A set period of time in which a specific set of work has to be completed by the development team. The duration of a sprint is often between 1 – 4 weeks. Also known as: iteration, timebox or small release.</td>
</tr>
<tr>
<td><strong>Story</strong></td>
<td>The smallest self-contained unit of work which provides the definition of a requirement, capturing who, what and why - question.</td>
</tr>
<tr>
<td><strong>Theme</strong></td>
<td>A group or collection of stories, which are related in some way and share a common attribute.</td>
</tr>
<tr>
<td><strong>Test Driven Development (TDD)</strong></td>
<td>Test-first development is a technique for building software that starts with writing a test for each of the features.</td>
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<tr>
<td><strong>User story</strong></td>
<td>See the definition of a story.</td>
</tr>
<tr>
<td><strong>Value stream</strong></td>
<td>Sequence of activities intended to provide a continuous flow of deliverables of value to the customer.</td>
</tr>
<tr>
<td><strong>Velocity</strong></td>
<td>The rate at which the work is completed, estimates the teams capacity for future sprints.</td>
</tr>
</tbody>
</table>
INTRODUCTION

// CHAPTER 1
1 INTRODUCTION

As mentioned in the title of this research, this research will focus on the changing role of the project manager in the transition from traditional to agile project management. Section 1.1 starts with an explanation of the context of the research subject, namely the need for an agile project management approach in software development projects. Section 1.2 describes the relevance of research on the role of project manager in project management; this section details the scientific and social relevance. This research is commissioned by KWD Resultaatmanagement, general information about this company is provided in section 1.3. In the last section of this chapter (section 1.4), details the problem statement.

1.1 THE NEED FOR AN AGILE PROJECT MANAGEMENT APPROACH: SETTING THE CONTEXT

The total spending on projects is currently around 20% of the world’s GDP (Bredillet, 2010). The role of projects is becoming more important in society, the phenomenon “projectification” describes this process of organisations turning from operations to project management as key to competitive advantage and achieving their strategic objectives (Bredillet, 2010; Maylor, Brady, Cooke-Davies, & Hodgson, 2006). Since more and more organisations define their activities as projects, interest in the field of project management has increased over the last years (Bredillet, 2010; Crawford, 2005).

This shift towards projects as the basic form of organising work, also holds for organisations managing their software development efforts (Xia & Lee, 2004). Historically, Information Technology (IT) projects are notorious for their high failure rate. The IT sector is facing poor performance; many software projects fail to deliver on time and within budget (Jalote, 2002; Xia & Lee, 2004). Moreover, improvement in value delivery of IT projects is necessary; according to a McKinsey study 56 percent of the large IT projects deliver less value than expected (Bloch, Blumberg, & Laartz, 2012). The Standish Group (1995) performed a study in the USA showing that 31.1% of IT projects are cancelled before completion. Further results revealed that more than half of IT projects costs 189% of their original budget (Standish Group, 1995). In the United States alone, $250 billion is spent each year on approximately 175,000 IT application development projects. Nowadays, software is everywhere and IT project management is a major struggle for many organisations (Whittaker, 1999).

Two of the reasons why IT projects fail, are the rapid IT change and the high level of complexity (Xia & Lee, 2004). Over the recent years IT has been changing in a very high pace (Benamati & Lederer, 2001); it is therefore a matter of certainty that projects change. Change is inevitable in this dynamic interconnected global economy where organisations are exposed to change and complexity. Experts foresee that the pace of change will only increase in the future. Apart from the increasing pace of change, projects become more complex and the level of interdependence increases (Joiner & Josephs, 2007). Dynamic environments such as the IT sector recognise that dealing with change is crucial. Not properly managed information technology systems threaten the very existence of a company according to Ko and Kirsch (2017).

Despite improvements mentioned in recent scientific research, the failure rates of IT projects are still high and keeping up with uncertain environments is challenging organisations (Ko & Kirsch, 2017). In order to cope with these changes, a degree of flexibility is often needed in projects (Olsson, 2006). Within the context of change, Kreiner (1995) explains the notion of “drifting environments”; the divergence of something from its projected course. The transformation of interest of stakeholders, is one of the causes of environmental drift. Despite the often fuzzy and dynamic need of the client in the design & planning phase; the interest of the client is framed at an early stage in the project and a detailed specification is incorporated in the contract. It is hard to predict future conditions and the environmental conditions can change over time. Leading to a situation in which the environment is true at the beginning of the project, but is outdated at the time of completion.

The above section illustrates the crux of the matter; in traditional project management or plan-driven methods value is defined at the beginning of the project. Although projects are designed to produce relevant outcomes, it cannot be assumed the outcomes remain relevant over time (Kreiner, 1995). Especially for projects in turbulent business environments, it is almost impossible to create a complete project plan at the beginning of a project (Špundak, 2014). In this context of continuous change, the business requirements and technical specifications are highly difficult to manage and estimate (Xia
According to Highsmith (2002): “demanding certainty in the face of uncertainty is dysfunctional”. Project-based organisations should be able to anticipate to changing circumstances; agility is key. Dove (1995, p. 8) defines agility as “the ability of an organisation to adapt proficiently (thrive) in a continuously changing unpredictable business environment”. Agile stands for the ease of movement, flexibility, responsiveness and the ability to survive in an environment with constant change (Chow & Cao, 2008). Agile project management, sees changes as unavoidable and an opportunity to increase the delivered value (Owen & Koskela, 2006a). Instead of defining the value at the beginning of the project, value creation and learning throughout the project is key.

Flexible approaches like Agile could offer a solution for challenges organisations are dealing with nowadays, such as rapidly changing environments, ambiguous user requests and schedule pressure (Cao, Mohan, Xu, & Ramesh, 2009; Nurdiani, Börstler, & Fricker, 2016). In order to maintain competitive advantage, accommodation of frequent changes is important for software organisations (e.g. changes in customer needs and regulations). The software industry can be described as highly dynamic and competitive (Byrd & Turner, 2000; Nurdiani et al., 2016). Software organisations need to develop IT faster (shorter lead times and speed-up the time-to-market), with lower budgets and higher quality. Agile software development might offer a solution for these challenges in the software industry.

1.2 THE RELEVANCE OF INVESTIGATING THE ROLE OF PROJECT MANAGER

1.2.1 Scientific relevance

In the field of IT, project managers play a key role in developing successful projects according to Wateridge (1997). Various reasons could lead to poor performance of IT projects; however, remedies are often within the scope of the project manager. In order to improve the success rate of IT projects, the project manager needs to develop certain skills to overcome these challenges. According to Crawford (2005), there is an increased interest in the competences of project managers as they are seen as having a major impact on project performance. Blaskovics (2016) acknowledges this by stating that: “it inevitably seems that project managers have considerable impact on projects and a key role in achieving project success”. Cheng, Dainty, and Moore (2005) emphasize the fact that project-based companies are more and more aware of the relationship between project managers’ competences and performance.

In their research for the Project Management Institute (PMI), Müller and Turner (2006, 2010) conclude that different leadership styles are appropriate for different types of projects and that the leadership competences of a project manager are a factor for project success. This is in line with findings of Malach-Pines, Dvir, and Sadeh (2009), stating that a fit between the personality of a project manager and the “personality” of the project leads to more successful projects. Although no general consensus among scientific researchers is reached regarding the factors leading to project success (Porthouse & Dulewicz, 2007), “is fast becoming accepted wisdom that it is people who deliver projects, not processes and systems” (Cooke-Davies, 2002). For this reason, it is relevant to investigate the role of the project manager in order to improve the success rate of projects.

Nowadays, agile practices are implemented by many organisations in order to manage increased complexities of projects in which change is a constant factor (Porthouse & Dulewicz, 2007). Considering the role of the project manager in the context of agile project management; Porthouse and Dulewicz (2007) showed significant differences in leadership profiles of agile project managers and traditional project managers. According to Joiner and Josephs (2007) the increasing level of change and complexity in companies today, requires leadership agility as a much-needed competency. Müller and Turner (2010) recognise the impact of agile methodologies on the traditional understandings of the role of project manager; leading to the transformation from manager to facilitator. Agile project management brings new challenges for (traditional educated) project managers. Agile teams are self-organising, people need to play new project roles and responsibilities are divided differently. However, in agile methods limited advise is provided on how to implement these new forms of leadership (Moe, Dingsøyr, & Dybå, 2010).
The software industry recognises the need for agility and therefore agile project management (Porthouse & Dulewicz, 2007). Existing scientific literature emphasises the importance of the project manager role in projects and their key role in project success. This research fills a current gap in literature by investigating the role of the project manager in agile project management approaches of software development projects.

1.2.2 Social relevance

According to Joiner and Josephs (2007) there is a need for agile leaders corresponding with the level of agility in organisations. The need to investigate the management role in agile projects is acknowledged in practice. Many project managers in agile projects are in search of their exact role. Augustine, Payne, Sencindiver, and Woodcock (2005) experience this confusion in reality; project managers often fall back on traditional linear approaches trying to control the increased volatility. The shift in project roles and responsibilities has an impact on the current established notions of the role of project manager. This raises the question: “what is the role of the project manager in an agile project management approach?”

Only a few studies investigate project management of large scale agile projects, often these software development projects are important for companies or even nations (Dingsøyr & Moe, 2013). Investigating agile practices and the role of the project manager in software development projects can contribute to further understanding of this research topic. This graduation research aims to fill the knowledge gap of the role of the project manager in agile project management. In addition, a better understanding of the changing role of the project manager is relevant for practice. Project performance can be improved when a project manager is more aware of his role in an agile approach, subsequently a higher success rate of projects benefits society.

1.3 KWD Resultaatmanagement

The research is commissioned by KWD Resultaatmanagement (KWDRM). KWDRM is an expert in the field of project-, program- and interim management primarily focused on complex IT projects in businesses. Besides their experience in traditional project management, senior project managers of KWDRM are involved in agile projects. KWDRM provides agile training courses to their clients and keep themselves informed by performing research in the field of agile project management. KWDRM offers their expertise and services to companies looking for project managers in the field of large IT projects. The KWDRM project managers are working on projects for different clients throughout the Netherlands. Clients are often large organisations in various industries including the aviation sector, public sector, telecom sector and transport sector to name a few.

In their quest to improve project management, this research was initiated by KWDRM in cooperation with Delft University of Technology, with the aim to gain a better understanding on the changing role of the project manager in agile project management from a scientific viewpoint.
1.4 Problem Statement
The need to investigate the role of an agile project manager is mentioned by Hoda and Murugesan (2016), their research recommend a thorough investigation of the project manager’s role in self-organizing contexts. Their research conducted through the perspective of the self-organising team, indicates that it was often unclear who was responsible for project management activities, since the boundaries between the teams and the manager were often blurred. Compared with traditionally managed projects, the distribution of roles is different in agile methods (e.g. scrum master, project owner). Several project management activities are taken over by self-organising teams. These significant changes have an impact on the current established notions of the role of the project manager.

As mentioned in existing literature, the project manager plays a key role in project success. The role of the project manager in agile project management approaches has been sparsely researched. The need to investigate the management role in agile projects is acknowledged in practice. As it turns out in reality, project managers are often required in projects with an agile approach, while this role is not clearly defined in literature. Many project managers in agile projects are in search of their exact role. Augustine et al. (2005) confirmed this confusion by stating that project managers often fall back on traditional project management approaches in reality.

The above context validates the need for more research into the changing role of project manager. The journey towards agility is still evolving, many companies and projects are already in the transition towards agile project management; the project manager should be aware of his role within these changing circumstances, especially in the field of the software development were agile practices are already implemented to a large extent.
RESEARCH DESIGN

// CHAPTER 2
2 RESEARCH DESIGN

This chapter details the research design for this graduation thesis. Section 2.1 states the research objective, followed by the research question and sub-questions in section 2.2. In order to clearly define the research, the scope is established and clarified in section 2.3. The research strategy is described in section 2.4; at the end of this section the structure of this research is illustrated and the research approach is described. The chapter concludes with a reading guide for this report in section 2.5.

2.1 RESEARCH OBJECTIVE

As described in the introduction, in wider context this research could contribute to improvement of project management of large complex projects acting in dynamic environments such as the IT sector. It is recognised that agile methods are able to respond quickly to changing requirements, technologies and market conditions (Hoda & Murugesan, 2016).

The aim of this research is to investigate the changing role of a project manager in agile project management, which makes this research relevant for both science and practice. The scientific objective of this research is collection of empirical data in order to enrich the existing literature about the role of project manager, when changing from a traditional to an agile project management approach. Furthermore, this research contributes to practice since project managers are interested in their “new” role in an agile approach; this quest for deeper insights is substantiated by the request of KWD Resultaatmanagement to perform this research. The main research objective is described as follows:

**Research objective:** Explore the changing role of the project manager in an agile project management approach compared to a traditional project management approach; within software development projects.

This study provides empirical data on the actual situation of project managers within software development projects. Data is obtained through exploring the individuals’ view on the role of the project manager. Focus is especially on the changing role of project manager when comparing traditional and agile project management approaches.

2.2 RESEARCH QUESTION

Analysis of the context, description of the research topic, definition of the problem statement and establishment of research objective led to a main research question:

**Research question:** How does the role of a project manager change, comparing an agile project management approach to a traditional project management approach in software development projects?

The following identified sub-questions contribute to answering the main research question:

- **Sub-question 1:** How do agile and traditional project management approaches differ?
- **Sub-question 2:** How to describe the role of the project manager according to literature?
- **Sub-question 3:** How is the role of the project manager described in traditional and agile project management standards?
- **Sub-question 4:** How is agile project management performed in practice?
- **Sub-question 5:** What are the key-differences between the role of the project manager in a traditional and an agile project management approach?

A theoretical view forms the starting point for obtaining empirical data in practice, an answer on sub-question 1, 2 and 3 is provided through a review of relevant scientific literature. The aim of the first three sub-questions is to develop sensitizing concepts. In sub-question 1, insights are gained on the different characteristics of traditional and agile project management in existing scientific literature. In addition, the aim is to investigate what is known about management in an agile approach. Sub-question 2 is answered by studying role theory and scientific literature on the role of project manager. Moreover, a
review on the project management standards can further clarify the role of the project manager, this provides an answer on sub-question 3.

An empirical view is obtained by the investigation of agile and traditional project management within software development projects in practice (sub-question 4). The collected data is analysed in order to investigate the key changes for the project manager’s role in agile project management approaches. Subsequently, data analysis of this empirical data provides an answer to sub-question 5. This research results in findings on the changing role of project manager from a holistic perspective. Moreover, three concrete deliverables can be defined; (1) a framework for comparing agile and traditional project management, (2) a card game for division of tasks within a project and (3) a taxonomy of the role of the project manager and a description of the desired behaviour in agile project management.

2.3 RESEARCH SCOPE
A scope is required to define the boundaries of the research project; to define what is included in the research and what is not. The project manager is the primary focus of this research, which is conducted within the scope of software development projects performed across industries in the Netherlands. The research includes the embedding of the project within the organisation; the project context. Nevertheless, emphasis is primarily on the project and to a limited extent on the project context. Figure 1 shows the scope of this research, the elements in blue are included in the scope (the project manager, software development project and project context). In order to further specify the area of research, the relevant conceptual terms of software development projects and the project context are explained.

2.3.1 Software development projects
Within the field of information technology, software development projects will be the focus of this research. According to the Software Engineering Book of Knowledge, software engineering management can be defined as “the application of management activities—planning, coordinating, measuring, monitoring, controlling, and reporting—to ensure that the development and maintenance of software is systematic, disciplined, and quantified” (Abran, Moore, Bourque, Dupuis, & Tripp, 2004). Furthermore, the characteristics of a project should be taken into account in this research. According to Turner and Müller (2003), the aim of a project is to deliver beneficial change. A project is (1) unique, (2) undertaken using novel processes and (3) transient. These three features lead to pressures; projects are uncertain, integration is required in order to conduct the project, and there is sense of urgency since the project should be finished within time. Wysocki (2011, p. 4) defines a project as: “a sequence of unique, complex, and connected activities that have one goal or purpose and that must
be completed by a specific time, within budget and according to the specification”. An organisational perspective is described by Andersen (2012, p. 68); “a project is a temporary organisation, established by its base organisation to carry out an assignment on its behalf”. The permanent organisation gives an assignment to the temporary organisation (the project).

Hence, when considering a software development project in this research, a project can be defined as a temporary endeavour (defined beginning and end), established to carry out a change assignment on behalf of the base organisation. A project is unique and novel software development processes are undertaken. Moreover, a project is transient and after completion of the change assignment, business as usual resumes.

2.3.2 The project context

A project suggests that it stands alone and is completely detached from its environments. However, in recent years awareness increased for the embeddedness of a project in multiple systemic contexts (Manning, 2008). A project is not a closed activity system, contextual factors do have influence on the project (Blomquist & Packendorff, 1998). According to Engwall (2003) no project is an island; projects are influenced by their historical and organisational context. Engwall (2003) states that: “structures and procedures employed in a project have to be understood in relation to previous and simultaneous courses of activity, to future plans and standard operating procedures, traditions and the norms of its surroundings”.

Hence, when considering a project management approach the embeddedness of the project should be taken in consideration. The structure and procedures within the project are in relation with those of an organisation. This implies that the project manager is not in control of all variables that have an impact on the project. The project context is significantly influenced by the organisation which often prescribes a certain project management method for the project. For this reason, when considering a project management approach, the project context is included. This implies a broader perspective than the project governance within an individual project; the context consists of the embeddedness of the project within a higher level of governance (governance of projects, and relationships and interaction with stakeholders). The scope does not cover the corporate governance structure.

2.4 Research Strategy

In order to meet the defined objective of this research, a research strategy is designed. This research can be characterised as an empirical study conducted through a qualitative approach. Little scientific research is published in relation to the project manager’s role in agile projects. Since extant scientific literature is limited, the research strategy is essentially based on an inductive approach. Nevertheless, theory is used to formulate research questions and coming to an interpretive framework. Due to the exploratory nature of this research, a holistic multiple-case study was selected as research strategy. The case study approach is an appropriate method to describe the project manager in project context, and explore the changes in role of project manager when comparing traditional and agile project management. Within the case study design, ten projects are selected and semi-structured interviews are conducted with 25 respondents.

Yin (2002 p. 13) defined a case study as: “an empirical inquiry about a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”. As mentioned in the research scope “no project is an island” (Engwall, 2003); investigation of the contextual conditions of the role of project manager are important to include in this research. According to Yin (2003), a cases study approach is a suitable strategy when the researcher believes the context might be highly pertinent to the research topic. Moreover, a case study provides an in-depth and insightful understanding of the phenomenon (Yin, 2012). Flyvbjerg (2006) indicated several misunderstandings about case study research; it is a common misunderstanding that theoretical knowledge is more valuable than practical knowledge. According to Flyvbjerg (2006) gaining context-dependent knowledge and experience in case study research lie at the very centre of human learning and are as important as context-independent knowledge.
This section elaborates on this chosen research strategy, by following the five process steps for conducting case study research proposed by Yin (2003):

1. Designing the research
2. Preparing for data collection
3. Collecting the evidence
4. Analysing the evidence
5. Reporting the research findings

2.4.1 Designing the research
In order to develop a multiple-case study design and gain a better understanding about the topic, a literature research is conducted. In case study research, the literature study is often a means to formulate the research questions and not to determine answers (Yin, 2003). Relevant literature on traditional and agile project management, the role of project manager in existing scientific literature and project management standards are part of the theoretical framework of this research. In addition, open interviews with project management KWD experts helped to establish the direction of the research and to investigate possible interesting research topics.

The literature review aims to develop several sensitizing concepts; these concepts form an interpretive framework which sets the starting point of a qualitative study (Bowen, 2006). Sensitizing concepts are points of departure for building analysis. According to Bowen (2006), researchers do not necessary need to test, improve or refine the sensitizing concepts in qualitative research; the concepts form the foundation for analysis of the data. “Whereas definitive concepts provide prescriptions of what to see, sensitizing concepts merely suggest directions along which to look”: Blumer (1954, p. 7).

The selected research strategy involves an exploratory and descriptive research. The descriptive nature of the research entails the description of the real-life cases and the role of project manager within these projects. The exploratory aspect of the research concerns the exploration of the changing elements in the role of project manager due to the change to agile project management. According to Yin (2003) quality of an exploratory and descriptive research is based on three tests. (1) Construct validity is aimed for by using various data sources within each case, and the establishment of a chain of evidence. (2) Reliability is achieved by, drafting a case study protocol, formulating case selection criteria, following an interview guide, recording the interviews and development of a case study database. (3) External validity is established by conducting ten case studies across nine large Dutch companies in several sectors. How this case study method is performed and by what means the quality of the case set-up is guaranteed is described in chapter 4.

2.4.2 Preparing for data collection
Preparation for the case study includes field exploration in the initial phase of this research; this concerns a group interview with agile experts. The group interview fulfils exploratory and pretest purposes; leading to lessons learned which are incorporated in the case set-up. The group interview contributes to a better understanding of the research context, adds precision to the research problem and research strategy, and further refines the case and respondents selection criteria. The set-up and key findings of the group interview are described in section 4.1.

The data collection preparation phase includes the preparation of a case study protocol, and the selection of cases and respondents. For the semi-structured interviews, an interview protocol is drafted containing a set of open questions based on the sensitizing concepts. The formulation of questions included in the interview guide, are prepared in line with the steps described by Bryman (2012) showed in Figure 2. Lessons learned for the research design and field procedures are obtained during a pilot interview. This interview with a project manager enables iterations leading to points of improvement and the revision of interview questions and the case study protocol. Furthermore, a multi-day course on agile project management prepares the researcher in performing the multiple-case study.
2.4.3 Collecting the evidence

Data on the current situation of project managers in agile- and traditional project management approaches of software development projects is collected through a holistic multiple-case study. Based on predefined case and respondent selection criteria, 25 interviews are conducted covering ten different cases. Eight of these ten cases consider software development projects with the application of an agile project management approach. All of them at different companies. The remaining cases, using a traditional project management approach, provide a comparison group for the agile cases.

The main unit of analysis is the role of project manager in software development projects, the context is the project management approach of the project. According to case study criteria, software development projects are selected for this case study. Rich qualitative data is obtained through data collection by means of semi-structured interviews. The selection of respondents is conducted through a snowball sampling technique. The role of project manager is analysed from an individual point of view, namely the point of view of the participants such as the program manager, the project manager and team members of the project delivery team. This approach provides different perspectives on the role of project manager. The selection of cases and respondents is elaborated in section 4.3. Other data sources include field notes and documentation. The three principles of data collection described by Yin (2003) are followed: (1) use multiple sources of evidence, e.g. multiple data sources and respondents per case, (2) create a case study database, and (3) maintain a chain of evidence.

2.4.4 Analysing the evidence

The qualitative data analysis is executed by coding and categorization of the transcribed interviews. Eisenhardt (1989) advises to first become familiar with each case as a stand-alone entity before comparing the cases. For this reason, case reports are drafted for every project (chapter 5), combined with the establishment of a case study database. These steps contribute to the reliability of the case study research.

Data analysis includes qualitative content analysis, and can be further defined as conventional content analysis (Hsieh & Shannon, 2005). A cross-case search for patterns is conducted and intergroup differences and similarities between the different cases are analysed. This research consists of elements of inductive analysis, since the themes and concepts emerge out of the data rather than being imposed on them prior to data collection and analysis (Bowen, 2006). Elements of directed content analysis are incorporated in this research since the sensitizing concepts were based on theory and provided the four main categories of the data analysis. Short descriptive phases are used as codes leading to coding concepts, categories and themes. Codes are compared within a case and cross-case, this cross-case search for patterns leads to an iterating process towards theory building fitting the data. The empirical results of the multiple case study are compared with existing literature and theories. Chapter 4 describes the performed data collection and analysis in more detail.
2.4.5 Reporting the findings and the structure of the research

Reporting forms the last step in case study research; a linear-analytic structure is chosen for this graduation thesis (Yin, 2003). The research structure and the research approach is incorporated in Figure 3.

Figure 3. Research approach (own illustration)

Six phases can be distinguished in this research project, several steps are undertaken within each phase; the main steps are included in Figure 3. The six phases of the research approach (indicated in blue), are connected to the overall structure of this research report. Moreover, Figure 3 illustrates the chapters of this report (indicated in grey) and the research questions (indicated in green). Furthermore, the main flow of information through the different phases of the process of this research is shown (indicated in purple). As described in the research strategy, the literature review and developed sensitizing concepts form an interpretive framework for the cross-case analysis in chapter 6.
2.5 READING GUIDE

Chapter 1  Introduction – The report starts with an introduction of the context, and scientific and social relevance of the research topic. Moreover, the problem statement is formulated which is significant for composing the research design.

Chapter 2  Research design – The research design is described, the chapter starts with composing the research objective and research question. The scope of the research is stated, which includes the identification and definition of key terms. Furthermore, the chosen research approach and strategy are defined, illustrated and described.

Chapter 3  Theoretical framework – The established theoretical framework consists of a review of relevant literature. This chapter results in the development of sensitizing concepts.

Chapter 4  Case study set-up – The research method is explained and the set-up of the multiple case study is provided. The chapter starts with the preparation of the case study research. In addition, this chapter provides the case study protocol, criteria for the case study and respondents selection, and method for data collection and analysis.

Chapter 5  Case results – The results of the selected cases are described in case reports in this chapter, the individual case descriptions form the basis for the cross-case analysis.

Chapter 6  Cross-case analysis – A cross-case overview is provided including an assessment of the agility of the cases. Furthermore, this chapter includes an analysis the empirical findings of the cases and explains phenomena within the framework of sensitizing concepts. The findings are linked to literature and the sensitizing concepts are redefined based on new insights gained in this research.

Chapter 7  Discussion – The research outcomes are discussed in a broader context, the chapter covers a discussion and reflection of the findings, implications for theory and practice, and the limitations.

Chapter 8  Conclusion – Since the sub-questions provide a guideline for answering the main research question, this chapter gives an answer to the sub-questions and main research question.

Chapter 9  Recommendations – Based on the discussion and conclusion of this research, recommendations for further research and project managers in practice are formulated.
3 THEORETICAL FRAMEWORK

This chapter contributes to a better understanding of the relevant scientific literature and gives an indication on how his research could be embedded within this existing knowledge. The aim of this theoretical framework is to develop sensitizing concepts; these concepts lead to an interpretive framework which forms the starting point of this qualitative study.

In addition, there are three reasons why this literature study is conducted; the literature review consists out of three main sections which are related to three of the sub-questions of this research:

1. To obtain an overview of the existing knowledge about the difference between traditional and agile project management (sub-question 1);
2. To gain an understanding about how to define a role, and what is known about the role of project manager in existing scientific literature (sub-question 2);
3. To see what is known about the role of project manager in project management standards and agile methodologies (sub-question 3).

Section 3.1 states the differences between traditional and agile project management. The objective is to formulate a scientific list of elements which characterise traditional and agile project management. Section 3.2 elaborates on how to describe a role according to role theory and details current research about the role of project manager. This existing knowledge forms the starting point for further investigation of this changing role. Section 3.3 will investigate the project manager's role according to books of knowledge, widely used project management standards and well-known agile methodologies in software development. In section 3.4, a brief review of the literature is given indicating the gap in knowledge and leading to sensitizing concepts.

3.1 TRADITIONAL AND AGILE PROJECT MANAGEMENT

The aim of this section is to obtain an overview of the differences between traditional and agile project management. In addition, its objective is to introduce agile development, the transition towards agility and management in an agile approach. Sub-question 1 is answered at the end of this section, contributing to the sensitizing concepts (section 3.1.5).

Sub-question 1: How do agile and traditional project management approaches differ?

- What is the essence of an agile approach? (section 3.1.1)
- What is known about the transition to an agile approach? (section 3.1.2)
- How can traditional project management and agile project management be compared? (section 3.1.2)
- What is known about management in an agile approach? (section 3.1.4)

3.1.1 Introduction into agile project management and the Agile Manifesto

In 2001, seventeen leaders in the field of software development defined four values that contribute to better ways of developing software (Owen & Koskela, 2006b). These values and the related twelve principles are documented in ‘Manifesto for Agile Software Development’ (Beck et al., 2001). The purpose of the Agile Manifesto is: “uncovering better ways of developing software by doing it and helping others do it” (Fowler & Highsmith, 2001). The values of the Agile Manifesto are the following:

1. **Individuals and interactions** over processes and tools
2. **Working software** over comprehensive documentation
3. **Customer collaboration** over contract negotiation
4. **Responding to change** over following a plan

The first value of the agile philosophy is (1) **Individuals and interactions** over processes and tools. An agile approach is people-oriented, focussed on team collaboration and improvement of individual skills. Individual employees are seen as professionals, they need to be supported and trusted to get the job done. Self-organized small project teams are the ultimate way to come to the best results (Beck et al., 2001).
According to the agile principles, working software can be seen as a measure of progress. Coming to the second value; (2) Working software over comprehensive documentation. Focus should be on the value of the product and not on the paperwork and documentation. Documentation is just a part of the work that needs to be done; documentation by itself is not useful. Agile documentation is “barely sufficient”, documentation should be (1) just on time, (2) just enough and sometimes (3) just because (Griffiths, 2015). Documentation should be enough to cover the needs and should be produced the last possible responsible moment since in that case no time is wasted on updating the files. Sometimes documentation is prepared just because it is required and requested, and not providing it has consequences for the business value of the project.

The third value concerns (3) Customer collaboration over contract negotiation. Already during the project, part of the solution (business value) is released in frequent time spans. Satisfaction of the customer has a high priority and therefore changes are welcomed during the project. Most likely, some of the requirements of the customer will change during the project. Agile teams are working closely together with the customer in order to achieve maximum value; flexibility is required and accommodation of these changes is necessary.

The final value (4) Responding to change over following a plan, also emphatises this requisite ability to deal with change during the entire span of the project. Change is highly common in software projects and therefore we need to acknowledge that changes will occur. Initials plans are often made in the beginning of the project when knowledge and sufficient information are limited. Effort should be invested in responding to changes instead of trying to stick no matter what to the original plan (Griffiths, 2015).

According to Aguanno (2005), these values can be applied on agile project management even though they were initially developed for agile software development in general. In addition to the values, the Agile Manifesto stated principles which are described and explained in Table 1. These twelve principles do not form the exact explanation and definition of agility; instead they form a guideline for performing agile software development (Dingsøyør, Nerur, Bajipally, & Moe, 2012). The core of this principles is to encourage practices that deliver a greater value to the customers and accommodate change. Self-organising teams work in a sustainable pace on products and the customer is involved to a high extent.

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>EXPLANATION</th>
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<tbody>
<tr>
<td>1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software</td>
<td>Achieve consumer satisfaction. The focus should be on the customer and the development of valuable systems. Value should be delivered early and frequent. In this case the development team can learn from mistakes and correct failures early in the process.</td>
</tr>
<tr>
<td>2. Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage</td>
<td>Welcome change. Changes will occur and therefore changes are welcomed during the project. The project should be flexible and adaptive in order to efficiently deal with change requests.</td>
</tr>
<tr>
<td>3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference for the shorter timescale</td>
<td>Deliver frequently. Frequent feedback during the project is required in order to guarantee value for the customer. The development team learns from this feedback given by the customer; this results in new insights on requirements, priorities and the right direction to move forward.</td>
</tr>
<tr>
<td>4. Business people and developers work together daily throughout the project</td>
<td>Work together with the business. In order to generate value, we need to understand the business and therefore work closely together on the project. Developers learn from the requirements of the business and are better able to come up with suggestions for improvements. While the business representatives learn from types of solutions and possible features.</td>
</tr>
<tr>
<td>5. Build projects around motivated individuals, give them the environment and support they need and trust them to get the job done</td>
<td>Motivate and empower people. Trust and support people by giving them autonomy to plan and organize their own work. Smart and motivated people are more important than having the best processes and tools.</td>
</tr>
<tr>
<td>6. The most efficient and effective method of conveying information with and within a development team is face-to-face conversation</td>
<td>Face-to-face communication. Face-to-face interaction is crucial in the self-organising teams, it is the most effective way of communication.</td>
</tr>
<tr>
<td>7. Working software is the primary measure of progress</td>
<td>Working software is the definition of done. Agile is result-oriented; working systems define the progress of the project. If the system or product is not working, it is considered not to be complete. Only complete products will be accepted by the customer and defined as ‘done’.</td>
</tr>
</tbody>
</table>
8. Agile processes promote sustainable development. The sponsors, developers and users should be able to maintain a constant pace indefinitely
   **Maintain sustainable pace**
   A sustainable constant pace of the project contributes to the productivity, happiness and better work-life balance of the team-members. This benefits the organisation as well since long workdays will lead to resignations and loss of talent and knowledge.

9. Continuous attention to technical excellence and good design enhances agility
   **Maintain a good design**
   The product should be easy to maintain and facilitate the implementation of changes. In order to keep the design clean, simple and efficient, regularly refactoring is required.

10. Simplicity - the art of maximizing the amount of work not done - is essential
    **Keep it simple**
    Agile recommends to develop the simple solutions first, also described as “the simplest thing that could possibly work”.

11. The best architectures, requirements and designs emerge from self-organising teams
    **Work in self-organising teams**
    Self-organising teams have a high level of ownership, knowledge about what works best, support the product they created and therefore produce better work. In addition, agile teams know the ins and outs of the project and can detect issues easily and come up with solutions & opportunities for improvement.

12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly
    **Reflect to become more effective**
    Learning during the project is key. In evaluation meetings or “retrospectives”, the teams evaluate the process and identify opportunities. Lessons learned should be implemented after every iteration.

**Table 1. The Agile Manifesto: Principles (Beck et al., 2001; Griffiths, 2015)**

Since the formation of the Agile Manifesto, researchers attempt to define agility and the associated aspects (Dingsøyr et al., 2012). Lee and Xia (2010, p. 88) define software development agility as; “the software team’s ability to efficiently and effectively respond to user requirement changes”. According to Henderson-Sellers and Serour (2005), an agile method includes the ability to be flexible towards change on two aspects. Firstly, the flexibility towards change on requirements, people, design and technology. Secondly, the flexibility to refine the development processes or the agile method if the demands of project or organisation has changed.

It is recognised in literature that agile can be seen as a way of thinking or mindset rather than a project management approach or a tool (Highsmith, 2002). Whereas before, agile was primarily carried out in the IT sector, nowadays this way of working is used in several sectors. Over the last 25 years, several different methods are developed for implementing agile into projects and organisations. Agile is the umbrella term for methods like; Extreme Programming (XP), Scrum, Dynamic System Development Methodology (DSDM) and Feature Driven Development (FDD) to name a few. These methods are implications of the Agile Manifesto and often include a specific set of values and prescribe a certain mind-set (Henderson-Sellers & Serour, 2005). Currently, Scrum is the most widely adopted agile methodology with 43% of the agile adopters using this methodology (Price Waterhouse Coopers, 2012).

### 3.1.2 The difference between traditional project management and agile project management

Literature proposes different ways to compare agile and traditional project management. Several scientific researchers use different terminology when comparing both types of project management. Traditional approaches are often referred to as plan-driven, task-driven, document-driven or marked as large “heavy-weighted” methodologies (Henderson-Sellers & Serour, 2005; Van Vliet, 1993). Heavy-weighted because of the focus on the process; this is in contrast to the light-weighted agile approaches such as Scrum and XP (Henderson-Sellers & Serour, 2005). A plan-driven or document-driven approach refers to the documented process plans (tasks and milestones) and product plans (designs, architectures and requirements) (Boehm, Port, & Brown, 2002). Since agile approaches also include planning activities (only in shorter iterations), the term “traditional project management” is used when comparing to agile project management.

Traditional and agile project management styles consist of a set of specific characteristics and underlying philosophy. Agile is based on the values of the Agile Manifesto (Beck et al., 2001) and this philosophy provides guidance on how to apply agile project management (Owen et al., 2006). Traditional project management pursues an ultimate goal; “optimization and efficiency in following initial detailed project plan, or, having said in usual way, to finalize project within planned time, budget, and scope” (Špundak, 2014, p. 941). The basis of a traditional approach is predictability, while agile is characterized by the adaptability to changes.
The different characteristics of a traditional and agile approach are described by Špundak (2014), and Leau, Loo, Tham, and Tan (2012). From a different perspective, research is performed on organisations utilizing both agile and traditional approaches or subunits (Nerur, Mahapatra, & Mangalaraj, 2005; Van Waardenburg & Van Vliet, 2013; Vinekar, Slinkman, & Nerur, 2006). These studies address the organisational challenges that comes with simultaneous presence of both approaches. Both Nerur et al. (2005) and Vinekar et al. (2006) provide a comparison of the different characteristics of traditional and agile software development approaches. Four main levels are distinguished when comparing both approaches; management and organisational, people, process and technology. Furthermore Khan, Qurashi, and Khan (2011) describe characteristics of popular heavyweight and lightweight methodologies.

Other literature compares agile and traditional project management on the base of development method or development life cycle (Fernandez & Fernandez, 2008; Hass, 2007; Leau et al., 2012; Wysocki, 2011). Owen et al. (2006) use a set of comparators to discuss the evolution of agile project management and the potential application in the construction industry. A set of agile project management characteristics is described, including the categories: philosophy, organisational attitudes and practices, planning, execution and control & learning.

Table 2 provides an overview of the comparison between agile and traditional project management. This framework is composed using several comparators extracted from existing literature. The five comparators indicating the fundamental differences between agile and traditional project management are primarily based on the four levels defined by Nerur et al. (2005) and as well used by Vinekar et al. (2006). The five comparators include: philosophy, organisation and management, development process, people and team, and technology. Each of the differences between agile and traditional project management is explained in detail in appendix A. The next section discusses only those aspects of the framework, which refer to management in an agile approach.
<table>
<thead>
<tr>
<th>COMPARATORS</th>
<th>ASPECTS</th>
<th>AGILE PROJECT MANAGEMENT</th>
<th>TRADITIONAL PROJECT MANAGEMENT</th>
<th>SOURCES</th>
</tr>
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<tbody>
<tr>
<td>PHILOSOPHY</td>
<td></td>
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<tr>
<td>Mindset</td>
<td></td>
<td>Individuals</td>
<td>Processes &amp; tools</td>
<td>Nerur et al., 2005; Vinekar et al., 2006; Agile Manifesto</td>
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<td></td>
<td></td>
<td>Working software</td>
<td>Comprehensive documentation</td>
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<td>Customer collaboration</td>
<td>Contract negotiation</td>
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<td>Responding to change</td>
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<td></td>
<td>Following the plan</td>
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<tr>
<td>ORGANISATION AND MANAGEMENT</td>
<td></td>
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<tr>
<td>Organisation</td>
<td>Structure</td>
<td>Flat team-based structure</td>
<td>Hierarchical structure</td>
<td>Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013</td>
</tr>
<tr>
<td></td>
<td>Form</td>
<td>Flexible &amp; participative encouraging cooperative social action (organic)</td>
<td>Bureaucratic with high formalization (mechanical)</td>
<td></td>
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<tr>
<td></td>
<td>Culture</td>
<td>Comfort and empowerment via many degrees of freedom (thriving on chaos)</td>
<td>Comfort and empowerment via framework of policies and procedures (thriving on order)</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Management style</td>
<td>Leadership-and-collaboration</td>
<td>Command-and-control</td>
<td>Owen et al., 2006; Nerur et al., 2005; Vinekar et al., 2006; Hass, 2007</td>
</tr>
<tr>
<td></td>
<td>Decision making</td>
<td>Decentralized &amp; pluralist decision making</td>
<td>Centralized &amp; managerial decision making</td>
<td></td>
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<tr>
<td>DEVELOPMENT PROCESS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development methods</td>
<td>Development style</td>
<td>Iterative, adaptive, extreme</td>
<td>Linear, incremental</td>
<td>Fernández &amp; Fernández, 2008; Wysong, 2012; Vinekar et al., 2006; Hass, 2007; Luu et al., 2012; Van Waardenburg &amp; Van Vliet, 2013</td>
</tr>
<tr>
<td></td>
<td>Development model</td>
<td>Evolutionary delivery model; e.g. Scrum, XP, DSDM, Crystal, FDD</td>
<td>Life cycle model; e.g. Waterfall model, spiral model, V-model</td>
<td></td>
</tr>
<tr>
<td>Development approach</td>
<td>Project cycle</td>
<td>Guided by project features</td>
<td>Guided by tasks or activities</td>
<td>Owen et al., 2006; Williams et al., 2010; Hass, 2007; Nerur et al., 2005; Cockburn, 2006</td>
</tr>
<tr>
<td></td>
<td>Iron triangle</td>
<td>Resources and time are fixed</td>
<td>Scope (solution) is fixed</td>
<td>Owen et al., 2006; Williams et al., 2010; Hass, 2007; Nerur et al., 2005; Cockburn, 2006</td>
</tr>
<tr>
<td>Development direction &amp; nature of planning</td>
<td>Development direction</td>
<td>Adaptable; readily changeable</td>
<td>Pre-planned; fixed</td>
<td>Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013</td>
</tr>
<tr>
<td></td>
<td>Planning approach</td>
<td>Planning is done prior and for every iteration</td>
<td>Rigorous planning for the entire project</td>
<td>Vinekar et al., 2006; Luu et al., 2012; Williams et al., 2010; Vinekar et al., 2006</td>
</tr>
<tr>
<td>Value delivery frequency</td>
<td>Value delivery</td>
<td>Frequent value delivery; after every iteration</td>
<td>At the end of each phase at the end of the project the value accepted by the customer</td>
<td>Vinekar et al., 2006; Owen et al., 2010; Williams et al., 2010; Boehm and Turner (2003)</td>
</tr>
<tr>
<td>Dealing with change</td>
<td>Change</td>
<td>Change is inevitable, dealt with after every iteration</td>
<td>Threat for meeting the plan, not dealt with until the next release</td>
<td>Van Waardenburg &amp; Van Vliet, 2013; Owen et al., 2006; Hass, 2007</td>
</tr>
<tr>
<td>PEOPLE AND TEAM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teamwork</td>
<td>Team composition</td>
<td>Small teams, collaborative work</td>
<td>Large teams, individual work</td>
<td>Williams et al., 2010; Hass, 2007; Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Team location</td>
<td>Co-located teams</td>
<td>Not always co-located teams</td>
<td>Williams et al., 2010; Hass, 2007; Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Role assignment</td>
<td>Self-organising teams &amp; encourages role interchangeability</td>
<td>Individual &amp; favours specialisation</td>
<td>Williams et al., 2010; Hass, 2007; Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Skills</td>
<td>Interpersonal &amp; multidisciplinary skills</td>
<td>Specialized skills</td>
<td>Williams et al., 2010; Hass, 2007; Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td>Customer involvement</td>
<td>Customer involvement</td>
<td>High customer involvement; dedicated customers focused on prioritized increments</td>
<td>Low customer involvement; as-needed customer interactions focused on contract provisions</td>
<td>Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Boehm and Turner (2003); Owen et al., 2006; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Customer location</td>
<td>Co-located customer</td>
<td>Not always co-located customer</td>
<td>Vinekar et al., 2006; Nerur et al., 2005; Luu et al., 2012; Boehm and Turner (2003); Owen et al., 2006; Williams et al., 2010</td>
</tr>
<tr>
<td>Attitude to learning</td>
<td>Learning type</td>
<td>Double loop learning</td>
<td>Single loop learning</td>
<td>Williams et al., 2010; Owen et al., 2006; Hass, 2007</td>
</tr>
<tr>
<td>TECHNOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>Definition of requirements</td>
<td>Requirements can undergo unforeseeable change, and consist of prioritized informal stories</td>
<td>Requirements undergo a foreseeable evolution and are formalized (e.g. projects, capabilities, interfaces, quality)</td>
<td>Boehm and Turner (2003); Luu et al., 2012; Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Clarification of requirements</td>
<td>Requirements discussed and clarified “just-in-time”</td>
<td>Requirements at the beginning of the project (Contract driven; requirements serve as contract)</td>
<td>Boehm and Turner (2003); Luu et al., 2012; Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td>Testing</td>
<td>Test cases</td>
<td>Executable test cases define requirements testing</td>
<td>Documented test plans and procedures</td>
<td>Boehm and Turner (2003); Luu et al., 2012; Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td></td>
<td>Timing testing</td>
<td>Write test prior to code (test-driven development)</td>
<td>Write code prior to test</td>
<td>Boehm and Turner (2003); Luu et al., 2012; Owen et al., 2006; Van Waardenburg &amp; Van Vliet, 2013; Williams et al., 2010</td>
</tr>
<tr>
<td>Release frequency</td>
<td>Frequency of testing</td>
<td>Testing on every iteration (incl. customer acceptance testing)</td>
<td>Testing after coding phase completed (incl. customer acceptance testing)</td>
<td>Van Waardenburg &amp; Van Vliet, 2013</td>
</tr>
<tr>
<td>Project metrics and documentation</td>
<td>Project metrics and documentation</td>
<td>Minimal, up-to-date metrics</td>
<td>Emphasis on data collection</td>
<td>Boehm and Turner (2003); Vinekar et al., 2006; Williams et al., 2010; Hass, 2007; Van Waardenburg &amp; Van Vliet, 2013; Owen et al., 2006; Nerur et al., 2005</td>
</tr>
<tr>
<td>Coding</td>
<td>Design</td>
<td>Simple design; refactoring assumed inexpensive</td>
<td>Extensive design; refactoring assumed expensive</td>
<td>Boehm and Turner (2003); Luu et al., 2012; Williams et al., 2010</td>
</tr>
</tbody>
</table>

Table 2. Agile and traditional project management comparators framework (open overview)
3.1.3 The transition towards agility

When exploring the changing role of project manager in the transition towards agility, it is valuable to have an understanding of the applicability of an agile approach in current projects and the implementation throughout organisations. Boehm and Turner (2003) describe the home grounds of agile and plan-driven (traditional) methods; this is the type of project environment the project management style is more likely to succeed. Five critical decision factors were identified for agile and traditional home grounds: (1) size of the team and project, (2) criticality of the project, (3) compatibility with prevailing culture, (4) the degree of dynamism and (5) competence of personnel. Agile methods are suitable for small teams and projects, while traditional methods are more appropriate for larger projects and teams. Criticality is described by Cockburn (2006) as the damage from undetected defects. A highly critical project requires more control and less tolerance and for this reason a traditional approach. Agile methods succeed better when the culture is one that is “driving on chaos”, while traditional methods function better in a “thriving on order” culture. Organisations providing comfort and empowerment via a large degree of freedom are suitable for an agile approach. In contrary, traditional methods are more likely to succeed in environments working with policies and procedures frameworks. Agile methods are better capable of dealing with uncertainties and high levels of risks arising from changing requirements. The requirements of traditional approaches should be stable and predictable. Lastly, the personnel in agile require a higher level of skills; traditional methods can work with both high and low skilled personnel.

In the past agile methodologies where mainly applied on small sized, non-critical projects with well-skilled personnel, an agile culture and highly changing environment (Boehm & Turner, 2003). Especially small-to-medium size projects are considered to be suitable for the agile methods according to Boehm (2002). However, things are changing nowadays; agile methods are applied on projects and within environments not necessarily matching the agile home grounds. This has given rise to a debate about whether agile methods are scalable to larger projects (Henderson-Sellers & Serour, 2005). According to Sutherland (2001) Scrum can be scaled to any size of project and also Cockburn (2006, p. 182) states an agile approach for larger projects is possible. However, larger projects (and larger teams) require heavier agile methodologies. Henderson-Sellers and Serour (2005) describe the need to empirically assess the applicability of the agile methods on a larger scale. The efforts that has been made to implement agile methods on larger and complex projects showed mixed results according to Cao et al., 2009.

In the past years organisations started to implement agile on a larger scale despite the challenge of managing multiple deployment teams (Bass, 2016; Cao et al., 2009). As stated before, agile is a mindset and not a specific set of practices, therefore tailoring the agile methodologies according to circumstances is common practice within organisations (Griffiths, 2015). According to Bass (2016), numerous scaling and tailoring techniques emerged for large-scale software development programs such as scaled-up scrum. The Scaled Agile Framework (SAFe) is another example of implementation of agile at enterprise level. SAFe provides guidance on agile development at portfolio, program and team level (Leffingwell, 2016).

According to Brown, Ambler, and Royce (2013) there are several organisational challenges when implementing agile on a larger scale such as governing and institutionalising. Scaling techniques include multi-level teams, plans, backlogs, coordination and governance (Rico, 2010). Qumer and Henderson-Sellers (2008b) state that implementing agile methods in traditional organisations environments is challenging. The complete agile transformation of an organisation often takes a few years. Moreover, the IT landscape is becoming more and more complex according to Van Waardenburg and Van Vliet (2013). Their research explains the reason for this complexity; IT departments with a traditional project structure and a project management method such as Prince2, manage some projects using agile methodologies and other projects according traditional approaches. Vinekar et al. (2006) describe the appearance of both agile and traditional subunits in development organisations; both exploitation and exploration can be important for organisations, this can lead to contradictory forces between stability and agility. Above these cultural contrasting sub-units, an integrated governance structure is required which facilitate both methodologies. While projects can have different characteristics, the development system of the organisation does not change for every project (Vinekar et al., 2006).
3.1.4 Management in an agile approach

According to Cao et al. (2009), adopting agile methods could, among other things, lead to organisational / management-related challenges. Cao et al. (2009) mention decentralized decision making and the need for a flat organisation structure when adapting agile methods to various environments. Several key issues and the challenges for organisations migrating to an agile approach are described by Nerur et al. (2005). Concerning management in an agile approach, the project management style is of relevance. The project manager as planner and controller shifts to the role of facilitator; which includes relinquishing authority and enabling the team to collaborate (shift from command-and-control to leadership-and-collaboration). In addition, knowledge management is relevant since information is tacit and documentation is limited in agile. This could shift the balance of power from management to the agile teams; shifting from a project manager making most of the decisions to a pluralist decision-making environment.

Vinekar et al. (2006) underline the changing team interactions, role interchangeability and self-organisation of the team. Moreover, the changing role of project manager is mentioned: “The traditional role of project manager as planner, organizer, and controller disappears, and the role of facilitator or coach who effectively manages the collaborative efforts of the team members without stifling their creativity takes its place” (Vinekar et al., 2006, p. 34). Traditional hierarchical organisations implementing agile development can have difficulties with self-organising teams, pluralistic decision-making, and transformation to a collaborative environment cherished by strong leadership instead of strict authority.

Moe, Dingsyr, and Kvangardsnes (2009) describe the challenges of establishing leadership in agile software development projects. This study focuses on Scrum and describes the significant level of decision-making authority of self-organising teams. Two main challenges were identified: the lack of mechanisms for effective learning and the difficulty of developing the right levels of autonomy for the project. In agile, the internal autonomy of the team requires shared leadership and shared decision authority. Moe, Dingsyr, et al. (2009) refer to the project manager as a vertical leader responsible for project management duties. In addition, shared decision-making in agile software development was explored in greater depth by Moe, Aurum, and Dybå (2012). Three levels of decision making are distinguished in agile organisations; (1) strategic decisions, related to organisational goals and objectives, (2) tactical decisions, related to identification and uses of resources and (3) operational decisions, related to the effectiveness of the operations.

In his book on agile software development, Highsmith (2002, p. 17) states the following: “A traditional project manager focuses on following the plan with minimal changes, whereas an agile leader focuses on adapting successfully to inevitable changes”. This quote by Jim Highsmith emphasizes the need for leaders in agile project management instead of managers. According to Highsmith (2002), traditional project managers are too often focused on the iron triangle: scope, schedule and cost. Probably, the false assumption is made that delivering on time, within budget and scope means delivering value. Highsmith (2002, p. 17) proposed three key values for agile leaders; (1) delivering value over constraints, (2) leading the team over managing tasks, (3) adapting change over conforming to plans.

Parker, Holesgrove, and Pathak (2015) investigated agile leadership of self-organised teams, since little research is conducted on the appropriate style of leadership in those teams. Based on a literature review the characteristics of traditional leadership and management were listed (Table 3). Within traditional management a leader should take tight control when circumstances are unpredictable; change control, risk control and most of all people control. According to Parker et al. (2015), “Traditional leaders believe that more control results in more order.” While in a world where change is inevitable this view of tight control does not really improve the overall productivity. According to Parker et al. (2015), it is apparent that traditional management and leadership does not match the autonomous self-organising teams. In agile practices a manager becomes an adaptive leader; self-organised teams need agile leadership. The following principles of agile leadership are defined (Table 3). The agile leader has a more facilitating role and encourages collaboration, adaption and feedback.
The fundamentals of agile project management are specified, including the values and principles of an agile approach. Moreover, the implementation and adoption of agile methodologies nowadays is described. In the past, agile methodologies where mainly applied on projects matching the agile home grounds. Nowadays, organisations recognise the need for agility and numerous scaling and tailoring techniques emerged for implementing agile on large-scale projects and within entire organisations on enterprise-scale. The comparison between agile and traditional project management resulted in a theoretical framework with several comparators extracted from existing literature (Table 2). This theoretical framework consists of five main themes: philosophy, organisation and management, development process, people and team, and technology. In terms of management, the differences between both approaches forms a starting point for this research. The most fundamental differences mentioned in literature are: collaboration with the team, decision making and authority, leadership and management style, and managing resources and value delivery. These identified aspects contribute to the development of sensitizing concepts in section 3.4.
3.2 THE ROLE OF THE PROJECT MANAGER ACCORDING TO ROLE THEORY

The aim of this section is to gain an understanding of the definition of a role according to role theory. Furthermore, this section details extant scientific literature on the role of project manager. In the conclusion of this section, sub-question 2 is answered (section 3.4). This contributes to the development of sensitizing concepts in section 3.4.

Sub-question 2: How to describe the role of the project manager according to literature?

- What is the general description of a role in an organisational context according to role theory? (section 3.2.1)
- How are the hard elements of the role of project manager described in existing literature? (section 3.2.2)
- How are the soft elements of the role of project manager described in existing literature? (section 3.2.3)

3.2.1 Role theory: the general definition of a role within the context of an organisation

The definition of a role is described in role theory literature. According to Biddle (1979, p. 20) role theory concerns; “the study of roles, or patterns of behaviours that are characteristic of persons and contexts”. Although everyone has an idea about the meaning of a role, there is no general accepted definition according to Zhu and Zhou (2008). With regard to organisations, individuals do have certain positions (or roles). This position (or role) is described by Zhu and Zhou (2008) as a specific “seat” that has certain responsibilities and privileges. In their research, Zhu and Zhou (2008) compare various role concepts in different research areas and mention numerous role definitions. In the light of this research, in particular a study into the role of project manager, the following definition of Zhu and Zhou (2008) fits best: “a role is a job function within the context of an organisation with some associated semantics regarding the authority and responsibility conferred on the user assigned to the role.” A clear role specification is of importance, since role ambiguity can lead to different expectations (Zhu & Zhou, 2008). When these role expectations are incompatible for an individual this is called a role conflict (Biddle, 1979; Jones & Deckro, 1993).

Jones and Deckro (1993) describe a role in an organisation as follows: “in an organisation an individual occupies a position (has a job) and associated with this position is a set of activities that make up an individual’s role”. The role of an individual occupying a position is a set of desired and undesired behaviours. Boyatzis (2008) explains the concept of competencies and how they drive performance. This links to the concept of job demands, since maximum performance is achieved when a person’s capability is consistent with the needs of the job demands and the organisational context. Boyatzis (2008) describes job demands as the role responsibilities and tasks that needs to be executed. The organisational environment does have a considerable impact on the design of the jobs and roles.

Hence, when considering the role of project manager, behaviours and activities should be taken into account. For this reason, section 3.2.2 covers the hard elements (e.g. activity, responsibility, tasks) and the section 3.2.3 the soft elements (e.g. behaviour, competences, attitude).

3.2.2 The hard elements of the role of project manager according to literature

According to BS 6079-2:2000 a project manager is defined as: “The individual or body with authority, accountability and responsibility for managing a project to achieve specific objectives” (Britisch Standards Institution, 2000). According to Aghion and Tirole (1997, p. 1) authority can be defined as “the right to select actions affecting part or the whole of an organisation”. Authority often comes with ownership and the right to decide about a certain asset/activity, this is called formal authority. Real authority includes “an effective control over decisions, on its holder” (Aghion & Tirole, 1997, p. 2).

One of the first descriptions of the project manager is written by Gaddis (1959). In his study on the project management function three topics are examined; what the project manager does, what kind of man the project manager must be, and what training the project manager needs. The project can be described as an organisation unit dedicated to the realisation of a goal. This goal is often the creation of a developmental product. The project manager has responsibilities in delivering this end product; (1) in accordance with the performance requirements, (2) within the limitations of his budget and (3) within the time schedule defined by the customer or company. Success or failure of the project manager depends on “the
ability to discern fine variations on emphasis among performance, budget, and time schedule needs and resolve the continuous apparent conflicts which occur between them” (Gaddis, 1959, p. 92).

According to Robertson and Secor (1986) project management includes: planning, organising, controlling and dealing with people. Others define the project manager as head of a temporary company. Wateridge (1997) explains that planning, controlling and communication is the essence of project management. Most of the time project managers are communicating with different stakeholders and interested parties. The project manager starts the project and supervises the work until the result is achieved. Wateridge (1997) identifies leadership as the most important skill, when comparing several studies on required skills for project managers.

3.2.3 The soft elements of the role of the project manager according to literature

According to Porthouse and Dulewicz (2007) research into project management is shifting from task perspective towards the competence of project managers. Boyatzis (2008) defines competency as “the capability or ability”. However, diffuse terms and different meanings concerning the concept of competence are mentioned in literature (Crawford, 2005; Le Deist & Winterton, 2005). Pierce (1994) states that the term “competence” is concerned with efficient performance of work. Competency is the ability or the behaviour required for competent performance. Based on the definitions of Pierce (1994), Cheng et al. (2005) distinguishes job-task competencies and behavioural competencies. Job-task competencies are concerned with the job output; which area of work the project manager needs to be competent. Behavioural competencies are underlying characteristics to perform well, and links to the personal characteristics of the project manager. In order to compile a competency framework, both types of competencies have to be taken into account. Job-task competencies are often industry specific while behavioural competencies are more generic in nature.

Competence frameworks in human resource management often includes three aspects; functional dimensions, cognitive dimensions and social dimensions (Chipulu, Neoh, Ojiako, & Williams, 2013). Functional dimensions are concerning job specific skills. Cognitive dimensions are defined by knowledge and understanding. Social dimensions are defined by behavioural and attitudinal competences. Competence cannot be observed directly according to Heywood, Gonczi, and Hager (1992). Both visible (e.g. knowledge base, skills, attitudes) as well as undefined or unrecognised personal attributes enable competent performance. Research can be performed on those underlying competences which lead to good performance within the profession; this is called an attribute-based approach. Another way to interpret competence is by observing competence at the workplace; the performance-based approach is based on demonstrable performance. Therefore the performance-based approach can also be described as competency standards; employees must achieve performance level in accordance with the standard. The attribute-based approach led to the development of competency models which describe for instance competencies required for certain jobs or functions.

![Figure 4. Integrated model of competence identifying components of overall construct (Crawford, 2005)](image-url)
The competency framework of Crawford (2005) (Figure 4) was developed based on the theory of Heywood et al. (1992). The figure entails both attribute-based (knowledge, skills and core personality characteristics) and performance-based inference of competence (demonstrable performance). Crawford (2005) defines three key components of competence: (1) input competencies; knowledge and skills, (2) personal competencies; behavioural characteristics including motives, traits and self-concept, and (3) output competencies; demonstrated ability to perform according to the standards. Output competencies can be defined by occupational standards (e.g. national occupational standards), professional standards (e.g. standards defined by project management institutions) or organizational standards (e.g. job descriptions) (Müller & Turner, 2010).

According to Crawford (2005) a project manager needs certain “core personality characteristics” in order to become an inspiring leader (Müller & Turner, 2010). Personal characteristics include the traits, behaviours, attitudes and emotions of people. Only the application of knowledge and skills makes a project manager not a leader but just an adequate manager. Müller and Turner (2006) conclude in their research that project manager’s competency (including the leadership style) does influence project success. Different project manager competency profiles and leadership profiles are appropriate for different types of projects. Porthouse and Dulewicz (2007) investigated the difference in competence between traditional project managers and agile project managers (scrum masters). It was concluded that emotional and social competences are more important for agile project managers than for mainstream project managers. Their findings show that agile project managers scored higher on the EQ dimensions; intuitiveness, communication and developing others; and scored lower on motivation and conscientiousness.

3.2.4 Conclusion: answering sub-question 2
A review of scientific literature on role of project manager provides an answer to the second sub-question. The general description of a role according to role theory was investigated first. Based on the established findings, the hard elements (e.g. activity, responsibility, tasks) and soft elements (e.g. behaviour, competences, attitude) of the role of project manager were investigated in extant scientific literature. Findings of the literature review provide an answer to the second sub-question:

| Sub-question 2: How to describe the role of the project manager according to literature? |

Role theory is a research area which gives insights on roles and patterns of behaviours. However, existing scientific literature reveals no precise and general accepted definition of a role. Despite this fact, a role can be described based on relevant literature in the field of role theory, by a set of activities and responsibilities (Jones & Deckro, 1993; Zhu & Zhou, 2008). This role description can be referred to as job demands or job-task competencies (Boyatzis, 2008; Cheng et al., 2005). The description of a role also includes a set of desired and undesired behaviours, which can be referred to as behavioural patterns or behaviour competencies (Biddle, 1979; Cheng et al., 2005; Jones & Deckro, 1993).

With regard to the hard elements of the project manager, relevant literature often dates back several years. Nevertheless, this literature is still valued as relevant for this research. A project manager has authority, accountability and responsibility for managing a project. In order to realise the goal of the project, project management includes planning, organising, controlling, communicating and dealing with people and stakeholders (Robertson & Secor, 1986; Wateridge, 1997). More recently, research on the soft aspects such as competences has gained traction in scientific research within the field of project management. The model of competence of Crawford (2005) is often referred to in literature, and describes the different components of competence. The concept of competence is dissected in three types: input, personal and output. Behaviour and attitude is related to the personal characteristics and falls under personal competences of the project manager.
3.3 THE ROLE OF PROJECT MANAGER ACCORDING TO THE STANDARDS

The objective of this section is to obtain knowledge about the role of project manager described in well-known standards. A better understanding of the difference in role division is gained by comparing agile and traditional standards. The conclusion of sub-question 3 is drawn in the final section (section 3.3.4), leading to the sensitizing concepts.

Sub-question 3: How is the role of the project manager described in traditional and agile project management standards?

- How is the role of the project manager described in conventional standards, project management methods and books of knowledge? (section 3.3.1)
- How is the role of the project manager described in agile methodologies, project management methods and books of knowledge? (section 3.3.2)
- How do these traditional and agile project management standards relate to each other? (section 3.3.3)

3.3.1 The traditional books of knowledge

Nowadays standards and books of knowledge describe the procedures and processes of project management (Vukomanović, Young, & Huynink, 2016). According to Špundak (2014), bodies of knowledge developed by project management organisations, are based on traditional project management approaches. These standards were developed in the 1980’s; a time in which traditional project management was the only project management approach. Over the years, the standards were further improved and updated according to the actual practice. This section describes two well-known project management standards; Prince2 by Axelos (2015) and Project Management Body of Knowledge (PMBoK) by Project Management Institute (2001). In addition, widely used methods are described for charting the role of project manager in a project. The focus of this section is on prominent project management guides, for this reason the PMBoK and Prince2 are incorporated in this literature review.

Project Management Body of Knowledge

PMBoK is a project management guide rather than a methodology; the book describes established norms, methods, processes, and practices. Project management can be defined as: "The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (Project Management Institute, 2001, p. 6). The PMBoK defines a role as: "the label describing the portion of a project for which a person is accountable" (Project Management Institute, 2001, p. 222). Figure 5 illustrates the project manager, project management team and the team members as part of the project team. The project management team is responsible for project management including the following activities; initiating, planning, executing, monitoring, controlling, and closing the various project phases. Furthermore, management of a project includes: (1) identifying requirements, (2) addressing the various needs, concerns, and expectations of the stakeholders as the project is planned and carried out, (3) balancing the competing project constraints including, but not limited to: scope, quality, schedule, budget, resources, and risk (Project Management Institute, 2001).

The role of project manager is defined as: "the person assigned by the performing organisation to achieve the project objectives" (Project Management Institute, 2001, p. 1). A number of responsibilities are included in this role: (1) developing a project management plan, (2) monitoring the budget and schedule, (3) identifying, monitoring, and responding to risk, (4) reporting of project metrics and (5) communication about the project with all stakeholders including the project team and project sponsors. In addition, the project manager is responsible for technical and organisational interfaces of the project.
**Prince2**

Prince2 is a generic method for managing any type of project across different areas of business activity. According to a definition provided by Prince2, project management is: “the planning, delegating, monitoring and control of all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks” (Axelos, 2009b, p. 4). With regard to the role of project manager; the method is focused on responsibilities and provides a structure for authority, communication and delegation. Leadership capabilities and other necessary skills for project managers are not taken into account in the methodology. The project management team consists of three levels in Prince2: (1) project board, (2) project manager and (3) team manager (Figure 6). The project management team is a temporary structure. Three project interests are represented in the project board: (a) business, (b) user and (c) supplier. According Prince2, this generic project management structure could be tailored to any project since the distribution of roles is flexible.

Prince2 does not define management jobs but suggests role descriptions for roles within the project management team. These role descriptions serve as input for a discussion about the distribution of responsibilities. According Prince2, the project manager is responsible for managing six variables involved in any project: scope, quality, time, costs, risk and benefits (purpose & performance goals of the project). Moreover, producing a result that complies with the defined benefits of the business case is the responsibility of the project manager. Table 5, shows the project manager’s responsibilities based on Prince2 (Axelos, 2009b).

<table>
<thead>
<tr>
<th>Responsibilities Project Manager</th>
<th>Responsibilities Project Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Prepare the following baseline management products, in conjunction with any Project Assurance roles, and agree them with the Project Board: Project Brief (incl. de project product description), Benefits Review Plan, Project initiation documentation (and its components), Stage/Exception Plans and their Product Descriptions, and Work packages;</td>
<td>- Manage the production of the required products, taking responsibility for overall progress and use of resources and initiating corrective action where necessary;</td>
</tr>
<tr>
<td>- Prepare the following reports: Highlight Reports, Issue Reports, End stage Reports, Lessons Report, Exception Reports, and End project Report;</td>
<td>- Establish and manage the projects procedures – risk management, issue and change control, configuration management, and communication;</td>
</tr>
<tr>
<td>- Maintain the following records: Issue register, Risk register, Daily log and Lessons log;</td>
<td>- Establish and manage the project controls – monitoring and reporting;</td>
</tr>
<tr>
<td>- Liaise with corporate or program management to ensure that the work is neither overlooked nor duplicated by the related projects;</td>
<td>- Authorize work packages;</td>
</tr>
<tr>
<td>- Liaise with any external suppliers or account managers;</td>
<td>- Advise the Project Board of any deviations from the plan;</td>
</tr>
<tr>
<td>- Lead and motivate the project management team;</td>
<td>- Unless appointed to another person(s), perform the Team Manager role;</td>
</tr>
<tr>
<td>- Ensure that behavioural expectations of the team members are established;</td>
<td>- Unless appointed to another person (or corporate/program function), perform the Project Support role;</td>
</tr>
<tr>
<td>- Manage the information flows between the directing and delivering levels of the project.</td>
<td>- Implement the Configuration Management Strategy;</td>
</tr>
</tbody>
</table>

Table 5. Responsibilities project manager according to Prince2 (Axelos, 2009b)

**Mapping the role of project manager**

The PMBoK describes various methods of documenting roles and responsibilities. Creating a Responsibility Assignment Matrix (RAM) can link the activities to the members of the project. In addition, RACI (responsible, accountable, consult.
and inform) is a well-known method for role clarification and alignment of expectations. Responsibility can be shared and is assigned to the individual who is actually doing the task. Accountability is the individual who is ultimately responsible for the activity or decision. This can be only one individual per action/decision and includes authority over the action/decision. Consult stands for the input required from the individual(s) concerning the action/decision. Inform refers to informing the individual(s) about the outcome of the action/decision (Smith, Erwin, & Diaferio, 2005). In the Netherlands, Taken, Bevoegdheden & Verantwoordelijkheden are often defined instead of using RACI. Prince2 defines three project roles when chartering quality responsibilities: the producer, reviewer and approver (Axelos, 2009b, p. 53). The producer is responsible for the development of the product. The reviewer will assess whether it satisfies the product requirements. The approver is responsible for approving the product, this can be either a person or group authorized to decide whether the product meets the standards.

3.3.2 The agile books of knowledge
Agile can be defined as a way of thinking and is therefore broader than a project management tool (Highsmith, 2002). For this reason, agile methodologies in general do not involve processes and procedures. However, the agile values form the basis of several methodologies, behaviours, concepts, frameworks and techniques. The main focus of this section is on the role distribution of Scrum and Prince2 Agile. These frameworks are selected since Scrum is an agile process most commonly used in software development, and Prince2 Agile is based on the widely used Prince2 project management methodology.

Scrum
With 43% Scrum is the most implemented agile methodology among organisations using agile project management (Price Waterhouse Coopers, 2012). Since Scrum is the most recognised framework for agile software development, this section will elaborate more on this agile method. Schwaber and Sutherland (2016) published the Scrum guide which can be described as the body of knowledge of Scrum.

The scrum team consists of a product owner, scrum master and the development team. The product owner (PO) interacts with the consumers and users, sets priorities for the backlog and communicates this to the development team. The scrum master helps with managing the backlog in such way that leads to maximization of value. The scrum master is the responsible for the implementation of the agile methodology in the team and throughout the organisation in a manner that contributes to high-value delivering. The scrum master coaches the development team in self-organisation, facilitates events and can act as a servant-leader. Removing impediments which slow down the progress of the development team, is one of the main tasks of the scrum master. The development team is responsible for translation of the products on the backlog to functionalities. The team is cross-functional and manage their own work, together they decide on the work that will be accomplished during the sprint. The optimal size of the development team is larger than three persons and not more than nine (excluding the product owner and Scrum master). The team size depends on the work within a sprint and the skills required. When scrum is applied on large projects, multiple development teams are required and scaling of agile practices is required.

Prince2 Agile
It is recognised by the writers of Prince2 (Axelos, 2015), that agile approaches such as Scrum focuses only to a limited extent on project management and project direction. Prince2 Agile combines Prince2 and agile using the scrum framework. According Prince2 Agile; the agile way of thinking and product delivery, and the Prince2 project management method and project direction complement each other; this is shown in Figure 7.

![Figure 7. Blending Prince2 and Agile – adopted from Axelos (2015, p. 17)](image-url)
Prince2 Agile describes the project management team structure and the role of project manager (Axelos, 2015, pp. 73-90). Even though the team is self-organising in agile, according Prince2 Agile there is need for a project manager/team manager. The role of project manager is to liaise with the delivery team, through the team manager or directly. On behalf of the project board, the project manager runs the project; the responsibilities within the project are managing the time, cost, quality, scope, risk and benefits. The project manager is responsible for archiving the benefits which are defined in the business case.

How does these Prince2 roles relate to the Scrum roles in Prince2 Agile? The team manager in Prince2 is most similar to the role of scrum master. However, the development team in Scrum is self-organising and therefore no management is required; only coaching and leading the development team is preferred. The product owner is mentioned in Prince2 Agile as the customer subject matter expert (CSME) which is part of the delivery team. However, a team can have more than one CSME, while Scrum only defines one product owner. The customer representative operates outside the delivery team and can provide information on detailed level or higher level. The senior user contribute to a high-level customer view and is also known as the senior product owner or product manager.

### 3.3.3 Comparison of the role of project manager to the roles of Scrum

When comparing the role distribution of the project management standard Prince2 and the agile methodology Scrum, it becomes clear that the responsibilities of the project manager’s role of are not fully covered by the Scrum roles. The comparison between the responsibilities of the project manager in Prince2 and the Scrum roles is shown in Table 6. Some scrum roles together fulfil a responsibility of the Prince2 project manager, such as “lead and motivate the project management team”. Other responsibilities of the project manager seems less relevant in an agile approach; an example is “perform the team manager role” or “authorize work packages”.

<table>
<thead>
<tr>
<th>Prince2 Responsibilities project manager</th>
<th>Scrum Responsibilities product owner, development team, scrum master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liaise with any external suppliers or account managers</td>
<td>Product vision</td>
</tr>
<tr>
<td>Establish and manage the projects procedures – risk management, issue and change control, configuration management, and communication</td>
<td>Product backlog, prioritizes, Sprint backlog, Scrum board</td>
</tr>
<tr>
<td>Manage the production of the required products, taking responsibility for overall progress and use of resources and initiating corrective action where necessary</td>
<td>Optimizing product value, Inspect done</td>
</tr>
<tr>
<td>Implement the Configuration Management Strategy</td>
<td>Translation product backlog to features</td>
</tr>
<tr>
<td>Establish and manage the project controls – monitoring and reporting</td>
<td>Create increment, Self-organizing</td>
</tr>
<tr>
<td>Lead and motivate the project management team</td>
<td></td>
</tr>
<tr>
<td>Authorize work packages</td>
<td></td>
</tr>
<tr>
<td>Ensure that behavioural expectations of the team members are established</td>
<td></td>
</tr>
<tr>
<td>Ensure project personnel comply with the Configuration Management Strategy</td>
<td></td>
</tr>
<tr>
<td>Unless appointed to another person (or corporate/program function), perform the Project Support role</td>
<td></td>
</tr>
<tr>
<td>Prepare the following baseline management products, in conjunction with any Project Assurance roles, and agree them with the Project Board: Project Brief (incl. de project product description), Benefits Review Plan, Project initiation documentation (and its components), Stage/Exception Plans and their Product Descriptions, and Work packages</td>
<td>Facilitate</td>
</tr>
<tr>
<td>Liaise with the corporate or program management to ensure that the work is neither overlooked nor duplicated by the related projects</td>
<td>Scrum master</td>
</tr>
<tr>
<td>Unless appointed to another person(s), perform the Team Manager role</td>
<td>Serve others, Remove impediments, Sprint Planning, Application of Scrum</td>
</tr>
<tr>
<td>Prepare the following reports: Highlight Reports, Issue Reports, End stage Reports, Lessons Report, Exception Reports, and End project Report</td>
<td></td>
</tr>
<tr>
<td>Manage the information flows between the directing and delivering levels of the project</td>
<td></td>
</tr>
<tr>
<td>Maintain the following records: Issue register, Risk register, Daily log and Lessons log</td>
<td></td>
</tr>
<tr>
<td>Advise the Project Board of any deviations from the plan</td>
<td></td>
</tr>
<tr>
<td>Schedule configuration audits to check that the physical products are consistent with the Configuration Item Records and initiate any necessary corrective action</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Comparing responsibilities of the project manager in Prince2 with the Scrum roles (own illustration)
Except from the book Prince2 Agile, very little business literature is found on the role of project manager in agile project management. Moreover, this standard details limited information and provides a very general role description; the role is not specified in detail. This raises several questions when performing agile project management; who in the project management team takes over the responsibilities of the project manager in his absence? Or which of the Scrum roles fulfils the traditional project manager role? If organisations still assign a project manager for projects conducted through an agile approach; what are responsibilities and tasks of this project manager?

### 3.3.4 Conclusion: answering sub-question 3

The role of the project manager is reviewed in conventional and agile standards, project management methods and bodies of knowledge. The third part of this literature review provides an answer on sub-question 3:

**Sub-question 3:** How is the role of the project manager described in traditional and agile project management standards?

The role of the project manager is described in-depth in several international standards and bodies of knowledge (Axelos, 2009b; Project Management Institute, 2001). According to business literature based on traditional project management approaches (Špundak, 2014), the “traditional” role of project manager is often defined by activities as initiating and closing phases, executing, controlling, planning, reporting, communication with stakeholders and monitoring the scope, quality, time schedule, budget, resources, and risks. Moreover, the project management standards suggest methods for role mapping; responsibility, tasks and accountability are factors that should be taken into account.

In contrast, established agile methodologies such as Scrum do not mention the role of project manager (Schwaber & Sutherland, 2016). The current established notions of the role of project manager in an agile approach, are therefore up for discussion. When comparing the project management standard Prince2 with the Scrum framework, it becomes evident that the responsibilities of the Scrum roles (scrum master, product owner and development team) do not cover the responsibilities of the traditional defined project manager. This raises the question of how the former “traditional responsibilities” of the role of the project manager are fulfilled in an agile project management approach.

### 3.4 Developing the sensitizing concepts

This section summarizes what is known and not known in existing research, and forms a point of departure by developing sensitizing concepts. Section 3.4.1 provides a brief introduction on sensitizing concepts. The gap in research is summarised in section 3.4.2, resulting in a sensitizing concepts model.

#### 3.4.1 Introduction of the sensitizing concepts

Sensitizing concepts offer a framework to which the researcher see, organize and experience the data (Putnam & Mumby, 2013). These concepts provide a suggestion for the direction in which to look and lack clear specification of the attributes. Sensitizing concepts are a general sense of what is relevant (Blumer, 1954), provide a basic orientation of the research and can be a tool for developing fresh theoretical insights from empirical observations. According to Bowen (2006), a literature review can lead to sensitizing concepts which form a conceptual framework.

#### 3.4.2 Sensitizing concepts derived from the literature review: summarising the gap in research

The aim of this research is to use sensitizing concepts to enrich the existing literature on the changing elements of the role of project manager in agile project management. The literature review forms a point of departure; a thorough literature study was performed on traditional and agile project management, and the role of project manager described in project management standards and literature. Figure 8, shows the research model which aims to schematize the research process in an abstract way. The sensitizing concepts are developed through answering the first three sub-questions of this research. The sensitising concepts are divided into four themes: (1) the project management approach, (2) the hard elements of the role, (3) the soft elements of the role, and (4) the changing role of project manager. As shown in
Figure 8, especially the hard and the soft elements of the role are based on literature described in different sections. For this reason, the establishment of these concepts is described below and forms the point of departure for this research.

**Hard elements**
The majority of the project management standards and books of knowledge are process-oriented and based on procedures (Vukomanović et al., 2016). Project management standards like Prince2 describe the role of project manager based on a structure for authority, communication and delegation and suggests tasks and responsibilities within management areas and procedures. These elements can contribute to clarification of hard characteristics of the role of project manager, such as the definition of tasks, responsibility and authority. The term “hard” elements is used since these role elements can be clearly defined and mapped. Mapping these elements can provide insights on what role the project manager fulfils. This can be described as a role specification, job description or functional role of the project manager. The activities of the role of project manager in agile project management are not described in existing literature. This research aims to investigate the hard elements of the role by means of (1) mapping the authority, accountability and responsibility (section 3.3.1), and (2) investigate the responsibilities and tasks by making use of the Prince2 framework and the Scrum guide (section 3.3.3).

**Soft elements**
The “Soft” characteristics of a role are often not clearly stated in project management standards, but cannot be excluded in the scope of this research. Agile development can be seen as a way of thinking or mindset rather than a project management approach (Highsmith, 2002). This mindset cannot be fully captured in a specific set of responsibilities, tasks, or practices (Griffiths, 2015). The agile manifesto is based on values and principles which provides guidance on how to develop software (Fowler & Highsmith, 2001). Existing scientific research indicates managerial challenges when shifting to agile
project management (Cao et al., 2009; Moe et al., 2012; Moe, Dingsyr, et al., 2009; Nerur et al., 2005; Vinekar et al., 2006). Parker et al. (2015) and Highsmith (2002) describe the role of traditional project manager shifting to an agile project leader. The exact role this agile leader fulfils in agile project is not specified and defined. Moreover, the research into project management is shifting from task perspective towards competence of project managers according to Porthouse and Dulewicz (2007). In their study focused on leadership, the difference in competence between traditional project managers and agile project managers (scrum masters) investigated (Porthouse & Dulewicz, 2007). This is in line with Andersen (2012), stating that: “Often in the project management literature there is too much focus on structure, and more attention should be paid to behaviour.”

The integrative literature review highlights the need to not only investigate what the role of project manager entails (hard elements), but also how to perform the role of project manager (soft elements). Although existing literature describes guidelines and challenges in the transition to an agile leader, the transition to a project manager in agile development projects is a current gap in literature. The role of agile leader is not defined. Literature about managerial challenges while shifting to an agile approach (section 3.1.4), forms a point of departure for further investigation of the soft elements of the role of project manager. Existing literature refers to several aspects which are taken into account in this research; collaboration with the team, decision making and authority, leadership and management style, managing resources and value delivery, and competences. These concepts form an interpretive framework, and a direction in which to look when investigating of the behaviour and attitude of the project manager in an agile approach.
CASE STUDY SET-UP

// CHAPTER 4
4  CASE STUDY SET-UP

The literature review has identified sensitizing concepts that were used to gain a better understanding about the role of project manager. As mentioned in the research strategy in chapter 2, a holistic multiple-case study is designed for this research. This chapter describes the research methodology with the purpose:

- To explain the research methodology by describing how the empirical research was conducted.
- To further elaborate on the case study tactics incorporated in the case study design; construct validity, external validity and reliability (Yin, 2003) are taken into account in order to ensure quality of the research design.

This chapter starts with the preparation phase of the case study research; a group interview was conducted with agile experts (section 4.1). The aim was to “explore the field” in the initial phase of the research, subsequently this led to valuable insights for the case study design. Furthermore, a detailed outline of the case study set-up is included in this chapter. Section 4.2 details the case protocol and the performed case selection is described in section 4.3. The conducted data collection and data analysis is described in section 4.4.

4.1  EXPLORING THE FIELD

Exploration of the field contributed to a better understanding of the research context and further refinement of the case and respondents selection criteria. A group interview with agile experts was conducted, section 4.1.1 describes the group interview technique and section 4.1.2 details the participants. Section 4.1.3 describes the main conclusions impacting the case study design. The transcript of the group discussion include lessons learned with regard to the research design and field procedures (Yin, 2012). The transcript is included in Appendix B; two of the participants validated the document.

4.1.1 Group interview technique and approach

According to Frey and Fontana (1991), a group interview can be used for exploratory purposes in the initial phase of the research. When the researcher is looking at an unfamiliar or new context, a group discussion can be a valuable research technique; it can serve further exploration of the situation, and the researcher’s image of the in reality can be revised or confirmed. “These studies can be used to satisfy a researcher’s curiosity, to arrive a better understanding of the social context, to test feasibility of a more complex study, to develop methodological techniques, to identify nuances of a research setting that could impact the investigation, to identify key informants, to add precision to a research problem and to serve as a source of grounded theory”: according to Frey and Fontana (1991, p. 177). In addition, a group interview can have a pretest purpose, the group can be used to test questionnaires, development of procedures and the analysis of various responds.

Frey and Fontana (1991) describe various forms of group interviews appropriate for qualitative research. The group interview performed in this research can be described as a focus group interview, the characteristics of this group interview technique is described in Table 7.

<table>
<thead>
<tr>
<th>FOCUS GROUP INTERVIEW CHARACTERISTICS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Formal meeting established for the interview</td>
</tr>
<tr>
<td>Role of interviewer</td>
<td>Directive role, the interviewer is the moderator</td>
</tr>
<tr>
<td>Question format</td>
<td>Structured, participants are responding to questions on the topic</td>
</tr>
<tr>
<td>Purpose</td>
<td>Exploratory and pretest</td>
</tr>
</tbody>
</table>

Table 7. Characterises of group interview technique

According to Babbie (2007, p. 308), “a focus group is a group of subjects interviewed together, prompting a discussion”. A guided discussion was held about the role of project manager in agile project management. The meeting included an introduction about the research, preliminary questions which were answered by the attendees followed by a group discussion about these topics.

4.1.2 Groups interview participants

The focus group consisted of nine participants who were selected based on their experience with agile development in IT projects within various branches. Among them were product owners, scrum masters, release train engineers and project managers of large corporations. Some participants currently fulfil multiple agile roles within the organisation or a project.
Their experience with agile varied from a year to eight years. Among them were a couple of participants responsible for implementing agile in their organisation or experienced with implementing agile management in projects. The maturity of the agile organisations and the experiences with agile project management of the participants varies significantly. Table 8 provides information about the participants.

<table>
<thead>
<tr>
<th>PERSONAL INFORMATION</th>
<th>INFORMATION PREVIOUS AGILE PROJECT</th>
<th>PROFESSIONAL AND AGILE EXPERIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>M/F</td>
<td>AGE</td>
</tr>
<tr>
<td>1</td>
<td>M</td>
<td>33</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>51</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>51</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>55</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>34</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
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</tr>
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<td>45</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 8. Participants of the group interview

4.1.3 Conclusion group interview

‘Very seldom does a start-up sampling frame survive the lovely imperfection and intractability of the field. It must be shifted and reframed’: according to Miles and Huberman (1994, p. 31). The group interview resulted in further specification of the case study selection criteria and the scope of the research (section 4.3). A better understanding of the context was gained and led to two main conclusions for the scope of the research:

1. This research focuses on agile project management with dedicated project teams

   Agile software development in agile enterprises often goes through agile release trains. Software is developed on a routine basis in value streams, fixed teams produce increments (value) every iteration. The teams form a fixed unity, this is in contrast with traditional project management: ‘In traditional project management, a team is formed to perform the work (formation of a project), while in agile project management the teams already exist and the work is transferred to the teams’: (release train engineer). In line with this different approach, the project manager might be dependent on various teams in order to achieve the aim of the project in an agile enterprise. Teams do not work full-time on the project; the project manager needs to approach the different product owners in order to place items on the backlog of their teams. The current research focuses on projects with dedicated teams, working according to a project-based approach on projects.

2. This research focuses on project management and not on software development in line management (working on a routine base in waterfall releases or agile releases)

   Although both agile projects and agile release trains develop software on a release basis, there is a difference in development approach. As pointed out by a project manager: ‘although a release include both a clear start and end date, project-based working in releases on existing software is not the same as working on a project which is developing new software’. Some participants indicated that the role of project manager is eliminated in an agile enterprise, while others addressed the need of a project manager when performing larger projects on epic level. The participants suggested that projects which require project managers are characterised by a clear defined beginning & end and are assigned for developing new software. For this reason, this research excludes software development activities primarily focused on release-based development and focuses on software development projects.
4.2 CASE PROTOCOL

A case study protocol and a case study database is required to ensure the reliability of the research (Yin, 2003). The investigator should follow the same procedures every case study, in order to minimize errors and biases. This case protocol is particularly focused on the interviews, as forming the primary data source of this research.

Every respondent received an email with general information about the research, the main topics of the interview were mentioned. This email is included in Appendix D. In addition the project managers were asked to send general information and documentation about the project, project management structure of the project and functional specifications of the project manager prior to the interview. This information and project documentation has been investigated before and after conducting the case study.

In order to ensure reliability and minimize errors and biases, an interview protocol was prepared containing a list of questions and topics that must be covered during the interview. The type of interview is a focused semi-structured interview consisting of approximately 20 open questions. Appendix C provides the interview protocol in detail. In addition, a card game was developed in order to understand the role of project manager in each project (Appendix E,F).

In order to obtain in-depth, detailed and rich information, the questions in the semi-structured interview may not exactly follow the interview script. The chosen qualitative interview approach is more flexible than in quantitative structured interviews in which the goal is to standardize and generate answers which can be coded quickly (Bryman, 2012). Flexibility when conducting a semi-structured interview, enables the interviewer to follow up on leads and clearing up inconsistencies in answers. The importance of flexibility is emphasized by Bryman (2012), stating that semi-structured interviews are not the same as a structured interviews with open questions. However, in order to ensure cross-case comparability the main structure of the interview and the topics covered will be the same in every interview.

The interviews took approximately one to an hour and a half. First an introduction was given and general information about the respondent, project and organisation was asked. The interview consisted of four phases: (1) a brief description of the project and the project management approach of the project, (2) the hard elements of the role of project manager, (3) the soft elements of the role of project manager, and (4) the changing role of project manager. The respondents was given the opportunity to raise topics outside the scope of the interview questions at the end of the interview.

Both during the interview and in the email it was mentioned to the respondents that it is in the interest of the research to respond truthfully and not on how the respondent knows that agile should be implemented according the standards. The interview was conducted in Dutch and was recorded. The respondent was informed that data will be anonymized and analysed on an aggregate level. At the end of the interview the respondents were thanked for giving up their time and a thank-you email was sent. After the interview phase, the interviews recordings were transcribed and verified with the respondents.

The projects of this case study research and the respondents are anonymized. The identities of the respondents are not disclosed; respondents are only mentioned by role and not by name. Anonymity of the case is assured as well, the cases only include a general explanation of the project context. For privacy reasons, it is decided to not include the interviews in the appendix of this report. The case reports are included in chapter 5.
4.3 Case selection and selection of respondents

The cases were selected according to the theoretical sampling method recommended by Eisenhardt (1989). Theoretically useful cases were selected based on common features in order to ensure comparability. Table 9 shows these features in the form of case selection criteria that were taken into account during the case selection, the criteria are ranked from high to low priority:

<table>
<thead>
<tr>
<th>#</th>
<th>Case selection criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Information technology projects in the field of software development;</td>
</tr>
<tr>
<td></td>
<td>- Preferable projects in which new software is developed</td>
</tr>
<tr>
<td>2.</td>
<td>Selection of projects within KWD and their network of professionals</td>
</tr>
<tr>
<td>3.</td>
<td>The project is conducted at this moment;</td>
</tr>
<tr>
<td></td>
<td>- There is present knowledge about the project, respondents do not have to rely on their memories</td>
</tr>
<tr>
<td>4.</td>
<td>Access to information;</td>
</tr>
<tr>
<td></td>
<td>- The company is willing to provide information and documentation about the project</td>
</tr>
<tr>
<td></td>
<td>- At least two interviews are possible: an interview with the project manager and a team member</td>
</tr>
<tr>
<td>5.</td>
<td>Multiple teams are working for the project manager;</td>
</tr>
<tr>
<td></td>
<td>- Preferable more than two teams and 15 people</td>
</tr>
<tr>
<td></td>
<td>- Preferable full-time teams are working on the project</td>
</tr>
</tbody>
</table>

Table 9. Selection criteria case studies

The selected software development projects are performed for large Dutch organisations within various sectors. In all the cases the permanent organisation instructed the temporary organisation (the project) to perform a work assignment. The screening procedure led to 10 different cases; two traditional cases and eight cases with an agile project management approach. The maturity level of agility was not a case study criteria. Table 10 shows the selection of the projects. The sampling approach aimed for maximizing a variety of cases in order to gain a broad view on agile project management in practice. To enhance representativeness, five cases were selected performed by program/project managers of KWD and the other cases were selected from the network and professional contacts of KWD.

<table>
<thead>
<tr>
<th>#</th>
<th>Project</th>
<th>Sector</th>
<th>Project management approach</th>
<th>Roles of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The replacement and development of a transport application</td>
<td>Transport and logistics sector</td>
<td>Agile project management</td>
<td>- Program manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Scrum master</td>
</tr>
<tr>
<td>2.</td>
<td>The development of a new digital working environment</td>
<td>Public sector</td>
<td>Agile project management</td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project leader/Scrum master</td>
</tr>
<tr>
<td>3.</td>
<td>The development of a system for colllocation of data</td>
<td>Banking sector</td>
<td>Agile project management</td>
<td>- Road manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Product owner</td>
</tr>
<tr>
<td>4.</td>
<td>The development of a system for registration of persons and the migration into this new system</td>
<td>Public sector</td>
<td>Agile project management</td>
<td>- Project leader</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Scrum master/lead developer</td>
</tr>
<tr>
<td>5.</td>
<td>Transport planning software application</td>
<td>Transport and logistics sector</td>
<td>Agile project management</td>
<td>- Program manager/head line organisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project manager/product owner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Scrum master</td>
</tr>
<tr>
<td>6.</td>
<td>The digitalization and automation of procedures</td>
<td>Public sector</td>
<td>Agile project management</td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Chief scrum master</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Product owner</td>
</tr>
<tr>
<td>7.</td>
<td>The development of an application for receiving, processing and controlling declarations</td>
<td>Public sector</td>
<td>Agile project management</td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Developer</td>
</tr>
<tr>
<td>8.</td>
<td>The development of data analytics applications</td>
<td>Utilities and energy sector</td>
<td>Agile project management</td>
<td>- Project manager/Scrum master</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Scrum master</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Product owner</td>
</tr>
<tr>
<td>9.</td>
<td>The development of an information system for personal data</td>
<td>Public sector</td>
<td>Traditional project management</td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Senior designer</td>
</tr>
<tr>
<td>10.</td>
<td>The transition to a new financial system</td>
<td>Public sector</td>
<td>Traditional project management</td>
<td>- Project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Functional financial consultant/team manager</td>
</tr>
</tbody>
</table>

Table 10. Overview of the selected projects

Semi-structured interviews were conducted with 25 respondents. The practice of snow-ball sampling is used in order to select the respondents. The project manager was asked to recommend other experienced respondents, based on the selection criteria. The respondents can be classified as professionals in the field of software development.

At least two respondents were selected per case. In order to ensure to comparability, the aim was to perform interviews with an actor of each of the three groups within each case (Table 11). When selecting respondents from these three groups was not possible, respondents with both agile and traditional project management experience were selected. Working closely with the project manager was another criteria since this is the unit of analysis. According to Yin (2003), screening
may consist of querying people who are knowledgeable about the candidates. The use of snow-ball sampling is in line with the explorative character of this research; the roles of agile project management are not always in line with the traditional project management roles.

<table>
<thead>
<tr>
<th>PROJECT DIRECTION</th>
<th>PROJECT MANAGEMENT</th>
<th>PRODUCT DELIVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. program manager</td>
<td>e.g. project manager, team leader.</td>
<td>e.g. team manager, designer, product owner, scrum master, team member (developer).</td>
</tr>
</tbody>
</table>

Table 11. Criteria for three groups of respondents based on categories of Prince2

The respondents provided information on their work experience and their experience with agile and traditional software development in projects (Table 12).

<table>
<thead>
<tr>
<th>Case</th>
<th>Function</th>
<th>Role</th>
<th>M/F</th>
<th>AGE</th>
<th>PROJECT EXPERIENCE</th>
<th>FUNCTION EXPERIENCE</th>
<th>IT EXPERIENCE</th>
<th>AGILE EXPERIENCE</th>
<th>AGILE METHODS</th>
<th>AGILE CERTIFIED</th>
<th>TRADITIONAL EXPERIENCE</th>
<th>TRADITIONAL METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Program manager</td>
<td>Program manager</td>
<td>M</td>
<td>51</td>
<td>4 years</td>
<td>1,5 years</td>
<td>20 years</td>
<td>6 years</td>
<td>DSDM, Kanban, Scrum</td>
<td>yes</td>
<td>14 years</td>
<td>Prince, RUP, waterfall</td>
</tr>
<tr>
<td>2</td>
<td>Senior project manager</td>
<td>Project manager</td>
<td>M</td>
<td>50</td>
<td>13 months</td>
<td>20 years</td>
<td>20 years</td>
<td>6 years</td>
<td>Kanban, Scrum, FDD, PML-AEC, SAFe</td>
<td>yes</td>
<td>20 years</td>
<td>Prince2, waterfall</td>
</tr>
<tr>
<td>3</td>
<td>Senior IT consultant</td>
<td>Scrum Master</td>
<td>M</td>
<td>26</td>
<td>3 years</td>
<td>1 year</td>
<td>4 years</td>
<td>4 years</td>
<td>Scrum, Rup, Kanban</td>
<td>yes</td>
<td>no experience</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Senior project manager</td>
<td>Project manager</td>
<td>M</td>
<td>44</td>
<td>4 years</td>
<td>16 years</td>
<td>16 years</td>
<td>6 years</td>
<td>DSDM, Kanban, Scrum, SAFe</td>
<td>yes</td>
<td>10 years</td>
<td>Prince2, RUP, waterfall</td>
</tr>
<tr>
<td>5</td>
<td>Senior project leader</td>
<td>Project leader / scrum master</td>
<td>F</td>
<td>48</td>
<td>4 years</td>
<td>3 years</td>
<td>5 years</td>
<td>4 years</td>
<td>Kanban, Scrum</td>
<td>yes</td>
<td>20 years</td>
<td>Prince2, waterfall</td>
</tr>
<tr>
<td>6</td>
<td>Senior road manager</td>
<td>Road manager</td>
<td>M</td>
<td>45</td>
<td>2 years</td>
<td>19 years</td>
<td>19 years</td>
<td>6 years</td>
<td>Scrum, SAFe</td>
<td>yes</td>
<td>19 years</td>
<td>Prince2, MSP, waterfall</td>
</tr>
<tr>
<td>7</td>
<td>Product owner, customer journey expert</td>
<td>Product owner</td>
<td>M</td>
<td>56</td>
<td>4 years</td>
<td>6 months</td>
<td>30 years</td>
<td>7 years</td>
<td>DSDM, XP, Scrum</td>
<td>yes</td>
<td>30 years</td>
<td>Prince2, waterfall</td>
</tr>
<tr>
<td>8</td>
<td>Project leader</td>
<td>Project leader</td>
<td>M</td>
<td>58</td>
<td>3 years</td>
<td>28 years</td>
<td>34 years</td>
<td>3 year</td>
<td>Scrum</td>
<td>yes</td>
<td>28 years</td>
<td>Prince2, waterfall</td>
</tr>
<tr>
<td>9</td>
<td>Team leader</td>
<td>Project manager</td>
<td>M</td>
<td>34</td>
<td>3 years</td>
<td>3 years</td>
<td>10 years</td>
<td>4,5 years</td>
<td>Scrum</td>
<td>yes</td>
<td>3 years</td>
<td>Prince2, MSP, waterfall</td>
</tr>
<tr>
<td>10</td>
<td>Technical Architect</td>
<td>Scrum master / technical lead developer</td>
<td>M</td>
<td>39</td>
<td>5 years</td>
<td>2,5 years</td>
<td>16 years</td>
<td>6 years</td>
<td>Scrum</td>
<td>limited</td>
<td>16 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>11</td>
<td>Program manager</td>
<td>Program manager &amp; head line organisation</td>
<td>M</td>
<td>59</td>
<td>2 years</td>
<td>5 years</td>
<td>28 years</td>
<td>5 year</td>
<td>Scrum</td>
<td>no</td>
<td>28 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>12</td>
<td>Project manager</td>
<td>Project manager / Product owner</td>
<td>M</td>
<td>42</td>
<td>3 months</td>
<td>7 years</td>
<td>20 years</td>
<td>4 years</td>
<td>Scrum, DSDM</td>
<td>yes</td>
<td>7 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>13</td>
<td>Medior Java developer</td>
<td>Scrum Master</td>
<td>M</td>
<td>27</td>
<td>1,5 years</td>
<td>4 years</td>
<td>4 years</td>
<td>2 years</td>
<td>Scrum</td>
<td>yes</td>
<td>2,5 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>14</td>
<td>Project manager</td>
<td>IT Project Manager</td>
<td>F</td>
<td>44</td>
<td>2 years</td>
<td>16 years</td>
<td>9 years</td>
<td>7 years</td>
<td>Scrum, Kanban, RUP</td>
<td>yes</td>
<td>9 years</td>
<td>Waterfall, Prince2</td>
</tr>
<tr>
<td>15</td>
<td>Product owner</td>
<td>Product owner</td>
<td>F</td>
<td>39</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>Scrum, Kanban</td>
<td>yes</td>
<td>no experience</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Application manager</td>
<td>Chief Scrum Master, agile coach</td>
<td>F</td>
<td>56</td>
<td>3 years</td>
<td>15 years</td>
<td>35 years</td>
<td>4 years</td>
<td>Scrum, Kanban, SAFe aspects</td>
<td>yes</td>
<td>31 years</td>
<td>Waterfall model, Prince2</td>
</tr>
<tr>
<td>17</td>
<td>Project manager</td>
<td>Project manager</td>
<td>M</td>
<td>60</td>
<td>3 years</td>
<td>10 years</td>
<td>22 years</td>
<td>5 years</td>
<td>Scrum</td>
<td>yes</td>
<td>22 years</td>
<td>Waterfall, Prince2, IPMA</td>
</tr>
<tr>
<td>18</td>
<td>Functional designer</td>
<td>Developer</td>
<td>M</td>
<td>61</td>
<td>5 months</td>
<td>12 years</td>
<td>43 years</td>
<td>1 year</td>
<td>Scrum</td>
<td>yes</td>
<td>43 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>19</td>
<td>Project manager</td>
<td>Project manager / Scrum master</td>
<td>M</td>
<td>32</td>
<td>1 year</td>
<td>1 year</td>
<td>13 years</td>
<td>1 year</td>
<td>Scrum, SAFe</td>
<td>yes</td>
<td>12 years</td>
<td>Waterfall, Prince2</td>
</tr>
<tr>
<td>20</td>
<td>Project manager</td>
<td>Scrum master</td>
<td>F</td>
<td>34</td>
<td>5 years</td>
<td>3 years</td>
<td>5 years</td>
<td>1 year</td>
<td>Scrum</td>
<td>yes</td>
<td>3 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>21</td>
<td>Business consultant</td>
<td>Product owner</td>
<td>M</td>
<td>29</td>
<td>1,5 years</td>
<td>2 years</td>
<td>3 year</td>
<td>3 years</td>
<td>Scrum, SAFe aspects</td>
<td>yes</td>
<td>3 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>22</td>
<td>Project manager</td>
<td>Project manager</td>
<td>M</td>
<td>63</td>
<td>4 years</td>
<td>30 years</td>
<td>35 years</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>35 years</td>
<td>Waterfall, Prince2</td>
</tr>
<tr>
<td>23</td>
<td>Senior designer</td>
<td>Senior designer</td>
<td>M</td>
<td>54</td>
<td>4 years</td>
<td>4 years</td>
<td>30 years</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>30 years</td>
<td>Waterfall</td>
</tr>
<tr>
<td>24</td>
<td>Project leader</td>
<td>Overall project manager / project manager team</td>
<td>M</td>
<td>45</td>
<td>2 years</td>
<td>10 years</td>
<td>8 years</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>10 years</td>
<td>Waterfall, Prince2</td>
</tr>
<tr>
<td>25</td>
<td>Functional financial consultant</td>
<td>Functional financial consultant / team manager</td>
<td>M</td>
<td>44</td>
<td>2 years</td>
<td>16 years</td>
<td>16 years</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>16 years</td>
<td>Waterfall, Prince2</td>
</tr>
</tbody>
</table>

Table 12. Overview of the selected respondents
4.4 DATA COLLECTION AND ANALYSIS

Yin (2003) describes the three principles of case study data collection: (1) multiple sources of evidence, (2) create a case study database and, (3) maintain a chain of evidence. Using these principles increase the reliability and construct validity of the research. In addition, the data analysis techniques used in this research are described in this section.

4.4.1 Data collection

(1) Multiple sources of evidence were used; the data material for this case study included field notes, interview transcripts and documentation (e.g. project initiation documentation, guidelines for agile practices, information on the project manager role). It was not always possible to use documentation for two reasons: (1) most of the agile projects do not document its agile practices and the division of roles, and (2) companies did not want to share this information since they regard this information as highly sensitive.

(2) A case study database was created; descriptive research was used to analyse each case as a stand-alone identity (within-case analysis). The aim is to become familiar with the patterns within each case, before searching for cross-case patterns (Eisenhardt, 1989). Interview transcripts and documentation were summarised in case study reports based on a descriptive framework (chapter 5). The case study reports consist out of four parts: (1) brief case description and project management approach, (2) the hard elements and (3) soft elements of the role of project manager, and (4) the changing role of project manager. The complete version of the case reports are documented in the case study database.

(3) A chain of evidence was maintained with the aim to increase the reliability of the case study. Figure 9 shows the chain of evidence from the primary data sources to the cross-case analysis. In order to provide a clear presentation of the large amount of obtained qualitative data, the primary data sources were summarised and converted to secondary data sources. By making use of the agile and traditional project management framework established in chapter 3, the agility of the cases was described. Moreover, a cross-case overview was represented and the case reports were drafted. Subsequently, this provided input for the cross-case analysis (chapter 6). The cross-case analysis is primary based on the synthesis of the case information and findings on the four sensitizing concepts. The cross-case analysis and the research technique to analyse this data will be elaborated in the next section.

![Figure 9. Chain of evidence of the case study (own illustration)](image)

4.4.2 Data analysis

Qualitative content analysis was used as research technique to analyse the data. Hsieh and Shannon (2005) define this research method as; “the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns”. In order to become familiar with each case as a stand-alone entity before comparing the cases, primary data sources were combined in case reports for every project. A cross-case search for patterns was conducted on the differences and similarities of the projects and the role of project manager. According to (Eisenhardt,
1989, p. 541): “The idea behind these cross-case searching tactics is to force investigators to go beyond initial impressions, especially through the use of structured and diverse lenses on the data.”

Content categories were derived from the data sources based on thorough analysis of patterns and themes. Since the categories are derived inductively from the data, this research can be defined as conventional content analysis (Hsieh & Shannon, 2005). However, also elements of directed content analysis are incorporated in this research, since the sensitizing concepts were based on theory and provided the four main categories for the data analysis. Several cross-case tactics were used to search for patterns; first codes were compared within a case and subsequently a cross-case study was conducted. A cross-case search for patterns led to an iterating process towards theory building fitting the data. The empirical results of the multiple case study were compared with existing literature.
RESULTS OF CASE STUDIES

// CHAPTER 5
5  CASE RESULTS

Little is known about the role of project manager in agile project management management, in existing literature. Since the aim of this research is to explore this changing role, insights should be gained by studying software development projects in practice. A multiple case study contributes to further understanding of this role. Based on the selection criteria mentioned in chapter 4, ten projects were selected as cases for this empirical research. This chapter describes these cases with the aim:

- To provide an insight in the way traditional and agile project management approaches are implemented in software development projects in practice.

The multiple case study is summarised in the case reports, the reports consist of descriptive information primary based on in-depth interviews with respondents. The case selection include eight agile projects (section 5.1 -5.8) and two traditional projects (section 5.9 - 5.10). As pointed out by Larsson (1993), a limitation of case study reports is that due to space limitations, much of the collected data should be left out. This also holds for these case study reports; the reports are primarily focused on the four sensitizing concepts. (1) The case reports begin with a brief description of the project and the project management approach, additional general case information is provided. (2) The hard and (3) soft elements of the role of project manager are described. (4) Lastly, the changes mentioned for the role of project manager are summarised.

5.1  CASE DESCRIPTION 1: The replacement and development of a transport application

Brief case description & project management approach

The replacement of a legacy system is the main objective of this case. The software development project is part of a larger program that falls under an IT department of a large Dutch organisation in the transport and logistics sector. The application developed on this large-scale software development project, includes two main software components: (1) the development of an application which connects mobile equipment to timetables and enables redirection and adjustment when circumstances change, (2) the linkage of the application to the timetable, which is provided by an external organization. General case information is provided in Table 13. Besides the project manager, two respondents were selected for this case; the program manager and scrum master.

<table>
<thead>
<tr>
<th>GENERAL CASE INFORMATION</th>
<th>The replacement and development of a transport application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>Replacement of an existing software system</td>
</tr>
<tr>
<td>Sector</td>
<td>Transport and logistics sector</td>
</tr>
<tr>
<td>Goal and deliverables</td>
<td>(1) The realisation of an application for controlling and redirecting mobility equipment and (2) the development of an application that connects the internal application to external information.</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>The project started in 2013, estimated end date: end of 2017, (duration is around 60 months)</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>60,000,000 euros</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>-</td>
</tr>
<tr>
<td>Amount of employees working for the project manager</td>
<td>45 people</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
<td>5 teams, 7/8 people in one team</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Scrum, Kanban and elements of the waterfall model</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>4 years of experience</td>
</tr>
</tbody>
</table>

Table 13. Project information case 1

Agile project management is applied in this case, the methodologies of Scrum and Kanban are used. Since the project is a replacement of an existing system, the functionalities are clear while the technology is new for the developer (non-functionalities). The product is complex, the scope is quite fixed and the minimal viable product is extensive, time is the variable factor on this project since degradation of quality is not an option. The program manager mentioned that the client is satisfied with the progress and performance of the project. However, the team was not able to meet release deadlines in the past. The team is performing to the best of their ability, yet the project is taking a long time. Compared to other complex projects within the organisation, this project is performing well.
The development teams are cross-functional and deliver increments in sprints of two weeks. After a "done" product is delivered, the acceptance department can decide whether to release it or not. The role of scrum master is played by a developer of the team. Every team also includes a lead developer. Testing during the sprint, Test Driven Development (TDD) and pair-programming are agile practices used within the teams. As pointed out by the scrum master, the agile way of working can be further improved: "the project is still at a low maturity level of agility". The absence of a sole project owner and the minimal readiness of the organisation are two of the main points of improvement.

The hard elements of the role of the project manager
The project manager is accountable for realisation of the application within budget and time. Efficient development of software by the teams is one of the main tasks of the project manager. Formally, the manager has the decision power on all the aspects on project level. The aim is to give the responsibility for software development to the teams. The project manager monitors the long-term plans and vision, and overall view. The manager is responsible for project risks but not for business risks, the quality of the application is his responsibility. The project manager feels responsible for the agile transformation and ensuring scrum is understood in the organisation. The teams are responsible for project administration, the project manager uses this data for reporting. The project manager is in charge of the resources, and can take decisions on the structure and the staffing. Lastly, monitoring release management and the end-to-end software development (DTAP) is part of the project management role.

There is no sole product owner representing the business. Product owners committees are formed since multiple people play the product owner role on several higher management levels; on team level, project level, program level etc. The project manager has strong influence on prioritising the backlog items on project level. The scrum master even mentioned that there are two product owners on this case: the project manager and the information analyst. In contrary, according to the program manager the project manager has no share in value creation, his aim is to work effective on value delivery: "The project manager is not responsible for doing the right things, only doing the things right". The project manager helps the product owners in translation of the items to the teams and management of the backlog. Each team does have a scrum master, the scrum master deals with issues and impediments on team level. The project manager describes himself as the chief scrum master on project level. The project manager is accountable for the project level impediments and deals with the project context which involves a hierarchical organisation.

The soft elements of the role of the project manager
The management style is human centric, continuously connecting people, motivating, coaching and stimulating the teams to get the best out of the sprints. The project manager has a strong vision about the product and overall planning, and his rapid decision making increases the speed of the process. Planning of the sprints is a collective decision, the project manager has a vision and suggests a direction. The teams come with ideas and the project manager will challenge the teams by asking them stimulating questions. In the end, the project manager takes a decision regarding the planning and future direction. The aim is to led the decision-making take place at the lowest possible level, and to delegate responsibility to an extend that is fitting the teams. Self-organized teams do not accept directive leadership. For this reason, the project manager cannot intervene too often and needs to convince the teams about his vision; "it is all about the way you approach the team". Dealing with change, eagerness to learn and being flexible are important characteristics of the role of a project manager. Persuasiveness can be necessary in order to convince the client of change and guidance in the process towards agility.

The changing role of the project manager
The respondents mentioned several aspects impacting the current role of the project manager in agile project management. First of all, the way the project manager interacts with the teams is changed in agile project management. Previously, the project manager was leading the team in a command-and-control style; monitoring the planning, authorizing work packages and checking the exact status of the work. The agile manager’s focus is on letting go, delegating and giving more responsibilities to the teams. Another role change was mentioned; when teams are self-organizing, this leads to more time for the project manager to create a vision for the project. A transition from a work authorisation function to the focus on strategic level of the project takes place. Thirdly, the development process changed which resulted in a different
management approach and mindset. Agile project management focuses on collaboration, competences and structure. This is in contrast with waterfall project management, where the manager is focused on time, practicalities and planning.

5.2 Case description 2: The development of a new digital working environment

Brief case description & project management approach
The project aims to develop a new digital working environment (intranet), which will replace an outdated system. The project team is successful in delivering products which are of high value for the end-user; intense collaboration and communication with the end-users is one of the success factors of this project. The project is divided in four high-level releases, at this moment the third release is completed and the software of the first two releases is installed. Optimisation of the digital working environment will take place during fourth release. Table 14 provides basic case information. The project manager and the scrum master / project leader are selected as respondents for this case.

<table>
<thead>
<tr>
<th>General case information</th>
<th>The development of a new digital working environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>Renewal of an obsolete intranet system</td>
</tr>
<tr>
<td>Sector</td>
<td>The goal of this new digital working environment is to make working more efficient and effective by providing access to personalized applications and functionalities.</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>2014 – end of 2017 (4 years)</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>10-12 million euros in total</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>38 000 man-hours per year</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
<td>28 people</td>
</tr>
<tr>
<td>Amount of team and team size</td>
<td>4 team, 9-12 people on one team</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Scrum framework</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>6 years ago the agile was implemented in some divisions of the organisation.</td>
</tr>
</tbody>
</table>

Table 14. Project information case 2

The IT department of this public organisation aims a transition towards agile development and DevOps. The project sets an example of agile project management for the entire organisation. Scrum development is applied in this project on team level; self-organizing cross-functional teams are following the Scrum guidelines. Development teams have a scrum master and a product owner. Traditional project management elements are still used on management level, especially in the way of documentation (Prince2 reports) and communication with the organization.

The aim of early value delivery is achieved in this project, the customer provided feedback regularly. Continuous delivery within the project is possible, however the linear processes of the organisation are not facilitating rapid value delivery and this can slow down the project. Agile is quite new for the traditional organisation which can be described as highly formalized, focused on procedures and inflexible. For this reason, the conventional role of project leader is maintained in the project structure. The project leader is mainly responsible for solving and foreseeing impediments for the teams on a higher level than the scrum master. According to the project manager the success and speed of the project is highly depending on the speed of the organisation and the project context.

The hard elements of the role of the project manager
The project manager is accountable for delivering the project within time and budget. Due to the complexity of the organisation and the many stakeholders involved, one of the main responsibilities of the project manager is continuous alignment of the product with the expectations of the organisation. Although the teams are self-organising, there are very clear boundaries on this matter. De product owners have the mandate to decide the priorities on operational level; within the boundaries set on strategic level by the project manager. Crossing these boundaries results in an intervention of the project manager, sometimes even on operational level. The project manager maintains a road map as a means to reach the aimed value of this project. For this reason, the project manager can be seen as a strategic product owner. The nature of planning is adaptive, although the increments on higher level are fixed to a large extent. The organisation determined a budget for these increments, and the project must comply with these agreements.
All together this results in a traditional hierarchical project structure, in which the product owners and the project manager are focused on value delivery. While the scrum masters and project leaders enable and facilitate the teams, taking care of impediments which can slow down the efficiency of delivering this product. The project leaders have more power throughout the management levels, this is apparently required in this traditional organisation. The project manager gets involved when impediments need to be solved on organisational level.

**The soft elements of the role of the project manager**

Alignment with the organisation and the many stakeholders is key, for this reason the project manager has to be a strong communicator and has to have a great power of persuasion. Although the teams are self-organizing, the project manager can have a steering role, because the manager is accountable for the project scope, road map planning and the budget. The project manager is redirecting the teams if at one stage the outcome of the project is not in line with the incentives agreed upon with the stakeholders. Top-down decision-making by the project manager on strategic level, often influence the decisions of the product owners and teams on an operational level. Connecting people, challenging the teams and being a good listener is of importance for the manager role. Other useful project manager skills are flexibility, acting decisively, having technical knowledge and having sufficient analytical skills.

**The changing role of the project manager**

The self-organizing character of the teams highly influences the dynamics within the project. The project manager is not the only one responsible for delivering the project, the team is also responsible and more visible in the process. The other changes mentioned in the role of the manager, are largely related to the increased focus on value creation within agile development. The focus of communication between the project manager and client is about the value that the project aims to deliver and detailed Prince2 reports are of less importance.

### 5.3 CASE DESCRIPTION 3: The development of a system for the collocation of data

**Brief case description & project management approach**

This case describes the development of a single collocated system for the data storage. Currently, data of this organisation in the banking sector is being stored at different data warehouses. This results in the use of the same data by the entire organisation, which can be used for preparing financial, management, risk and compliance reports. Transformation to this new system improves efficiency and contribute to compliance with legislation and regulations by providing visibility into the data flow (data lineage). Table 15, details the general case information. The respondents selected in this case are the road manager and the product manager. An agile approach was chosen for two main reasons; (1) speed-up the time to market, since the banking sector has to keep up with the fast changing technology and (2) increasing job satisfaction by giving teams mandate about how to develop software.

<table>
<thead>
<tr>
<th>GENERAL CASE INFORMATION</th>
<th>The development of a system for the collocation of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>Banking sector</td>
</tr>
</tbody>
</table>
| Goal and deliverables    | - The transition from decentral data collection to a single collocated system which ensures the use of the same data sources throughout the organisation for financial, management and compliance reports.  
- A single system will increase efficiency, since there are less interfaces between separate systems and processes are requiring less manual work.  
- The system will contribute to compliance with legislation and regulations. |
| Duration of the project  | 4 years in total (the program/theme started 2 years ago) |
| Total budget for the project | Budget is indicated by the amount of teams, one team costs around 1 million euros a year |
| Man-hours of the project | - |
| Amount of employees working under the project manager | 100 people working on the program/theme |
| Amount of teams and team size | 8 teams (consisting of 8-9 people) |
| Software development method used on the project | Agile development |
| Experience of the organisation with agile project management | 5 years (in the IT department) |

*Table 15. Project information case 3*
The management approach can be described as BusDevOps. One and a half year ago, a shift to agile development took place and the organisation transformed into an agile enterprise (business- and IT work together in teams). Reorganisation took place and this resulted in transition from 150 project- and program-managers to 17 road managers. In addition, 125 agile coaches were hired to help teams in performing effectively. Former responsibilities of the role of the project manager were being migrated to several roles in the organisation. Nowadays more and more changes are covered within the line organization, only the very complex organization-wide changes are defined as a program/ theme and led by a road manager. This results in the disappearance of semi-complex change assessments, previously handled as projects in the organization; currently these changes are dealt with within the teams. For this reason the case describes a program or theme as it is formally called within the organization. Both respondents values the program as very successful; it sets an example for other programs in the organisation.

The development teams (also known as squads) focus on the ‘how-question’; how to build the software? Product owners are in charge of the ‘what- and why-question’, he is responsible for managing the priorities on the backlog. The eight teams working on the program are cross-functional and consist of a maximum of 9 people. The teams work in sprints of three weeks, extra staff members work for the program but not in the development teams. These extra staff members form a so-called integration team (e.g. architects, business analysts and IT integrators), this team provide guidance by setting a framework for the teams. Operational team members (DevOpper’s) are part of the squads if necessary, this depends on the type of work. There are no separate test teams, automated testing takes place within the teams.

The hard elements of the role of the project manager
The road manager is accountable for meeting the defined objectives and scope management. The concrete results of the program are not defined, the road manager stated: “I cannot assure that I deliver product x on moment y”. The means to achieve the defined objectives are not completely in the hands of the manager. The road manager has informal power and not a lot of formal power: “I have limited influence and little control to make a difference” (road manager). The mandate to make fulltime use of the development teams was granted by higher management. However, it is not self-evident that this mandate is given to a road manager; in this case the mandate was granted since the higher management considers the program as important. The road manager stated; ‘In this program the teams are dedicated and committed to one theme, this gives the feeling that the program is a traditional project’. At the same time, it would be deficient to call this new structure a project; the feeling, management and relations between stakeholders has been changed, according to the road manager.

In order to achieve the goal, the road manager can only continue to do efforts in bringing the teams together, supporting them to deliver the right products and moving in the right direction. The road manager cannot take substantive decisions, since the teams are in charge of the development of the product. However, the road manager helps to implement a standard way of working for all the teams. The agile coach, chapter lead and product owner are responsible for coaching, staffing and team performance, the road manager is not in charge of the teams and human resources. This implies that the road manager is not charge of hiring employees and team staffing, since he has no budget; ‘the budget I have for the program are the teams’ (road manager). Higher management can allocate extra teams to the program, this is not a decision of the road manager and he only has indirect power.

The road manager sets deadlines for the achievements of goals. A roadmap is created and prioritised on epic level by the road manager, this map is communicated on the market place. The market place is facilitated by the manager and takes place every 4 weeks, the entire program staff comes together to discuss the developments, progress and priorities. The road manager is one of the stakeholders on the market place and strives to achieve the overall goal by placing the right stories on the backlogs of the teams. The road manager can be seen as the overall/theme product owner since he facilitates alignment of the product owners towards a common goal; this is often a negotiation between the stakeholders and the road manager sees this as ‘’a negotiation game’’. The targets per quarter (quarter business review) are defined in the delivery board. The manager reports to the higher management.

The soft elements of the role of the project manager
As pointed out by the road manager: “The responsibility of the road manager is limited to the alignment, focus and overall collaboration in case of complex changes”. The road manager is a spider in the web, bringing people together and giving clear guidance. There is no hierarchy towards the teams and facilitating human-centred leadership is key. The road manager contributes to the value of the product by facilitating the market place and trust the product owners on development of the epics. There is a shift from a process-oriented to a content-oriented management; the road manager focuses on collaboration, communication and influencing in an informal manner. Informal influencing and having knowledge about the content is crucial, since the agile manager is not in the position to formal influence the teams (though projects boards etc.). As a manager you need to offer added value to the teams in order to get things done, for this reason a manager needs to be more aware of the content than in traditional management. It is very important to have strong communications skills (from management board level to team level) and an insight into human behavior.

The changing role of the project manager

“As a project manager in waterfall project, I used to make project initiation documents and continuously monitored the budgets”: according to the road manager. This program is not a form of conventional project management, since there is no budget allocated and the road manager is not responsible for financial planning. In addition, the project manager was responsible a project time schedule, monitoring what progress has been reported by the teams and decide where the project is standing in relation to the original planning. The traditional project manager needs to encourage the teams to deliver on time and according the schedule; continuously monitoring whether the work is done and tasks are finished. A manager in agile development has a more hands on approach since the information is not documented, managers need to find different ways to obtain this knowledge.

In addition, two major role changes have taken place in the shift to agile development, (1) the level of detail in phases, and (2) no formal mandate is assigned to the road manager and the teams do not belong to the road manager. The road manager is not a hierarchical leader but the leader of the program, the teams are not formally managed by the road manager and less connected to the manager. The respondents also mentioned changes in the behaviour and competences required for the role of road manager. Furthermore, both respondents recognise the need for road managers and product owners, but the project manager will not be required in this organisation. Only program management roles are required for change assessments which are complex and at a higher level in the organisation.

5.4  CASE DESCRIPTION 4: The development of a system for registration of persons and the migration into this new system

Brief case description & project management approach

This case describes the development of a system for registration of persons and the migration of an existing system to the new system. New legislation has been introduced which describes the requirements and effects the development of this application. At the same time the application had to be developed simultaneously in order to provide input for establishment of the law. All respondents indicate that the project management approach is not a purely implementation of Scrum. The implementation of agile project management is complicated due to two main reasons; (1) multiple public organisations are involved and these many stakeholders have different product requirements which results in the absence of one sole business representative (product owner) with a clear vision, (2) the product is highly complex since the new system is cross-linked with the existing system and many interfaces are in place which until now made it impossible to go live. The high level of uncertainty, implementation of new legislation, and lack of an ambiguous vision from the business results in many changes during the project and makes iterative development a suitable approach according to the respondents.

Due to time delays the project has not been successful in the past, the client was not satisfied with the progress and the political pressure increased. Currently the project is functioning well and the progress has been improved. General information about this project is given in Table 16.
The terms “waterscrum” and “Scrum / crum” are used to characterize the project management approach. These terms are made up by respondents, since traditional project management elements are incorporated in the project. The approach consists of mini-waterfalls; testing is been done late in the development process by a test team, the software release frequency is low, the increment cannot be accepted by the customer after every sprint and planning is done to a large extent at the start of the project (through a product breakdown structure and work breakdown structure). Although the development teams are working according to the Scrum guide, value is not delivered to the client after every time-box. And deployment of the software has not taken place. The agile mindset, dealing with change, iterative development style, cross-functional team structure and collocated teams are well-implemented agile project management aspects within this case.

The hard elements of the role of the project manager

The project manager also takes upon the role of product owner, because of the absence of a business representative. This makes the project manager responsible for the time-schedule, budget, human resources, but also for the development of a high-quality product and management of the backlog. Together with the architects the functional requirements and backlog items are defined. The specifiers (the linking pins) and the project manager communicate the backlog items with the development teams. This indicates that the project manager is a crucial link between the different teams when it comes to development of the product and value creation. The manager is responsible for operational control of the process and deployment of the complete end-to-end product. The project manager is focused on the project, while the project leader is more outward-looking.

The soft elements of the role of the project manager

All respondents mention the focus of the manager on connecting people, facilitating the teams, enabling decision making and solving issues/impediments. Being a good listener, having adequate communication skills and people skills are of importance. The project manager needs to be structured, requires planning skills and a clear vision about the product. Clear priorities are set with a particular emphasises on the main lines of the project. The manager works closely together with the teams and gives personal advise when requested. Trusting the teams on technical matters and giving the teams autonomy and responsibility is the aim of the project manager. The leadership style is focused on collaboration and guidance of the individual, leadership is not hierarchical.

The changing role of the project manager

In essence, the role of the agile project manager brings together professionals, ensures good communication and facilitates the team in finding a solution together. This is in contrast with the traditional role of project manager who gives clear tasks and direct directions to the testers and developers. In addition, the project manager deals differently with change since the additional value of changes will not be financially calculated. Because of working in time-boxes, the project manager is focused on division of work which can be challenging and more intense. Making a more detailed planning on team level requires the project manager to have more in-depth knowledge, in traditional project management a high level planning is sufficient and requires less software knowledge. The project leader emphasises that the role of project manager is highly

<table>
<thead>
<tr>
<th>Type of project</th>
<th>The development of a system for registration of persons and the migration into this new system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Public sector</td>
</tr>
<tr>
<td>Project goal and deliverables</td>
<td>The aim is to replace the existing application which is part of a decentral system and develop a new application for registration of persons which contains more in-depth information and is a centralized system.</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>Around 9 years (2010 – approximately end 2019)</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>10 million euros in total for the project (37 million for the overall project)</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>Around 250.000 man-hours</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
<td>23 employees working under the project manager, 60 employees working on the overall project</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
<td>3 scrum teams, around 7 people per team</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Aspects of the Scrum and waterfall methodology are used</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>Scrum implementation started 5 years ago</td>
</tr>
</tbody>
</table>

Table 16. Project information case 4
dependent of the context of the project and the kind of project. The changing role of project manager is not only influenced by agile development and the project leader sees agile development as nothing new.

5.5 Case Description 5: Transport planning software application

Brief case description & project management approach
The project aim is to develop a transport planning software application for mobile equipment on a national scale. The organisation is the IT department of two collaborating Dutch organisations in the transport and logistics sector. A part of an outdated application landscape will be replaced by this new application, which will include extra functionalities and increased automation. In the first phase of this project, development of a solid application landscape was required, since the application is connected to existing applications. For this reason, the first fifteen months were spent on the refactoring of this existing software. Table 17 provides general case information.

In total three respondents were selected for this case; the project manager, programme manager and scrum master. The start of the project was problematic and not very successful, since the completion of the first release has been delayed for half a year. Since the new project manager (who managed to finish the release and get the project back on track) joined the team, the programme manager has more confidence in the project performance.

<table>
<thead>
<tr>
<th>General Case Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
</tr>
<tr>
<td>Sector</td>
</tr>
<tr>
<td>Goal and deliverables</td>
</tr>
<tr>
<td>Duration of the project</td>
</tr>
<tr>
<td>Total budget for the project</td>
</tr>
<tr>
<td>Man-hours of the project</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
</tr>
<tr>
<td>Software development method used on the project</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
</tr>
</tbody>
</table>

The scope is fixed to a large extent, since the application replaces the existing planning software application. A strict deadline is in place, because the support for the existing application will expire. The chosen planning methodology (the solution) is still a point of discussion between the end-users and the project team. The development teams work according to Scrum within traditionally defined boundaries, the Prince2 project management framework is implemented at this project. In order to gain assurance about the functionalities of the application, work packages are defined on theme level.

It is important to have control on these functionalities according to the programme manager. The project management approach can be described as “Fragile”; first the functional requirements are defined and subsequently these work packages are developed according to an agile approach.

The project does not embody a pure form of agile project management. Continuous delivery of software is not possible because of organizational processes. Next to that the increments delivered by the teams at the end of a sprint are not potentially releasable. All respondents mentioned the difficulties in fulfilling the product owner role, since the business lacks sufficient knowledge about the innovative planning processes. For this reason the role of product owner is not fulfilled by a sole person from the business representing the end-users. As the project manager points out: “Input comes from within and not from outside the project”.

The hard elements of the role of the project manager
The manager is like a traditional project manager performing stakeholder management, being in charge of human resources, and making a founded decision between time, money and scope. The manager is responsible for a well-functioning process of producing software. And he has the complete overview and focuses on end-to-end software development. Team productivity is important and the manager actively seeks opportunities to improve this. In addition, the manager fulfils the role of high-level product owner but without business mandate. The project manager chairs a
committee of architects and specifiers that have the mandate to decide about the backlog items. The manager is accountable for the high-level product backlog. Although in practice, part of this responsibility is delegated to the specifiers who are in contact with the end-users and define the functional requirements of the product. For this reason, the scrum master considers the specifier (and not the project manager) as product owner.

The soft elements of the role of the project manager
The manager aims to empower the self-organised teams, although this might be challenging in this traditional hierarchical organisation. The project manager has more power and status, for this reason the teams and scrum masters ask for help when solving impediments. The project manager coaches the scrum master, who in his turn coaches the team. Switching between effective leadership styles is important; the manager aims to play a coaching role but plays an influential and steering role when the teams are not able to achieve their goals independently. The project manager has a strong vision on the product, but needs to convince the teams with clear arguments about suggested changes or ideas. Decisions are results of discussions within this project, for this reason the project manager should be able to convince people, give a well-argued opinion and stand firm when required. Software knowledge is a preferred skill, as well as social skills and being open and transparent towards stakeholders inside and outside the project.

The changing role of the project manager
Although the programme manager considers an agile approach not something completely new. All three respondents believe that the role of the project manager changes in agile project management; various different aspects are mentioned. The agile manager is a less directive leader, focuses more on collaboration and coaching qualities are more important. Although the agile manager still has the complete overview, he is less in control and not solely responsible for the product. A high level of trust by the manager in the teams is important, because of the increased responsibility and team autonomy. In addition, the agile manager is not telling the teams what to do and how much time is reserved for the task. Other changes mentioned are the less cost-centric view on change in software development, less focus on documentation and scope decisions by a committee of product owners in which the project manager fulfils a leading role.

5.6  CASE DESCRIPTION 6: The digitalization and automation of procedures

Brief case description & project management approach
A system is developed which aims to digitise and automate the organisational procedures. This system will modernise the existing procedures, improve effectiveness and contribute to saving expenses. The system needs to comply with new procedures based on revised legislation, this results in a minimal viable product and scope which is fixed to a large extend. Continuous interaction takes place between the development of the system and the legislative process. As pointed out by the project manager: “The circumstances of the project made it almost impossible not to work in an agile way”. Table 18 gives an overview of the general characteristics of the case. The scrum master and product owner were suggested by the project manager as additional respondents for this case. Although the client is satisfied with the product, the project is taking longer than expected.

<table>
<thead>
<tr>
<th>GENERAL CASE INFORMATION</th>
<th>The digitalization and automation of procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>Law sector</td>
</tr>
<tr>
<td>Sector</td>
<td></td>
</tr>
<tr>
<td>Goal and deliverables</td>
<td>Modernisation of the existing procedure which aims to increase the effectiveness and contribute to cost-savings</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>2013 - 2021 +/- (total duration around 8 years)</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>6-7 million euros per year</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>+/- 4,000,000 man-hours per year</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
<td>45 people</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
<td>3 teams, 11-14 people per team</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Scrum, Kanban, Prince2, elements Scaled Agile Framework</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>Around 3-4 years</td>
</tr>
</tbody>
</table>

Table 18. Project information case 6

An agile development approach is chosen for this project based on Scrum, Kanban and SAFe elements. The development teams work according to Scrum, backlog refinement takes place using the Kanban methodology and the long-term project
planning is based on SAFe elements. The project is embedded in a traditional hierarchical organisation, which includes many management levels and is in search of their less directive and command-and-control role in agile development. The scrum master role is fulfilled on two levels, team level and management level. Two cross-functional scrum teams develop software, the functional design team is responsible for the translation of backlog items to the development teams. The software designers of this team are the connection between the product owner and the developers. The product owner works closely together with a group of business experts, who have major impact on the functionalities of the product.

The hard elements of the role of the project manager
Three main roles can be distinguished within the management of the project: the project manager, the chief scrum master and the two product owners. These three roles share ownership of the end-product. The roles do have overlapping responsibilities and have different perspectives on the goal of this project. A balance is sought between the role of project manager and product owner, who are both operating on the same management level as “two captains on one ship”. The project manager reports to the project board about time and budget, takes care of the coordination with the base organisation and is responsible for the technical value. The functional value of the product is the responsibility of the product owner. The two roles can have conflicting interests regarding to extra requirements which are not achievable in the established budget and time, or during the definition of the long-term planning on epic level (satisfying the business versus efficient planning). The PO manages the product backlog priorities within financial boundaries and time-schedule which are monitored by the project manager. Having two captains on a ships also brings benefits, the manager keeps the PO focused by asking critical questions about the added value of features. In addition, overlap in responsibilities is in present between the chief scrum master and the project manager. Both roles aim to maximize efficiency and solve impediments for the teams. The manager is ultimately responsible for the development process, team structure and staffing, although this is in consultation with the chief scrum master; in practice the scrum master has the delegated authority to handle team related matters.

The soft elements of the role of the project manager
The attitude of the project manager towards the development teams is stimulating, facilitating and enabling. The manager is challenging the teams, the scrum master and the product owners by asking stimulating and critical questions. Openness for change and being flexible on one side, but focused and goal-oriented on the other side. Listening to the professionals is very important: “as a manager you have to tap into the collective wisdom of the teams” according to the project manager. Although decisions are based on information received from the teams / professionals, the project manager sometimes has to be a directive leader. As pointed out by the project manager, in some situations the team needs someone to make a decision for them or gather input from various stakeholders and make a decision.

The changing role of the project manager
Several different aspects which have an impact on the role of project manager were mentioned by the respondents. There is an increased sense of reality and transparency interwoven in agile project management. Transparency helps the project manager to get an overview of the progress, while the traditional project manager monitors the process based on the established time-schedule. The scrum master mentioned the transition of project manager to product manager in which the total end-to-end development becomes more important. Conventional project managers mainly focus on their own project, while collaboration on product level is important for value creation. If project boards will continue to function in a cost-centric manner, the transition to a value-centric approach is hampered according to the scrum master. Separate budgets for projects needs to be eliminated, in this case the project manager becomes a product manager, responsible for the development of products with the highest value.

5.7 CASE DESCRIPTION 7: Development of an application for receiving, processing and controlling declarations

Brief case description & project management approach
This project aims to develop a new application that improves processing of electronic declarations through data-analytic service departments of this public organisation. The application will enable a more integral approach of data processing and contributes to further digitalization of the validation process of declarations. Increased political pressure to finish the
project on time was driven by continuous postponement of the project. Two respondents were selected for this case, the project manager and the functional designer (developer in the Scrum team). The project performance is very good according to both respondents. The client is satisfied with the results and the project was finished on time. Information about the project is given in Table 19.

<table>
<thead>
<tr>
<th>General case information</th>
<th>Development of an application for receiving, processing and controlling declarations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Public sector</td>
</tr>
<tr>
<td>Goal and deliverables</td>
<td>- Improving the financial administrative processes by further digitalisation of the processing of the declarations - The transition to a more integral approach of data processing</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>6 Months (the project was officially finished April 2016, the team is currently working on the remaining backlog items)</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>Budget is the total days spent on the project.</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>8400 man-hours</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
<td>Around 15 employees are working on several projects</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
<td>Teams of 5/6 persons</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Scrum</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>This division of the organisation works already 5 years in an agile manner</td>
</tr>
</tbody>
</table>

Table 19. Project information case 7

The Scrum methodology is used to develop the software for this application, the team works in a three-weekly sprint and Scrum events are organised. The application was developed based on an one-pager with a general description of the product. The amount of sprints and the budget was fixed, this is based on a rough estimation of the work. Items that are not developed within these sprints will remain on the product backlog. One self-organising team is responsible for the development of the application; this cross-functional collocated team has an experienced scrum master who is the main point of contact. The product owner is not working on the same location; the team, project manager and product owner meet once a week. The scrum master often fulfils the product owner role, since the product owner is not experienced enough and lacks sufficient IT knowledge to communicate with the external stakeholders.

The hard elements of the role of the project manager

The manager is accountable for the deployment of the application and responsible for staffing, management of costs and the time-schedule. Content-wise the project manager has no prominent place in the development of the application. Although the manager attends the Scrum meetings to monitor the progress, no active participation is expected. Value creation and management of the priorities on the backlog are the responsibilities of the product owner. The manager can intervene in case of unreasonable demands or vaguely described requirements, since this could result in budget overruns. According to the project manager; “a product owner can ask for a Rolls-Royce but only needs a mini”. The manager is responsible for management of the information flows from and to the organisation and the handover of the application to IT operations. Impediments are solved by the teams, and by the manager on organisational level since the organisation is highly complex.

The soft elements of the role of the project manager

The project manager has a hierarchical relation with the developers, despite the self-organising character of the team. The manager is facilitating, supporting and makes sure that the team is able to focus completely on software development. With a focus on solving impediments and managing the external stakeholders, he ensures that the team can work efficiently, because they are not exposed to external influences. This role requires communicative skills, planning skills and political skills to control the environment. The project manager has to be able to trust and serve the teams. Being an accessible and situational leader, who leads on the basis of management by exception.

The changing role of the project manager

In present, the project manager manages multiple projects using waterfall or agile approaches. When starting a project, the manager evaluates the type of project and selects a suitable methodology which can result in a mix of methodologies and elements. According to both respondents, leadership style of the manager does not differ within an agile or waterfall project. However, elements in the role changed according to both respondents. Several aspects were mentioned affecting the role of the project manager, such as the changing dynamics of the division of work and the monitoring of the process.
According to the project manager a transition takes place from the role of project manager, to a facilitating manager with self-steering teams. Resulting in an increased span-of-control; the facilitating manager will be able to facilitate more teams than when using the waterfall model.

5.8 CASE DESCRIPTION 8: Development of data analytics applications

Brief case description & project management approach
This project is part of a project portfolio which aims to develop data analytics applications for several departments of this organisation operating in the utilities and energy sector. Data analytic applications make data comprehensible and readable which contributes to making more-informed business decisions. The type of projects in this portfolio is high innovative; often a proof of concept or prototype is developed first, since the value product might be difficult to predict. General case information is provided in Table 20. The project manager suggested two other respondents for this case; a project manager mainly in the role of scrum master (responsible for one project/team) and a product owner from the business. The project manager himself is responsible for four projects and fulfils the role of scrum master. Moreover, the manager has a shared responsibility on portfolio level for the implementation of agile.

<table>
<thead>
<tr>
<th>GENERAL CASE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of project</strong></td>
</tr>
<tr>
<td><strong>Sector</strong></td>
</tr>
<tr>
<td><strong>Goal and deliverables</strong></td>
</tr>
<tr>
<td><strong>Duration of the project</strong></td>
</tr>
<tr>
<td><strong>Total budget for the project</strong></td>
</tr>
<tr>
<td><strong>Amount of employees working under the project manager</strong></td>
</tr>
<tr>
<td><strong>Amount of teams and team size</strong></td>
</tr>
<tr>
<td><strong>Software development method used on the project</strong></td>
</tr>
<tr>
<td><strong>Experience of the organisation with agile project management</strong></td>
</tr>
</tbody>
</table>

Table 20. Project information case 8

The projects in the portfolio adhere the agile principles and work according to Scrum. The scope of the project is variable and the time and the budget is fixed. The teams work in sprints of 3 weeks, every development team has a product owner and scrum master. The project manager/scrum master is not a developer but in charge of the process. The product owner works part-time on the project but attends the scrum meetings regularly, and is responsible for backlog management. The project used to have a very traditional way of documentation and reporting to the portfolio board (using Prince2). This traditional project context is changing. Currently, the project portfolio is in a transition from project-based software development to an agile release train with multiple value streams. Dedicated small cross-functional self-organizing teams will work on these value streams and the portfolio board is replaced by a higher level board. Since the organisation still wants to have some control on product delivery, budget is granted every three months for a part of the product. ‘It is a battle to receive budget without agreement on a pre-defined product’: according to the product owner. Previously, project initiation documents were made by the project manager/scrum master, in the new structure the product owner is responsible for a one-pager with goals for the coming three months.

The hard elements of the role of the project manager
Currently, the project manager is responsible for setting up the project, forming teams and coaching the product owner. In addition, the project manager is an agile coach on portfolio level; making sure Scrum is understood and guides the transition towards agile. Other responsibilities are risk management, stakeholder management (as well a responsibility of the product owner), following the project progress, resource management and monitoring the plans and budget. The manager is in charge of the team structure, monitors the team collaboration and makes sure the development team can do their job by solving impediments. The product owner sees the project manager as a scrum master and change manager, more than as a traditional project manager.
The soft elements of the role of the project manager
The project manager serves, facilitates and coaches the teams and shows facilitating leadership. Focus is on development of the product together as a team. The project manager challenges the teams by asking questions; the team members are stimulated to think for themselves. “The project manager is not leading the teams, this is not what he is supposed to do since the teams are self-organizing”; according to the product owner. Although the manager is not responsible for the value of the product, the manager coaches the product owner by giving advice on the trade-offs between costs and value, the development of high-value products and prioritising the backlog. Moreover, the manager contributes to value creation by ensuring maximum efficiency of the teams. A clear vision is important for the role of project manager/ scrum master and the drive to continuously improve. Two respondents mentioned that a manager cannot be an authoritarian leader within agile development, coaching leadership must be in the nature of the manager. Communicative skills and insights in human behaviour and processes are important characteristics.

The changing role of the project manager
The respondents mentioned the changing behaviour of the manager, from steering/ leading to coaching. The manner in which the product is developed has been changed. In traditional project management the manager is end responsible for the project; including management and control (e.g. finances, schedule), in agile this is more a shared responsibility. As pointed out by the project manager: “There is a transition from a project manager to an agile project manager, but in this organisation there is also a transition towards an agile enterprise”. The product owner is not sure whether the role of project manager is still required when working in value streams. The role originates from the project-based manner, in which this organisation used to develop software. Organisation procedures are still project oriented, in this context a project manager is required. According to the project manager, this role would not be necessary in case agile is perfectly applied. However, this is never the case; even when working with adequate teams, scrum masters and product owners, someone needs to take care of the agile process. At this moment, the project manager takes care of resources, budget, team structure and governance. This umbrella function can as well be fulfilled by another role, such as an agile coach but this is currently not the case.

5.9  CASE DESCRIPTION 9: The development of an information system for personal data

Brief case description & project management approach
This application links information flows and data from several (national and international) external sources to a data module which consists of personal accounts. In present, the project teams deliver software in releases, although the development of this application started as a project. A waterfall approach is applied on this project. The releases overlap, both respondents called this a “roof-tile like structure”; the new release already starts when the previous release is not finished yet. The project managers and lead designer were selected as respondents for this case. Table 21 provides an overview of the general case information.

<table>
<thead>
<tr>
<th>GENERAL CASE INFORMATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>The development of an information system for personal data</td>
</tr>
<tr>
<td>Sector</td>
<td>Public sector</td>
</tr>
<tr>
<td>Goal and deliverables</td>
<td>The addition of new external data sources to an existing data system which contributes to the aim of setting up a complete data system.</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>The project was started 4 years ago and currently is working in releases.</td>
</tr>
<tr>
<td>Total budget for the project</td>
<td>Around 5 million yearly</td>
</tr>
<tr>
<td>Man-hours of the project</td>
<td>5000-5500 days (44000 man-hours)</td>
</tr>
<tr>
<td>Amount of employees working under the project manager</td>
<td>30 people, of which 22 people are working on this project.</td>
</tr>
<tr>
<td>Amount of teams and team size</td>
<td>3 teams consisting of 6-12 people</td>
</tr>
<tr>
<td>Software development method used on the project</td>
<td>Waterfall model (the releases overlap)</td>
</tr>
<tr>
<td>Experience of the organisation with agile project management</td>
<td>This department works around 1 to 2 years according to agile. In other departments agile development is implemented for already 4 to 5 years.</td>
</tr>
</tbody>
</table>

Table 21. Project information case 9

The teams do not work cross-functional, although a lot of communication takes place and cross-team feedback is provided. The lead designer is the sidekick of the project manager on substantive issues. The lead designer is responsible for the translation of the assignment to functional requirements, contact with the senior user and architect, and definition of the
impact of the new requirements on the existing application. After the design phase, the project manager allocates the developers to make the technical design, build the software and conduct preliminary tests. When the development team is finished, the manager allocates the test team. After completion of the application, the system and integration tests will be performed by another team. Thereafter, the business will perform several tests and after another 4 weeks the software will be deployed.

The hard elements of the role of the project manager
The project manager is responsible for resources (optimal staffing on the project), time, budget, change management and communication with the base organisation. The manager is accountable for the end-product and aims to finish the release on time and within budget. The teams are content-wise responsible for development of the software and the lead developer translates the wishes of the client into product requirements and a design. The manager assigns the work packages among the team members on a weekly basis, the team members know exactly what they should do and how much time is scheduled for this task. At the end of the week, the project manager makes a planning for the next week, based on the progress the employees made during that week. A large excel file is used, which assists the project manager in the authorisation of work packages.

The soft elements of the role of the project manager
The manager prefers to be involved in major substantive decisions and gives advice on technical issues. For this reason, substantive knowledge is a valuable characteristic according to both respondents. This functional knowledge is also of use when drafting the planning and distributing the work packages. The project manager is result oriented, and his share in developing a high value product consist of continuously tracking planning and resources. The manager is not an authoritarian leader according to the lead designer; the manager is human centric, listens to the teams and is open for suggestions, gives guidance and advise, fulfils a mentor role, and trusts and supports the team on personal and work related matters.

The changing role of the project manager
Not applicable, since the respondents do not have experience with agile development.

5.10 CASE DESCRIPTION 10: The transition towards a new the financial system

Brief case description & project management approach
This project aims to implement a financial system, which already is implemented in other departments of the governmental organisation. This new system for financial and procurement administration will replace an existing system. The development and implementation of this system involved three parties; (1) the IT management organisation, who is developing and managing the financial system, (2) the client organisation that implements the system, and (3) the owner of the financial system who is also responsible for financial record-keeping. Table 22 gives information about the main characteristics of the project. The respondents include the project leader who fulfils a dual function of overall project manager and project manager of one team with end-users. The other respondent is a functional financial consultant, who fulfils the team manager role (hereafter referred to as the team manager).

A non-agile project management approach is chosen for this project. The chosen approach is based on existing management approaches of the involved organisations. The team manager referred to the waterfall model when describing the project management approach. Documentation and reports are in line with the Prince2 project management framework. Software is developed in accordance with the pre-established requirements which are documented and approved by the steering board. Clear agreements, an up-front design and an analysis phase is required since the two systems are interconnected, according to the team manager. The teams are not collocated, some teams work part-time on the project and there is a clear separation between the teams of the different organisations.

The information analysts of the IT management organisation are responsible for creating a solution document which was reviewed by the end-user team of the client organisation. The established customised software solutions were further
examined and described, risk analysis ad impact assessments took place, followed by establishment of the technical and functional design.

<table>
<thead>
<tr>
<th>General Case Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of project</td>
<td>The transition to a new financial system</td>
</tr>
<tr>
<td>Sector</td>
<td>Public sector</td>
</tr>
</tbody>
</table>
| Goal and deliverables    | - Implementation of a financial system without disrupting primary processes within the organisation  
                          - Incorporation of the specific processes and the required functionalities of this organisation in this integrated financial system. |
| Duration of the project  | 16 months (end 2015 – April 2017) |
| Total budget for the project | 3.8 million euros in total |
| Man-hours of the project | Around 39,000 man-hours |
| Amount of employees working under the project manager | Around 10 in the end-users team, 25 in total |
| Amount of teams and team size | The team size varies since not everyone is working full time on the project (2-10 people) |
| Software development method used on the project | Waterfall model / not specified project management approach |
| Experience of the organisation with agile project management | No experience |

Table 22. Project information case 10

Both respondents value the project as successful. At present, the software is live and not many issues occurred during the current post-live support phase. The respondents agree that the collaboration went well, since adequate people with the qualified expertise were involved.

The hard elements of the role of the project manager

The project manager is accountable for the end result, this involves the delivery of the pre-agreed products within time and budget. The project manager has the authority to respond to changes and takes corrective action on these matters. Involvement of the manager was minimal in relation to the content of the product. The manager has an indirect role in value creation. His role is to stimulate the end-users on improvements on the system and gives them a voice in definition of the product. The project manager was the link between the involved organisations, communication was done through the project managers. Once a week a project leader meeting took place to discuss the progress. Reporting to the project board is the responsibility of the manager, input of all project managers is gathered and presented to the board who control the project in general terms. Human resources and staffing is monitored by the subproject managers on their own teams.

The soft elements of the role of the project manager

Both respondents mentioned different soft elements that are important for the role of the project manager. The ability to work with the several parties and having political skills are important since many stakeholders are involved according to the team manager. Knowledge about the content of the system is a valuable skill as well. The manager himself mentioned additional skills such as being a good listener, having strong communication skills and a systematic approach. The manager does not describes himself as a directive leader, although he will do everything in his power to finish the project within time and budget. This includes identifying the adequate people who can make the right decisions with respect to the content. The manager can take decisive actions when there are issues concerning the development process. In general, the manager takes the final decision and if other managers do not agree, the matter can be escalated to the project board. Since communication was mainly done through the subproject leaders, the team manager experienced a detached attitude and leadership style of the manager. Although the project was successfully managed by the manager, the team manager would have appreciated more direct communication.

The changing role of the project manager

Not applicable, since the respondents have limited experience with agile development in practice.
CROSS-CASE ANALYSIS

// CHAPTER 6
## 6 CROSS-CASE ANALYSIS

The multiple-case study provides insights on the way agile and traditional project management is performed in practice. In chapter 5, each project has been described individually in order to become familiar with each case as a stand-alone entity. The aim of this chapter is to compare the cases and conduct a cross-case analysis by means of qualitative content analysis. This chapter will provide answers to sub-questions 4 and 5 of this research:

| Sub-question 4: How is agile project management performed in practice? |
| Sub-question 5: What are the key-differences between the role of the project manager in an agile and traditional project management approach? |

The following sections elaborate on the findings of the performed data analysis. Section 6.1 describes a supporting framework for conducting the cross-case analysis. A cross-case overview and an assessment of agility of the cases forms a point of departure for comparing the cases (section 6.2). Subsequently, observed patterns on fulfilment of the role of project manager are categorised and described within the four themes of the sensitizing concepts. Section 6.3 details the cross-case analysis of the project management approach. The hard elements and soft elements of the role are analysed in section 6.4 and 6.5. The changing role of project manager in the future is described in section 6.6. In addition, section 6.6.1 details the elaboration of additional findings and refinement of the sensitizing concepts. Furthermore, in section 6.8 findings of this research are embedded in existing literature and the contribution of the findings is highlighted. This chapter concludes by answering sub-question 4 and 5 (section 6.9).

### 6.1 SUPPORTING FRAMEWORK

The steps of the cross-case analysis are visualised in a supportive framework which is provided in Figure 10; the sections of this chapter are indicated in this figure. Within each of the four sensitizing concepts, the generic and specific elements for the role of project manager are analysed. The findings are summarised at the end of each section.

![Supportive framework of the cross-case analysis](own illustration)
The categories are derived inductively and described within the four sensitizing concepts, in specific: the context of the role, the taxonomy of the role, the changing behaviours of the role and the future of the role. However, it should be mentioned that some of the categories overlap to some extent. Sections 6.1-6.6.1 are only based on empirical findings. The link to existing literature is made in section 6.8. As indicated in the sub-questions, the focus of this cross-case analysis is (1) investigating agile in practice and (2) studying the key differences for the role of project manager in an agile approach compared to a traditional project management approach. When identified patterns do not apply for all cases or only to a limited extent, non-patterns and additions to these patterns are described within the different sections.

6.2 CROSS-CASE OVERVIEW

General case information is provided in section 6.2.1, the agility of the cases is assessed in section 6.2.2. Furthermore, at the end of this section synthesis of the case information offers a reflection on the total case set (section 6.2.3).

6.2.1 General information of the characteristics and metrics of the cases

The aim of this section is to provide general information about the cases as a starting point for the cross-case analysis. The main differences and similarities between the cases are elaborated. Table 23 provides general case information, more detailed information about each case can be found in the case reports (chapter 5). Various characteristics of the cases will be briefly discussed below.

<table>
<thead>
<tr>
<th>#</th>
<th>TYPE OF PROJECT</th>
<th>SECTOR</th>
<th>TOTAL DURATION</th>
<th>BUDGET</th>
<th>SCOPE, TIME, RESOURCES</th>
<th>TEAM STRUCTURE</th>
<th>SOFTWARE DEVELOPMENT METHOD PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>New software is a replacement of an existing system</td>
<td>Transport and logistics sector</td>
<td>3 years</td>
<td>60 million euros in total</td>
<td>Semi-fixed scope</td>
<td>5 teams / 7-8 per team</td>
<td>Scrum framework and Kanban</td>
</tr>
<tr>
<td>2.</td>
<td>New software is a replacement of an existing system</td>
<td>Public sector</td>
<td>4 years</td>
<td>10-12 million euros in total</td>
<td>Semi-fixed scope</td>
<td>4 teams / 6-12 per team</td>
<td>Scrum framework, “Agifall”</td>
</tr>
<tr>
<td>3.</td>
<td>New software replaces and transforms the type of system</td>
<td>Banking sector</td>
<td>6 years</td>
<td>Budget is amount of teams</td>
<td>Iterative scope</td>
<td>8 teams / 8-9 per team</td>
<td>Scaled agile framework</td>
</tr>
<tr>
<td>4.</td>
<td>New software replaces and transforms the type of system</td>
<td>Public sector</td>
<td>6 years</td>
<td>10 million euros in total</td>
<td>Semi-fixed scope</td>
<td>3 teams / 7 per team</td>
<td>Elements of the Scrum framework and waterfall model, “Waterfall”</td>
</tr>
<tr>
<td>5.</td>
<td>New software is a replacement of an existing system</td>
<td>Transport and logistics sector</td>
<td>4 years</td>
<td>10 million euros in total</td>
<td>Semi-fixed scope</td>
<td>4 teams / 4-5 per team</td>
<td>Scrum framework</td>
</tr>
<tr>
<td>6.</td>
<td>Complete new software system</td>
<td>Public sector</td>
<td>8 years</td>
<td>6-7 million euros per year</td>
<td>Semi-fixed scope</td>
<td>3 teams / 11-14 per team</td>
<td>Elements of the Scrum framework, Kanban, Scaled Agile framework (SAFe)</td>
</tr>
<tr>
<td>7.</td>
<td>New software in existing system</td>
<td>Public sector</td>
<td>6 months</td>
<td>Budget is total days spent on the project</td>
<td>Iterative scope</td>
<td>1 team / 6 per team</td>
<td>Scrum framework</td>
</tr>
<tr>
<td>8.</td>
<td>Complete new software system</td>
<td>Utilities and energy sector</td>
<td>6 months</td>
<td>200.000 euros in total</td>
<td>Iterative scope</td>
<td>1 team / 5 per team</td>
<td>Scrum framework, shifting towards scaled agile (elements of SAFe)</td>
</tr>
<tr>
<td>9.</td>
<td>New software in existing system</td>
<td>Public sector</td>
<td>2 years</td>
<td>5 million euros per year</td>
<td>Fixed pre-defined scope</td>
<td>3 teams / 6-12 per team</td>
<td>Waterfall model</td>
</tr>
<tr>
<td>10.</td>
<td>Implementation system &amp; development new software</td>
<td>Public sector</td>
<td>16 months</td>
<td>3,8 million euros in total</td>
<td>Fixed pre-defined scope</td>
<td>3 teams / 2-3 per team</td>
<td>Waterfall model</td>
</tr>
</tbody>
</table>

Table 23. General information of the selected cases

Various sectors: In total, the ten selected projects are conducted for nine large Dutch private and public companies in various sectors. The majority of the cases are performed in the public sector, although it should be noted that the cooperating companies have very different characteristics. In one company, two case studies are performed within different departments; one of these two cases is developed through a traditional project management approach and the other case according to an agile project management approach.

The size of the projects and the amount of teams: The majority of the cases consists out of 3-5 teams, the size of these projects is comparable (budget and duration). When taking into account the total case selection, the size of the projects varied to a large extent; the amount of teams ranged between one and eight teams. The duration of the projects ranged from multiple years to half a year.
Software development method: All agile cases make use of Scrum elements in their selected software development method. Supplementary, some cases implemented elements of the agile methodologies Kanban and SAFe. One of the cases is part of a scaled agile organisation, another case is currently in transition towards scaled agile.

The type of projects and the iron triangle: Although all projects are in the field of software development, the specific project type differs slightly among the cases. For most of the agile projects, the minimal viable product is very similar to the total requirements of the product. The scope of these cases is set to a large extent since the new application replaces an existing application, or the application has to comply with procedures and legislation. Although a lot of cases do have a relatively fixed scope (the solution is fixed to a large extent), the definite scope is an iterative process; the exact solution and non-functionalities of the system are not fixed. Other agile cases adhere to the agile iron triangle to a larger extent; the general objective of the project is defined beforehand, while the solution is created during the project. In particular in case 3 and 8 the development approach is according to the agile principles; the resources and time are fixed and the scope (solution) is variable. This is pointed out by a respondent of case 3: “In the current way of working we can choose to quit the development at 70%. While in the past projects were finished for the full 100%, while the last 30% maybe does not add significant extra value”.

Additional details of the cases: Some additional characteristics should be mentioned. As described in chapter 5, it should be noted that it is questionable whether case 3 can be identified as a “traditional project”. This organisation structure is more comparable to a program or project on theme level. Case 8 is part of a larger project portfolio, which might have an impact on the dynamics. Case 9 was initiated as a project but currently develops software more in a release-based manner.

Successfulness of the projects: The successfullness of the project differs for each case. In some cases poor performance was shown in the beginning of the project. Subsequently, improvements have been made by a new project manager or interim manager. This implies that the projects as a whole might be less successful, while the current project performance is in control. Since none of the projects have been fully completed, the eventual success of the projects cannot be determined.

6.2.2 The agility of the cases

The agility of the cases is assessed through the agile and traditional project management framework (Table 2) which has been established in chapter 3. This framework is based on existing scientific literature and consists of five main themes: (1) philosophy, (2) organisation and management, (3) development process, (4) people and team and (5) technology. Table 28 provides a complete overview of the agility of the cases. Assessment of the cases is based on a four-level scale, the bar within each separate theme shows the level of agility; a grey bar represents a low level of agility, and a complete green bar a high level of agility. Only the theme (1) philosophy, is based on a two-level scale, this is explained in this section.

The maturity of agile project management varies among the cases. The empirical study shows that most cases experience organisational barriers when implementing agile development on project level. The findings within these five main themes are briefly described below, including a description of the agility levels.

(1) Philosophy

Eight of the selected projects (1-8) do have an agile mindset and two a non-agile mindset (9-10). This theme reflects on the philosophy of the project management approach, and not necessarily on the actual practices. Table 24 describes the assessment levels within this theme.

<table>
<thead>
<tr>
<th>ASSESSMENT OF THE AGILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile</td>
</tr>
<tr>
<td>Traditional</td>
</tr>
</tbody>
</table>

Table 24. Assessment of agility – philosophy

(2) Organisation and management

Although an agile approach is adopted in most of the cases, the organisational context is often traditional and hierarchical. The majority of the cases do have a command-and-control management project board, who wants to keep in control of the
products that are delivered and when. In these cases communication with the project board is still heavily relying on documentation. Two cases are noteworthy regarding the organisational & management level of agility. Only case 3 involves an organisation with a flat team-based structure and flexible organic organisation form. Furthermore, case 8 is going through a transition from a project-based to a value stream structure in which the organisation form is more flexible and less formalized.

Assessment of agility with regard to organisation and management is based on the four levels of Table 25. Level 1 can only be achieved when the intended management style is leadership-and-collaboration and decision making is decentralized. Level 2 requires a more flexible team-based organisation form. Level 3 can only be achieved when the management style, decision making and organisation (culture, structure and form) itself is agile.

<table>
<thead>
<tr>
<th>ASSESSMENT OF THE AGILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 0</td>
</tr>
<tr>
<td>Level 1</td>
</tr>
<tr>
<td>Level 2</td>
</tr>
<tr>
<td>Level 3</td>
</tr>
</tbody>
</table>

Table 25. Assessment of agility – organisation and management

(3) Development process

Only case 9 and 10 conduct a linear development style; the development direction is pre-planned and value is delivered at the end of the project or project phase. In contrast, all the agile cases adopt an iterative development style, the development direction is adaptive and dealing with change is a continuous activity. However, the fast-paced development processes of agile conflict often with the traditional processes. Due to these organisational barriers, value delivery is not always possible on a frequent basis. Another reason could be that organisations do not aim to increase the pace of value delivery. It is noteworthy that value is often delivered after every iteration (sprint), although this increment is not always potentially releasable at the end of the sprint. Reflecting on the iron triangle of an agile approach, only case 3, 7 and 8 set a fixed time and resources, and not like in the majority of the cases a fixed scope.

Table 26 provides an overview of the agility levels with regard to the development process. Level 1 can be achieved when the development style, planning and development direction are according to an agile approach. The value delivery frequency should be at moderate level and change should be dealt with every iteration for agility level 2. For level 3, the agile iron triangle should be adhered to: resources and time are fixed. In addition, value delivery should be frequent.

<table>
<thead>
<tr>
<th>ASSESSMENT OF THE AGILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 0</td>
</tr>
<tr>
<td>Level 1</td>
</tr>
<tr>
<td>Level 2</td>
</tr>
<tr>
<td>Level 3</td>
</tr>
</tbody>
</table>

Table 26. Assessment of agility – development process
(4) People and team
All the agile cases do have co-located, multi-disciplinary and self-organising teams. The work is divided within the teams, often the teams are small and role interchangeability is encouraged. Despite the cross-functional teams, every multiple team project has a work preparation team; translating the work packages (themes/ epics) to manageable functionalities and then to user stories which will be developed by the agile teams. A work preparation team is not necessary in one-team projects (case 7 and 8), probably since these projects are less complex and of a smaller scale. In the traditional cases the teams are not cross-functional and specialized teams are in place. Role assignment is individual, favours specialisation and employees have more specialized skills.

In several agile cases, limited customer involvement forms a barrier for meeting the agile principles. In three of the cases the role of product owner is not fulfilled by a business representative (case 1,4,5); the customer is not actively involved in prioritizing the increments on team level. Case 1 does not have a sole product owner representing the business, since the project involves the replacement of an existing system. Similar difficulties occur in fulfilling the product owner role in case 5, since the business lacks sufficient knowledge about innovative planning processes. Case 4 involves a complex landscape with a large amount of various stakeholders, for this reason the business cannot be represented by one sole product owner. In other agile cases, higher customer involvement is obtained. Case 6 includes product owners on management level working full-time and co-located, while cases 2,3,7 and 8 do have customer involvement on team level, the product owner is dedicated and prioritises the backlog items for the teams.

Assessment of agility with regard to people and teams is mainly based on various aspects within teamwork and customer involvement (Table 27). Level 1 can only be achieved in case teamwork is based on multi-disciplinary self-organised teams and collaborative work. Level 2 requires high customer involvement and the presence of a product owner representing the business. Level 3 can only be achieved if all “people and team” aspects are agile.

| Level 0 | Teamwork: not always co-located, favours specialisation, specialized skills, (large) teams, individual work | Customer involvement: low-medium involvement, not co-located |
| Level 1 | Teamwork: not always co-located, multi-disciplinary, self-organising, (small) teams, collaborative work | Customer involvement: low involvement (part-time), absence of business product owner |
| Level 2 | Teamwork: co-located, multi-disciplinary, self-organising, (small) teams, collaborative work | Customer involvement: medium involvement (part-time), prioritizes backlog, not always co-located |
| Level 3 | Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work | Customer involvement: high involvement (full-time), prioritizes backlog, co-located |

Table 27. Assessment of agility – people and team
<table>
<thead>
<tr>
<th>2 PHILOSOPHY</th>
<th>ORGANISATION &amp; MANAGEMENT</th>
<th>DEVELOPMENT PROCESS</th>
<th>PEOPLE &amp; TEAM</th>
<th>TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: scope is fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: high involvement (full-time), prioritizes backlog, co-located</td>
</tr>
<tr>
<td>2. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: scope is fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: high involvement (full-time), prioritizes backlog, co-located</td>
</tr>
<tr>
<td>3. Agile</td>
<td>Organisation: flat team-based structure, flexible organic, thriving in order</td>
<td>Style: iterative; Iron triangle: resources &amp; time fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: not dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: high involvement, absence of business product owner</td>
</tr>
<tr>
<td>4. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: scope is fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: low involvement (part-time), absence of business product owner</td>
</tr>
<tr>
<td>5. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: scope is fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: not dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: low involvement (part-time), absence of business product owner</td>
</tr>
<tr>
<td>6. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: resources &amp; time fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: high involvement (full-time), prioritizes backlog, co-located</td>
</tr>
<tr>
<td>7. Agile</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: iterative; Iron triangle: resources &amp; time fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: medium involvement (part-time), prioritizes backlog, not co-located</td>
</tr>
<tr>
<td>8. Agile</td>
<td>Organisation: flat team-based structure, flexible organic, thriving in order</td>
<td>Style: iterative; Iron triangle: resources &amp; time fixed; Direction: adaptive; Planning: prior for every iteration; Value delivery: frequent; Change: dealt with every iteration</td>
<td>Teamwork: co-located, multi-disciplinary, self-organising, small teams, collaborative work</td>
<td>Customer involvement: high involvement (full-time), prioritizes backlog, co-located</td>
</tr>
<tr>
<td>9. Traditional</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: linear; Iron triangle: scope is fixed; Direction: pre-planned, fixed Planning: rigorous planning; Value delivery: at the end Change: dealt with in next release</td>
<td>Teamwork: co-located, favourable specialization, specialized skills, large teams, individual work</td>
<td>Customer involvement: low involvement, not co-located</td>
</tr>
<tr>
<td>10. Traditional</td>
<td>Organisation: hierarchical structure, bureaucratic and high formalization, thriving in order</td>
<td>Style: linear; Iron triangle: scope is fixed; Direction: pre-planned, fixed Planning: rigorous planning; Value delivery: at the end Change: dealt with in next release</td>
<td>Teamwork: not always co-located, favourable specialization, specialized skills, individual work</td>
<td>Customer involvement: medium involvement, co-located</td>
</tr>
</tbody>
</table>

Table 28. The agility of the selected cases (own illustration)
When taking into account the technology, the cases are valued low on the agility. In general the release frequency of the projects is low, increments are often combined in one large release which is implemented once in a year or half a year. As mentioned in the previous section, continuous value delivery in agile projects is often not possible due to organisational processes. Some of the long-term agile cases do not have any software in production yet. On the other hand, in most agile cases, teams do operate the software that is already in production. Although the release frequency is low, with respect to running software continuous delivery is possible in these agile projects.

The requirements are discussed and clarified “just in time” in the agile cases. Automated testing takes place within the development teams during every iteration. However, most projects do have an implementation or test team which performs extra tests and/or combines the increments to a high-level release. This separate implementation phase can be indicated as a waterfall approach element and could reduce flexibility and increase lead time. This is particularly the case in the traditional projects (case 9, 10); testing is performed by various test teams late in the development process. The requirements are set at the beginning of the project, emphasis is on data collection and formal communication about the requirements of the application.

The assessment levels of the agility with regard to the technology are given in Table 29. In order to reach level 1, the requirements needs to be defined just in time and not at the beginning of the project. In addition, testing needs to take place every iteration. Furthermore, a higher level of agility can be reached if the release frequency increases.

<table>
<thead>
<tr>
<th>ASSESSMENT OF THE AGILITY</th>
<th>Requirements: defined at the beginning of project</th>
<th>Release frequency: low</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Testing: late in development process</td>
<td>Project metrics: focus on formal communication and documentation</td>
</tr>
<tr>
<td>Level 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirements: discussed and clarified “just in time”</td>
<td>Release frequency: low</td>
</tr>
<tr>
<td></td>
<td>Testing: every iteration and early in the process</td>
<td>Project metrics: minimal, up-to-date</td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirements: discussed and clarified “just in time”</td>
<td>Release frequency: moderate</td>
</tr>
<tr>
<td></td>
<td>Testing: every iteration and early in the process</td>
<td>Project metrics: minimal, up-to-date</td>
</tr>
<tr>
<td>Level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirements: discussed and clarified “just in time”</td>
<td>Release frequency: high</td>
</tr>
<tr>
<td></td>
<td>Testing: every iteration and early in the process</td>
<td>Project metrics: minimal, up-to-date</td>
</tr>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 29. Assessment of agility – technology

6.2.3 Synthesis of the multiple case information

Synthesis of the case information leads to a starting point for the cross-case study in the following sections. The following project metrics and characteristics should be taken into account when performing the cross-case analyses:

- The majority of the agile cases share a set of characteristics. The projects are part of a traditional organization and the Scrum framework is implemented. The scope of these projects is fixed to a large extent, as well as the resources and time. The agility of these cases is at a moderate level.

- Most of the cases consist of multiple teams and these projects are of similar size. However, the smaller single team projects (case 7 and 8) might have a different dynamic, this should be taken into consideration.

- In particular, two cases should be pointed out; case 3 and 8. The project in case 3 is not embedded in a traditional organisation but in an agile organisation. Case 8 is embedded in a project-based organisation but in transition towards scaled agile. For this reason, both cases score higher on agility of organisation and management. The boundaries of these projects seems less defined, since business as usual and the change assessment of the project are more integrated. These cases tends towards a release-based approach; the focus is primarily value-based and less project-based. The selected cases and the initial scope of this research is shown in Figure 11.
With regard to the conducted agility assessment, the general results on the five themes of the agile and traditional project management framework are described below:

1. **Philosophy:** As already mentioned in the case study set-up, these findings suggest two main groups: projects with a traditional and projects with an agile project management approach.

2. **Organization and management:** Although the management style of projects is agile, the organisation form is traditional in most of the cases. This can form a barrier in achieving agility on project level.

3. **Development process:** The development process in agile cases is iterative and adaptable, while the iron triangle is often still based on traditional norms and the frequency of value delivery is low.

4. **People and team:** It turns out that most of the agile teams function according to agile principles. However, in particular the limited customer involvement is an obstacle in adoption of agile ways of working.

5. **Technology:** In general the cases are valued low at technology level since the release frequency forms a barrier for rapid value delivery.

Interestingly, most of the barriers mentioned for achieving agility are related to factors outside the project. Not unexpectedly, a higher degree of agility can be achieved when the organisation supports and embraces agile development.

### 6.3 The Project Management Approach

An agile approach has an impact on established roles and the role of project manager. Agile methodologies such as the Scrum framework suggest different roles (e.g. scrum master, product owner). These “new” roles are included in the organisation charts of projects. This section discusses the impact of an agile approach on the role of project manager, by taking into account the project context, governance structure of the project, and the interaction within the project.

Agile project management in relation to the project context is described in section 6.3.1 and the relation with the role division in section 6.3.2. Section 6.3.3, details the organisational interpretation of these Scrum roles by large scale projects. A general description of the new interaction between the Scrum roles and the project manager role is included in section 6.3.4. This section concludes with a summary of findings with regard to the project management approach (section 6.3.5).
6.3.1 Implementation of agile project management is context dependent
The governance structure of the projects is tailor-made and the actual practice depends on the situation. This is illustrated by eight different implementations of agile project management among the eight selected agile cases. Implementation of agile project management is context dependent, this is pointed out by several respondents;
- “The project is embedded in a traditional organisation with a traditional organisation structure. But that does not mean the project cannot work according to agile development; you need to mirror the structure of the project to the organisational structure”: (project manager, case 2).
- “The way the higher management of the organisation acts (e.g. reporting, accountability) impacts the attitude and behaviour within the project”: (project manager, case 1).
- “It took us years to come to a situation which works for this project, this is not only dependent on the implementation of self-organising teams or the role of project manager; it is the synergy between people on this project” (project leader, case 4).

6.3.2 The role division is dependent on the context and type of project
The context and the type of project influence the way agile project management is implemented in practice, subsequently this impacts the role division within the project. Various context related aspects can have an impact on the chosen role division. Especially, the role of product owner is a crucial role in agile project management; four of the eight agile cases struggle with fulfilment of this role. Reasons vary from the lack of experience and knowledge, to the absence of a sole product owner representing the business. The organisational context of an agile project, also plays a major role in how roles and responsibilities are divided. Various aspects were mentioned by respondents which influenced the established role division in practice;
- “There is no business decision on this project, the total application should be of high quality and meet the requirements. This means that the product owner cannot make a business choice, there are no alternatives for the development of this system. For this reason, the product owner role is fulfilled by the architect”: (project leader, case 4)
- “In addition to the project manager and scrum masters, we maintained the conventional role of project leader. The traditional organisations consists of linear processes, the project leader is responsible for synchronizing the speed of the project with the speed of the organisation”: (project manager, case 2).

6.3.3 The various interpretations of “new” agile roles within projects
The new roles of agile project management have an impact on the dynamics of an IT project. The way these roles are divided is situational and related to the context and circumstances of the project. The agile roles are fulfilled on different levels within the project, by people with various functions. This section focuses on the cases (1,2,4,5,6), in which multiple teams are working at the same project according to the Scrum framework. Figure 12 shows examples of scaling Scrum in large-scale projects with multiple development teams. This figure does not illustrate an ideal model, but gives a glimpse of the various forms of agile project management in practice.

Figure 12. Schematic illustration of the division of Scrum roles in projects with multiple development teams (own illustration)
The product owner and scrum master role can be fulfilled at operational team level or at a strategic level within the management team. The presence or absence of the agile roles on management level result in a different division of responsibilities. The project manager role is indicated in purple, the scrum master in green and the product owner in blue. As shown in Figure 12, project management can be the responsibility of the scrum master, product owner and project manager. The multiple case study illustrates a large variety of implementation of Scrum. A project manager can fulfil the scrum master and product owner role, while in other projects the product owner and scrum master are separate roles on management level. A shared responsibility by several functions, for the product owner or scrum master role also appears on management level. These findings indicate that the project manager role is situational in an agile approach.

Deviations and additions to these patterns
The one-team projects developing according to scrum, do have a product owner and scrum master for each team. The majority of the cases implemented scrum and the corresponding scrum roles. Only one case made use of the additional agile roles, these are roles specific for this organisation and beyond the roles defined in agile literature. This further illustrates that the implementation forms of an agile approach are wide-ranging and tailored in various ways.

6.3.4 Shifting to a new interaction between the project manager role and the agile roles
The project manager collaborates with the Scrum roles, division of the roles and this collaboration is described on a general level in this section. This section focuses on the cases (1,2,4,5,6), in which multiple teams are working at the same project according to the Scrum framework. The other cases are excluded in this section since only one team is working full-time on the project or the projects do not work entirely according to Scrum (other additional agile roles are in place). Figure 13 illustrates the responsibilities of the agile roles and the interaction with the project manager. Since the governance of agile projects differ to a large extent (section 6.3.3), a project is not visualised by means of an organisational chart but through visualisation of the process. The project manager responsible for the “when-question” (planning of resources and scheduling) and the product owner for the “what-question” (maximizing the product value) and these interests may conflict as indicated by the red line. The team is responsible for the “how-question”; the development of the software. The scrum master is responsible for the “who-question”, and helps the teams with the “how-question”. The “who-question” indicates the main focus of the scrum master, which is the functioning of the team. The interaction between the project manager and the teams and the scrum master is indicated in red lines. This section describes the role interaction between the project manager and the agile roles.

![Figure 13. The roles in the product delivery process of agile project management approach (own illustration)](image-url)
**Project Manager – Product Owner**

This research illustrates that especially the “new” role of product owner has a large impact on the role of project manager. The connectedness of the role of product owner and the role of project manager is illustrated by the following statement: “The scope definition steers the budget” (program manager, case 1). Alignment is required between the scope of the (operational or strategic) product owner, and budget and time planning of the project manager. The product owner manages the product backlog priorities (what-question), within the financial boundaries and time-schedule managed by the project manager (when-question).

The project manager is responsible for an efficient process of product delivery, while the product owner is responsible for the vision and value of the product. Since a detailed refinement of this vision takes place during the project, this might influence the product delivery of the project manager and the arrangements with the sponsor (project board) with regard to time and budget. The two roles might have conflicting interests when (1) the product owner wants extra requirements which are not possible within the estimated budget and time, or (2) in defining the long-term planning on large story (epic) level; there can be a trade-off between satisfying the business and efficient planning.

In case the product owner has a role at a strategic level, this results in shared responsibility of the result and “two captains on a ship” (product owner, case 6). Both roles are responsible for stakeholder management; the product owner manages alignment with the client/users and the project manager with the base organisation and other stakeholders than the business stakeholders. Having two captains on a ship also brings benefits, both roles challenge each other. The manager keeps the product owner focused by asking critical questions about the added value of (additional) features.

The role of product owner is complex in large scale projects, and often multiple people fulfil the product owner role on different levels and with various interests. Moreover, often different product owner roles can be identified; for example product owner can focus more on business requirements or technical requirements. The business project owner is often less experienced with software development. For this reason a technical product owner could fulfil a role in managing the non-functional / technical value of the product. The responsibility for technical value is divided differently among the cases, often a specialist (e.g. architect) can be seen as technical product owner. Together with the architect, the project manager often plays a role in technical value and quality of the product, since the project manager takes care of product delivery/implementation and is in touch with IT operations of the base organisation. Several product owners at different levels of the project often meet in committees for backlog alignment. The following statements illustrate the multiple stakeholders involved in definition of the product backlog:

- “We have five product owners managing the backlog; a domain architect, two business product owners, two persons responsible for functional and technical operations. Alignment of the product owners is achieved in the program management team. There is a layered structure of product owners on program and project level. The information analysts and solution architects are the product owners on project level and communicate backlog items to the teams” : (project manager, case 1)
- “The product owner role is fulfilled by three persons, two architects and the project manager”: (project manager, case 4)
- “The product owner is responsible for functional value (80% of the backlog) and the project manager for technical value (20% of the backlog)”: (project manager, case 6)
- “I facilitate alignment between product owners with business interests and technical interest in a product owner forum”: (project manager, case 5)
- ‘We have multiple forums of product owners defining the backlog on higher level, the product owner does not have a complete mandate’ : (chief scrum master, case 6)

These findings indicate a hierarchical layered structure of product owners. Moreover, the role of product owner influences the role of project manager, and sometimes the project manager even fulfils the product owner role (section 6.4.2). It can be concluded that the product owner role is crucial in agile development and has a large impact on the project manager role.
PROJECT MANAGER- SCRUM MASTER

Especially in hierarchical traditional organisations, the scrum masters at team level cannot easily solve impediments within the organisation. Often this results in at least two levels of scrum masters. The project manager and team scrum masters both facilitate the teams and solve impediments on project level and team level. Both roles help the development teams to create high-value products. The scrum master on team level focuses on short-term and the project manager on longer-term. “The aim of the role of project manager is to make himself unnecessary, and coaching the development team in agile development and self-organisation”: (scrum master, case 5). The scrum master forms a buffer between the project manager and the teams, but cannot be described as the team leader. The “who-question” accentuates the core of the scrum master role; the development team. The role of project manager and scrum master do overlap; efficient delivery of the products by the teams is a shared responsibility. Both roles could have a different opinion about what is best for the team.

PROJECT MANAGER- DEVELOPMENT TEAM

The development team is responsible for the “how-question”; how to develop the products within the sprints. This includes the development of a high-quality product. However, since the project manager is accountable for the delivery of entire project, he could be held liable by the board. This is pointed out by a respondent: “The project manager is responsible for the output and optimisation of the process, but not for the delivered content”. Although the teams are self-organising, a project manager is the link between the project and the organisation. The manager forms a barrier to external influences which could hinder the efficient development by the teams. In addition, the project manager is often in a more powerful position than the teams in a traditional organisation. “As a self-organized team we sometimes do not have the power to achieve what we want in this traditional organisation, the project manager assists us in carrying things through”: (Scrum master, case 5).

6.3.5 Summarising the findings of the project management approach

The implementation of agile project management is related to the project context and type of project; established agile methods are tailored to project- and organisational structures. When taking into account the eight agile cases, agile is tailored in eight different ways; this highlights the various forms of implementation of an agile approach. With regard to governance within a project, the new agile roles are fulfilled at different operational and strategic levels. The project manager repositions himself within the existing scrum roles, and replaces other roles that are not covered within the project. This makes the role of project manager situational, and demands a high level of flexibility from the project manager.

Moreover, the interplay between roles changes in agile project management; there is often a considerable overlap between the scrum master, the product owner and the project manager role. The project manager should reposition himself in a changed arena filled with “new” roles. Findings show that especially the role of product owner has a large impact on the definition of the project manager role. Despite the different forms of agile project management in practice, the interaction between the Scrum roles and the role of project manager can be described. The product owner is responsible for what must be developed, and the project manager when this is developed. How the development takes place is the responsibility of the teams. The scrum master helps with effective performance of the team; who is developing the software.
6.4 **HARD ELEMENTS OF THE ROLE OF PROJECT MANAGER**

The findings of this research resulted in a taxonomy of various project manager roles and related responsibilities. Figure 14 illustrates the findings with regard to the hard elements of the role. A project manager does have certain key responsibilities (core role) and might tend towards different roles within a project. Moreover, the transition towards agile seems to transform the traditional project manager into other roles more at a distance from the traditional defined role.

![Figure 14. The role of the project manager in agile project management (own illustration)](image)

Section 6.4.1 details the accountability and the key responsibilities of the role of project manager in agile project management. Moreover, complementary to the key responsibilities of the manager, section 6.4.2 describes a taxonomy of different directions of the role of project manager derived from findings of this research. A summary of the findings on the hard elements of the role is provided in section 6.4.3.

### 6.4.1 **Accountability and key responsibilities of the project manager role**

The agile cases (cases 1-8) are taken into account in this section. This research shows that project managers are responsible for a set of key activities which form the core of the role:

1. **Starting up and closing the project**
2. **Long-term planning of the project (e.g. roadmap on theme/epic level) and monitoring progress**
3. **Stakeholder management with the base organisation (reporting to the project board)**
4. **The total end-to-end software development process of delivering acceptable products**
5. **The project delivery of the result / output (not the solution definition)**

In general, the role of project manager is responsible for ensuring a well-functioning software production process. This includes management of the software development process and the delivery of output (the product). This is pointed out by a project manager; “The role of project manager is broader than Scrum, the development teams focus only on a small part of the end-to-end software development” (project manager, case 5). The project manager is responsible for end-to-end software development and the supervision of the entire software development chain within the project. The total overview and long-term planning (or roadmap planning) are the responsibilities of the project manager. Moreover, all project managers are responsible for stakeholder management with the base organisation and reporting to the project board. This includes project-to-project and project-to-organisation alignment; controlling the project context and taking care of the political aspects in communication with the outside world. The project manager forms an important link between the project and the organisational context.
In both traditional and agile project management approaches the project manager role can be defined by activities as planning, monitoring the process, reporting, and communication with stakeholders and the base organisation. However, the key responsibilities are slightly changed compared to traditional project management. The project manager is accountable for the end-result, but not always directly responsible for the value of the product and iterative development of the solution. A project manager in a traditional approach is responsible for achieving a pre-defined result within budget and time. As pointed out by the project manager of case 10: “I am responsible for the completion of the project (the delivery of the pre-defined products) within budget and time”. In an agile context, the project manager is responsible for the when-question: planning of resources and scheduling. While the what-question: the definition of what to develop (the product) is not pre-defined at the beginning of the project.

Although the accountability of the project manager is only slightly changed, there is a change in behaviour of the manager; ‘‘Although I am still end-responsible for the products my teams develop, the way in which the project manager is willing to delegate the responsibilities has been a major change’’: (project manager, case 1). There is a change in how to achieve this goal together with the project teams, this behaviour change will be elaborated further in section 6.5.

**Deviations and additions to these patterns**

Two additional findings to these patterns should be mentioned. 1) **Smaller projects**: Findings indicate that in smaller projects, product delivery and the management of the development process can be covered to a larger extent by the teams; leaving a smaller role for the project manager. 2) **Responsibility for time, budget and resources**: In nine of the ten cases, the project manager is responsible for time, budget and resources. Time and budget is managed and reported to the board, except for the road manager in case 3. Planning human resources is traditionally part of the project management role: this includes staffing of the project and setting up the team structure. The road manager in case 3 is not in charge of a budget and cannot hire employees himself. The higher management allocated an amount of teams responsible for achieving the result. The road manager is not in control of resources that can optimise the project operations: ‘‘the budget I have for the program are the allocated teams’’ (road manager, case 3). The commitment of resources for the project is expressed in teams and not in money, the manager has no authority to spent and manage the budget. This finding should be considered in a broader context since it depends on the specific organisational context of the case. The impact of the organisational context on the role of project manager is described in the additional findings of this chapter (section 6.6.1).

**6.4.2 Fulfilment of the role of the project manager in agile project management**

Section 6.4.1 identified patterns for the role of project manager leading to the core of the role. Although the roles and responsibilities are dependent on the actual context, different directions of fulfilment of the role can be distinguished. This research suggests that the function of project manager in agile project management transforms towards various roles, three role categories are identified and outlined below; (1) the agile project manager, (2) the chief scrum master and (3) the strategic product owner. These labels for the described roles are assigned by the researcher and derived from the findings of this research. The roles of (2) the chief scrum master and (3) the strategic product owner combine the traditional role of the project manager and with agile roles; this can be seen as a hybrid form of the project manager’s role.

1. **THE AGILE PROJECT MANAGER**

   → The basis project manager is focused on reporting, time and budget

   The project manager will remain focused on the core elements of project management. In case 6 a project manager, chief scrum master and two products owners are together responsible for project management. These roles do have different perspectives on the goal of the project. The product owner is responsible for product value and stakeholder management with the client and end-user. The project manager takes care of the stakeholder management with the sponsor (project board and base organisation), monitors the progress and focuses on a realistic planning. The chief scrum master monitors the performance of the teams and solves impediments.
The essence of the project manager’s role is on the overall progress, communication with the base organisation and time and budget planning. The basic project manager has a reduced amount of responsibilities; effective development of the teams, the value of the product and stakeholder management to the client is not part of the role. At present in case 6, the manager does still have a role in these aspects but this will change: “Currently my role includes management of the technical value of the project and the effective development of high value products. In the future the project manager role will be impoverished and these responsibilities will be handed over to the product owner and scrum master. The project manager’s role will be purely focused on reporting, time planning and budget planning.” (project manager, case 6).

2. The chief scrum master

→ Helping the development teams and product owner(s) to create high-value products

The project manager can fulfil the role of chief scrum master and agile coach, if no other scrum masters on management level are represented. The chief scrum master is not responsible for the product owner role, but can have an influence on the product backlog management. The chief scrum master helps the product owners in understanding the planning, arrangement of the product backlog and effective product backlog management. The chief scrum master has no share in value creation, his aim is to work effective on value delivery: “The project manager (in the role of chief scrum master) is not responsible for doing the right things, only doing the things right” (program manager, case 1). The project manager feels responsible for the agile adoption and ensuring scrum is understood in the organisation. The main responsibility is to ensure optimal performance of the teams.

3. The strategic product owner

→ The project manager as strategic product owner is facilitating decision making about the product value

The role of strategic product owner might be fulfilled by the project manager because of two reasons: (1) the product owner role is not fulfilled by a business representative, or (2) a product owner on strategic level is required to bring together multiple product owners on operational level.

In general, the strategic product owner brings product owners together, in order to make a decision about the priorities of the product. Committees are formed which brings together either technical product owners (e.g. architects, information analysts) and/or business product owners. As mentioned before, the business product owner is often a different role in the project, than the technical product owner.

(1) The role of strategic product owner can be performed by the project manager, in case the role of product owner is not performed by a business representative (case 4,5). The boss of the project manager is often the sponsor of the project, but not the business client or customer requiring the project. This is the situation in case 4 and 5; the strategic product owner does not have a business mandate, but takes decisions about the priorities of the product backlog on a strategic level (theme or epic level). In the case 1,4 and 5, IT specialists fulfil the role of product owner on team-level and are responsible for decomposing the product in backlog items. The strategic product owner prioritizes the backlog items in collaboration with these other product owners.

(2) In case 2, teams do have product owners on team-level, the strategic product owner can take decisions together with the teams on portfolio level. “Scrum describes that the product owner is in charge of the backlog, but I disagree with that because someone working at an operational level cannot change the strategy of an entire organisation” (project manager, case 2). The strategic product owner is responsible for the backlog on strategical and tactical level, the backlog on operational level is the responsibility of the product owners, who communicate with the end-users. The strategic product owner continuously aligns the expectations of the sponsor on strategic level, with the expectations of the customer through product owners on operational level.

Deviations and additions to these patterns

As mentioned in the case study synthesis, some cases do have characteristics which should be taken into account. The following role definitions seems to be at more of a distance from the original project manager role. Three roles are
described: (1) the road manager, (2) the facilitating manager and (3) the agile transition manager. Although these roles consists of elements of the former project manager role, the role has been changed to a larger extent. This might be connected to the transition towards agility, the embeddedness in an agile organisation, or the tendency towards a more release-based structure.

1. THE ROAD MANAGER

→ The project manager as informal influencer and strategic product owner

The role of road manager differs from the role of project manager, the two roles share a lot of similarities and have the same goal; achieving a complex transformation that cannot be achieved in the existing structure of the line organisation. Nevertheless, the road manager of case 3 mentioned that: “former responsibilities of the role of project manager are splitting up and being migrated to other roles in the organisation”. This implies that some elements of the traditional project manager role are included in the role of road manager, while other role elements could be assigned to the product owner on team level, agile coach or chapter lead for instance.

When comparing the role of road manager to the role of traditional project manager, the role is stripped and responsibilities and access to resources is reduced. The road manager is the overall product owner in epic level. The manager does not have formal power, only informal power is a given to reach the goal: “I have limited influence and little control to make a difference” (road manager, case 3). The budget is not managed and kept by the road manager, the human resources are not his responsibility either. Dedicated teams work full-time on the theme, but this is not the case for every road manager in this organisation. The very core of the road manager role is the focus on communication, collaboration and informal influencing. Value is created by facilitating alignment of product owners and place trust in others to make the decision.

2. THE FACILITATING MANAGER

→ The project manager forms primary a connection between the organisation and the autonomous self-organized teams

In case 7 the project manager transforms to a facilitating manager; “The span-of-control of the manager increases since the teams are self-steering and the project manager becomes a facilitating manager” (project manager, case 7). The teams work autonomous, monitor their own progress, compose the product and divide the tasks. Contact with the project manager is minimal compared to traditional project management. The project manager is primarily responsible for communication between the organisation and the teams, staffing and setting up the project. The project manager coaches the product owner on developing the product, but value delivery is not his responsibility. This type of project manager tends towards a line manager, since his main responsibility is assigning people on the various projects.

3. THE AGILE TRANSITION MANAGER

→ The project manager becomes a change manager, guiding the agile transition

The project manager of case 8, performs the role of agile transition manager or change manager. “Although the project manager is currently also scrum master of the teams, this will change in the future”: (project manager, case 8). The agile transition manager is responsible for the implementation of an agile approach beyond the boundaries of a project. One may argue that the role of agile transition manager is not part of project management (only if the change assessment is a project itself).

These findings raise the question whether these identified roles arising from the transition towards agile development, should be fulfilled by the original project manager. This matter will be raised in the discussion of the findings (section 7.1.4; the impact of the defined role changes on the project manager’s role).
6.4.3 Summarising the findings of the hard elements of the role

Despite this situational nature of the role of project manager, the findings suggest key responsibilities which form the essence of the role: (1) starting up and closing the project, (2) long-term planning of the project (e.g. roadmap on theme/epic level) and monitoring progress, (3) stakeholder management with the base organisation (reporting to the project board), (4) the total end-to-end software development process of delivering acceptable products, and (5) the project delivery of the result / output (not the solution definition). When comparing the agile and traditional cases, the responsibilities of the project manager slightly changed. The project manager in an agile approach does not deliver a pre-defined product, which is the case is traditional project management. Moreover, not in all cases the project manager is responsible for resources and budget. This is in contrast with traditional project management.

In addition, the role of project manager can transform towards several directions. These roles combine the traditional role of the project manager and with agile roles, or can be seen as a result of the agile transition. For this reason, these roles can be seen as a hybrid form of the project manager’s role. Three specified directions are indicated within the boundaries of a project; (1) the agile project manager, (2) the chief scrum master or (3) the strategic product owner. Moreover, other roles are less related to the conventional project manager role due to the agile transition. The project manager might transform into a (1) the road manager, (2) the facilitating manager or (3) the agile transition manager.

6.5 SOFT ELEMENTS OF THE ROLE OF PROJECT MANAGER

The behavioural changes for the role of project manager are described in section 6.5.1 Moreover, these changes are compared to traditional project management in section 6.5.2. The findings on the soft elements are summarised in section 6.5.3.

6.5.1 The changing attitude and behaviour of the role of project manager

This research identified eight key changes for the role of project manager in agile project management. These changes are behavioural changes impacting the way in which the role is fulfilled. The interviews revealed desirable attributes of the project manager in agile project management.

1. The traditional project manager becomes a facilitating human-centric leader
2. The project manager as connecting link, changed to a facilitating project manager connecting people
3. Pursuing transparent value-related communication instead of planning-related communication
4. From individual ownership to shared ownership
5. Finding a new balance between creating conditions and creating room for the teams
6. Communication through planning documentation changed to regular face-to-face communication
7. Intensified collaboration on definition and distribution of the work
8. Formal influencing towards informal influencing of the project manager

Some of the behavioural changes are more applicable for some directions of the project manager role; linking to the hard elements of the previous section. When this is the case, it is mentioned in the explanation of the behavioural change. When discussing these changes, the link to traditional project management is highlighted. Since some of these soft issues might already play a role in traditional project management.

1. The traditional project manager becomes a facilitating human-centric leader

Agile has changed the mindset and behaviour of the project manager; from managerial and controlling, to coaching. The project manager changed to a human-centric leader, primality focused on facilitating and serving the teams. This leadership style is focused on collaboration. The manager should create an open atmosphere and be accessible as a person. Responsibility is shifted towards the teams; trusting the teams in software development is mentioned as an important aspect. The manager should let go the responsibility and give space and freedom to the teams to develop software. Strong communication
skills are important, as well as insights in human behaviour, coaching and listening skills. This changed role is illustrated by several respondents:

- “Agile is about the will to let go, and trust that this will give us more in return”: (road manager, case 3).
- “Previously, the project manager was leading the teams in a command-and-control style, this had been changed in agile to “letting go”, giving the teams responsibility and having confidence in people”: (project manager, case 3).
- “My leadership style is focused on collaboration. I am responsible for the entire project, but I am not making all the decisions and not all the decisions have to go through me”: (project manager, case 4)
- “The project manager used to execute more directive control, the current way of working is more focused on consultation”: (program manager, case 5)

However, it should be mentioned that the leadership style is dependent on the maturity of the agile development teams. Findings illustrate that in case a team is less self-organised, some managers choose to fulfil a more steering role and a directive approach. As one respondent illustrated: “when you are accountable as a project manager, you feel the need to intervene when things are not going well”. Nonetheless, the aim of a project manager in an agile approach is to trust the team on self-organisation and pursuing a human-centred approach.

2. The project manager as connecting link, changed to a facilitating project manager connecting people
In both traditional and agile cases the project manager was mentioned as the link between the teams; connecting people is important in both management approaches. The difference lies in the interpretation of this linking role: in traditional project management the project manager is forming the link in the decision making process (centralized decision making). While in an agile approach, the project manager is connecting people in order to facilitate decision towards a shared the project goal. The traditional linking role can be defined as follows:

- “The project manager used to have a connecting role in work division; alignment of what work needs to be done and is finished in order to make a division of tasks. In agile, this update takes place within the team.”: (developer, case 7)
- “Decision making goes from team leader, to sub-project leader to project manager, and finally to the project board; the project manager is mainly in touch with the sub-project leaders”: (team leader, case 10)

In an agile approach, value is created by connecting the right people, facilitating decision making and let the professionals make the decisions. In traditional project management the manager is fixing problems rather than helping others to fix the problem. The connecting role in agile is illustrated by a respondent: “In traditional project management I used to have more direct control on the testers and developers. The strength of agile is to bring knowledge together and come to a solution together. Leading the teams is not the right word, it is about making sure that people can do their job.”: (project manager, case 4).

3. Pursuing transparent value-related communication instead of planning-related communication
The project manager will remain the connection with the base organisation. The project manager reports to the project board, or another board that controls the progress of the project. The way of reporting has been changed, communication is more transparent and has become more realistic according to respondents. The communication is less focused on planning and more on value delivery. Project control focuses on a more realistic sense of value creation instead of value creation by following the plan. The following statements underline the increased focus on transparency and communication about value delivery:
− “In agile, we are more transparent about what we are working on, when we are not able to meet the deadline and/or when we are facing problems”: (chief scrum master, case 6)
− “Traditionally, expectation management is important. In agile project management this should be done more frequently; communicating about the value the project will or will not create”: (project manager, case 2).
− “The way of controlling the project has been changed; traditional project management includes a false sense of security. Despite the chosen project management approach, I cannot assure that I deliver product x on moment y; within an agile approach this is not required”: (road manager, case 3)
− “The scope is not completely fixed, the sense of reality is increased. There is more transparency, when results are disappointing the alternative solutions are clarified”: (project manager, case 6)

4. FROM INDIVIDUAL OWNERSHIP TO SHARED OWNERSHIP OF THE PROJECT OUTPUT

The manager is not solely responsible for the output of the project, this is a shared responsibility for all the team members. Focus should be on increased collaboration and developing the product together as a team. This identified change for the role of project manager requires a different attitude and culture; creating a mentality of shared responsibility is important. The following quotes by respondents underline the shared responsibility in an agile project:
− “Working together on the basis of documentation is different than having a shared responsibility for the product”: (project manager, case 2)
− Responding to a question about the leadership style, the project manager answered: “Why do you ask a question about leadership? I am not leading the teams. The teams are committed to a shared goal, the teams are not attached to me as a manager”: (project manager, case 2)

5. FINDING A NEW BALANCE BETWEEN CREATING CONDITIONS AND CREATING ROOM FOR THE TEAMS

As compared to traditional project management, agile embraces the idea of self-organising teams and the teams do have more responsibility. Findings of this research show that managers are reassessing the balance between setting conditions and giving room to the teams; this is a search for the right balance between structure and flexibility.
− “The project manager should create space and bring structure; create space within the sprints and bring structure in the Scrum events (e.g. backlogs, planning, scrum of scrums)”: (program manager, case 1)
− “The manager should identify the work that needs to be done, and give people the space they need to do this work”: (project manager, case 4)
− “A balance is sought between alignment and autonomy. Too much alignment makes the teams very dependent on the manager and they expect the manager to tell them what to do. Too much autonomy of the teams leads to development of a product that is not in line with the higher goal”: (road manager, case 3)
− “Waterfall management is practical and focused on the time planning, agile management is based on structure, collaboration and competences”: (program manager, case 1)

When it comes to creating room for the teams, the project manager has a relevant role in challenging the teams to make the most out of the sprints and asking stimulating questions. “When a team is performing well the project manager is only responsible for establishing the framework, the teams are responsible for the sprint and the project manager challenges the teams by asking questions”: (project manager, case 5). Providing a clear structure calls for having a strong vision as a project manager. The project manager should have a vision on the product delivery, so that the teams can work together to mutual point on the horizon. In addition, when the teams achieve a higher level of self-organisation, the project manager can focus more on developing a vision.
6. COMMUNICATION THROUGH PLANNING DOCUMENTATION CHANGED TO REGULAR FACE-TO-FACE COMMUNICATION

The traditional project manager acts on the basis of mandate. The manager’s activities included the management of a time-schedule, monitoring what progress has been reported by the teams and to compare the actual situation in relation to the original planning. This implies that a traditional project manager needs to encourage the teams to deliver on time and according the schedule; continuously monitoring whether the work is done and tasks are finished. This image is underlined by the project manager of a waterfall project: “I am responsible for the authorization of work packages, every week the developers report the status of their work, this update is integrated in the planning and I provide them with a list of tasks for the next week” (project manager, case 9).

The project manager in an agile approach does not combine the work, it is essentially not the intention to ask the teams about the finished and unfinished tasks. In agile project management less documentation is in place, the project manager should obtain information in a different way (e.g. through tacit knowledge, attending the scrum-of-scums). As pointed out by a respondent: “The project manager used to be a process manager; the manager was behind his desk and monitoring the reported status of the teams. The agile project manager is more hands-on, the amount of documentation decreased and the manager should obtain his information in a different way”. In large projects this results in very involved project managers, closely monitoring the teams in order to get a feeling of the progress. In one team projects the manager might stay more at a distance.

7. INTENSIFIED COLLABORATION ON DEFINITION AND DISTRIBUTION OF THE WORK

Both traditional and agile respondents indicated that the project manager should not focus on the content but on the process. However, in some cases the project manager fulfils the role of strategic product owner (section 6.3.5). In that case, the manager is more involved in the distribution of work. The level of detail at the start of the project is minimal this makes the work distribution during the project more intense. In addition, changes are dealt with continuously and the project manager needs to respond quickly to these changes. The project manager in the role of strategic product owner is involved in decomposing the functionalities into smaller work packages.

- “In traditional project management the planning is at high level, the work is divided in large functionalities of a couple of months each. When working in sprints it is challenging for the project manager to divide these functionalities into smaller sprint-size work packages. This results in an intensified planning process in which the division of work is more complex for the agile project manager”: (scrum master, case 4)

- “Agile methodologies do not describe the way items are placed on the backlog of teams, as a project manager I play a role in drafting the specifications from overall theme level to items on backlog level”: (project manager, case 5)

Often a team of specialists supports the strategic product owner in refinement of the work packages. In the role of strategic project owner a vision of the product is very important for effective backlog management.

8. FORMAL INFLUENCING TO INFORMAL INFLUENCING

In case the project manager does not have formal power to achieve his goals, informal influencing of the teams becomes more important in agile project management. Especially in the role of road manager, informal influencing is highly important. However, this aspect was also mentioned by other respondents.
“The project manager needs to convince the teams of his vision”: (scrum master, case 5)
“In order to convince the teams about the project vision, it might be of use to know something about the content of the product”: (project leader, case 2)
“I cannot influence the teams on the basis of authority, only in the basis of content-based authority; I must have something to offer to the teams”: (road manager, case 2)
“Although I have the authority to intervene. As a project manager I should not use this power too often, I need to convince the teams. Since self-organised teams do not appreciate directive leadership”: (project manager, case 1)

The project manager needs to convince the teams in order to achieve the result. As an informal influencer, the project manager should have convincing skills, a strong vision and actively engage in debates. Based on these required characteristics, it might be useful as a project manager to have sufficient knowledge about the content.

6.5.2 The project manager’s behaviour in an agile approach compared to a traditional approach

Although the previous mentioned changes for the role of project manager are significant, it should be mentioned that some respondents indicated the following; despite the chosen project management approach, the project manager should always have confidence in professionals, focus on people and trust their ability. Focus on the soft factors of a project are therefore not necessarily limited to an agile approach. As pointed out by a respondent: “Before agile development I already used to work with self-organising teams; the quality of the result depends on the power of the people working at the project”: (project manager, case 1). Another respondent mentioned: “Before the implementation of an agile approach, I already used to lead the teams as a facilitator” (project manager, case 8). In addition, some of the respondents of traditional cases described the project manager as people-oriented and trusting and listening to the development teams. However, participants of agile cases accentuated the behavioural aspects much more explicit; participants are much more aware of their attitude and (changing) behaviour towards the teams.

The fact that some project managers already used to have a focus on human interaction, is in line with another notable finding of this research. Interestingly, a number of experienced project managers do not see agile as something new. Although all respondents mentioned changes for the role of project manager in an agile approach, some managers indicated that the agile approach is very similar to how they used to manage projects:

- “In the past, I used to bring people together in one physical place and do a daily start every day with the teams. Frameworks like Prince2 led to process thinking, we are no on our way back to focus on collaboration” (project leader, case 4)
- “Maybe I was ahead of my time, I used to bring people together and stimulate interaction between the different disciplines. Agile development is differs because the specifications are not pre-defined; besides this I see Agile not as a very new way of software development” (program manager, case 5)

Remarkably, these convictions are in contrast with the view of a younger generation of developers, who are only familiar and experienced with agile development. This group of agile practitioners crave for more responsibility and implementation of greater compliance with the agile values and agile methodologies. Despite these different views on agile project management, it should be taken into account that some project managers already conducted an agile way of working and applied a human-centred leadership style even before the Agile Manifesto was established.

In conclusion, when comparing the behaviour of project managers in the traditional cases and the agile cases, the focus of some of the “traditional” project managers might already be human-centred. Focus on the soft factors of project management cannot be completely dedicated to an agile approach. However, findings strongly indicate the positive contribution of agile approaches to this change in mindset and further increased the focus on human interaction and people management.
6.5.3 Summarising the findings of the soft elements of the role
The behaviour of the project manager changed in agile project management, the eight key-differences for the project manager’s role are indicated: (1) the traditional project manager becomes a facilitating human-centric leader, (2) the project manager as connecting link, changed to a facilitating project manager connecting people, (3) pursuing transparent value-related communication instead of planning-related communication, (4) from individual ownership to shared ownership, (5) finding a new balance between creating conditions and creating room for the teams, (6) communication through planning documentation changed to regular face-to-face communication, (7) intensified collaboration on definition and distribution of the work, (8) formal influencing towards informal influencing of the project manager.

Although some of the soft factors of the role of project manager are connected to the hard elements of the role of project manager. Most of the behavioural changes are applicable for the different agile interpretations of the project manager role of section 6.8.2. When comparing the behaviour of the project manager in an agile and traditional approach, some project managers already pursue a human-centric approach with a focus on people and collaboration before the implementation of agile. This implies that despite the chosen project management approach, focus on people is important. However, findings of this research indicate a significant change in the project manager’s behaviour as a result of the implementation of an agile approach.

6.6 The changing role of project manager: a glance into the future
The findings of this research indicate changes for the role of project manager. Furthermore, respondents mentioned future changes for the project manager’s role, projects, and organisations. Although this is a perception of the respondents, it gives a glimpse on the transition towards agile development. Many respondents noted that further optimisation of agile software development within the project is important and would be desirable. Moreover, respondents of six of the eight agile cases mentioned that agile development will be further implemented throughout the organisation.

Two main trends or scenarios can be distinguished; the vertical and horizontal integration of agile development (Figure 15). In most of the cases an agile approach was initiated bottom-up; at first the teams or projects adopted agile initiatives. Subsequently, further implementation of agile grows into the organisation into various directions (horizontal integration). Shifting to an agile organisation (entirely), requires a top-down management decision (vertical integration). Figure 15 shows the two scenarios, of an agile transition based on this bottom-up approach starting at team/project level.

1. The vertical integration of agile development
The transition to agility can eventually lead to a different organisational structure: the implementation of scaled agile software development throughout the organisation. An agile enterprise is structured in agile release trains which consists
of various value streams. In traditional project management, people are disbanded when a project is finished. In contrary, the teams are the constant factors in these value streams which deliver a continuous flow of deliverables. The budgets of these value streams are not fixed, like in a project-based structure. Dynamic budgeting will be applied; budget can be moved from one value stream to another during the development process. The most valuable products will be developed (value-centric development instead of budget-centric), this can results in the decision to not finish a product for the full 100% but for 80%. Case 2 is an example of an agile enterprise; both business, and IT development and operations are combined in a BusDevOps structure. Case 8 describes an example of transition from a project-based portfolio to an agile release train structure which consists of various value streams.

Implications for the role of the project manager
The scenario of vertical integration of agile development, would have a large impact on the role of project manager. The traditional defined role of project manager will not be required within an agile enterprise. The role of project manager might expire and be replaced by several other roles, such as: agile coaches, product owners, scrum masters, road managers or release managers. These roles are primarily focussed on high performance of teams or maximal value creation within product delivery; the roles are value-centred and team-centred. The agile roles are less focussed on monitoring time and budget of the temporary project structure.

2. THE HORIZONTAL INTEGRATION OF AGILE DEVELOPMENT
The transition towards agility can eventually lead to further integration of various stages in the software development lifecycle, projects and departments within the organisation. Respondents mentioned the transition from project management to product management. Project managers are required to think about the total product and should be not limited to the borders of their project. Moreover, agility between projects is of importance. This is pointed out by the program manager (case 1): “we are shifting towards project portfolio’s in order to increase agility between the projects”. Furthermore, agile development empathises the collaboration between departments responsible for different stages of the development lifecycle. DevOps is a term which describes the collaboration of IT development and operations staff. In some cases of this current research, operations already take place within the project development teams. As pointed out by a respondent: “A DevOps structure requires software development teams to eat their own dogfood”. Changes in earlier developed software will be solved during the sprints, by the same teams that developed the initial software (case 2,3,6). Moreover, currently integration of departments already takes place since the product owner in some of the cases is from the business department.

Implications for the role of the project manager
Within the scenario of horizontal integration of agile development, the project manager is required to have a more product-oriented approach instead of a project-oriented approach. The focus is shifting towards integrated management of the total life cycle of a product. This can result in integration of the various stages of the product; operations of the developed software will take place within the project and not in a separate department. These developments change is the focus of the project manager and require a more integrated value-centric view on product delivery.

6.6.1 Summarising the findings of the changing role of project manager
The respondents indicate that optimisation of agile practices within their current project is important. Moreover, agile development will be further implemented throughout the organisation. Two scenarios are distinguished based on the insights of the practitioners: (1) vertical integration and (2) horizontal integration. In case of vertical integration, the agile transition can eventually lead to a different project or organisational structure. Subsequently, this transformation will have a large impact on the traditional role of project manager. The organisational structure of an agile enterprise consists of agile roles primarily focused on teams and value delivery. Respondents indicate that the traditional role of project manager will disappear. In case of a horizontal integration scenario, various stages in the software development lifecycle will be integrated within the project. The project manager should have a more product oriented view, integrating the various phases of software development within the project, between projects and departments.
6.7 ADDITIONAL FINDINGS

The additional findings of this research are discussed in this section. Section 6.7.1 elaborates on the refinement of the sensitizing concepts based on in-depth knowledge gained during this multiple-case study research. Additional concepts are identified beyond the initial scope of the research. Findings and concepts within this refined framework of sensitizing concepts are described in section 6.7.2.

6.7.1 Refinement of the sensitizing concepts

Initially, this research focused primarily on software development projects in practice (sub-question 4) and the changing role of project manager (sub-question 5). The cases were selected based on case criteria on project level. Findings of this research indicate that the organisational context has a significant impact on the role of project manager. Although this component is partially covered within the initial scope which included the project and the project context, the organisational context should be considered as a separate factor and an additional sensitizing concept. For this reason, three levels are distinguished when analysing the role of project manager: (1) the organisational context, (2) the project, and (3) the project manager. The initial interpretive framework of the four sensitizing concepts is incorporated in Figure 16; factors additional to the original scope of the research are added which lead to a redefined framework.

Figure 16 shows the continuous change impacting these three levels in the transition towards agility. The black arrows indicate the interaction between factors. The role and responsibilities of the project manager interacts with the desired behaviour of the project manager. The agility of the project interacts with the governance structure of the project. Moreover, the framework of Figure 16 suggests that challenges lie at the interfaces between the three levels. The blue arrows indicate friction or the need for finding a new balance between the levels. For example, the project management approach of a project might aim for maximum agility while the project is embedded in a traditional organisational context (arrow A). Moreover, an agile project management approach including the governance of a project influences the role and desired behaviour of the project manager; the current research addresses this search for a new equilibrium (arrow B,C).

Figure 16. Redefined sensitizing concepts for analysing the role of project manager (own illustration)
6.7.2 Further explanation of obtained insights within the redefined sensitizing concepts

More specifically, this section further elaborates on the blue arrows of Figure 16, and discusses the organisational context which is suggested as an additional sensitizing concept. The obtained insights within the refined sensitizing concepts are illustrated in Figure 17. The relation between (1) the organisational context, (2) the project and (3) the project manager is illustrated. The current research investigated the role of project manager when changing to an agile project management approach (arrow 1). Additional findings include the interaction between the project management approach and organisational context (arrow 2) and, the impact of the organisational context on the role of project manager (arrow 3). A traditional approach is illustrated in blue, and an agile approach in green in Figure 16.

![Figure 17. The relation between the project manager, project and organisational context (own illustration)](image)

1. New equilibrium between agile project management approach and the role of project manager

The impact of an agile project management approach on the role of project manager is described in the cross-case analysis of the previous sections of this chapter. The role of project manager is required in projects with a traditional and agile approach embedded in a traditional organisational context. Since the traditional role of the project manager tends towards several agile roles or other roles resulting from the agile transformation; this research indicates a hybrid form of the project manager’s role when an agile project is part of a traditional organisation.

2. New equilibrium between the agile project management approach and the organisational context

Projects with an agile project management approach embedded in a traditional organisation might experience various difficulties. Organisational barriers can limit projects in optimal implementation of agile project management. Continues alignment of both governance structures in this hybrid situation, is part of the role of project manager. As mentioned by one respondent: “The project management approach is a mix of traditional project management on higher level and implementation of scrum on a lower level”. These tensions require a project manager, who forms the link or a buffer between both worlds.

Respondents indicated that misalignment between the agile project structure and traditional organisational structure can be counterproductive. As pointed out by one respondent: “Agile development and a traditional project organisation do not go hand in hand”. An example of the interaction between a project and the organisation is mentioned by a respondent: “As long as projects and project boards still exist in a traditional setting, focus will remain on a budget centric instead of a value centric development approach of products”. When project boards function in a traditional manner, achieving agility at project-level is challenging. This research acknowledges the fact that maximum agility cannot be achieved in a traditional context. However, this hybrid situation might be most the feasible approach for some projects. In that case a new equilibrium needs to be reached between both worlds; this impacts the role of project manager as indicated in this research.

3. The impact of the organisational context of a project on the role of project manager

Additional findings indicate that the role of project manager is to a large extent related to the governance structure of an organisation. As pointed out by a project manager: “The role of project manager is changing, but this change not only involves the chosen project management approach, the organisational development has influence as well”. The sensitizing concepts of this
research are focused primarily on the project and the project management approach. Although the embeddedness of a project (project context) was initially taken into account, the governance of the organisation was not part of the scope.

As pointed out by a respondent: “When the Scrum framework is implemented within a waterfall outer shell, a project manager is required”. This implies that the role of project manager is not required when the organisational context is agile (illustrated in Figure 17). During the multiple-case study as well as in the group interview with agile experts, the impact of the organisational structure and governance on the role of project manager was pointed out by respondents of agile enterprises. The respondents reported; “the traditional role of project does not exist anymore in an agile enterprise” and “former responsibilities of the role of project manager are splitting up and being migrated to other roles in the organisation”. One of the organisations recently transformed into an agile enterprise and replaced around hundred project managers for other agile roles. These statements underline the impact of the organisational context on the role of project manager. For this reason, this research indicates that the organisational context should be taken into account when investigating the role of project manager. Moreover, as shown in Figure 17, findings indicate that the traditional role of project manager is not required in an agile organisation. The project manager is only required in case the organisation is structured in a project-oriented manner or in the case of a stand-alone project.

6.8 LINKING BACK TO LITERATURE

In this section, the empirical findings of the case study are compared with existing literature and theories; the four sensitizing concepts are addressed.

6.8.1 The project management approach

In this research, the majority of the agile projects included non-agile elements in their project management approach; the type of project and the surrounded organisation can lead to challenges and require a tailor-made approach. This research supports the writing of Reifer, Maurer, and Erdogmus (2003), the writers mention that “green field” projects are idealistic; software applications are often based on legacy systems and exploit existing architecture and these components might constrain the use of agile methods. Several problems may occur when developing new software to these legacy systems through agile processes (Boehm & Turner, 2005). The cases of this research also experience other challenges mentioned by Boehm and Turner (2005), such as different life cycles between the agile project and traditional organisation and traditional progress management. Organisational control was mentioned by Moe, Dingsøyr, and Dybå (2009) as a critical barrier to self-managed software teams. The findings presented here confirm other research that advocates that a unique project is surrounded by an organisation and this overall organisation must also be ready to adapt the agile practices (Sidky, Arthur, & Bohner, 2007). Earlier research has focused on the challenges of agile practices in traditional organisations, however the role of project manager in this tailoring process has not been assessed.

Scientific research presented four key roles that can be identified in information system projects: (1) the project manager, (2) specialist (e.g. technical developer, programmer, database designer), (3) the business/system analyst and the (4) user (Edwards, Ward, & Bytheway, 1991). These roles are still present in agile development through the Scrum framework, although some staff members play an extra role. For example; the role of product owner can be fulfilled by a business representative, while in other projects this role is played by a specialist (e.g. business analyst or architect). The product owner role can be fulfilled by practitioners with different functions, while for others their formal function is product owner.

Scrum describes a sole product owner representing the business; “the product owner is one person, not a committee” (Schwaber & Sutherland, 2016, p. 5). Findings of this research show that fulfilment of the crucial role of product owner is complex; often multiple product owners fulfil the role on different levels and with various interests. In general, scientific literature provides limited detail on scaling of the product owner role and hierarchical product owner structures. The findings of the current research supports the writing of Paasivaara, Heikkilä, and Lassenius (2012); the product owner role needs to be scaled in large projects with multiple agile teams. Moreover, this research describes the interaction between the agile roles and the project manager role and contributes to findings of Van Waardenburg and Van Vliet (2013).
6.8.2 Hard elements of the role of the project manager

In an agile approach, the project manager is responsible for the result, while the solution of the project is not pre-defined. This is in contrast with the definition of a project according to Prince2: “a temporary organisation that is needed to produce a unique and pre-define outcome or result at a pre-specified time using pre-determined resources” Axelos (2009a, p. 22). As mentioned in scientific literature (Robertson & Secor, 1986; Wateridge, 1997) and bodies of knowledge (Axelos, 2009b; Project Management Institute, 2001), the “traditional” role of project manager is often defined by activities as initiating and closing phases, executing, controlling, planning, reporting, communication with stakeholders and monitoring the scope, quality, time schedule, budget, resources, and risks. Findings of this research indicate small changes for the role of project manager as defined in existing literature.

- In an agile approach the project manager is not controlling the teams whether work is done and tasks are finished; this activity is not suitable for an agile approach.
- The way of communication and reporting has been changed since the amount of documentation is decreased and more value-oriented. The project manager obtains information through face-to-face communication.
- In an agile approach, the communication with stakeholders is a shared responsibility with the product owner.
- Although monitoring of the scope is still a responsibility of the project manager, the product owner has a large say in scope definition of the product.
- Initiating and closing phases is not applicable to an agile approach, since no phases are in place.

Responsibility for the project execution and monitoring time, budget and resources are part of the project manager’s role in most of the agile cases. Interestingly, some traditional responsibilities of the role of project manager were not often mentioned by respondents of agile cases; such as risk management and quality management. When reflecting on the definition of project manager by British Standards Institution (2000) “The individual or body with authority, accountability and responsibility for managing a project to achieve specific objectives”. This research indicates that the project manager still has real authority but less formal authority (which includes ownership and the right to decide). The project manager should influence the teams informally (real authority) instead of formal influencing (formal authority).

6.8.3 Soft elements of the role of the project manager

The findings support research suggesting that the project manager becomes a facilitating leader (Nerur et al., 2005; Parker et al., 2015; Vinekar et al., 2006). The findings could contribute to existing research in the field of agile leadership of self-organized teams. Parker et al. (2015) describes guiding principles of agile leadership in general terms, these principles are in line with this research. The findings are also in line with the research of Moe et al. (2012): multiple levels of decision making are distinguished. Furthermore, this research contributes to better understanding the possible roles an agile leader can fulfil in practice.

6.8.4 The changing role of the project manager

Findings illustrate that agile development will be further implemented within the projects and throughout the organisation in most of the cases. This is in line with two trends described by Joiner and Josephs (2007), although the specific future developments are difficult to predict, these trends can be observed; (1) an increased pace of change, level of complexity and interdependencies, and (2) the need to develop agile companies in order to respond to this change. In addition, the findings support the research of Sirkiä and Laanti (2015) stating that agile software development and traditional cost accounting don’t match. Three reasons are mentioned; (1) traditionally, a long term financial planning is required while agile avoids such a detailed planning, (2) traditional cost accounting is based on an accurate planning while agile embraces change and uncertainty, the final costs can be impacted by the continuous feedback, and (3) budget overruns are traditional concerns, agile project management can even encourage further investments in case of positive feedback on the product.
6.9 CONCLUSION OF THE CROSS-CASE ANALYSIS

In this section, an answer is provided on sub-question 4 and 5. As indicated at the beginning of this chapter, sub-question 4 is focused on agile project management in practice and sub-question 5 is oriented towards the project manager’s role.

6.9.1 Conclusion: answering sub-question 4

The case reports of chapter 5 served as a point of departure for a cross-case overview and an assessment of the agility of the cases. This assessment was performed by making use of Table 2 (chapter 3), a theoretical framework for comparing agile and traditional project management. Furthermore, a cross-case analysis of the project management approaches of the cases was conducted. These investigative steps resulted in an answer to sub-question 4:

**Sub-question 4: How is agile project management performed in practice?**

This research highlights the various ways agile project management methods are tailored and customised to project- and organisational structures. As shown in the case reports, the eight agile cases adopt an agile approach in a different manner; this leads to differences in role division, project governance and implementation of agile practices. In addition, the maturity of agile project management varies among the cases. The majority of the cases do have non-agile elements in their project management approach; the projects developed a hybrid combination of both agile and traditional project management approaches.

Moreover, the empirical study shows that most cases experience organisational barriers when implementing an agile approach. In addition, many agile cases adhere the traditionally defined iron triangle although the development process is iterative and adaptable. With regard to the people and team aspects of the agile cases, practitioners adhere to agile values and principles and teams are self-organised and cross-functional. In most of the cases the management style is according to agile standards, while the organization form and culture is traditional. In these cases organisational barriers can appear in various ways. One of the findings in this field, is the crucial role of project owner which is challenging to fulfil; limited customer involvement is an obstacle in adoption of agile ways of working. In addition, significant improvements can be made with regard to value delivery. The low frequency of releases and organisational processes can form a barrier for rapid continuous value delivery.

6.9.2 Conclusion: answering sub-question 5

The cross-case analysis of this chapter led to key-differences for the role of the project manager with regard to the activities, responsibilities, and desired behaviours. The categories of the cross-case analysis were inductively derived from the data and have been described within the interpretive framework of the four sensitizing concepts, namely: (1) the project management approach, (2) the hard elements of the role, (3) the soft elements of the role, and (4) the changing role. Based on the findings within the sensitizing concepts, an answer to sub-question 5 can be provided:

**Sub-question 5: What are the key-differences between the role of the project manager in an agile and traditional project management approach?**

1. **The project management approach** - The role of project manager is situational and highly dependent on the context. The project manager should reposition himself within the ‘new’ agile roles, and replaces agile roles that are not covered within the project. Findings show that especially the role of the product owner has a large impact on the definition of the project manager role. Despite the different forms of agile project management in practice, the interaction between the Scrum roles and the role of the project manager can be described. The product owner is responsible for what must be developed, and the project manager when this is developed. How the development takes place is the responsibility of the teams. The scrum master helps with effective performance of the team; who is developing the software. Adoption of an agile approach leads to changes for the project manager’s role with regard to interaction with the other agile roles.

2. **The hard elements of the role** - The core responsibilities of the project manager are comparable to the traditional project manager. The largest change is that the project manager in an agile approach does not deliver a pre-defined product, which is the case is traditional project management. Findings indicates the following role activities: (1) starting up and closing the
project, (2) long-term planning of the project (e.g. roadmap on theme/epic level) and monitoring progress, (3) stakeholder management with the base organisation (reporting to the project board), (4) the total end-to-end software development process of delivering acceptable products, and (5) the project delivery of the result / output (not the solution definition). Furthermore, the role of project manager in an agile approach might change since the role can transform in several directions, namely; (1) the agile project manager, (2) the chief scrum master or (3) strategic product owner. In case the transition towards agile tends to release-based working, the role of project manager changes to a larger extent; the project manager can shift towards the role of (1) facilitating leader, (2) agile transition manager or (3) road manager.

3. The soft elements of the role - Findings of this research indicate a significant change in the project manager’s behaviour as a result of the implementation of an agile approach. Eight changes with regard to the behaviour of the project manager are indicated: (1) the traditional project manager becomes a facilitating human-centric leader, (2) the project manager as connecting link, changed to a facilitating project manager connecting people, (3) pursuing transparent value-related communication instead of planning-related communication, (4) from individual ownership to shared ownership, (5) finding a new balance between creating conditions and creating room for the teams, (6) communication through planning documentation changed to regular face-to-face communication, (7) intensified collaboration on definition and distribution of the work, (8) formal influencing towards informal influencing of the project manager. In addition to these behavioural changes, it should be noted that a human- and collaboration-oriented approach can be attributed to project managers in both agile and traditional project management approaches. However, findings of this research emphasize the considerable impact of an agile approach on the behaviour and attitude of the project manager.

4. The changing role - Many respondents indicated the further implementation of agile development on within the project and throughout the organisation. Based on the views of respondents, two scenarios are identified for the future transition of agile approach: (1) vertical integration and (2) horizontal integration. These scenario’s lead to changes for the role of project manager. Vertical integration impacts the project- and organisational structure; in the light of an agile organisation, the role of project manager will disappear to a large extent. Horizontal integration of an agile approach, involves the integration of various stages of the software development cycle; shifting from a project-oriented view to a product-oriented-view. The project manager should have a more product oriented view, integrating the various phases of software development within the project, and increase collaboration among projects and various departments.

Next to these findings, a fifth sensitizing concept was established based on the findings of this research. 5. The organisational context is important to take into account when analysing the role of project manager. Moreover, the established refined sensitizing concept framework showed the relation between the role of project manager, the project and the organisational context. At global level, this can result in three situations which are related to the previous described scenario’s. (1) The traditional situation: a project manager is required in projects which are embedded in a traditional organisational context (project-based organisation). (2) The hybrid situation: an agile project in a traditional context often results in a hybrid form of the project manager’s role; acting as a buffer and ensuring the continues alignment between both management approaches. (3) The agile situation: in case the organisation transforms into an agile enterprise the temporary structure of a project is adapted to this new organisational structure, which makes the traditional role of the project manager no longer required.
DISCUSSION

// CHAPTER 7
7 DISCUSSION

This empirical research has illuminated the role of project managers in software development projects conducted through an agile approach. This section discusses the findings in section 7.1 and the implications of this research on theory and practice are discussed in section 7.2. The main limitations of this research are discussed in section 7.3.

7.1 DISCUSSING THE FINDINGS

The explorative nature of the research resulted in in-depth data on the project manager’s role within the context of projects. The research has enriched existing knowledge on agile in practice and the role of the project manager in agile project management approaches. The findings illustrate the differences in the activity and behaviour of the project manager’s role. What role the project manager fulfils and how to perform this role depends on many factors. It might not be unexpected that the role also depends on the organisational context and type of project. For this reason, a complete overview of tasks and responsibilities is not relevant and might be not something to aim for. Although this research probably does not offer a complete view on the changing role elements, it contributes significantly to understanding the role of project manager in agile project management. This research provides a thorough basis for future research in the field of agile.

The next subsections will put the findings of this research into context, by taking a broader view on the research topic. Several themes are discussed which emerged from this research and are worthy to reflect upon.
- The “imperfection” of the agile project management approaches in practice (section 7.1.1)
- The compatibility of the definition of a project and agile project management (section 7.1.2)
- A broader view on the agile transition and the impact on the role of project manager (section 7.1.3)
- The impact of the defined role changes on the project manager’s role (section 7.1.4)

7.1.1 The “imperfection” of agile project management approaches in practice

THE JOURNEY TO AGILE; IS AGILE PROJECT MANAGEMENT THE ULTIMATE GOAL?

In the formulated research design, emphasis is put on the “transition to agile project management”. In order to evaluate agile development in practice, the agility of the cases is described and assessed in detail. This approach implicitly values agile project management as the finish line and agility as the ultimate goal. Nevertheless, findings of this research illustrate that practitioners are enthusiastic about the approach, but none of the respondents see agile as a holy grail. So, the question arises, is agile the ultimate goal? And is it possible for projects in complex environments to comply with all the agile principles and develop according to agile methodologies? The case studies in this research, have shown the “imperfection” of agile development in practice. The question is whether this imperfection and the non-pure agile approach of these projects is a limitation in fitting the project’s needs? The study indicates that a true agile approach should not be the aim of all projects; working precisely according to an agile methodology (e.g. Scrum) most probably result in non-agile practices. Strictly following the rules can lead to high formalisation or process designs not matching the project and project context; which is in fact everything apart from agile. This research suggests that practitioners should select the most suitable and effective approach for achieving the goal of the project; tailoring of traditional and agile methods might result in a hybrid approach. This implies that an one-size-fits-all approach is inappropriate.

For project managers this means that tailoring of agile methodologies is often required; selecting an appropriate approach matching the project’s needs. Training can be a first step for project managers in becoming familiar with agile methodologies. However, in the end agile is not about implementing agile practices it is about having an agile mindset. Project managers should consider whether agile project management suits their personality, this is clarified in section 7.1.4.

REFLECTION ON THE COMPARISON BETWEEN AGILE AND TRADITIONAL PROJECT MANAGEMENT

The level of agility of the cases was not rated by a scientific framework or tool, the developed comparators framework of Table 2 was used to compare traditional and agile project management (chapter 3). The cases are assessed based on this framework which is derived from an in-depth literature review. Based on the findings of this study, agile literature tends
to take a too simplistic view when comparing agile and traditional project management. Above all because in reality the comparison is not black and white; a lot of hybrid project management approaches are implemented in practice. For this reason the assessment of agility of the cases included various levels of agility (as shown in Table 28). In addition, as mentioned in the cross-case analysis, the organisational context plays a large role in the achievable level of agility. Comparing the agility of a project cannot be seen in isolation from the agility of the organisation.

These findings contribute to literature on assessing the level of agility of projects. The conducted literature review led to a very limited amount of scientific studies within this field of research. Findings of this research support the established framework of Sidky et al. (2007), this framework assesses the agility level of projects and organisations based on a set of practices. When comparing both frameworks, the framework developed in this graduation research is focused on the differences between an agile and traditional approach. While the framework of Sidky et al. (2007), focuses on agile adoption; taking into account a project-level assessment and the organisational readiness. This research confirms that both project and organisational level should be assessed separately. For the reason that the organisational context has a large impact on the agile adoption on project level; it is impossible to be agile as a project in case the organisational culture and form does not support it.

7.1.2 The compatibility of the definition of a project and agile project management

AGILE REKINDLED THE DEBATE ABOUT THE DEFINITION OF A PROJECT; DOES AGILE PROJECT MANAGEMENT EXIST?

Agile methods are challenging the traditional definition of a project, and the findings of this research triggered the question whether agile project management does exist. When considering the classic definition of a project in scientific literature, some of the widely quoted definitions can be considered;

- “A project is an organisation unit dedicated to the attainment of a goal – generally the successful completion of a developmental product on time, within budget and in conformance with predetermined performance specifications”: (Gaddis, 1959, p. 89).
- “A system of work activities for which there is a predefined outcome to deliver and an associated timeline with an end date”: (Sapsed & Salter, 2004, p. 1516).
- “A project is undertaken to deliver beneficial change, and thus has three essential features; (1) it is unique, (2) it is undertaken using novel processes, (3) it is transient”: (Turner & Müller, 2003, p. 1).

In addition, at the beginning of this research a project definition was stated, taking into account various widely-quoted definitions: “A project can be defined as a temporary endeavour (defined beginning and end), established to carry out a change assignment on behalf of the base organisation. A project is unique and novel software development processes are undertaken. Moreover, a project is transient and after completion of the change assignment, business as usual resumes”. The results of this study show that agile project management gives rise to challenges for the definitions above, including:

**Pre-defined outcome** – When requirements of the result are specified at the beginning of the project, this is not an agile project because the solution is fixed instead of developed iteratively. The exact solution of the product is less clear at the beginning of the project in agile project management. For this reason, defining a pre-defined outcome of the project is not compatible with agile development.

**Temporary endeavour (defined beginning and end)** – In truly agile development, teams work towards a shared goal and not according to a plan and pre-defined product. As a program manager pointed out: “Agile aims to achieve the goal, while a waterfall approach focuses on achievement of the plans”. This research suggests that in pure agile projects, the end of a project is less fixed. Especially in software development, projects often result in ongoing operations. In addition, agile organisations not always aim to finish products for the full 100%. As opposed to conventional pre-defined projects, teams should work on products with the highest business value. In this value centric approach, items can remain on the backlog at the end of the pre-defined amount of sprints. In case of positive evaluation of the product value, further investments can be committed. This also allows that budget and time are less fixed, which is incompatible with the definition of a project; finishing on time and within the budget.
Uniqueness, novel processes and beneficial change – Agile methodologies embrace change throughout the development process: so why start a project to achieve change? Classic definitions of a project, explicitly mention the uniqueness and novel processes undertaken within a project. While agile development aims to respond rapidly to changing environments in order to keep up with fast-paced market developments. Uniqueness and novel processes could be covered to a larger extent by the existing cross-functional teams, it is “business as usual”.

These three reasons have implications for the classical definition of a project; agile project management cannot exist, since the definition of a project and the definition of agility are not compatible. This research indicates the need for a revised definition of a project. In this perspective, a project structure itself should be more agile and its existence more related to value delivery in comparison with other projects. Moreover, existing teams are the fixed unit of organisation and a project does not require formation of new project teams. The following adjusted definition of a project is suggested: “A project is a temporary endeavour undertaken to achieve a value oriented overarching goal which involves multiple value streams. The project may end when other projects provide more value.”

7.1.3 A broader view on the agile transition and the impact on the role of project manager

Projects and project-based working; agile is transforming project management

As mentioned in the previous section, agile development is not compatible with the classic definition of a project. Moreover, as described in the cross-case analysis, agile aims integration of various phases of the software development life cycle. Integration of agile throughout the software delivery cycle, e.g. integration of design, development, testing, releasing and operations, can lead to continuous delivery; frequent deployment of software which enables dealing with a high rate of change.

In the light of continuous delivery of software, agile development seems to be more suitable for project-based / release-based development instead of a temporary structure in the form of a classic defined project. Software development projects that result in ongoing operations (through methods such as DevOps), are not temporary endeavours; it becomes business as usual and thus release-based development. Two cases of this multiple-case study research transformed to a more release-based development structure, when pursuing the objective of maximal agility. The transition to a value-centred approach aims delivery of products with high business value, this does not necessary mean that the initial aim of the product should be achieved for the full 100%; this adaptable process is value-driven and not plan-driven.

The concept of integration of various phases of the software development life cycle and a value-centred approach can lead towards “fading boundaries” between a project and release-based development. Consequently, the natural tendency of agile development towards release-based working drives changes for the role of project manager. When aiming for “pure” agile development, this seems to be inherent to “fading boundaries” of a project; consequently the role of project manager will change to a large extent. Since in release-based development, the project manager becomes part of the base organisation instead of the project organisation. In contrary, in case of temporary structures that comply with the existing scientific definitions of a project, the role of project manager in an agile approach will remain closer to the original “traditional” role. Although the findings of this research show that hard and soft elements will definitely change for the project manager in projects, this change will be much more significant in case pure agility will be achieved.

Not for all types of projects an increased integration between the execution and the operations/ maintenance phase can be achieved. Unlike software development projects, construction projects are more often “green field” projects and clear phases can be distinguished. Software development projects are often based on existing architecture and aim to replace existing applications or systems within a complex landscape of existing systems. Construction projects more often build something new and the beginning and end of the project is very clear; project delivery takes place after the construction phase. The project boundaries are clear; this implies that the project manager’s role in agile development within construction projects will change only within the boundaries of a project; there is no tendency towards release-based working.
TEMPORARY STRUCTURES IN THE VIEW OF AN AGILE ENTERPRISE: A DIFFERENT VIEW ON ORGANISATIONAL STRUCTURES

Projectification describes the process of organisations turning from functional management to project management. Maylor et al. (2006, p. 1) indicates this increasing use of projects: “Nowadays, it is hard to imagine an organisation that is not engaged in some kind of project activity. Over the past decade, organisations have been turning from operations to project management as part of their competitive advantage strategy”. Others even suggest that projects are key for organisations to competitive advantage in the 21st century.

Interestingly, the transition towards agility makes managers re-evaluate whether to start a project or whether this change assessment could be achieved within the base organisation. As a project manager pointed out: “The question whether or not it is worthwhile to set up a project has not been raised often enough in the past few years, ‘everything’ was a project in this organisation”. Moreover, starting a project seems less relevant if dealing with change is business as usual for agile enterprises. This implies that only highly complex organisation extensive changes will require a temporary organisation. Especially in agile enterprises, temporary organisational structures are primary required on a higher level than on project level (programme or theme level).

When evaluating organisational forms, the definition of Sydow, Lindkvist, and Defillippi (2004, p. 1475) for project-based organisations is of interest: “project-based organisations refer to a variety of organisational forms that involve creation of a temporary system for the performance of project tasks”. As stated before, the existing definition of a project is not in line with temporary systems in an agile enterprise. This matter gives rise to the question whether traditional defined projects do have a role in agile enterprises. And, how do we still define a project being a temporal system within an agile organisation? Reflecting on findings of the current research; investigating projects and the role of the project manager in the light of true agile enterprises, should be marked as a “traditional” research approach. For the reason that an agile enterprise is not necessarily a project-based organisation; not projects but responding to change is the main aim in achieving competitive advantage. The results of this study shed a light on organisational structures of agile enterprises and the form of a temporary (project) structure.

An agile approach requires a different way of thinking, this also applies to current definitions of temporary structures in an organisation. Davies et al. (2006) draw six ideal types of organisational structures; functional, functional matrix, balanced matrix, project matrix, project-led organisation and project-based organisation (Figure 18). These structures are based on functional departments of the organisation (F) and projects (P). This is in contrast to the focus of agile development, in which the team is the product and not the project. The objective of an agile organisation is not to meet the predefined goals of a project, nor the project itself; the goal is agility and optimisation of value creation. This changed objective of an organisation results in changes for the organisational structure. Moreover, as pointed out by a product owner: “teams are the holy union, switching people is more difficult than switching teams”. An agile team is already cross-functional and consists of employees from different functional departments. Whereas previously a project used to bring different functions together. In this perspective, findings of this research suggest a different form of a temporary project structure. Figure 19 shows this new form of project, which is based on cross-functional teams (T) as a fixed entity. These teams are part of cross-functional value streams, and a “project” can use various value streams in order to meet its goal.
These new insights on organising temporary (project) structures in an agile organisation are input for further research. Currently, traditional roles such as the project manager role still exist in agile project management due to the “traditional” project-based organisation. When organisations become agile, the role of project manager is no longer matching the agile organisational structure and therefore no longer required in its traditional form.

7.1.4 The impact of the defined role changes on the project manager’s role

Refined sensitizing concepts with regard to the role of project manager
The initial sensitizing concepts led to a holistic view on the role of project manager. However, it is just as important to reflect on these concepts and address attention to the new concepts that emerged. Since these concepts might be more reflective when investigating the role of project manager. The scope of this research included the project management approach and project governance structure of the software development projects. According to Pinto (2014) project governance can be defined as: “The use of systems, structures of authority and processes to allocate resources and coordinate or control activity in a project”. As stated in scientific literature, there is an overlap between project governance and corporate governance. Müller et al. (2013) define corporate governance as; “Corporate governance encompasses all work done in an organisation, and thus governs the work in traditional line organisations, plus the work done in temporary organisations, such as projects”. The additional findings of this research underline the impact of the corporate governance context on the project governance structure and the role of project manager. Hence, in the initial scope the corporate governance was not taken into account as one of the sensitizing concepts. As shown in Figure 16 (section 6.6.1), findings of this research suggest that the organisational context should be taken into account as an additional sensitizing concept, when investigating the role of project manager in the transition towards agile.
THE NEED TO BE AGILE AS A PROJECT MANAGER; WHAT DO THESE ROLE CHANGES MEAN FOR THE PROJECT MANAGER?

In the light of an agile approach, questioning respondents about their responsibilities, accountability and authority is a “traditional way” of defining a role. Agile emphasises the importance of how to fulfil the role, what the responsibilities are exactly seems to be less relevant. For this reason, the role division in agile projects might be less formalized compared to traditional project management; from individual responsibility to shared responsibility. As a chief scrum master pointed out: “On a basic level, the roles and responsibilities are allocated between the product owner, project manager and scrum master but roles are not fixed. This is probably inherent to the agile way of working”. The exact definition of the role and responsibilities of the project manager seems to be more fluid in agile project management. This is in line with the limited documentation of agile projects on the organisational structure, responsibilities and roles. Based on these findings, general guidelines on the role of the project manager could be helpful. However, developing an exact list of responsibilities might be challenging since the findings of this research illustrate that every project manager fulfils his role differently. Moreover, this might be not something to aim for when the focus is on “how to fulfil the role” and to a lesser extent on “what includes the role”.

When linking back to literature (section 6.8.2), this research suggests a different view on the activities typical for the role of project manager in an agile approach. Traditionally, the role is described by activities as initiating and closing phases, executing, controlling, planning, reporting and communication with stakeholders; most of these activities still apply for the project manager role. However, when consider the role from an agile perspective (not focusing on what but how), the role could be described through activities such as; motivating, coaching, trusting, influencing and facilitating. This line of reasoning touches upon the difference between a project manager and a project leader. Müller and Turner (2010, p. 2) discuss the difference between managers and leaders and refer to the definition of Bennis and Nanus (1985): “to manage means to bring about, to accomplish, to have the responsibility for, to conduct. Leading is influencing, guiding in direction, course, action, and opinion. This distinction is crucial. Managers are people who do things right and leaders are people who do the right things”. According to Cleland (1995) “Project leadership is defined as a presence and a process carried out within an organisational role that assume responsibility for the needs and rights of those people who choose to follow the leader is accomplishing the project results”.

Reflecting on findings with regard to the changing soft elements of the role; an agile approach accentuates the need for the project manager to be a project leader. This is however nothing new, and project leadership is not only important in an agile approach. However, leadership might be more important under conditions of rapid change and the transition towards an agile approach in projects and organisations; project managers are required to be flexible and agile themselves. In the transformation towards agility it is all about change, which requires (1) the need to be agile as a project manager and (2) having an agile view on the role of project manager. The project manager should be open for fulfilment of several directions for the project manager role. Moreover, it is all about the tailoring of an agile approach to the project’s needs, which requires a flexible and innovative approach as a project manager. Training on agile methods can be a first step in becoming familiar with agile development. However, in the end it is all about being an agile leader and having an agile mindset. Implementing the exact agile methodologies in practice is not appropriate.

On the contrary, there is a risk involved in focussing on the “how” and less on “who” is responsible. Blurred or shared responsibilities can lead to unclarity, and certain activities can easily be forgotten when roles are not formalized. The limited documentation on the division of responsibilities, require project management teams to have meetings often about their responsibilities in order to keep practitioners aligned about expectations.

THE ROLE OF PROJECT MANAGER AS A GIVEN FACT IN AGILE PROJECT MANAGEMENT; IS A PROJECT MANAGER REQUIRED?

This research focuses on descriptions of the roles found within the project manager function; from the perspective that the role of project manager is required in agile project management. However, the project manager as a given fact is a point of discussion. One could argue that the role of project manager is not necessary, and for instance could be replaced by a scrum-of-scrums meeting or other agile role. With regard to projects with an agile project management approach, embedded in traditional organisations; the findings of this research illustrate that a project manager is required. In case the traditional organisation is project-based a project manager is required as buffer between both worlds. The project manager is responsible for the core responsibilities defined in section 6.4.1. Every (self-organising) team needs some kind of leader, as one respondent pointed out: “self-organizing football teams do not exist either, there must be a coach”.

104
Moreover, this study suggests that the role assumed by project managers appears to be expanding in several possible directions in the transition towards an agile approach. This gives rise to the question: should these roles be fulfilled by the function of project manager? Some of these “new” roles (e.g. the road manager or agile transition manager) seems to be at a distance from the core job description of a project manager. For this reason, this research suggest that some of these roles do not necessarily have to be fulfilled by the traditional project manager role; these roles could be fulfilled by similar management roles. However, what are the boundaries for the role of project manager? This research indicates that the project manager is required when the project is time-driven and budget-driven, the traditional iron triangle is in place (Figure 20). The project manager is responsible for managing the estimated variables time and budget (resources). In case the scope (the solution) is the variable, the product owner role seems to be in charge of the project; managing the variable of value-driven product development. As findings of this research indicate, in a hybrid situation the project manager is required due to the traditional project-based organisation. This often results in a hybrid situation for the project manager; for instance fulfilment of the strategic product owner role in which the project manager is still managing the time and budget variables.

![Figure 20. The traditional and agile iron triangle - adapted from (Owen & Koskela, 2006a)](image)

Another example is the role of the road manager; the road manager is not responsible for resources and budget which is a major change compared to traditional project management. Based on the previous line of reasoning, this research indicates that the role of road manager is beyond the boundaries of the project manager’s role.

THE FUTURE FOR PROJECT MANAGEMENT IN AN AGILE ENTERPRISE; THE ONGOING TRANSITION TOWARDS AGILITY

As mentioned in section 6.6, projects and organisations are in a transition towards agility. Agile project management could be a point of departure for further implementation of agile practices throughout the organisation. During the case study preparation phase, several large Dutch agile enterprises indicated a decreasing trend of the number of projects. Several companies mentioned that projects and the role of project manager do not exist in an agile organisational structure. The transition towards agility has an impact on the established organisational structure, and therefore subsequently on the future role of project manager in software development projects. This research reveals the importance of being agile as a project manager as well. Project managers are advised to be open for a career change towards agile roles in an agile enterprise (e.g. release manager, agile coach or product owner). Training and education on scaled agile could be a first step for project managers in practice.
7.2 DISCUSSING THE IMPLICATIONS

This research is expected to be of interest for scientists in the field of project management and agile development, and project managers in practice. Several implications for theory (section 7.2.1) and practice (section 7.2.2) are evident.

7.2.1 Implications for theory

This research makes several contributions to literature. The implications for theory are captured within three levels; the role of project manager, the project and the organisation.

THE ROLE OF PROJECT MANAGER

This research shed new light on the current definition of a project manager in scientific literature. First, this research puts a greater focus on the behaviour of the manager as compared to project management approach standards. Nowadays, bodies of knowledge and project management standards describe management processes. As pointed out by one respondent: "agile is more a collaboration and communication model, than a process model". This new perspective on a role description, has implications for theory when describing the role of manager in a project management approach; behaviour is an important aspect to take into account. Second, this research contributes to literature on appropriate leadership styles for different types of projects (Müller & Turner, 2006). Third, existing scientific research describes the role of the agile leader, yet a definition of this agile leader is not provided (Joiner & Josephs, 2007). This research contributes to an increased understanding of possible leadership roles in agile development. In addition to the project manager’s role, the agile leader role is fulfilled by several other roles in agile development (e.g. product owner, scrum master). These other agile roles should be considered in scientific research; only focussing on the agile leader in general does not fully contribute to the understanding of the different roles in an agile approach. Fourth, this research contributes to an increased understanding of the role of project manager in agile project management. The way project managers fulfil their role differs in practice; e.g. tending towards a strategic product owner role or the role of chief scrum master. Porthouse and Dulewicz (2007), indicated the agile project manager as the scrum master. Moreover, Moe, Dingsyr, et al. (2009) stated that the traditional project manager role is replaced by the scrum master role. On the contrary, this research shows that the scrum master role is not necessarily the role of the project manager. Future research on the role of project manager should take these findings into account. Lastly, the findings of this research contribute to theory on factors impacting the role of project manager when changing to an agile approach. In the framework of Figure 16 (chapter 6), the sensitizing concepts are redefined and factors impacting the project manager’s role are illustrated.

THE PROJECT

This study provides several new insights on agile in practice and the comparison between agile and traditional project management. The five themes of the theoretical framework (Table 2, chapter 3), that are assessed in this research (Table 28, chapter 6), form a thorough basis for further development of an agile and traditional project management comparators framework. Furthermore, when comparing agile and traditional project management, the level of organisation agility should have a prominent role. Since projects often make use of hybrid project management approaches, a comparison framework should consist of multiple levels; comparing agile and traditional project management is not "black and white". Moreover, this research contributes to existing scientific literature on the established definitions of a project. This research provides an agile perspective on the definition of a project and states that classical definitions of a project are not compatible with the definition of a true agile approach.

THE ORGANISATION

This research accentuates a different perspective on organisational structures of agile organisations, and contributes to theory on temporary organisation structures. Traditional defined projects and the role of project manager does not exist in a true agile organisation. A temporary system in an agile organisation requires a new form of organisation, which forms currently a gap in scientific knowledge. Accordingly, this research forms a basis for further research on organisational structures (e.g. projects) in agile organisations.
7.2.2 Implications for practice

The findings of this research significantly contribute to practice. Changes for the project manager in an agile project management approach, are not well-described in current scientific literature. Project managers are in search for their exact role in an agile approach, this makes this research relevant for practice. The implications for practitioners can be translated in three concrete deliverables which can be put to immediate use:

1. **The agility of a project**
   The first deliverable includes a theoretical framework that reflects on the comparison between agile and traditional project management. This comparative framework is provided in chapter 3 (Table 2, Page 23). Project managers can benefit from this framework by assessing the agility of the used project management approach and identify opportunities for improvements in their journey towards Agile.

2. **The roles and responsibilities**
   A practical contribution of the present research is the developed card game which can be used for the division of tasks and responsibilities within a project (Appendix E). Findings of this research indicate, that the governance structure and the specific responsibilities of the roles are often tailored during the project. Initially, the card set was developed for the interviews of this research, with the aim of charting the responsibilities of the project manager. Practitioners had to assign tasks and responsibilities based on Prince2 and Scrum, to the role in charge (Appendix F). It became apparent that respondents were enthusiastic about the card game as a tool to make responsibilities transparent. This card game contributed to practice already, since one of the projects made use of the tool during a meeting with the project management about the distribution of their tasks and responsibilities. This underlines that not only project managers but also other agile roles are in search for their exact role in agile project management. The established card set can facilitate open discussions in group setting about roles and responsibilities, in order to gain insights on the role division within the project.

3. **The role of project manager**
   The third deliverable that contributes to practice, concerns the findings on the role of project manager in agile project management. A taxonomy of the different roles a project manager could fulfil and a description of the desired behaviour is provided in the cross-case analysis (chapter 6). In general, project managers can benefit from this broader perspective on their role. Another additional contribution to practitioners, is the detailed description of how agile development is applied in the selected software development projects of this research (the case database). These experiences are useful for project managers in practice, who are planning to apply agile project management to similar settings.

Project managers can use these three concrete deliverables in their journey towards an agile approach. Furthermore, the current research provides several practical implications; six main implications for practice are described:

First, this study raises the question whether every project manager could and should move towards an agile approach. The desired behaviour of the role of project manager in an agile approach differs from the role in traditional project management. Consequently, traditional project managers should ask themselves whether the required agile attitude fit their competences and personality. Project managers should be able to identify themselves with the agile philosophy. In addition, this should be taken into account from a human-research perspective when hiring project managers for agile projects. This research challenges organisations to identify and train professionals who feel attracted to this changed role of project manager and are competent or can develop an agile attitude.

Second, the findings suggest that project managers themselves should be agile in an agile approach. The taxonomy of the hard elements highlights different roles an agile project manager could fulfil. This implies that the traditional role of project manager adapts to agile circumstances in various ways. This requires a high level of flexibility since the role of project manager is situational.
Third, the present research suggests that practising project managers should be knowledgeable about agile development. Understanding of agile values and agile methodologies could help project managers in having a guiding vision for implementation of an agile approach. Although the agile teams are as well a driving force in the adopting agile practices, the project manager needs to guide this agile transformation process from a more strategic and tactical perspective. Being an agile expert is required to strategically guide the project towards a higher level of agility. However, it should be mentioned that following the agile methods in detail is not the goal of agile training, it is a stepping stone in understanding agility. For this reason, project managers are advised to take initiative towards developing agile leadership skills.

Fourth, findings illustrate that there is not “one-size-fits-all” approach in agile project management. In order to tailor agile methods in an appropriate manner, project managers should be knowledgeable about agile tools and techniques. Practitioners should be aware of the fact that implementation of an agile approach is situational; a tailor-made solution should be developed mirroring the project context and the type of project. This requires a high degree of creativity and flexibility of the project manager, especially in the hybrid situation of an agile project management approach in a traditional context.

Fifth, this research provides insights into the changing activity- and behaviour elements of the manager’s role. Specifically, the identified changes in managing according to an agile approach, are important from the managerial perspective. These identified changes can help project managers in practice in becoming more effective in an agile approach. Practitioners should be aware of the desired and undesired behaviours in agile project management. This research can contribute to training and education programmes of (traditional) project managers in order to better fulfil their role and responsibilities.

Sixth, the findings indicate that practitioners should be open to changes within their profession as a result of the agile transformation. This study provides an indication of possible scenario’s with regard to the future of the project manager. In the coming future, agile development will be implemented further throughout projects and organisations. In order to keep up with these developments, project managers should be aware of the transition to agility; have an understanding of agile project management as well as scaled agile on organisational-level. Moreover, findings of this research indicate the transition of organisations toward an agile enterprise, in which the project manager is no longer required. This is an important finding for project managers in practice and recommends practitioners to (1) be open and willing to change, and (2) identify and explore a possible alternate career path.
7.3 DISCUSSING THE LIMITATIONS

Apart from the contributions of this research to theory and practice, several limitations should be taken into account. Section 7.3.1 details the limitations of the chosen research strategy in general. In section 7.3.2, the limitations of the case study set-up are identified, based on a discussion of the concepts of construct validity, reliability and external validity.

### 7.3.1 Limitations of the research strategy

The journey towards agile project management is not necessarily the end of the journey towards agility, within the field of software development. With this in mind, the established research question was formulated from a “traditional” project management perspective on achieving agility. Especially in the light of an agile enterprise, the formulated research question is outdated; this traditional perspective on agility might be a limitation of this research.

The sensitizing concepts were based on a very in-depth literature review. In addition, an extensive agile training course further increased the knowledge of the researcher about agile project management. However, another researcher could have selected different concepts and this would have resulted in a different interpretive framework. The sensitizing concepts suggested directions in which to look and formed a starting point for building analysis. This is a suitable approach for an explorative research, however it is important to keep in mind that these established concepts are not complete. Subsequently, the changes for the role of project manager in agile project management might be incomplete. For this reason, a complete overview of the changing role cannot be reached in this research; which might be considered as a limitation.

A multiple-case study approach was selected as research strategy. The interviews were conducted during the same period and analysed according to qualitative content analysis. Building theory through the grounded theory might have been a more powerful research strategy. In that case, the set of interviews would have been conducted in multiple iterations; an initial theory is extracted from initial data, this theory is further developed by continually collecting and analysing data until the researcher reaches saturation. By using this strategy the new theory would have been more solid, since new interviews and cases could have validated the findings of this research. If the finding in a new context could be reproduced it is a dependable one (Miles & Huberman, 1994). In addition, this case research was mainly based on semi-structured interviews; the researcher did not observe the role and behaviour. The method of participant observation would have been a valuable contribution for gaining deeper insights into the role of project manager.

The level of agility of the cases was not determined by a scientific framework or tool. The literature review resulted in a limited amount of scientific studies assessing the level of agility of projects; nonetheless some of these tools might have been of use. However, filling out a comprehensive questionnaire for indicating the level of agility was too time consuming to include in this research. Moreover, the focus of this research is the changing role of project manager and not primarily the level of agility. For this reason, the agility of the cases was assessed by making use of the agile and traditional project management framework established in chapter 3. Despite this substantiated decision, the use of a scientific framework in order to assess the agility of the cases could have further improved the analysis of agile project management in practice.

### 7.3.2 Limitations of the case study design

Yin (2003) lists four broadly acknowledged tests for verifying the quality of a case study design; construct validity, reliability, internal validity and external validity. When considering descriptive and exploratory research, internal validity is less relevant according to Yin (2003), this section shows the limitations of the case study design with regard to the three appropriate tests.

1. **Construct validity** was archived by using various data sources within each case, and the establishment of a chain of evidence. The selection of various respondents within each case contributed to different viewpoints. However, four key limitations in collection of data are distinguished.

   First, this research heavily depends on participating respondents, which were selected by the manager. It was mentioned during the interviews that respondents should answer the questions in line with practice (and not according to the agile guides). Moreover, respondents were anonymized in this research which increased trust and honesty. Despite these measure taken to ensure honest answers, respondents might have been tempted to give socially desirable answers. In
addition, respondents might wanted to act as pure agilists and distance themselves from traditional project management practices and behaviour. However, this might have limited the extent in which the research procedure led to an accurate observation of reality.

A strength of this research is the broad variety of cases. However, the second research limitation concerns that the established case study selection criteria are based on project characteristics primarily. The organisational structure was initially not valued as a sensitizing concept and therefore not taken into account in the case selection criteria. This resulted in a limited amount of projects in an agile context; the majority of the agile projects are part of a traditional hierarchical organisation. This limitation may seem contradictory, since this research states that a traditional project does not exist in an agile organisation. However more diversity with regard to the project context would have further strengthen this finding, and better substantiated conclusions could have been drawn with regard to the entire journey of the project manager towards agile.

The third limitation of the case study concerns the use of multiple sources of data. Triangulation increases the credibility and validity of results. This research aimed for triangulation through multiple data sources in each case; three respondents per case, fieldnotes and documentation (Miles & Huberman, 1994). Due to time constraints and the availability of the respondents it was not always possible to interview three respondents per case. In addition, documentation was not always accessible and available. This limited the use of multiple data sources in some of the selected cases.

A fourth limitation might be that the selected cases were ongoing during the research. The strength of this approach is that practitioners do not have to rely on their memories which increases validity. On the other hand, a limitation could be that it is difficult for practitioners to reflect on their role when being in the middle of the project. Furthermore, the success of the project and the effectiveness of the chosen project management approach cannot be determined.

(2) Reliability is achieved by, among other things, drafting a case study protocol, formulating case selection criteria, following an interview guide, recording the interviews and development of a case study database. However the quality of the case study design could be improved. According to Bengtsson (2016) there is always a risk that another researcher draws dissimilar conclusions; in order to increase validity and minimize personal bias and errors in interpretation, a second researcher should independently perform the qualitative content analysis.

(3) External validity was achieved by conducting case studies across nine large Dutch companies and through conducting interviews with a wide range of respondents. However, two main limitations are distinguished:

Five of the ten projects were projects led by project managers from KWD Resultaatmanagement. This probably results in a selection bias, most likely the selected cases are not representing the entire population. This case study selection is therefore maybe not diverse enough to ensure generalization of these results. In addition, the representativeness of the projects can be questioned since a lot of the selected cases are part of companies in the public sector. However, the impact of this limitation is probably small with regard to the hard elements of the role; this research suggests that the role of project manager is to a large extent context dependent.

Software development projects do have specific characteristics. For this reason findings and conclusions cannot be generalized to other type of projects. Another notable remark should be made; although all projects are software development projects, the specific type of software project does have an impact on the possible implementation of agile practices. A green field or innovative project differs from a project that is replacing an existing application or relies heavily on legacy systems. This criteria emerged from this research and was not incorporated in the case criteria, this is a limitation of the research and should be taken into account in future research.
CONCLUSION

// CHAPTER 8
8 CONCLUSION

The objective of this research was to explore and gain a better understanding of the changing role of project managers in agile project management compared to traditional project management. The main question was defined as follows:

How does the role of a project manager change, comparing an agile project management approach to a traditional project management approach in software development projects?

This conclusion chapter gives an answer on the main question of this research. In section 8.1, answers are given on the five sub-questions. Together these questions lead to the answer on the main question of this research, in section 8.2.

8.1 ANSWERING THE SUB-QUESTIONS

The conclusions of the five sub-questions at the end of the chapters of this research will be combined in order to come to a main conclusion. The first three sub-questions aim to develop sensitizing concepts (theoretical view), which form the starting point for answering the last two sub-questions (empirical view).

1. How do traditional and agile project management approaches differ?

A review of scientific literature on traditional and agile project management provided an overview on the differences between traditional and agile project management. Four themes were incorporated in the literature review; the essence of an agile approach, the transition towards an agile approach, the comparison between agile and traditional project management, and a review of extant literature on management in an agile approach. In the past, agile methodologies where mainly applied on projects matching the agile home grounds. Nowadays, organisations recognise the need for agility and numerous scaling and tailoring techniques emerged for implementing agile on large-scale projects and within entire organisations on enterprise-scale. The comparison between agile and traditional project management resulted in a framework with several comparators extracted from existing literature (Table 2). This theoretical framework consists of five main themes: (1) philosophy, (2) organisation and management, (3) development process, (4) people and team, and (5) technology. In terms of management, the differences between both approaches forms a starting point for this research. Although existing literature provides little detail within this field of research, several managerial differences were identified; collaboration with the team, decision making and authority, leadership and management style, and managing resources. These insights on the differences between the traditional and agile project management and the managerial changes, were incorporated in the development of the sensitizing concepts.

2. How to describe the role of the project manager according to literature?

Through research into role theory, the general description of the role of project manager was investigated in scientific literature. Role theory is a research area which gives insights on roles and patterns of behaviours. Although existing scientific literature reveals no precise and general accepted definition of a role, insights were gained on the description of the project manager role. In general, a role can be described by a set of activities and responsibilities (Jones & Deckro, 1993; Zhu & Zhou, 2008); this role description can be referred to as job demands or job-task competencies (Boyatzis, 2008; Cheng et al., 2005). Moreover, a role also includes a set of desired and undesired behaviours, which can be referred to as behavioural patterns or behaviour competencies (Biddle, 1979; Cheng et al., 2005; Jones & Deckro, 1993). Based on these gained insights, the hard elements (e.g. activity, responsibility, tasks) and soft elements (e.g. behaviour, competences, attitude) of the role of project manager were investigated in extant scientific literature.

With regard to the hard elements of the project manager, relevant literature often dates back several years. Nevertheless, this literature is still valued as relevant for this research. A project manager has authority, accountability and responsibility for managing a project. In order to realise the goal of the project, project management includes planning, organising, controlling, communicating and dealing with people and stakeholders (Robertson & Secor, 1986; Wateridge, 1997). More recently, research on the soft aspects such as competences has gained traction in scientific research within the field of project management. The model of competence of Crawford (2005) describes the different components of competence. The concept of competence is dissected in three types: input, personal and output. Behaviour and attitude is related to the...
personal characteristics and falls under personal competences of the project manager. Based on these insights gained on the role of project manager, two sensitizing concepts were developed: the hard elements of the project manager role and the soft elements of the project manager role.

3. How is the role of the project manager described in traditional and agile project management standards?
Nowadays standards and bodies of knowledge describe the procedures and processes of project management (Vukomanović et al., 2016). The literature research aimed to get an overview of the well-known project management standards (e.g. Prince2) and most widely implemented agile methodologies (e.g. Scrum). The role of project manager is described in-depth in several international standards and bodies of knowledge (Axelos, 2009b; Project Management Institute, 2001). According to these standards based on traditional project management approaches (Špundak, 2014), the “traditional” role of project manager is often defined by activities as initiating and closing phases, executing, controlling, planning, reporting, communication with stakeholders and monitoring the scope, quality, time schedule, budget, resources, and risks. In contrast, established agile methodologies such as Scrum do not mention the role of project manager (Schwaber & Sutherland, 2016). The Scrum guide describes several new agile roles and their responsibilities. The current established notions of the role of project manager in an agile approach, are therefore up for discussion. This raised the question of how the former “traditional responsibilities” of the role of the project manager are fulfilled in an agile project management approach. These insights were taken into account, leading to four sensitising concepts: (1) the project management approach, (2) hard element of the role, (3) soft elements of the role, and (4) the changing role.

4. How is agile project management performed in practice?
Ten software development projects were selected according to the case selection criteria; the case selection resulted in a broad variety of cases. The performed multiple-case study resulted in case reports, which served as a point of departure for a cross-case overview and an assessment of the agility of the cases. This assessment was performed by making use of Table 2 (chapter 3), a framework established within the current research for comparing agile and traditional project management. In addition, the cross-case analysis of the project management approach of the cases, led to insights on agile project management in practice.

This research highlights the various ways agile project management methods are tailored and customised to project- and organisational structures. The eight agile cases adopted an agile approach in a different manner; this led to differences in role division, project governance and implementation of agile practices. In addition, the maturity of agile project management varied among the cases. The majority of the cases had non-agile elements in their project management approach; the projects developed a hybrid combination of both agile and traditional project management approaches. Moreover, the empirical study showed that most cases experience organisational barriers when implementing an agile approach within projects. This research illustrated that there is no “one-size-fits-all” approach, agile project management is performed in many different ways depending on factors such as the type of project and the organisational context.

5. What are the key-differences between the role of the project manager in an agile and traditional project management approach?
The cross-case analysis led to key-differences for the role of the project manager with regard to the role and responsibilities, and desired behaviours. The categories of the cross-case analysis were inductively derived from the data and described within the interpretive framework of the four sensitizing concepts, namely: (1) the project management approach, (2) hard element of the role, (3) soft elements of the role, and (4) the changing role of the project manager.

With regard to the project management approach it was found that the role of project manager is situational and highly dependent on the project and organisational context. The project manager should reposition himself within the “new” agile roles, and replaces agile roles that are not covered within the project. Despite the situational character of the role, the changed interaction between scrum roles and the project manager role can be described. Especially the role of the product owner has a large impact on the project manager role. With regard to the project management approach the main change for the project manager is the presence of new roles; the interaction between these roles is new.
Taking the hard elements of the project manager’s role into account, the research identified the core responsibilities of the project manager: (1) starting up and closing the project, (2) long-term planning of the project (e.g. roadmap on theme/epic level) and monitoring progress, (3) stakeholder management with the base organisation (reporting to the project board), (4) the total end-to-end software development process of delivering acceptable products, and (5) the project delivery of the result / output (not the solution definition). These responsibilities are comparable to the traditional project manager, although some changes can be identified compared to the activities defined in scientific literature. One of these changes, concerns the fact that the project manager is not responsible for delivery of a pre-defined product; the exact definition of the product is an iterative process that take place during the project. Moreover, possible changes for the role of the project manager in an agile approach concerns the tendency towards several directions, namely; (1) the agile project manager, (2) the chief scrum master or (3) strategic product owner. Furthermore, when implementation of agile development results in a tendency towards release-based working, the role of the project manager will change to a larger extent; shifting towards the role such as (1) facilitating leader, (2) agile transition manager and (3) road manager. These changes imply that the role of the project manager could shift in various directions when using an agile approach.

In terms of the soft elements for the role of the project manager, research findings indicated a significant change in the project manager’s behaviour as a result of the implementation of an agile approach (soft elements of the project manager role). Eight changes with regard to the behaviour of the project manager are indicated: (1) the traditional project manager becomes a facilitating human-centric leader, (2) the project manager as connecting link, changed to a facilitating project manager connecting people, (3) pursuing transparent value-related communication instead of planning-related communication, (4) from individual ownership to shared ownership, (5) finding a new balance between creating conditions and creating room for the teams, (6) communication through planning documentation changed to regular face-to-face communication, (7) intensified collaboration on definition and distribution of the work, (8) formal influencing towards informal influencing of the project manager. In addition to these behavioural changes, it should be noted that a human- and collaboration-oriented approach can be attributed to project managers in both an agile and a traditional project management approaches. However, findings of this research emphasize the significant impact of an agile approach on the behaviour and attitude of the project manager. In an agile approach a human-centred focus is essential and included in the approach, while this is not explicitly incorporated in a traditional plan-driven project management approach.

With regard to the changes for the role of the project manager, this research identified two scenarios for the further agile transformation: (1) vertical agile integration and (2) horizontal agile integration. Vertical integration impacts the project- and organisational structure, and therefore has a major impact on the traditional role of the project manager. In the light of an agile organisation, the role of the project manager will even disappear to a large extent. Horizontal integration of an agile approach, involves the integration of various stages of the software development cycle; shifting from a project-oriented view to a product-oriented-view. This requires a more product oriented view of the project manager, integrating the various software development phases, collaboration among projects and interests of various business units.

Next to these findings based on the four sensitizing concepts, additional findings of this research highlighted the impact of the organisation on the role of project manager; the organisational context should be included as a fifth sensitizing concept. A refined sensitizing concept framework was established which showed the relation between the role of project manager, the project and the organisational context. It was found that the role of the project manager is required in projects embedded in a traditional organisational context (project-based organisation). In a hybrid situation ( an agile project in a traditional context), this results often in a hybrid form of the project manager’s role; acting as a buffer and ensuring the continues alignment between both management approaches. Moreover, in case the organisation transforms into an agile enterprise the temporary structure of a project is adapted to this new organisational structure, which makes the traditional role of the project manager no longer required.
8.2 ANSWERING THE MAIN QUESTION

This study answered the call for exploration of the role of project manager in agile project management. The findings of this multiple-case study contribute to project management and agile theories. This study is focused on agile in practice and takes into account the perspective of the practitioners of traditional and agile project management in software development projects. The main research question was defined as follows:

How does the role of a project manager change, comparing an agile project management approach to a traditional project management approach in software development projects?

This thesis has presented research on the changing role of the project manager when comparing an agile to a traditional project management approach. The perspective of this research was based on an in-depth literature review which led to four sensitizing concepts to investigate this changing role; (1) the project management approach, (2) the hard elements of the project manager role, (3) the soft elements of the project manager role, and (4) the changing role of project manager. Based on the findings of ten case studies the importance of being agile and flexible as a project manager in the transition towards agility is identified. Several changes were indicated for the project manager’s role. Adaptability is required since the role is situational and highly dependent on the context and fulfilment of the new agile roles within the project. Although the core responsibilities are to a large extent similar to the “traditional” project manager, this research showed that in an agile approach the project manager often tends towards several other (agile) roles; a high agility-level is required of the project manager. Moreover, the project manager needs to have an agile mindset and attitude; the present study identified behavioural changes in an agile management approach. Although a human-centred approach might also be suitable in traditional project management; an agile project management approach cannot be adopted without it. Despite the fact that training could help project managers to understand their role, responsibilities and behaviour. Project managers need to ask themselves whether their personality, mindset and leadership style suits an agile approach. Nevertheless, knowledge of agile development is necessary since an agile approach requires tailoring; this research showed the “imperfection” of agile approaches in practice. Especially when a project is embedded in a traditional organisation, organisational barriers can limit the level of agility of a project. Once again agility is required, since the project manager needs to be creative and innovative; when it comes to agile methodologies in practice “no-size-fits-all” and often non-agile practices are implemented resulting in hybrid project management approaches. Furthermore, this study illustrated that alongside the changing role of project manager within the context of agile project management, a transition takes place towards agile development within organisations. This implies that the role itself changes, as well as the broader context; the project manager is in continuous search for an equilibrium between the changing project manager’s role, the project and the organisational context. Next to these findings with regard to the four sensitizing concepts, this study has indicated a fifth concept: (5) the organisational context is important to take into account when analysing the role of the project manager. In the light of agile organisations, the agile organisational structure is no longer compatible with classical defined projects and the traditional role of the project manager. Agility is essential with regard to the future of the role within in the field of software development; the findings showed that the project manager needs be open for a possible career change towards agile roles. In a rapidly changing world where agility is key, there is a strong need for a more agile view on the traditional role of the project manager; only agile project managers who are willing to change, survive in an agile approach.
RECOMMENDATIONS

// CHAPTER 9
9 **Recommendations**

The limitations of this research make further research worthwhile. The exploratory nature of the research led to a large number of possible directions for future research. This chapter details recommendations for future research (section 9.1) and project managers in practice (section 9.2), which are based on the limitations of section 7.3.

9.1 **Recommendations for Further Research**

In general this research contributed to a further understanding of the changing role of project manager in the transition towards an agility. Three main directions for further research are indicated and discussed in this section (Figure 21):

1. Additional research on the changing role of project manager in an agile project management approach
2. Understanding an agile project management approach at project-level
3. The impact of agile development on organisations

![Figure 21. Three research directions for further research (own illustration)](image)

### 9.1.1 Research direction 1: additional research on the changing role of project manager in an agile project management approach

This first direction for further research builds upon the current research direction. As discussed in the limitations, the nature of this research is explorative and forms the basis for more conclusive research. The identification of the key changes for the project manager forms the starting point for follow-up research; further research is required to address the limitations. A next step in validation of the research findings could be the performance of a conclusive case study; reproducing the findings of this research in a new context. Moreover, an even deeper insight into the role of project manager could be obtained by participant observation; e.g. observing daily stand-ups and planning meetings. Furthermore, the identified changes can be investigated further, by means of a survey study on the changing role of project manager. Directions for further research with the project manager as unit of analysis in the context of agile project management could be the following:

**Research of the role of project manager in other type of projects and sectors** - In this research, exclusively software development projects were included the scope. It would be interesting to conduct research on the role of project manager in an agile approach, within other type of projects as well (e.g. the construction sector). In addition, further research is recommended on the project manager role in finished projects, it is interesting to gather knowledge about changed role of project manager from a more reflective point of view. The successfulness of the project can be incorporated in this study.

**Research on the competences of a project manager in agile development** - Additional research could identify the required competences and characteristics of a project manager in an agile approach. Existing literature on crucial competences of the project manager is wide-ranging. Project manager competences are described in scientific literature and international project management standards (e.g. IPMA Individual Competence Baseline). The competences of a project manager
including the leadership style does have a major influence on project success according to Müller and Turner (2006). Dulewicz and Higgs (2005) investigated the difference in leadership competences between traditional and agile project managers (scrum masters). As indicated in this research, the leadership style of the manager does change in agile management. Further research on the (leadership) competences of the project manager in agile project management could be beneficial in the light of project performance. Moreover, the current research focuses on soft elements primarily based on the personal characteristics of the project manager (e.g. behaviours and attitudes). Required knowledge and skills of the project manager in agile project management are not included in this research. This research suggests that the role of project manager in an agile approach, requires a different skill-set and additional knowledge, future research can contribute to this knowledge gap.

**Research on education and training of the project manager in agile development** - In agile projects the roles are divided differently and in order to fulfil these new roles, practitioners require training on agile development, values, principles and methodologies. Future research can be performed on the education of the project manager and other agile roles; what training is required for successful performance in an agile approach?

**9.1.2 Research direction 2: understanding an agile project management approach at project-level**

This second research direction involves further research on projects with an agile approach. Although the current research was particularly focused on the project manager’s role, the need for further research on project-level emerged since existing research within this field is limited.

**The definition of an agile project** – This research highlights the incompatibility of the classical definition of a project and agile project management. Based on the definition stated in the discussion of this research, additional research could further define and test a conclusive definition for a project which is compatible with the definition of agile project management.

**Further development of the established traditional and agile project management comparators framework** - Future research could further assess the agility of projects by making use of the established framework. Further refinement is recommended and generation of necessary empirical evidence for using the framework in practice. Eventually, this framework could guide project managers in identifying the barriers and opportunities for achieving a higher level of agility. Furthermore, the developed card game for division roles and responsibilities can be investigated further in a group setting in projects in practice.

**Hybrid combination of agile and traditional project management approaches** - More empirical research is required on the effects of agile and successful tailoring of agile methodologies, since a pure form of agility on project-level seems challenging in practice. Additional research could investigate under what conditions a hybrid form could be effective. Moreover, research on the hybrid situation of agile project management approaches in a traditional organisation could be of value. These directions of research aim to build a bridge between agile methodologies in theory and the “imperfection” of agile implementation in practice.

**9.1.3 Research direction 3: the impact of agile development on organisations**

There is a transition towards agile project management, while some organisations are simultaneously in a transition towards an agile enterprise. The third research direction includes further investigation of the impact of agile development on structure of organisations.

**The impact of an agile approach on organisations** – This research could lead to a follow-up research about the impact of agile development on the way organisations are organised; this research would consider the organisation as the unit of analysis. A possible research question could be: How does agile development influence the governance and structure of an organisation? Moreover, research can be conducted among various organisations worldwide, in order to map the transition towards an agile approach and the transformation towards an agile enterprise.

**Research on temporary structures in agile organisations** - Future scientific research can investigate the existence of projects in software development of agile enterprises. During the case selection phase of this research, multiple agile enterprises
indicated that setting up temporary projects for change assessments is less common in an agile enterprise. A research question to support further research within this field research could be: What constitutes a temporary structure (e.g. project) in an agile organisation?

The career prospect of project managers in an agile organisation - The evaluation of the role of project manager is especially an interesting area of further research in light of agile organisations. The role of project manager in an agile enterprise will disappear in its current form. In that perspective, further research should be conducted on the possible new positions of former project managers. This research would be relevant for career prospects of existing project managers and training or re-training. The unit of analysis could be the agile roles of an agile organisation, and the comparability with the traditional project manager role, a specific research question could be: what are the career prospects of a project manager in agile project management?

9.2 Recommendations for project managers

In addition to the implications for practice (section 7.2.2), recommendations for project managers are provided. This research led to six recommendations for project managers in the transition towards agile project management.

1. Be aware that an agile approach is not for everyone

From a managerial point of view, project managers are recommended to consider whether an agile project management approach match their personality and type of leadership competences. Project managers in favour of a command-and-control leadership style might reconsider agile development. Agility can only be achieved when the practitioners have an agile mindset. In the end, agile methods such as Scrum can provide a framework but agility is all about the personality, culture and flexibility. Project managers should be able to identify themselves with this agile mindset; this may not appeal to every project manager.

2. Be agile as a project manager

It is important to be agile as a project manager. A project manager should be able to respond to a high levels of change within an agile approach. In addition, their working environment is in continuous change since both projects and organisations are in a transition towards agility. The current research shows the various implementations of agile within projects and organisations. Project managers can tend towards various new roles within an agile approach. The role is situational and more fluid in an agile approach, this requires a high level of flexibility from the project manager.

3. Be an agile expert as a project manager

In particular in the field of information technology, organisations are in a transition towards agility; sooner or later project managers will be confronted with this new development approach. Project managers are recommended to be aware of agile development in projects, as well as agile on a scaled enterprise level (e.g. scaled Scrum, SAFe). The present research highlights the need for project managers to broaden their knowledge on agile development.

4. Be creative in agile methods tailoring

There is no one-size-fits-all approach for agile project management, methods should be tailored an customised to the type of project and organisation. This requires creativity and adaptability of the project manager; strictly following the agile methodologies most possibly will not work out in practice. Agility will not be achieved by simply implementing the agile practices, the project manager is required to come up with innovative solutions. Project managers should have an agile mindset and the drive to continuously improve the agility of the project. This implies overcoming barriers for further agile adopting and thinking outside the traditional defined project by having a product-oriented focus. The comparators framework of agile and traditional project management can help project managers (Table 2), in order to gain an overview of the opportunities and shortcomings of the applied agile approach. Furthermore, the card-set developed in this research is recommended for agile practitioners as a helpful tool to discuss the distribution of responsibilities.

5. Be aware of your behaviour and attitude as a project manager

This research indicates behavioural changes for the role of project manager. Project managers are advised to be very aware of their behaviour and leadership style as an agile leader. Trust is very important and the will to give responsibility to the
teams, not act on the basis of formal mandate but discuss ideas with the teams. A proper balance between alignment and autonomy of the teams is essential. The project manager should aim be to make himself unnecessary and coach and motivate the teams towards self-organisation.

6. **BE OPEN FOR AN AGILE FUTURE AND CHANGE IN FUNCTION**

Project managers are advised to take personal control over their careers by becoming more knowledgeable about agile development. Although projects will remain the basic form of organising work in project-based organisation. When organisations become agile enterprises, “traditional” defined projects and the “traditional” role of project manager will disappear in its present form. Traditional educated project managers or project managers that are used to manage traditional waterfall projects are recommended to gain further insights in the changing role of project manager in an agile approach. Furthermore, outside the boundaries of a project; project managers must be open for other agile roles in an agile enterprise and might start to consider a carrier change.
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// CHAPTER 10
10 References


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APPENDIXES
APPENDIX A – SCIENTIFIC LITERATURE ON THE COMPARISON BETWEEN AGILE AND TRADITIONAL PROJECT MANAGEMENT

This appendix discusses the traditional and agile project management framework of section 3.1.2 more in-depth. Five comparators are clarified in detail; philosophy, organisation and management, development process, people and team, and technology.

PHILOSOPHY

The philosophy of agile project management is already discussed in section 3.1.1 and therefore only briefly explained in this section. Nerur et al. (2005, p. 75) describe the fundamental assumptions for both approaches, within traditional project management; “systems are fully specifiable, predictable, and can be built through meticulous and extensive planning”. The fundamental assumption of agile project management is defined as; “high-quality, adaptive software can be developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and change” (Nerur et al., 2005, p. 75). Agile primarily emphasises on people, communication and collaboration and this requires a different way of thinking than following the predefined (traditional) process (Špundak, 2014). An agile approach is not like traditional project management a highly optimized and repeatable process.

ORGANISATION AND MANAGEMENT

Organisation culture, form and structure: A hierarchical organisation structure is better suitable for traditional project management, while agile approaches prefer working in a flatter team-based structure (Owen et al., 2006). Traditional approaches function in formal organisations that are built around bureaucracy and high formalization (Nerur et al., 2005). Agile project management should be compatible with the existing processes of the organisation.

Management style: An agile approach requires a less authoritative leadership style; a shift is required from command-and-control management to leadership-and-collaboration (Nerur et al., 2005). Traditionally, the project manager has an authoritative role and acts as planner and controller. In traditional project management, a central decision making process is often in place, as opposed to decentralized decision in agile. Agile project management requires a facilitating role of the project manager, supporting collaborative efforts of all team members (Hass, 2007).

DEVELOPMENT PROCESS

Development style of the project management method: According to Wysocki (2011, p. 39), project management starts with choosing the appropriate management approach. Wysocki (2011) developed the four quadrant matrix which is shown in Figure 23. The appropriate style of project management is based on two projects characteristics: goal and solution. Quadrant 1 requires a traditional project approach; both goal and solution are clear defined. In quadrant 2 an agile project approach is suitable, the goal is clear and the solution is unclear. Quadrant 3 and 4 requires more extreme forms of project management since the goal of the project is not clear stated.
According to Fernandez and Fernandez (2008), traditional project management is defined by a linear and incremental development style. Linear project management approach consists of: “dependent sequential phases that are executed with no feedback loops” (Fernandez & Fernandez, 2008, p. 11). In an incremental strategy, partial solutions are initially released and form together the complete solution; the complete solution is already defined in the beginning of the project (Wysocki, 2011).

Agile project management is based on either iterative, adaptive or extreme strategies Figure 23. An iterative process differs from incremental development since the incomplete solution is delivered in repeated periods of time during the project; the complete solution is not known beforehand. Agile is managed in time-boxes, which ensures the continuous flow of delivery of product and value (Owen et al., 2006). In Scrum a time-box or iteration is called a sprint, and takes less than one month (Schwaber & Sutherland, 2016). The consumer is closely involved and provides feedback on the incomplete solution, these changes will subsequently be integrated in the product (Paulk, 2002). This makes it a learn-by-doing strategy, learning step by step more details about the complete solution (Fernandez & Fernandez, 2008). An adaptive approach differs from an iterative approach since feedback on the iteration influences the next iteration, and so the solution. In extreme strategies after each iteration adjustment is made to converge upon discovering the goal of the project.

Development methods: Development methods such as the waterfall model are falling under the umbrella of traditional project management development method. The waterfall development model distinguishes all the life cycle phases and once a phase is finished it will not be revised (Hass, 2007). Five stages are included in this method (1) analysis and definition of requirements, (2) design, (3) implementation and unit testing, (4) integration and system testing and (5) operations and maintenance. The project follows a sequential flow and clients have to state all the requirements at the beginning of the project (Hass, 2007). Other traditional software development methods are the V-model, Spiral model and Rational Unified Process (RUP) (Leau et al., 2012) and some variations of these. These methods were developed in order to solve the problems of the waterfall model, however the methods are still plan-driven and heavyweight approaches (Abbas, Gravell,
& Wills, 2008). Four overall phases characterise a traditional software method: (1) requirements phase; making a time schedule for the project phases, (2) design and architectural planning phase; forming diagrams and models, (3) development phase; producing code and the (4) testing phase; including customer feedback.

Agile project management requires a development model facilitating a highly iterative process. Development methods like Scrum, Extreme programming (XP), Chrystal family, Feature-driven development (FFD), Dynamic software development method (DSDM) and Lean software development identified as Agile project management (Leau et al., 2012).

**Development approach:** Agile project management relies on iterative development methods and therefore the exact scope (the solution) of the project is viable. The variable scope in agile projects contributes to the ability to deal with changes during the project. Scope control as an ongoing process enables the possibility to learn during the project. In traditional projects the scope is fixed and when circumstances change the resources and time are variable. Figure 24 shows the shift in fixed and variable aspects between agile and traditional projects (Owen & Koskela, 2006b).

![Figure 24. Changing from traditional to agile project management - adapted from (Owen & Koskela, 2006a)](image)

According to Highsmith (2013), the traditional elements of the iron triangle (scope, time and cost) are important but do not form the main goal of the project. The definition of success in traditional projects is delivering accordance the plan based on scope, schedule and cost. In his view, agile focusses on the adaptability and this results in an agile triangle which is focussed on the real goals of projects: producing value (releasable product), building quality (reliable and adaptable product that creates an feasible platform for future improvements), and delivering within constraints (scope, schedule, and cost).

Agile project management is characterised as feature-driven development; focus on one feature at a time (Hass, 2007). Components should ideally have only an one-way dependency to the core system. This leads to more flexibility in the development of the components since they are independent of each other.

**Development direction & nature of planning:** The different interpretation of fixed and variable aspects of the iron triangle results in a different development direction. Agile project management is adaptive, while traditional approaches are pre-planned and the solution is fixed. The traditional process is therefore activity-based, measurement-based and compliance-driven (Nerur et al., 2005). The nature of planning in agile methods is on the short term (every iteration) which makes it often more realistic (Owen et al., 2006). In traditional project management a detailed plan is prepared for the entire project before the beginning of the project.

**Value delivery:** According to Highsmith (2013), traditional projects are carried out in phases, while agile projects in releases or iterations. Agile project management delivers value early in the process and at a sustainable pace during the project. After each iteration, value is delivered and the customer can provide feedback (Owen et al., 2006). Feedback and learning leads to renewed priorities which influence the upcoming value deliveries. As opposed to traditional project management
where at the end of each project phase or project, value is delivered if the customer is prepared to accept the product as complete.

**Dealing with change:** Change is inevitable and therefore agile project management sees change as an opportunity to increase value delivery. This inevitability of change is described by Highsmith (2013), however what managers can manage is how they respond to these changes. This contrasts starkly with traditional approaches, where changes are a threat to the original plan (Owen et al., 2006).

**People and team**

**Teamwork:** In agile project management small teams are required, while traditional project management works with large teams. The ideal size of agile teams is defined differently among the renowned agile methodologies. The Scrum guide recommends that the team should include three to eight people (Schwaber & Sutherland, 2016). In XP the team should consists out of twelve people maximum. According to Cockburn (2006) if teams become larger than 8-12 people, there is a need to focus more on coordination and communication. Agile methods require co-located highly cohesive teams, there is a focus on collaborative work and face-to-face communication is preferred. Traditional methods does not require co-location and teams are often distributed; there is less empathises on team collaboration.

Agile teams require a multi-skilled employees and roles within team are interchangeable (Vinekar et al., 2006). Team members should have social and interpersonal skills since communication is key in agile (Leau et al., 2012). In contrast, individual role assignment is used in traditional project management. The agile team is self-organising and most of the decisions are made by the developers and customers, this creates a pluralist decision- making environment (Nerur et al., 2005). People making the decisions have different back-grounds, attitudes and goals. This in contrast to traditional project management where the project manager makes most decisions. Lastly, in agile there should be an incentive to work together as a team and therefore the team should be awarded and not the individual (Vinekar et al., 2006).

**Customer involvement:** Customer involvement throughout the project is key in agile; the development team can learn from the customer and bring this knowledge to the next iteration to improve the product and increase the value (Owen et al., 2006). The customer working on the same location as the team is preferred within agile. The customer role involves a large amount of responsibility and time; providing user feedback every iteration and frequent implementation of deliverables (Vinekar et al., 2006). The organisational structure and culture of the client is having an major impact on successful implementation of agile. In traditional project management interaction with the client is required to define the detailed specifications up-front. Owen et al. (2006) state that in traditional development the customer is of importance as well. However in practice many project managers sees customer involvement as an “irritation obstruction to efficient completion of the plan” (Owen et al., 2006, p. 58).

**Attitude to learning:** Owen et al. (2006) distinguish single and double loop learning. Whereby traditional project management facilitates single loop learning; learning is based on organisational assumptions and routines which forms a constraint on detection and correction of errors. Moe, Dhingshyr, et al. (2009) explains single loop learning as learning based on observed effects. In contrast, double loop learning is not only about observing the effects but also about understanding the factors leading to and influencing these effects. Agile approaches stimulate double loop learning through multi-disciplinary teams and iterative development. Important features of double loop learning in learning organisations are: sharing control, participation in design and implementation of action (Owen et al., 2006). Scrum includes the sprint retrospective, an opportunity to reflect on the previous sprint and to implement improvements in the next sprint (Schwaber & Sutherland, 2016).
TECHNOLOGY

Requirements: Requirements often serve as a contract in traditional project management; detailed requirements are specified at the beginning of the project (Van Waardenburg & Van Vliet, 2013). Traditional methods assume that the customer knows what they want at the beginning of the project and before they have seen the product. Software development is presumed to be a predictable process and requirements will not change during the development of the product (Sutherland, 2001). In agile project management projects can start when the requirements are not on a detailed level yet (Rubin, Cohn, & Williams, 2010). Requirements can change during the project and the design is created collaboratively “just-in-time” during the iterations.

Testing: Agile methodologies require developers to develop the unit tests prior to coding (Hass, 2007). Test-driven development stimulates thinking about writing tests before writing the code and therefore contributes to a clean simple design which is easily maintained (Nerur et al., 2005). Agile requires early and frequent unit testing and continuous integration, automated testing can help achieving this goal. Automated testing is also preferable when performing acceptance testing (testing the system on acceptance criteria). If the system passes the test, the feature is done and accepted by the customer (Rubin et al., 2010). This is in contrast to traditional approaches where test plans and procedures needs to be documented upfront and testing often takes place at a later stage in the development process.

Release frequency: Software releases should be possible after every iteration when using agile project management. The organisation must be able to facilitate the rapid iterative development (Nerur et al., 2005). In contrast, traditional approaches often have a slow release frequency (e.g. one release every six or more months) (Van Waardenburg & Van Vliet, 2013).

Project metrics and documentation: Traditional project management focusses heavily on data collection, this information can be beneficial for communication and traceability of design (Nerur et al., 2005). This contrasts with agile project management which works with up-to-date metrics and visible planning for all team members (Hass, 2007). Often knowledge in agile approaches is tacit, as opposed to traditional project management where knowledge is explicit.

Coding: Agile approaches support collective code ownership and the establishment of a consistent coding standard. Working together in pairs, also known as “pair programming” is a well-known agile practice to increase the level of quality of the product (Hass, 2007). Knowledge of the code base is wider distributed within the team and more people can detect defects and improve the code. Time for refactoring is required in order to keep the code design simple and clear. Traditional project management shares some of these practices. Although pair programming is often mentioned in agile approaches.
As a question to warm-up, participants were asked to write down words on post-its which they associated with the role of project manager in agile and traditional project management. This resulted in the following overview (Table 30):

<table>
<thead>
<tr>
<th><strong>AGILE PROJECT MANAGEMENT</strong></th>
<th><strong>TRADITIONAL PROJECT MANAGEMENT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Loslaten, vertrouwen, transparantie creeren</td>
<td>Belangen sturen, veel stakeholders managen, stuurgroep, project manager is voor 80% intern en 20% extern georiënteerd</td>
</tr>
<tr>
<td>Gearicht op product</td>
<td>Eindeloos wachten op resultaat, altijd vertraging, wanneer is iets af??</td>
</tr>
<tr>
<td>Incrementeel, snel, korte sprints, snel bijsturen,</td>
<td>Controle, budget bewaking, doel vasthouden, project manager denkt in control te zijn, top down</td>
</tr>
<tr>
<td>Post-it</td>
<td>Gericht op proces, sturen deliverables</td>
</tr>
<tr>
<td>Gearicht op meer langdurige samenwerking</td>
<td>Risk management</td>
</tr>
<tr>
<td>Fixed budget, geld/tijd/planning vast &amp; scope niet</td>
<td>Regulatory compliance</td>
</tr>
<tr>
<td>Verandering verantwoordelijkheid PM - PO</td>
<td>Project file opbouw</td>
</tr>
</tbody>
</table>

Table 30. Outcome of the post-it session (in Dutch)

Interestingly, mainly tasks and focus areas were mentioned for traditional project management, such as budget, planning, control, stakeholders and risks. In contrast, people associated agile project management with behavioural aspects on how to perform project management such as facilitating, coaching, teamwork, transparency and trust.

A discussion was held on the role of project manager in agile project management. The release train engineer responded from his point of view (working in an agile line organisation where scaled agile framework (SAFe) is implemented): “an agile project manager does not exists”. It was concluded that a project manager can be necessary for projects with a clear defined beginning and end. However, when scaling agile to an enterprise level (e.g. using the scaled agile framework) a project manager is not required since software is produced in an agile release train. On the other hand, some attendees argued that in an agile enterprise, large epics can be transformed to projects and consequently require project managers.

The difference between software development projects and the software development release process was highlighted during the meeting. The software development process of an agile enterprise could be compared to release management in a line organisation; release-based development. In both traditional organisations and agile organisations, release-based development cannot be marked as a project; although the product in release-based development can be unique (like in a
When the attendees were asked to draw the project management structure of their current project, a project manager replied: “I can draw a project management structure for my current project, but in half a year this structure is probably different!” Others responded that they were working on various projects within different roles at the same time, which made it hard to answer the question. Another question dealt with project documentation of roles, responsibilities and the project management structure. The attendees responded that documentation on roles and responsibilities in an agile project is often not in place; one of the respondents even mentioned that the internet was consulted for descriptions of agile roles, and these roles descriptions were implemented within the project.

Each participant was asked how they ended up working in an agile environment. For most of the participants the agile way of working was something they felt attracted to and therefore applied for an agile position or took initiative to implement an agile approach on organizational- or project-level. In addition, the following remark was made by a couple of participants: “agile is just a handy tool in my project management toolbox and this tool is not applicable on all projects”. Nowadays, various agile frameworks and methods are developed on project-level and enterprise-level. Nowadays, various agile frameworks and methods are developed on project-level and enterprise-level. One of the main discussion points between the participants was about the “correct” way of implementing agile / Scrum. Organisations implement agile in a different manner; a lot of organisations are still searching for tailoring methods in order to scale agile in a suitable way.

### THE FIELD PROCEDURES – LESSONS LEARNED

Six lessons learned with regard to the field procedures were indicated. (1) The discussion among the experts showed that it is very important to mention that it is in the interest of the research that participants answer the questions truthfully and not on how they know agile should be implemented according the books. (2) The three levels of the project management team in Prince2 are not applicable in agile enterprises (in which there are three levels of line management). This means that the question needs to be adjusted for the interview session. (3) One of the main take-aways was that projects are closely related to their contexts. Therefore asking participants about the organizational context and the maturity of agile in the organisation is of importance. (4) Participants should be asked about their function profile and competency profile in order to gain a better understanding of the role of the project manager (according to RACI or taken, bevoegdheden & verantwoordelijkheden). (5) When working in an agile enterprise, the comparison between agile and traditional project management is less applicable. Moreover, the comparison between agile and traditional project management on projects is not black and white. For example one of the participants noted that in SAFe organizations there is a high formalization, while this is also a characteristic of a traditional organization. These insights highlight the importance of not thinking “black and white” during the interviews; it is important to ask in-depth questions order to really understand the used project management approach. (6) Since drawing the project management structure was a challenge for a lot of participants, this procedure will take place during the interview in order to get a better view of the project organisation chart.

### THE RESEARCH DESIGN – LESSONS LEARNED

The four main lessons learned from this expert meeting are summarised in this section.

1. **The organisational context has an impact on the project and implementation of the project management approach** - Several agile experts mentioned that the years of experience of an organisation with agile has a major influence on the way agile is implemented throughout the organisation. Some organisations use agile approaches primarily for projects. While in other organisations, entire departments are working according agile values and principles (scaled agile). The context of the organisation has an influence on the comparison between agile an traditional project management.

2. **There are many different implementations of agile throughout organisations** - The project management structures of different projects were discussed among the experts; all organisations customised the agile methods in suitable manner. This implies that many different flavours of an agile approach, are presented within organisations.
3. The implementation of agile is focused on long-term team collaboration - During the expert meeting, participants mentioned the focus on team collaboration within agile project management. According to the release train engineer: “In traditional project management when there is a lot of work to be done, a team is formed to do this work (formation of a project), while in agile project management the teams already exist and the work is transferred to the teams”. The following example illustrates the shift of bringing the work to the teams: one of the attendees fulfilled the role of project owner and was responsible for the backlog of a self-organizing team, multiple project managers could ask the team to perform work and the project owner is responsible for prioritizing this work. This implies that the project manager is not in charge of the teams; he should approach various teams and their product owners in order to get the work done.

4. There is a difference between agile project management on a project and an agile release train in an agile enterprise - A discussion was held with regard to the role of project manager in agile project management. As pointed out by one respondent (the release train engineer); an agile project manager does not exist in an agile organisation. A project manager is not required according to some of the experts, because when scaling agile to an enterprise level (e.g. using the scaled agile framework) software is produced in agile release trains. The difference between release management and project management was highlighted by several practitioners. On the other hand, some experts argued that in an agile enterprise, large epics can be transformed to projects and consequently require project managers. In addition, the difference between projects and release-based development was discussed. A project manager argued that “although a release includes both a clear start and end date, project-based working in releases on existing software is not the same as working in a project which is developing new software” and, moreover: “it becomes apparent that project-based working in releases is by some organisations incorporated in the line organization”. In general, it was concluded that a project manager can be necessary for agile or traditional projects with a clear defined beginning and end. Both types of project management approaches in projects can therefore be compared.

RESPONSE FORM PARTICIPANTS GROUP INTERVIEW

<table>
<thead>
<tr>
<th>Naam:</th>
</tr>
</thead>
</table>

Wat is uw huidige rol binnen het project? (meerdere vakjes aankruisen is mogelijk)
- Project manager
- Team manager
- Scrum master
- Product owner
- Development team member
- Anders namelijk ….

Waar bevindt uw positie zich binnen het projectmanagement team?
- Sturing over één of meerdere projecten (project direction)
- Sturing over meerdere teams (project management)
- Sturing over één team (project delivery)

Wilt u hier uw huidige projectmanagement structuur tekenen en uw functie aangeven binnen dit overzicht?
(Zie voorbeeld plaatje PowerPoint presentatie)
Welke software ontwikkelingsmethode wordt er gebruikt op uw project? (meerdere antwoorden mogelijk)

☐ Scrum
☐ Extreme Programming (XP)
☐ Kanban
☐ Feature Driven Development (FDD)
☐ Dynamic Systems Development Method (DSDM)
☐ Crystal methods
☐ Waterfall model
☐ Spiral model
☐ V- model
☐ Rational Unified Process (RUP)
☐ Anders namelijk…

Welke fases worden uitgevoerd conform de agile projectmanagement methodiek? Graag omcirkelen in welke fase(s) er agile project management wordt toegepast. (meerdere fases mogelijk)

Binnen welke bestuurslagen wordt agile projectmanagement toegepast? Geef aan op de pijl tot welke hoogte er gewerkt wordt conform de agile project management methodiek.

<table>
<thead>
<tr>
<th>PROJECT MANAGEMENT APPROACH</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Not applicable</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANISATION AND MANAGEMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational culture, form &amp; structure</td>
<td>Flat team-based structure</td>
<td></td>
<td></td>
<td></td>
<td>Hierarchical structure</td>
</tr>
<tr>
<td></td>
<td>Flexible and participative encouraging cooperative social action (organic)</td>
<td></td>
<td></td>
<td></td>
<td>Bureaucratic with high formalization (mechanic)</td>
</tr>
<tr>
<td></td>
<td>Comfort and empowerment via many degrees of freedom (thriving on chaos)</td>
<td></td>
<td></td>
<td></td>
<td>Comfort and empowerment via framework of policies and procedures (thriving on order)</td>
</tr>
<tr>
<td>Management</td>
<td>Leadership-and-collaboration</td>
<td></td>
<td></td>
<td></td>
<td>Command-and-control</td>
</tr>
<tr>
<td></td>
<td>Decentralized &amp; pluralist decision making</td>
<td></td>
<td></td>
<td></td>
<td>Centralized &amp; managerial decision making</td>
</tr>
</tbody>
</table>

Heeft u nog vragen en/of opmerkingen? Indien er vragen niet geheel duidelijk waren kunt u dat ook aangeven.

Bent u mogelijk beschikbaar voor vervolgonderzoek?
APPENDIX C – INTERVIEW DESIGN

Een onderzoek naar de veranderende rol van project manager in de transitie van een traditionele- naar een agile project management aanpak

CHECK VOORAFGAAND AAN HET INTERVIEW
- Email sturen aan kandidaten met toelichting van het onderzoek.
- Vragen naar documentatie over de (1) organisaties structuur van het project, (2) functieprofiel van de projectmanager en (3) algemene informatie over het project.

INSTRUCTIE ONDERZOEKER

Houd in gedachte: wees duidelijk, pak terug naar de structuur/ doel / wat je wilt weten, wees flexibel & open naar de kandidaat toe, vraag om verheldering als het niet duidelijk is, wees kritisch bij inconsistenties.

INTRODUCTIE (5 MINUTEN)

Onderzoek
- Dit onderzoek vindt plaats in het kader van mijn afstudeeronderzoek naar de veranderende rol van project manager in de transitie van een traditionele naar een agile project management aanpak.
- Onderzoek wordt uitgevoerd in samenwerking met KWD Resultaatmanagement en de TUdelft
- Uw project is geselecteerd aangezien jullie werken aan een software ontwikkelingsproject. Ik vergelijk de verschillende projecten en project management aanpakken van software projecten binnen verschillende sectoren met als focus de rol van projectmanager.

Praktische zaken
- De gegevens en antwoorden op de vragen worden anoniem in het rapport opgenomen en vertrouwelijk behandeld. (niet aan derden verstrekt)
- Ik wil u toestemming vragen voor het maken van een geluidsopname om zo antwoorden te kunnen notuleren en te gebruiken voor het onderzoek. De opname zal na het onderzoek verwijderd worden.
- Uw interview is onderdeel van een project (een case) die in het rapport samengevat en beschreven zal worden. De informatie zal worden geanalyseerd op een algemeen niveau, algemene conclusies zullen per project toelicht worden in het rapport.
- Uw kunt de samenvatting van het rapport over uw case ontvangen indien daar behoefte aan is. Ik zou het waarderen als u deze kunt valideren.
- Daarnaast zal ik een sessie houden na afloop van het onderzoek om de belangrijkste resultaten toe te lichten.
- Het interview zal ongeveer 1 uur tot 1,5 uur duren. Ik zal de tijd in de gaten houden.

Inhoud
- Het interview zal bestaan uit 5 delen, (1) informatie over het project en uw werkervaring, (2) project management aanpak van uw project, (3) welke taken doet (u als) de project manager (4) wat is de houding van de project manager, (5) hoe ziet u de rol van project manager (verder) veranderen.
- Graag wil ik benadrukken dat uw ervaring en mening erg waardevol is voor dit onderzoek: er zijn dan ook geen foute of goede antwoorden!
- Het gaat er dan ook niet om hoe zaken horen te gebeuren beschreven in project management standaarden (zoals Prince2, AgilePrince2 of Scrum etc.), ik ben benieuwd hoe het daadwerkelijk in de praktijk gebeurd.
**FASE 1: HET PROJECT, ORGANISATIE & AchTERGROND VAN KANDIDATEN (10 MINUTEN)**

Dit onderdeel zal ingaan op het project, de organisatie en uw persoonlijke achtergrond en ervaringen. Er wordt nog even kort ingegaan op de toegezonden documentatie. Deze informatie wordt alleen gebruikt om verbanden te kunnen leggen en zullen niet aan u persoonlijk gekoppeld worden in de weergave van het onderzoek.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
</table>
| Check of documentatie voorafgaand aan het interview is ontvangen over de: (1) organisatie structuur, (2) functieprofiel project manager en (3) algemene informatie van het project. Zo niet vraag hier naar. | Uitkomst informatie:  
  - Overzicht algemene informatie over:  
  - De organisatie  
  - Het project  
  - Persoonlijke informatie kandidaten |

**Informatie per project & organisatie**

De volgende vragen gaan over uw huidige project binnen de organisatie. Indien er meerdere projecten / ook project matig gewerkt wordt door het project team; wil ik uw vragen om de vragen te beantwoorden over een specifiek project wat op dit moment wordt uitgevoerd.

<table>
<thead>
<tr>
<th>Alleen project manager / programma manager</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Kunt u mij kort vertellen over de organisatie waarbinnen het software ontwikkelingsproject wordt uitgevoerd?</td>
<td>Een korte indruk krijgen van het project &amp; context; input voor de case omschrijving.</td>
</tr>
</tbody>
</table>
| 2. Kunt u vertellen over de inhoud en uitvoering van uw huidige software ontwikkelingsproject?  
  a. Wat zijn de karakteristieken van het project bijvoorbeeld in termen van tijd, geld, teams etc. | Een indruk krijgen van het project & context; input voor de case omschrijving. |

**UITKOMST INFORMATIE:**  
- Loop de volgende lijst langs tijdens het interview.

---

**FACTSHEET PER CASE**

<table>
<thead>
<tr>
<th><strong>INFORMATIE PER SOFTWARE-ONTWIKKELINGSPROJECT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Naam project</td>
</tr>
<tr>
<td>Naam organisatie &amp; branche</td>
</tr>
<tr>
<td>Belangrijkste te leveren producten van het project (deliverables /hoe vast ligt de scope / inhoud/ belang van het project)</td>
</tr>
<tr>
<td>Tijdschap van het project (duur)</td>
</tr>
<tr>
<td>Aantal teams werkende op het project &amp; team grootte</td>
</tr>
<tr>
<td>Aantal mensen werken onder de project manager</td>
</tr>
<tr>
<td>Aantal manuren staan er voor het project</td>
</tr>
<tr>
<td>Totale budget voor het project</td>
</tr>
<tr>
<td>Softwareontwikkeling methode gebruikt op project: (scrum, xp, kanban, FDD, Safe, waterval etc.)</td>
</tr>
<tr>
<td>Organisatie ervaring met agile project management? (aantal jaren)</td>
</tr>
</tbody>
</table>
### Informatie per kandidaat

De volgende vragen gaan over uw persoonlijke ervaring en positie binnen uw huidige project.

<table>
<thead>
<tr>
<th>3. Kunt u vertellen over uw functie op uw huidige project?</th>
<th>Een indruk krijgen over de ervaring en achtergrond van de kandidaat.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uitkomst informatie:</strong></td>
<td>- Loop de volgende lijst langs tijdens het interview.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FACTSHEET PER KANDIDAAT</th>
<th>INFORMATIE PER KANDIDAAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wat is uw huidige functie (formele titel)?</td>
<td></td>
</tr>
<tr>
<td>Hoeveel jaar ervaring binnen deze functie?</td>
<td></td>
</tr>
<tr>
<td>Wat is uw specifieke rol binnen dit project? (PM, SM, PO, TM, etc. er kunnen meerdere rollen zijn)</td>
<td></td>
</tr>
<tr>
<td>Hoelang werkt u al op dit project?</td>
<td></td>
</tr>
<tr>
<td>Wat is uw leeftijd?</td>
<td></td>
</tr>
<tr>
<td>Man/ vrouw</td>
<td></td>
</tr>
<tr>
<td>Heeft u ervaring met agile project management? (bv. Scrum, XP, FDD, DSDM, Crystal, PMI-ACP, Agile-Prince2)</td>
<td></td>
</tr>
<tr>
<td>a. Zo ja: hoeveel jaar ervaring?</td>
<td></td>
</tr>
<tr>
<td>b. Zo ja: met welke methodes heeft u ervaring?</td>
<td></td>
</tr>
<tr>
<td>c. Zo ja: certificaten gehaald / training?</td>
<td></td>
</tr>
<tr>
<td>Heeft u ervaring met traditioneel project management? (bv. waterval model, spiraal model, v-model, PM-BOK, Prince2)</td>
<td></td>
</tr>
<tr>
<td>a. Zo ja: hoeveel jaar ervaring?</td>
<td></td>
</tr>
<tr>
<td>b. Zo ja: met welke methodes heeft u ervaring?</td>
<td></td>
</tr>
<tr>
<td>c. Zo ja: certificaten gehaald / training?</td>
<td></td>
</tr>
</tbody>
</table>
**FASE 2: DE PROJECT MANAGEMENT AANPAK VAN HET PROJECT (5 MINUTEN)**

Deze verdiepende vragen zijn bedoeld om een beter beeld te krijgen over de project management aanpak van uw huidige project. Graag ga ik hier kort op in aangezien de focus van het onderzoek met name ligt op de rol van project manager en niet op de project management aanpak.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.</strong> Hoe ziet in het kort de project management aanpak van uw project eruit? Eventueel doorvragen:</td>
<td>Omschrijving project management methode van het project. (agile/traditioneel)</td>
</tr>
<tr>
<td>a. Gebruikt u een bepaalde ontwikkelingsmethode? (denk aan software methodes &amp; proces methodes)</td>
<td>Uitkomst informatie:</td>
</tr>
<tr>
<td>b. Welke aspecten werken wel/niet goed binnen deze methode?</td>
<td>- Project management aanpak van het project &amp; ontwikkelingsmethode</td>
</tr>
<tr>
<td></td>
<td>- Mate van agile &amp; volwassenheid organisatie</td>
</tr>
<tr>
<td><strong>5.</strong> Waarom is er gekozen voor een (agile/traditionele) project management aanpak op dit project? Doorvragen:</td>
<td>Omschrijving project management methode van het project. (agile/traditioneel)</td>
</tr>
<tr>
<td>a. Wat waren de beweegredenen voor deze aanpak?</td>
<td>Uitkomst informatie:</td>
</tr>
<tr>
<td>b. Wordt er binnen de organisatie vaker op deze wijze gewerkt? (aantal jaren)</td>
<td>- Project management aanpak van het project &amp; ontwikkelingsmethode</td>
</tr>
<tr>
<td></td>
<td>- Mate van agile &amp; volwassenheid organisatie</td>
</tr>
<tr>
<td><strong>6.</strong> Wat is uw rol geweest bij de keuze van deze project management aanpak?</td>
<td>Indien agile &amp; invloedrijke rol:</td>
</tr>
<tr>
<td><strong>Indien agile &amp; invloedrijke rol:</strong></td>
<td>Is het project een succes?</td>
</tr>
<tr>
<td><strong>7.</strong> Hoe heeft u leiding gegeven in de transitie naar agile project management? Probeer te onderscheiden:</td>
<td>Uitkomst informatie:</td>
</tr>
<tr>
<td>a. Het was al deze aanpak</td>
<td>- Positioneren van kandidaat en in welke context de antwoorden geïnterpreteerd kunnen worden</td>
</tr>
<tr>
<td>b. Betrokken bij de methodiek &amp; aanpassingen gedaan</td>
<td></td>
</tr>
<tr>
<td>c. Zelf de methodiek uitgerold &amp; door ontwikkeld.</td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong> Is uw project succesvol? Waarom wel/ waarom niet?</td>
<td>Is het project een succes?</td>
</tr>
<tr>
<td>a. Is uw opdrachtgever tevreden over het project tot nu toe?</td>
<td>Uitkomst informatie:</td>
</tr>
<tr>
<td></td>
<td>- Positioneren van de case &amp; de mate van succes</td>
</tr>
</tbody>
</table>

**Alleen als de keuze door de project manager gemaakt is:**

**Indien agile & invloedrijke rol:**

**7.** Hoe heeft u leiding gegeven in de transitie naar agile project management? Probeer te onderscheiden:

| a. Het was al deze aanpak                                             | Is het project een succes?                                         |
| b. Betrokken bij de methodiek & aanpassingen gedaan                  | Uitkomst informatie:                                                |
| c. Zelf de methodiek uitgerold & door ontwikkeld.                    | - Positioneren van kandidaat en in welke context de antwoorden geïnterpreteerd kunnen worden |

**8.** Is uw project succesvol? Waarom wel/ waarom niet?

| a. Is uw opdrachtgever tevreden over het project tot nu toe?         | Is het project een succes?                                         |
|                                                                      | Uitkomst informatie:                                                |
|                                                                      | - Positioneren van de case & de mate van succes                    |
**FASE 3: DE INVULLING VAN DE Rol VAN PROJECT MANAGER (20 MINUTEN)**

De volgende vragen zullen dieper ingaan op de invulling van de rol van project manager op uw huidige project.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Waarom is er een project manager nodig op dit project?</td>
<td>Begrip krijgen van de project manager rol.</td>
</tr>
</tbody>
</table>
| 10. Kunt u de project management structuur tekenen van uw huidige project?  
   a. Hoe worden de werkzaamheden verdeeld binnen dit project?  
   b. Wie stuurt u aan?  
   c. Wie is uw leidinggevende? Door wie wordt u beoordeeld? | Begrip van de project management structuur, rol van de kandidaat en interactie met project manager.  
   **Middel:** Tekenen op enquête formulier. |
| 11. Welke formele bevoegdheden heeft de project manager?  
   *Het gaat hier om het recht om besluiten te mogen maken over bepaalde activiteiten (formele autoriteit).*  
   a. Welke bevoegdheden worden door de project manager bij het team neergelegd?  
   b. Waarom legt de project manager dit bij het team neer? | Inzicht krijgen over formele autoriteit van de project manager & bevoegdheden.  
   **Uitkomst informatie:**  
   - Autoriteit & bevoegdheden project manager |
| 12. Waar is de project manager eindverantwoordelijk voor binnen het project? *Dit kan maar 1 persoon zijn per taak/aspect.*  
   a. Zijn dit ook de resultaatgebieden waar de project manager op wordt beoordeeld? | Inzicht krijgen over de eindverantwoordelijkheden.  
   **Uitkomst informatie:**  
   - Overzicht eindverantwoordelijkheden projectmanager |
| 13. Kun je doormiddel van deze kaartjes aangeven waar uw verantwoordelijkheden & taken liggen?  
   b. Welke verantwoordelijkheden zijn niet relevant in uw project? Waarom?  
   c. Zijn er gedeelde verantwoordelijkheden? Waarom?  
   d. Ga in op de overlap tussen verantwoordelijkheden van rollen: laat de kandidaat uitleggen hoe deze overlap zich in de praktijk voordoet. *Waarom* leg je dit bij de andere partij/team neer?  
   e. Indien meerdere rollen vervuld door de project manager: Is er sprake van een rol conflict tussen de rollen die u vervult? | Inzicht krijgen in verantwoordelijkheden project manager en de verdeling van deze verantwoordelijkheden binnen het project management team.  
   **Middel:** Spel met kaartjes & rollen binnen het team; lijnen trekken tussen de verantwoordelijkheden en rollen (gebaseerd op prince2 en scrum). De kandidaat maakt een verdeling; foto maken van deze verdeling.  
   **Uitkomst informatie:**  
   - Verdeling verantwoordelijkheden van de verschillende rollen binnen het team |
**FASE 4: HOUDING EN GEDRAG VAN DE PROJECT MANAGER (20 MINUTEN)**

In deze fase zal ik dieper ingaan op de invulling van de rol van project manager, met betrekking tot uw houding en gedrag. Ik ben benieuwd naar uw persoonlijke ervaring en hoe u als project manager acteert en handelt. Het gaat er dus niet om, hoe agile wordt beschreven volgens het boekje.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Kunt u een voorbeeld geven van de samenwerking tussen de u (project manager) en de (self-organiserende) teams?</td>
<td>Sensitizing concept: “self-organising teams &amp; de samenwerking tussen project manager en teams.”</td>
</tr>
<tr>
<td>a. Hoe stelt de project manager zich op in deze samenwerking?</td>
<td></td>
</tr>
<tr>
<td>b. Doorvragen: hoe werkt het self-organiserende aspect? Wat gebeurt er in de praktijk? Hoe ga je hier als project manager mee om?</td>
<td></td>
</tr>
<tr>
<td>15. Hoe stelt u (de project manager) zich op met betrekking tot de (decentrale &amp; gezamenlijke) besluitvorming binnen het project?</td>
<td>Sensitizing concept: “decision making &amp; authority”</td>
</tr>
<tr>
<td>a. Kunt u een voorbeeld geven: welke type besluiten neemt het team en welke worden genomen door de project manager?</td>
<td></td>
</tr>
<tr>
<td>16. Hoe geeft u (de project manager) leiding aan het project team?</td>
<td>Sensitizing concept: “leadership / management style”</td>
</tr>
<tr>
<td>a. Kunt uw een voorbeeld geven?</td>
<td></td>
</tr>
<tr>
<td>b. Hoe definieert u de leiderschapstijl van de projectmanager?</td>
<td></td>
</tr>
<tr>
<td>17. Hoe zorgt u (de project manager) ervoor dat de beoogde waarde gerealiseerd wordt binnen het project?</td>
<td>Sensitizing concept: “managing resources &amp; benefits” (denk aan: management van resources: geld, tijd, scope &amp; value delivery)</td>
</tr>
<tr>
<td>a. Kunt u een voorbeeld geven hoe dit proces van waarde creëren in zijn werk gaat in het project?</td>
<td></td>
</tr>
<tr>
<td>18. Welke competenties zorgen ervoor dat u (de project manager) in deze project management aanpak succesvol bent?</td>
<td>Sensitizing concept: “competences”</td>
</tr>
<tr>
<td>a. Wat doe je als project manager waardoor het project goed verloopt?</td>
<td></td>
</tr>
</tbody>
</table>

In het interview zijn een aantal aspecten genoemd die een mogelijk een impact hebben op de veranderende rol van project manager van een traditionele naar een agile project management aanpak. De volgende vraag gaat in op uw ervaring met deze overgang in de praktijk.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Wat is er nu anders, voor de invulling van de rol van project manager dan toen er nog traditioneel project management werd gebruikt? Waar komt dat door?</td>
<td>Aanvulling sensitizing concepts: eventuele aanvullende rol elementen</td>
</tr>
<tr>
<td>a. Kunt u een voorbeeld geven bij de genoemde rol elementen?</td>
<td></td>
</tr>
<tr>
<td>b. Waar loopt u tegenaan in uw rol als project manager binnen agile project management? (grootste uitdaging van de project manager)</td>
<td></td>
</tr>
</tbody>
</table>
**FASE 5: BLIK OP DE TOEKOMST OP DE Rol VAN PROJECT MANAGER (Extra: 5 MINUTEN)**

Graag wil ik van u weten, hoe u de ontwikkeling verder ziet gaan op het gebied van agile werken in uw organisatie.

<table>
<thead>
<tr>
<th>VRAAG</th>
<th>DOEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vragen aan ervaren agile project managers en programma managers:</td>
<td>Een blik in de toekomst op de rol van projectmanager binnen agile project management van projecten.</td>
</tr>
<tr>
<td>20. In de overgang naar agile werken; welke richting gaat het</td>
<td>Uitkomst informatie:</td>
</tr>
<tr>
<td>volgens u op met de implementatie van agile project management in uw organisatie?</td>
<td>- Informatie over de verandering van de rol van projectmanager in de transitie naar agile project management.</td>
</tr>
<tr>
<td>a. Wat zijn de toekomstplannen op het gebied van implementatie van agile binnen projecten en uw organisatie?</td>
<td></td>
</tr>
<tr>
<td>b. Wat voor impact heeft dit op de rol van project manager?</td>
<td></td>
</tr>
<tr>
<td>Vragen bij een agile project:</td>
<td>Een blik in de toekomst op de rol van projectmanager binnen agile project management van projecten.</td>
</tr>
<tr>
<td>21. Wat zijn in uw opinie de pluspunten en minpunten van een agile aanpak dit project?</td>
<td></td>
</tr>
<tr>
<td>a. Is agile project management the holy grail?</td>
<td></td>
</tr>
<tr>
<td>b. Wat vindt u van agile project management?</td>
<td></td>
</tr>
</tbody>
</table>

**AFSLUITING INTERVIEW (5 MINUTEN)**

Kom terug op de volgende punten:
- Bedankt voor het interview!
- Zijn er nog andere aspecten die u wilt toelichten in het kader van dit onderzoek? Zijn er vragen die u verwacht had die niet gesteld zijn tijdens het interview?
- Vindt u het goed als ik in de toekomst contact met u opneem over het onderzoek als er onduidelijkheden zijn?
- Ik stuur u de samenvatting van het interview toe ter controle, zou uw deze informatie kunnen valideren / feedback geven indien wenselijk?
- Bent u geïnteresseerd in de uitkomsten van het onderzoek? Ik kan u de samenvatting van het onderzoek toesturen als het onderzoek is afgerond.

**AFSLUITING VOOR DE ONDERZOEKER**

Maak een korte notitie van de volgende punten:
- Hoe ging het interview?
- Heeft het interview je op nieuwe inzichten/gedachtes gebracht?
- Wat was de setting van het interview?
De volgende managementproducten opstellen, in samenwerking met eventuele Project Assurance-rollen, en daarover overeenstemming bereiken met de stuurgroep:
- Projectvoorstel (incl. de productbeschrijving)
- Benefits review plan
- Projectinitiatiedocument
- Fase plan & afwijkingenplan
- Werkpakketten

De volgende rapporten opstellen:
- Hoofdpunten rapport
- Issue rapport
- Fase-eindrapport
- Leerpuntenrapport
- Afwijkingenrapport
- Project-eindrapport

De volgende projectgegevens bijhouden:
- Issue register
- Risico register
- Dagelijks logboek
- Leerpunten logboek

Contact onderhouden met het bedrijfs- of programmamanagement om ervoor te zorgen dat er geen werk over het hoofd wordt gezien, en/of werk dubbel wordt gedaan door gerelateerde projecten.

Contact onderhouden met eventuele externe leveranciers of accountmanagers

Het projectmanagementteam leiden en motiveren

Erop toezien dat verwachtingen over het gedrag van teamleden worden vastgesteld.

Managen van de informatiestromen tussen de sturende en uitvoerende niveaus van het project.

Managen van de productie van de vereiste producten, door de verantwoordelijkheid te nemen voor de algehele voortgang en inzet van resources en corrigerende maatregelen te nemen waar dat noodzakelijk is.

Het inrichten en managen van de procedures van het project: risicomanagement, issue- en wijzigingsbeheer, configuratiemanagement en communicatie.

Het inrichten en managen van de projectbeheersing: bewaken en rapporteren.

Werkpakketten autoriseren

De stuurgroep in kennis stellen van alle afwijkingen van het plan.

De rol van team manager (indien er geen andere persoon is aangewezen)

<table>
<thead>
<tr>
<th>Nummer</th>
<th>Taak</th>
<th>Beschrijving</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>De volgende managementproducten opstellen, in samenwerking met eventuele Project Assurance-rollen, en daarover overeenstemming bereiken met de stuurgroep:</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>De volgende rapporten opstellen:</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>De volgende projectgegevens bijhouden:</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Contact onderhouden met het bedrijfs- of programmamanagement om ervoor te zorgen dat er geen werk over het hoofd wordt gezien, en/of werk dubbel wordt gedaan door gerelateerde projecten.</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Contact onderhouden met eventuele externe leveranciers of accountmanagers</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Het projectmanagementteam leiden en motiveren</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Erop toezien dat verwachtingen over het gedrag van teamleden worden vastgesteld.</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Managen van de informatiestromen tussen de sturende en uitvoerende niveaus van het project.</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>Managen van de productie van de vereiste producten, door de verantwoordelijkheid te nemen voor de algehele voortgang en inzet van resources en corrigerende maatregelen te nemen waar dat noodzakelijk is.</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>Het inrichten en managen van de procedures van het project: risicomanagement, issue- en wijzigingsbeheer, configuratiemanagement en communicatie.</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Het inrichten en managen van de projectbeheersing: bewaken en rapporteren.</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Werkpakketten autoriseren</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>De stuurgroep in kennis stellen van alle afwijkingen van het plan.</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>De rol van team manager (indien er geen andere persoon is aangewezen)</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>De rol van project ondersteuning (indien er geen andere persoon is aangewezen)</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>De configuratiemanagement strategie implementeren.</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>Erop toezien dat de projectmedewerkers zich houden aan de configuratiemanagement strategie.</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>Configuratieaudits plannen om te controleren of de fysieke producten consistent zijn met de configuratiestruktuur en eventuele noodzakelijke corrigerende maatregelen te nemen.</td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>Management van de prioriteiten op de product backlog, met als doel de product waarde te maximaliseren.</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>Het duidelijk maken en communiceren van de product backlog items.</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>Het selecteren en vertalen van functionaliteiten naar items op de product backlog die worden gebouwd tijdens de sprint.</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>Het bouwen en opleveren van een ”done” product increment.</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>Scrum uitdragen en implementeren binnen de organisatie.</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>Het oplossen van belemmeringen die het development team in de weg staan.</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>Het faciliteren van Scrum events (indien hier behoefte aan is).</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
<td>Optreden als Scrum coach: zorgdragen dat Scrum wordt begrepen en er volgens Scrum wordt gewerkt in het Scrum team.</td>
</tr>
<tr>
<td>28</td>
<td>28</td>
<td>Helpen van het development team met het effectief opleveren van hoogwaardige producten.</td>
</tr>
</tbody>
</table>
APPENDIX D – INTERVIEW EMAIL

Beste <naam>,

We hebben elkaar gisteren telefonisch gesproken over mijn afstudeeronderzoek naar “de veranderende rol van projectmanager in de transitie van traditioneel naar agile project management”. Binnen dit onderzoek zal de rol van projectmanager vergeleken worden tussen een niet-agile en agile project management aanpak in software ontwikkelingsprojecten. Het onderzoek wordt uitgevoerd aan de Technische Universiteit Delft in samenwerking met KWD Resultaatmanagement.

Uw huidige rol als projectmanager van een software ontwikkelingsproject bij de <bedrijf> is erg relevant. Graag zou ik om deze reden dit project gebruiken als een casus binnen mijn onderzoek. In het kader van dit onderzoek zou ik graag een interview afnemen met u als projectmanager en een interview doen met een van de teamleden van uw project. Het interview zal ingaan op de volgende onderwerpen: (1) algemene informatie over het project en project management aanpak, (2) de verantwoordelijkheden van de project manager, (3) het gedrag van de project manager en (4) de veranderende rol van de project manager. Het interview zal ongeveer vijf kwartier in beslag nemen.

Tenslotte ontvang ik graag algemene informatie en documentatie voorafgaand aan de interviews om mij zo te kunnen inlezen over het project. Indien mogelijk wil ik u vragen de volgende informatie op te sturen via de mail:
- Algemene informatie over het project
- Informatie over de project management structuur (organisatiestructuur, organogram etc.)
- Informatie over het functieprofiel van de projectmanager (verantwoordelijkheden, competenties, resultaatgebieden etc.)

De informatie zal vertrouwelijk behandeld worden en alleen ten behoeve van het onderzoek gebruikt worden. Daarnaast zullen de respondenten enkel anoniem in het verslag genoemd worden.

We hebben over de telefoon afgesproken om op <datum> een interview te doen om <tijd> uur. Ik ontvang graag informatie over waar ik me kan melden. Ik zie u naar het interview! Mocht u vragen hebben over het onderzoek dan kunt u mailen of bellen naar 06-13713360.

Alvast bedankt voor uw tijd en medewerking aan het onderzoek.

Met vriendelijke groet,

Annelot Verbruggen
**APPENDIX E – DEVELOPMENT OF ROLE DIVISION CARD GAME**

In order to develop the role division card game for this research, responsibilities and tasks according to Prince2 and the Scrum methodology were identified and translated into Dutch. Together these responsibilities and tasks resulted in 28 cards; 18 cards based on Prince2 and 10 cards based on Scrum.

**PRINCE2 ROLES & RESPONSIBILITIES**

Table 31 provides the translations in Dutch with regard to the responsibilities and tasks for the project manager according to Prince2. The translations are based on the English version of the standard “Managing Successful projects with Prince2” (Axelos, 2009b) and the Dutch version “Managen van Succesvolle projecten met Prince2” (Axelos, 2009a).

*Table 31. Responsibilities project manager according to Prince2 – translated in Dutch*

<table>
<thead>
<tr>
<th>#</th>
<th>RESPONSIBILITY PRINCE2 (ENGLISH)</th>
<th>VERANTWOORDELIJKHEDEN PRINCE2 (NEDERLANDS)</th>
<th>VERANTWOORDELIJKHEDEN PRINCE2 (NEDERLANDS)</th>
<th>VERANTWOORDELIJKHEDEN PRINCE2 (NEDERLANDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prepare the following baseline management products, in conjunction with any Project Assurance roles, and agree them with the Project Board: - Project Brief (incl. de project product description); - Benefits Review Plan; - Project initiation documentation (and its components); - Stage/Exception Plans and their Product Descriptions; - Work packages.</td>
<td>De volgende baseline-managementproducten opstellen, in samenwerking met eventuele Project Assurance-rollen, en daarover overeenstemming bereiken met de Project Board: - Project Brief (incl. de project product description); - Benefits Review Plan; - Project Initiation Documentation (en de onderdelen daarvan); - Stage/Exception Plans en de Product Descriptions daarvan; - Work packages.</td>
<td>De volgende managementproducten opstellen, in samenwerking met eventuele Project Assurance-rollen, en daarover overeenstemming bereiken met de stuurgroep: - Projectvoorstel (incl. de productbeschrijving) - Benefits review plan - Projectinitiatiedocument - Fase plan &amp; afwijkingsplan - Werkpakketten</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Liaise with the corporate or program management to ensure that the work is neither overlooked nor duplicated by the related projects.</td>
<td>Contact onderhouden met het bedrijfs- of programmamanager om ervoor te zorgen dat er geen werk over het hoofd wordt gezien, en/of werk dubbel wordt gedaan door gerelateerde projecten.</td>
<td>Contact onderhouden met het bedrijfs- of programmamanager om ervoor te zorgen dat er geen werk over het hoofd wordt gezien, en/of werk dubbel wordt gedaan door gerelateerde projecten.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Liaise with any external suppliers or account managers.</td>
<td>Contact onderhouden met eventuele externe leveranciers of accountmanagers</td>
<td>Contact onderhouden met eventuele externe leveranciers of accountmanagers</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lead and motivate the project management team.</td>
<td>Het projectmanagementteam leiden en motiveren</td>
<td>Het projectmanagementteam leiden en motiveren</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ensure that behavioural expectations of the team members are established.</td>
<td>Erop toezien dat verwachtingen over het gedrag van teamleden worden vastgesteld.</td>
<td>Erop toezien dat verwachtingen over het gedrag van teamleden worden vastgesteld.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Manage the information flows between the directing and delivering levels of the project.</td>
<td>Managen van de informatiestromen tussen de sturende en uitvoerende niveaus van het project.</td>
<td>Managen van de informatiestromen tussen de sturende en uitvoerende niveaus van het project.</td>
<td></td>
</tr>
</tbody>
</table>
9 Manage the production of the required products, taking responsibility for overall progress and use of resources and initiating corrective action where necessary. Manage van de productie van de vereiste producten, door de verantwoordelijkheid te nemen voor de algehele voortgang en inzet van resources en corrigerende maatregelen te nemen waar dat noodzakelijk is. Manage van de productie van de vereiste producten, door de verantwoordelijkheid te nemen voor de algehele voortgang en inzet van resources en corrigerende maatregelen te nemen waar dat noodzakelijk is.

10 Establish and manage the project procedures – risk management, issue and change control, configuration management, and communication. Het inrich ten en managen van de procedures van het project: risicomanagement, issue- en wijzigingsbeheer, configuratiemanagement en communicatie. Het inrich ten en managen van de procedures van het project: risicomanagement, issue- en wijzigingsbeheer, configuratiemanagement en communicatie.


12 Authorize work packages. Work packages autoriseren Werkpakketten autoriseren

13 Advise the Project Board of any deviations from the plan. De Project Board in kennis stellen van alle afwijkingen van het plan. De stuurgroep in kennis stellen van alle afwijkingen van het plan.

14 Unless appointed to another person(s), perform the Team Manager role. De rol van Team Manager (indien er geen andere persoon is aangewezen) De rol van team manager (indien er geen andere persoon is aangewezen)

15 Unless appointed to another person (or corporate/program function), perform the Project Support role. De rol van Project Support (indien er geen andere persoon is aangewezen) De rol van project ondersteuning (indien er geen andere persoon is aangewezen)


18 Schedule configuration audits to check that the physical products are consistent with the Configuration Item Records and initiate any necessary corrective action. Configuratieaudits plannen om te controleren of de fysieke producten consistent zijn met de Configuration Item Records, en eventuele noodzakelijke corrigerende maatregelen te nemen. Configuratieaudits plannen om te controleren of de fysieke producten consistent zijn met de configuratierek, en eventuele noodzakelijke corrigerende maatregelen te nemen.

### SCRUM ROLES & RESPONSIBILITIES

Table 32 provide the translations in Dutch with regard to the responsibilities and tasks mentioned for the scrum master, product owner and the development team according to the Scrum methodology.

<table>
<thead>
<tr>
<th>#</th>
<th>THE SCRUM TEAM</th>
<th>SAMENGEVATTE VERANTWOORDELIJKHEDEN IN SCRUM (NEDERLANDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Product Owner</td>
<td>Management van de prioriteiten op de product backlog, met als doel de product waarde te maximaliseren.</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Het duidelijk maken en communiceren van de product backlog items.</td>
</tr>
<tr>
<td>21</td>
<td>Development team</td>
<td>Het selecteren en vertalen van items op de product backlog naar functionaliteiten die worden gebouwd tijdens de sprint.</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Het bouwen en opleveren van een “done” product increment.</td>
</tr>
<tr>
<td>23</td>
<td>Scrum Master</td>
<td>Scrum uitdragen en implementeren binnen de organisatie.</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>Het oplossen van belemmeringen die het development team in de weg staan.</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>Helpen van de product owner met het beheren van de product backlog en het maximaliseren van waarde.</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Het faciliteren van Scrum events (indien hier behoefte aan is).</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>Optreden als Scrum coach: zorgdragen dat Scrum wordt begrepen en er volgens Scrum wordt gewerkt in het Scrum team.</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>Helpen van het development team met het effectief opleveren van hoogwaardige producten.</td>
</tr>
</tbody>
</table>

Table 32. Roles and responsibilities of Scrum, adapted from (Schwaber & Sutherland, 2016)
APPENDIX F – AN IMPRESSION OF THE ROLE DIVISION CARD GAME

Two examples of respondents using the card game, as established within this present research. The pictures below show two type of cards (Figure 25):

1. Cards with several responsibilities and tasks *(indicated in black text)*
2. Cards with different roles performed within the project *(indicated in red text)*

In case responsibilities or roles were missing in this card game, respondents could add additional cards.

*Figure 25. Two examples of respondents doing the role division card game (own pictures)*