Bridging the gap between Business, Development and IT Operations

The design of a work method to discuss implementation complexity and to create a shared vision during the innovation process

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Pre-face

This report captures the journey I have taken over the past several months, starting in November 2015. Back then I had merely formulated for myself what kind of graduation assignment I wanted to do, when this opportunity presented itself online and surprisingly matched my requirements.

There is currently a lot going on in the innovation domain; new technological developments are following up faster and faster and consequentially form opportunities as well as threats for existing organizations. The need for innovation support is therefore greater than ever, while the role of design within innovation has grown tremendously over the years.

I would like to thank Giulia Calabretta as the Chair of this project. Thank you for your guidance and support, especially on the moments challenges started to emerge. I also want to thank Boris Eisenbart for mentoring during this graduation project. Despite the busy schedule you had of your own, you always could make time when I needed help. Your feedback on my writing has really helped me putting the final story on paper.

I want to thank Anika Siepel for providing the opportunity to do my graduation project within Capgemini. It was a pleasure working in this great environment and culture, where everybody is eager to think along and offer support for your project. Although I had little knowledge about the IT domain in advance, I really have learned a lot in the past few months. I hereby want to thank all consultants who have helped me along the way, especially Henk Vermeulen, Yvonne Kolen and Dirk-Jan Plender who always could find the time for sparring when I needed it.

I can imagine that when you recently started a job as consultant within a company, and within two months your younger brother decides to apply for a graduation position at the same firm, you would not directly be fan of the idea. My older brother however, has never tried to withhold me from this and even supported me throughout the entire process. A final thanks to Laurens-Jan de Kroon for this support.
Executive summary

A new initiative within Capgemini is the Applied Innovation Exchange (AIE). The aim of this initiative is to consult companies in adopting, applying and scaling innovations to their organization. Those innovations include emerging technologies such as virtual reality, drones and 3D-printing. As a technology company, Capgemini is aware of the complexity that comes into play when implementing new technology at client organizations. In the AIE’s framework, this implementation step stakes place between Devise and Deploy. Therefore, the initial challenge that was formulated for this assignment was: ‘How can Capgemini AIE optimize its innovation process with their client to ease the step from Devise to Deploy?’.

As the conducted case study showed, many variables come into play when implementing new technology. For starters, employees may become resistant to innovations, since it could require them to adopt new ways of working or to learn new skills. Examples of enablers of innovation implementation are change management programs, where those employees get involved early for training and increase acceptance via workshops, and the use of Product Champions, which are employees that create support for innovation adoption within the organization. In order to determine how the innovation can deliver value to the client, the right information is needed about the organization. The innovation may however be perceived as complex, making it difficult for the client to contribute his knowledge to the process. The tacit knowledge of the client that is needed for innovation is thus difficult to access by the consultants of Capgemini.

Specific within IT is the implementation complexity at the back-end; large new software applications often need to be embedded into the existing IT landscape of the client. This landscape is a complex infrastructure of various IT processes and systems. During implementation of new software, changes in one area of the landscape can have major consequences for IT processes on the other end of the infrastructure. By offering software solutions via cloud computing, organizations can use new software solutions without affecting their existing IT landscape. This requires development of the right ‘connectors’ that enable this implementation approach. The party responsible for maintaining the IT landscape is the Operations department of the client’s organization. This department has the responsibility of keeping the current system stable. A challenge within innovation is the conflicting mind-set between Development and IT Operations; one is in favor of change, while the other strives for stability. This opposing mind-set makes collaboration between the two disciplines challenging, which could lead to late involvement of Operations during innovation projects. This consequentially results in laborious implementation process, since the development has to change in order to meet the acceptance criteria held by Operations.

During the innovation process, stakeholders from both the Business and IT Operations should become involved to contribute their knowledge and function as a Champion within their organization. The knowledge boundaries that exist between the different disciplines should therefore be addressed by applying the right boundary object. This has resulted in the following design statement: ‘To design a work method that supports collaboration between Business, Development and IT Operations and creates a shared vision for the innovation process.’ This challenge has been addressed by designing three facilitated sessions that can be held during the innovation process.

‘SPARK’ is an ideation session, where opportunities and product ideas are generated. Through the use of Lego Serious Play, a shared vision is created. ‘MONITOR’ is a risk assessment session, where the impact of the innovation on the IT landscape of the client is discussed and a shared roadmap is created. ‘CHECK’ is a frequent risk management session where the majority of risks are exposed and to define concrete objectives to address these. To overcome the knowledge barriers between the three stakeholders, the sessions make use of Lego Serious Play (LSP) and Innovation Roadmapping. While LSP provides the stakeholders with the means to express themselves and observe complex innovation challenges from different angles, Innovation Roadmapping aligns the objectives between the different parties.

One important risk that has been identified through the evaluation with stakeholders was the application of Lego. The perceived risk is the image it may convey towards clients. Alternative suggestions and simplified versions of the design have been given. Once experience has been gained with innovation projects, more and more elements of the solution can be implemented into the work approach.
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1 Introduction

The first chapter of the report provides a brief introduction to the project and the initial assignment. An overview of the report’s structure is given, together with a description of the approach that has been taken to address the formulated challenge.
This graduation assignment has been executed for Capgemini, a multinational management-consulting firm that offers consulting-, technology-, and outsourcing services and is active in the several different sectors. These include for example Public, Consumer Products and Retail, Financial Services, Utilities and Telecom. The company has over 180,000 employees worldwide and is present in more than 40 countries. A new initiative within Capgemini is the Applied Innovation Exchange (AIE) which was launched in January 2016. The AIE is a global initiative, with the mission of consulting companies in adopting, applying and scaling innovations to their enterprise. Instead of investing in technology development themselves, the AIE scouts for emerging technologies and subsequently aims to develop applications of them for their clients. Examples of technologies that the AIE want to explore are 3D-printing, drones and virtual reality. By launching the AIE, Capgemini aims to strengthen its innovation capabilities and extend its service portfolio towards their clients. The AIE has developed an own framework, which is displayed below (fig 1.1). This framework consists of four phases, namely Discover, Devise, Deploy and Sustain. The initial phase, Discover, is where the AIE wants to engage in an exploration phase with the client, where they look for technology opportunities and trends, and assess the relevance for the client and his domain. In the following phase, Devise, business models and applications will be developed and validated. Followed by Deploy, where the concept will be launched at the client’s organization. Lastly, Sustain captures the support for a sustainable innovation climate by applying the right technology strategy, governance and processes.
**Problem definition**

The Applied Innovation Exchange is still in its early stages and has yet to engage in projects with clients. However, experience within the company has shown that the step towards implementation is a complex undertaking with a large influence on the client’s decision to adopt an innovation. This is especially the case when the innovation is perceived as too disruptive for the organization and when there exists a large gap between the innovation and the client’s current situation in regards to processes or business model. As a result, companies might need to go through organizational changes before an innovation can be implemented successfully. The AIE is looking for a way to optimize its innovation process and to ease the transition towards implementation of the innovation, also referred to as the step from Devise to Deploy. Therefore, the initial challenge that has been addressed during this graduation assignment was:

‘How can Capgemini AIE optimize its current innovation process with their client to ease the step from Devise to Deploy?’
The formulated challenge has been addressed using the Double Diamond approach. The Double Diamond approach is divided into four stages: Discover, Define, Develop and Deliver, and involves a diverging-converging process. This is an iterative process of creating options (diverging) and making choices (converging) (Design Council, 2006). Consequently, the report is structured as such, where the first diamond captures the exploration of the problem and problem definition, and the second diamond the development and implementation of the solution. This has been visualized in figure 1.2.

Discover

To address the formulated challenge, three separate research questions have been formulated. For starters, the AIE itself has been analysed to obtain insight into the new initiative of Capgemini and the environment in which it takes place. This results in the following research question:

RQ1: What is the Applied Innovation Exchange and how does it operate?

The step from Devise to Deploy captures the transition from innovation development towards implementation. The challenges of innovation implementation have therefore been explored extensively to get a better understanding of the topic. This has been done by using two additional research questions:

RQ2: What are the main barriers of innovation implementation?

RQ3: What are enablers of innovation implementation?

Internal analysis

Approach

The AIE applies several innovation principles in its innovation process. Therefore, RQ1 is partially addressed in chapter 2 Literature Review, where these principles are briefly discussed. In order to provide further answer to this research question, an internal analysis has been conducted with interviews and observations.

Method

These interviews have been conducted semi-structured. The interview subjects were the AIE director, the AIE CoZone lead and the AIE innovation lead, who all have been involved in the set-up of the Applied Innovation Exchange for the Dutch office of Capgemini, and have an average IT experience of 20 years. A complete overview of all interview subjects can be found in Appendix A Interview Subjects.

Furthermore, explorative interviews have been held with an IT governance consultant who has been project manager during software implementations, and a solution lead of SalesForce implementation projects. These interviews have been conducted with a more open structure to get initial insight into implementation complexity within Capgemini. The input has been used for preparation of the case studies. The questions that
have been used during the interviews can be found in the Appendix B Interview Guide Internal Analysis. Additional Insights have been obtained through observations of the work environment by conducting the majority of the project in the workplace of the AIE.

Data analysis
The interviews have subsequently been transcribed and analyzed manually to collect important information and quotes.

Results
The results of the interviews, observations and answer to RQ1 are discussed in chapter 3 Internal Analysis.

Case study: innovation implementation

Approach
RQ2 and RQ3 have been addressed by conducting a literature review and two separate rounds of case studies with consultants from Capgemini with experience in the area of innovation implementation. The literature review has been conducted prior to the case study to get a first understanding of the topic and thereby obtain first answers to RQ2 and RQ3. This literature review is discussed in chapter 2. Both case studies have been executed with a different approach and interview guide. Due to the explorative nature of the research, both rounds of case studies have been conducted with a semi-structured interview guide, which allowed to deviate from the interview questions if required.

Method
The first case study has been conducted with consultants who are involved with the implementation of Capgemini’s Intellectual Property (IP) solutions, which are pre-invested software offerings from the company. During the interviews, the challenges that these consultants face during implementation of the IP-solutions were discussed, together with how they dealt with those challenges. The interview guide was divided into two main themes. Each theme contained a different set of questions to apply, depending on the interview’s direction. This interview guide can be found in Appendix C Interview Guide Case Study 1.

In the second round of case studies, additional interviews have been held with other consultants on the topic of implementation. These interviews have been conducted in a more interactive manner, by having the interviewees reflect their story directly to the AIE framework. The aim of this approach was to obtain different perspectives and insights on the implementation challenges and to make them directly applicable to the case of the AIE. Before the interview, consensus was reached about the different phases of the framework. The interviewees were asked to reflect on a recent implementation case and pinpoint the events in the framework during their story. This interview approach also required a different set of questions, which were setup in a more explorative manner, categorized per project phase. The interview guide used during these case studies can be found in Appendix D Interview Guide Case Study 2.

Case selection
All implementation cases have been provided by Capgemini as suitable cases for gathering answers to the research questions. Descriptions of these cases and a brief background introduction of the interview subjects can be found in chapter 4 Case Study.

Data analysis
During the data collection, all interviews have been recorded and transcribed. The transcripts have been analyzed manually by highlighting important parts and key phrases. The events of the second case study had already been plotted within the AIE framework during the interviews. The findings from the first case study have also been added and placed within the framework. This step is elaborated more in Appendix F Data Analysis.

Results
Summaries of the interviews can be found in Appendix E Case Study Summaries. The findings and answers to RQ2 and RQ3 are presented in chapter 4 Case Study.

Define
In Define, the answers to RQ1, RQ2 and RQ3 are synthesized by mapping the variables and discussing the findings. The specific problem has been delineated and translated into a design statement for guidance during the ideation process. The insights from the case studies have been used to construct a set of criteria for the design process. This step can be found in chapter 5 Design Vision.

Develop
As the design statement delineates the problem context, an ideation process took place to develop a solution to the problem. This has been done through a process of
idea generation and discussions with several consultants from Capgemini.

**Method**
This iterative process is discussed in chapter 6 Ideation. All of these discussions took place with an open structure, with the purpose of sharing ideas and thoughts.

**Result**
The ideation process has eventually led to a final design outcome, which is presented in Chapter 7 Final design.

**Deliver**
The deliver step captures the evaluation of the final design outcome, followed by suggestions for further improvement. This step can be found in Chapter 8 Evaluation. The evaluation has been conducted with several different stakeholders, namely three AIE consultants, one ASE consultant and one ADM consultant. The evaluation guide can be found in Appendix J Evaluation Guide. Furthermore, an implementation strategy is proposed for the design outcome, for which an additional challenge was used: ‘How can Capgemini AIE offer this service to their clients?’. The necessary steps for successful implementation of the design are proposed in this chapter. The report closes with a final reflection on the project’s process and initial problem definition.
This chapter addresses several literature topics that are related to the case of the Applied Innovation Exchange. Firstly, the literature stream on three of the innovation approaches, Design Thinking, Lean Start-up and Agile/Scrum will be discussed briefly, because of their application within the AIE’s innovation process, and thereby obtaining a first answer to RQ1. Secondly, challenges in multidisciplinary collaboration in new product development have been reviewed, because of its relevance to the innovation domain and the AIE’s intention to collaborate closely with their clients. Lastly, the literature on innovation adoption and implementation is explored to find first answers to the research questions RQ2 and RQ3, and to use the insights for preparation of the case study.
Innovation principles

The innovation approach of the AIE consist of principles of Design Thinking, Agile/Scrum and Lean Start-up. A literature review on these innovation principles has therefore been executed to obtain a first insight into the AIE and RQ1: ‘What is the Applied Innovation Exchange and how does it operate?’.

Design Thinking
Design Thinking is an approach that draws its characteristics from the actual practice; it uses designer’s sensibility and methods to address complex problems and develop solutions that are technologically feasible, market viable and consumer desirable (Brown, 2008). Design thinking is gaining popularity and increasingly applied in Research and Development (R&D), innovation and marketing departments worldwide (Thoring and Muller, 2012). Although originally shaped by IDEO (Kelley and Littman, 2001), the model from Plattner, Meinel and Weinberg (2009) is presented below (fig. 2.1). This model divides the design thinking process in six different steps, namely Understand, Observe, Point of View, Ideate, Prototype and Test. However, one could move back and forth between the phases of the process when desired. Important in Design Thinking is the human-centered approach; the process always starts with understanding and observing the user context. By synthesizing, the insights are used to establish the ‘point-of-view’ (POV) for the rest of the project. This POV subsequently functions as a framework that directs the ideation phase, where the insights are translated into ideas. Prototyping and testing is a repeated process to test ideas, for instance in form of user- or performance tests. (Thoring and Muller, 2011).

Agile/Scrum.
Agile software development is an alternative to traditional ‘linear’ software development. In comparison to the traditional approach, where the possibility of change is reduced to cut costs, Agile is more adaptive to changing environments. Product iterations are made within customer feedback loops, which take no longer than six weeks. (Cockburn and Highsmith, 2001)

Scrum is a process framework within Agile software development. In Scrum, larger tasks are broken down into smaller tasks, and collected and prioritized on the ‘product backlog’, which is an overview of what needs to be done. The product backlog is managed by the ‘Product Owner’, who is the key stakeholder for the project and envisions what needs to be built. Scrum uses ‘sprints’ that range from 1 to 4 weeks. A sprint is a period of time in which backlog items are turned into ‘product increments’, which are the product iterations. As part of Scrum, ‘Stand-ups’ are held, which are moments throughout the sprint where the team comes together to discuss progress. In the beginning of the sprint, the development team reports the sprint goal and at the end of the week what is delivered. A last important stakeholder in a Scrum team is the ‘Scrum Master’, who is responsible for effective team communication and information exchange (Sutherland and Schwaber, 2013).

Lean Start-up
Lean Start-up is an innovation approach that originates from the IT sector, where it has mainly been used by start-ups. The principle can however be applied for all sorts of innovation initiatives (Ries, 2011). By applying a constant feedback loop with end-users and customers, uncertainties can be reduced to a minimum. Lean Start-
up captures three steps: Build, Measure and Learn, where each step generates a specific output (Code, Data or Ideas, as displayed in fig. 2.2). Such feedback loops can be applied to large problems as well as sub-problems. (Thöring and Müller, 2012). In Lean start-up, hypotheses are formulated, based on uncertainties, and subsequently validated or falsified. The goal is to quickly start off with a product version that carries enough features to be presented to a critical audience for validation, also known as a Minimum Viable Product (MVP). The aim is to learn from these feedback loops and use the input for setting new directions, which is also known as ‘pivoting’ (Ries, 2011).

**Conclusion**

This section has given a first impression of what the future innovation approach of the AIE looks like. Although the AIE wants to explore technology opportunities, and subsequently develop business applications, it aims to address a specific user-need by applying Design Thinking. This may however be challenging, considering the fact the process is driven from a technology push and that the opportunity may not always match a defined need. Lean Start-up could for that reason be a more appropriate approach, since it allows to start-off with an application idea and test it with a critical audience to assess product’s desirability. Building the products in increments then enables to rapidly pivot the project’s direction to a desirable outcome.

With regards to innovation implementation, the Lean Start-up principle may also be applicable to implementation complexity. Assumptions made about implementation could for instance be validated through engagement with the client.

This literature review has given first insight into the AIE’s innovation approach. How the AIE applies the three different approaches exactly will be discussed in the next chapter, Internal analysis.
Innovation consists of collaboration between different individuals and practices, which requires to collaborate in a multi-disciplinary manner. Although such team play can provide many benefits, it also brings challenges of its own, due to differences in knowledge between the stakeholders. The AIE wants to collaborate closely with their client during the innovation process, which could mean that knowledge gaps need to be overcome. The literature on knowledge transfer is therefore reviewed below.

Knowledge types
In literature knowledge is often classified into one of two categories, namely explicit knowledge or tacit knowledge. Explicit knowledge is knowledge that is coded, structured and directly accessible to parties other than the owner. Tacit knowledge is knowledge that is unconsciously present and which cannot be accessed by others directly. This type of knowledge can be shaped as a physical skill or cognitive skill (Leonard and Sensiper, 1998). Although these two categories are often discussed in literature, the reality shows that knowledge lies more on a spectrum and incorporates elements of both categories, instead of being fully assigned to one (Polanyi, 1967, via Leonard and Sensiper, 1998). Tacit knowledge plays an important role in innovation and sustainable competitive advantage.

Knowledge boundaries
Although the term ‘knowledge boundary’ originally comes from Brown and Duguid (2001), Carlile (2002) elaborates on this in the organizational context and called it ‘both a source and barrier to innovation’ (Carlile, 2002, p.442). Knowledge boundaries exist in three different levels, namely Syntactic, Semantic and Pragmatic. For each knowledge boundary, a different type of ‘boundary object’ is needed.

A syntactic boundary between individuals exists when there is no mutual language present, which could be tackled by making information for all parties available, for instance by using repositories. When there is a mutual language present, individuals could have different interpretations. In such case, we speak of a semantic knowledge boundary between individuals, which can be addressed by using standardized forms and methods. This helps creating a shared understanding between individuals and supports the translation of tacit knowledge into explicit knowledge. The last type of knowledge boundary is the pragmatic boundary, which exist when individuals are committed to their invested and hard-won knowledge, and do not favor sacrifices of this knowledge. Using prototypes and models is a way to overcome such a boundary and to transform the knowledge of both individuals into new knowledge (Carlile, 2002).

Learning styles
A different perspective on the topic is the different types of learning that are needed at different stages within a NPD process. Smulders (2004) discusses the impact of newly developed products on the routines of the people responsible for production. While the developing team uses a more conceptual way of thinking, people from the production side apply a more operational way of thinking (i.e. concrete thinking). These different learning styles causes both groups to react differently to certain situations, which could result in conflicts between the two. For successful collaboration, both groups should be able to shift into the opposite learning style. Developing such a capability is only possible if there is a consistent interaction pattern between the individual and the environment. This takes time however and needs proper support from the people from this type of learning style (Smulders, 2004).

Conclusion
Knowledge plays an important role in innovation, especially in a collaborative approach with different disciplines. Since the AIE also wants to develop innovations in a collaborative way with client, some challenges may be aspected. In order to address a clear client-need, the consultants should be able to make use of the client’s tacit knowledge, while the client may not be aware what knowledge to contribute to the innovation process. Furthermore, the different knowledge boundaries identified by Carlile (2002) could all take place within the innovation process, since cross-disciplinary communication with employees from the client’s organization is likely to occur. This could mean that an appropriate boundary object is needed during the innovation process to transfer or transform knowledge. Although Smulders (2004) studied the NPD process of physical products, the findings might also be relevant to IT and the software domain, since different groups of people are responsible for different parts of the application lifecycle. This difference in learning style may cause different attitudes towards innovation by the different stakeholders involved with the AIE. This should therefore be taken into consideration during the development process. In case the party responsible
for production maintains a negative attitude towards the innovation, implementation can be expected to go laboriously.
Innovation adoption and implementation

The topic of innovation is discussed extensively in literature. Innovation in the organizational context is in many studies defined as a technology or practice that is used by an organization for the first time, regardless of the fact if this technology or practice is already in use by others (Nord and Tucker, 1987). The ‘newness’ of innovation is considered to be relative and to apply to the adopting unit only. Apart from organizations, this also involves individuals or groups of people (Angel and Van de Ven, 2000; Damanpour and Schneider, 2006). Innovation adoption refers to a decision point, purchase or plan to adopt new technologies into the firm. Innovation implementation captures the transition period between the adoption decision and the moment it is used skillfully within the company (Klein and Sorra, 1996).

Innovation adoption
Rogers (1995) proposed five innovation attributes that influence one’s decision to adopt innovations, namely Relative Advantage, Compatibility, Triability, Observability and Complexity. Relative advantage captures the perceived benefits minus the perceived cost of the innovation. These costs include for example investments in form of time and money. Compatibility refers to the perceived fit with the existing situation. Observability captures the visibility of the innovation to third parties. Triability is the extent to which an innovation can be trialed and abandoned with little loss. Lastly, Complexity involves the perceived usage complexity of the innovation and required learning curve before it can be used successfully (Rogers, 1995).

Innovation implementation
Implementation is one of the most critical parts of successful innovation. According to Klein, Conn and Sorra (2001, p.2): ‘many organizations adopt innovations with disappointing results. Recent analyses suggests that the reason is not innovation failure, but implementation failure’. The literature on innovation implementation is mostly focused on human barriers to overcome during innovation implementation. Klein and Sorra (1996) discuss the necessity of an innovation climate and value fit with the organization’s employees for successful implementation. Fitzgerald et al. (2014) discuss the organizational resistance that could result from implementation attempts; employees could for instance be resistant to technological changes, because it is perceived as too complex, while single individuals or entire departments might fight against power shifts that could result from change. Implementation is therefore often coupled with change management programs to increase employees’ acceptance towards change (Kemp and Low, 2008).

Little research has been conducted on the impact of new technology implementation on ongoing business processes and routines within a firm, and how a new technology requires processes to be redesigned. Although mentioned by some authors, the assumption seems to be that it occurs automatically (Clark and Stoddard, 1996). Davenport (2013), however, has written on adopting information technology to enable process innovation, since human activities can be replaced by technology.

Conclusion
Preliminary answer to RQ2: ‘What are the main barriers of innovation implementation?’ and RQ3: ‘What are enablers of innovation implementation?’ can be given after reviewing the literature on innovation adoption and implementation. The technologies that flow out of the AIE’s innovation process can be expected to have an impact on the client’s existing organization, for example on its employees that have to learn new skills to use the technology. From the innovation characteristic can be concluded that the amount of disruption of the innovation with the existing operations might influence the client’s decision to adopt the innovation, because of a lack of compatibility. First enablers have also been found. For successful implementation, change management programs executed parallel to the innovation process to prepare employees could be an enabler for implementation, since it would increase overall acceptance. The relative advantage of the innovation also influences the client’s decision to adopt; the perceived costs, such as purchase price and project complexity, could be countered with significant added value. These first insights will be used for preparation of the case studies for gathering more detailed answers to the research questions.
Parallel to the literature review, an internal analysis has been conducted to obtain a deeper understanding of the context. In this chapter, an answer is given to RQ1: What is the AIE and how does it operate? Besides the literature review on the innovation principles in chapter 2, additional interviews have been conducted with consultants involved with the AIE, namely the AIE Director, AIE CoZone Lead and AIE Innovation Lead. Furthermore, two explorative interviews have been held with two consultants on the topic of innovation implementation to get first insight into the topic.
As introduced in the beginning of this report, Capgemini is a global management-consulting firm in the IT domain. The company was founded in 1967 and has its origin in France. The services they offer towards clients include developing, implementing and hosting large IT systems for several different industries. Their outsourcing services involve for example business process outsourcing, such as data analysis or cyber-security monitoring. Examples of Capgemini’s clients in the Dutch market are Eneco, Philips, ING, KPN and the Dutch Police Organization. Over the years, Capgemini has established several partnerships with large technology players, such as Microsoft, IBM and Intel. In general, the company is structured into the following pillars; Apps1, Apps2, Infrastructure Services (Infra) and Capgemini Consulting (Fig. 3.1). The business unit Apps is responsible for IT system integration and application maintenance, which is divided into two separate entities, both targeted at a different market. Apps1 is aimed at the North-American-, UK and Asian market, while Apps2 offers system integration services in continental Europe. Infra’s core activities are designing, implementing, outsourcing and maintaining large IT infrastructures. Capgemini Consulting is the business unit that delivers consulting services aimed at (digital) transformation. Within these pillars, consultants can be assigned to different sectors in which the company is active, which as displayed in figure 3.2.
The Applied Innovation Exchange

The AIE was launched globally in January 2016 within nine offices of Capgemini. Besides AIE Utrecht, AIE studios have been initiated in San Francisco, London, Paris, Lille, Toulouse, Munich, Mumbai and Melbourne. Some of these AIE studios have been assigned to specific domains; Lille mainly focuses on innovations for retail, while Munich is dedicated to the automotive industry. By collaborating closely with each other, the AIE creates an ‘eco-system’ that also includes partners and universities. This eco-system is used to share knowledge on trends and technologies. As mentioned in the beginning of this report, the AIE wants to deliver new services to their clients in the innovation domain, which will be done by looking at technological developments that emerge worldwide and develop suitable applications of these technologies. Examples of such technologies are 3d-printing, virtual reality and drones. The specific setup of each AIE is determined locally. In the Netherlands, the AIE is labeled as an ‘initiative’ instead of a division, meaning that it does not fit within regular governance directly. Its activities are meant as support to the other divisions of Capgemini, in order to attract innovation projects for the entire company.

‘The goal is positioning Capgemini as an innovation partner and getting more projects in the innovation domain. That is actually what it is about’ – AIE director –

The AIE differs from Capgemini’s current divisions with regards to the type of request that comes from the client. Clearly defined problem statements will first arrive at the different divisions of Capgemini, which are then translated into a solution by the company’s business analysts. More ambiguous requests could be directed towards the AIE for exploration.

‘The moment the client is on an even higher abstraction level, such as: “we have something but we don’t know what to do with, can you think with us?”’, then it’s the idea that they can knock on our door to explore this very vague concept.’ – AIE CoZone lead –

Innovation as an Eco-System

The AIE aims to create ‘eco-systems’, which captures the idea of close collaboration with partners to achieve innovation. The type of partner is selected based on the capabilities it can contribute to the innovation process. In this way, eco-systems could be created with a strong set of capabilities that consequentially create a mutual dependence between the different companies. Also Capgemini’s direct client is adopted into this eco-system, while the application development is focused at the client of the ‘client’ (fig 3.3). Capgemini’s primary contribution to the eco-system is its capability of delivering large back-end systems and analytics.

‘Our capabilities are of large value in a digital transformation at the client; hosting of data, deployment of an IoT platform, you name it. Large platforms to generate data and 80.000 people in India to analyze your data’ – AIE innovation lead –

The Collaboration Zone

An important aspect and capability of the Applied Innovation Exchange is the Collaboration Zone (CoZone), located within the Dutch Capgemini office. While the Discover phase occurs mostly in the AIE studio with the clients, application and concept development occurs in the CoZone. The CoZone currently makes use of available consultants that are in between projects, also known as ‘the bench’. These are in most cases young professionals and starters. The Agile way of working and building in increments enables teams to be composed and dissolved rapidly, and thus also enables flexible deployment of available resources (fig 3.4). Deployment of an employee could vary from one single week to five months, depending on when they can return to their primary function. The main benefit that the CoZone provides for those employees is to start gaining experience early in their career.

Besides delivering value to both clients and employees, the AIE also functions as an internal idea platform where employees of Capgemini can submit ideas that may be worth exploring. The consultants currently deployed in the CoZone are for example working on ideas for
mobile phone applications, brought in from the different divisions of the company. It is expected that once innovation projects with clients are initiated, experienced consultants will join the CoZone to deal with more complex challenges.

**IP Solutions**

One of the goals of the AIE is to turn the innovations that flow out of the process into IP-Solutions or ‘Ready2Series’ (Intellectual Property Solutions) if possible. IP-Solutions are pre-invested, standard solutions from Capgemini that can be implemented at clients ‘out-of-the-box’. There are currently a few of them that run via the AIE studio for client presentations. These IP-solutions have been developed at other Capgemini offices or obtained via acquisition of external companies. By translating the applications into standard offering, the outcome of the innovation process could be used to extent Capgemini’s IP-portfolio. A few examples of Capgemini’s current solutions are introduced in chapter 4 Case study.

**Digital- vs. organizational transformation.**

The innovations that will be implemented at clients are expected to have a transformative nature. Companies may innovate their business processes or entire business model by adopting new technologies to their firm. The extent of change can be plotted over two axes: digital- and organizational transformation. While the AIE will be responsible for the digital transformation by delivering new technology, the organizational transformation will be delivered by the Accelerated Solution Environment (ASE), which is an existing business unit of Capgemini from its Consulting pillar, specialized in facilitating creative programs. Such programs include intensive workshops of three consecutive days, where different levels of the client’s organization come together to generate a solution for a particular problem. The ASE is often involved with implementation projects of the different business units of Capgemini. During projects of the AIE, a close collaboration is therefore seen between the AIE and ASE.

**The innovation process**

Although a brief introduction of the AIE framework has been given in the beginning of this report, this chapter elaborates on the innovation process the AIE aims to apply in the future with their clients. In the first step of the process, Discover, the emerging technologies are explored and connected to business problems and needs. The client’s current strategy is discussed, while there is aimed for executive alignment. Compared to the other phases of the framework, this step is relatively short and primarily takes place in the AIE Studio, where new technologies are displayed. This can be seen in the preliminary set-up of the AIE innovation process (fig 3.5).

Followed by Devise, which takes place in the CoZone. During the Devise phase, the project moves from ideation to designing and prototyping, and ends with a validated pilot. This is done through an Agile product development approach, where the software application is built and tested in sprints of one week. At the end of each sprint, small demos are held with the client, while after each period of five sprints, a larger validation session is held. The Devise phase flows as a typical innovation funnel, where ideation involves the generation of multiple ideas, which are slowly turned in one concrete and validated concept that can be implemented at the client. The
outcome of Devise is a Proof-of-Concept (POC), which is a demo version of the product capturing the essentials to prove its value. Based on the POC, the client decides to move onward to a Pilot. This is a larger test setup of the innovation at the client’s premises.

After validation of the Pilot, the innovation is scaled up at the client’s organization in Deploy. The different steps are visualized in figure 3.6. Although major risks have been exposed during the pilot, the majority of the application’s software still has to be developed. This is ideally done in DevOps, which is a setup in IT where Development and Operations, the department responsible for maintenance of deployed applications, are closely collaborating. This allows new software code to be developed and deployed continuously. According to a Dutch survey from Xebia (2014), many organizations struggle with the transformation towards this way of working. One of the main reasons given is the difference in mind- and skillset between the two disciplines. The same survey not only exposed the DevOps struggle, but also the struggle to successfully implement Agile software development in the organization. The main reason given is a lack of commitment of the ‘Business’ from the organization, who need to be involved as Product Owner, and mismatching strategies between Business and IT.

**Software implementation**

Capgemini offers implementation services of partners’ software. Examples are Salesforce CRM and Oracle Enterprise Resource Planning (ERP) software platforms. Such large standardized software packages, also called ‘out-of-the-box solutions’ carry many standardized business- and IT processes. While the adoption of standard business processes forces companies to conform to new ways of working, the implementation of new software as results in other and more technical challenges. New software applications have to be embedded into the client’s current IT landscape, which is a complex infrastructure of many different systems and processes. Fig 3.7 displays an example of an IT landscape, in which the interdependence between applications can be seen. Small applications have relatively little implementation complexity at the outside of the landscape, the more one moves inwards, the more these applications are intertwined. Implementing large software packages is therefore a complex undertaking, since changes in one area of the landscape can have major consequences for IT processes on the other side of the landscape.

> ‘Many organizations have an existing IT environment. One of the most important characteristics is that you have to make many changes in your landscape to embed new initiatives. This means you suddenly encounter the complexity of your existing IT landscape, its processes and everything that is there.’ - IT governance consultant -

**Conclusion**

This chapter addressed RQ1: ‘What is the Applied Innovation Exchange and how does it operate?’. What has been seen is that the AIE itself is no individual business unit, but an initiative to support the existing business units of Capgemini. Who or what business unit will address the new type of client requests is yet unclear however. The shifting nature of the development teams in the CoZone could be a challenging aspect in regards to the project’s flow. As the project runs as a typical innovation funnel, it would be desired to have team members committed to the project from idea generation to final delivery. However, sponsored projects would enable the possibility to assign experienced consultants to projects permanently.

Furthermore, the innovation process shows several client
meeting moments that could not only be used for client validation, but also provides the opportunity to discuss implementation complexity. An important capability that may be used here is the ASE that can guide such creative client meetings. As stand-ups are held at the end of each week, brief client sessions could be held in an afternoon. The larger validation sessions with clients offer room for more extensive sessions. Concluded from the ASE’s common work approach, extensive creative client meetings may not take longer than three days. What other capabilities might be beneficial to the innovation process is unknown. The aim to innovate as an ecosystem might provide interesting value, since a strong set of capabilities can be gathered by choosing the right partners.

In case the innovations are turned into IP-solutions by creating standardized products, the problem that the innovation addresses should have sufficient similar use cases, in order to provide value for Capgemini, while implementation complexity should be assessed for multiple clients.

Lastly, the step from Devise to Deploy captures the transition from a POC to a Pilot, while in Deploy the application is scaled and embedded in the IT landscape. Although the aim is to deploy in a DevOps approach, there is a chance that the client has not organized his IT department as such, and might even struggle with Agile development due to little alignment between Business and IT. These general challenges within the IT domain are therefore assumed to also relate to the AIE as IT initiative. This may consequentially affect implementation complexity.

Fig 3.7 Example of IT landscape (blurred for security reasons)
After the literature review, first answers have been given to RQ2 'What are the main barriers to innovation implementation?' and RQ3: 'What are enablers of innovation implementation?'. In this chapter, the topic of innovation implementation is discussed with findings from the field, for which case studies have been conducted with consultants from Capgemini. The goal of the case study was to obtain a further understanding of challenges and enablers of innovation implementation in the IT domain. This chapter provides a brief introduction of the cases and the different roles of the interviewees, followed by the findings.
Case description case study 1

The first round of case studies has been conducted with consultants involved with the implementation of Capgemini's IP-solutions. The goal of this case study was to gather insights in the barriers and enablers during implementation of the solution. Summaries of the case studies can be found in Appendix E Case Study Summaries.

Solution lead, Digital Industrial Asset Lifecycle Management (DiALM).
The DiALM is an IP-solution developed by Capgemini for clients in the industrial sector. In the near future, it is expected that many industrial assets can operate independently and wirelessly. Such assets generate an extreme amount of data, which ends up at many different places. DiALM is a cloud platform that functions as a dashboard where all that data comes together and can be accessed simultaneously. The interview has been conducted with the solution lead, who is responsible for the sales of the platform.

Solution architect, Transform Police (t-Police)
This interview has been conducted with a Solution Architect with a background in Oracle technology for almost 15 years. By the time of the interview he was involved with the implementation of t-Police for the Finnish police department. t-Police is a shared service application for police forces that enables higher efficiency and cost savings via standardized and combined processes. The solution is a replacement for existing IT processes and therefore has to be implemented in the existing client IT landscape.

Solution architect, Security Operations Center
The Security Operations Center (SOC) is a shared service offered by Capgemini to identify and prevent cyber threats for clients. IT processes of clients are monitored and analyzed, and in case of a threat, a report is sent to a delivery team in-house that can act upon the threat. The interview was conducted with a solution architect from Capgemini, who has been involved with Infra-projects within the domain of cyber security for almost 20 years.

Solution lead, Odigo
Odigo is a cloud based contact center from Capgemini, which functions as a layer between customers and the client organization. The software directs all incoming communications, such as telephone, texts and e-mails, from the customer to the right receiver at the other end. The platform enables clients to balance customer communication with employee availability efficiently. Odigo is not built by Capgemini itself, but obtained via the acquisition of the French founder of the platform. The interviewee was a solution lead, who has handled the sales of several Capgemini offerings for more than 10 years.
The second round of case studies has been conducted in a more explorative manner, by having the interviewees reflect their story directly on the AIE framework. The goal was to find additional implementation challenges and enablers that directly relate to a particular phase in the AIE framework. Summaries of the case studies can be found in Appendix E Case Study Summaries.

**Senior management consultant DCX - Thunderhead**
Thunderhead is a partner from Capgemini that offers a cloud service that can provide real time insight into customer journeys. The solution tracks customers via multiple channels and can directly report on their behavior. It enables clients to act upon their customers’ journeys directly, for instance if those customers get stuck at a specific point in the customer journey or are displaying dissatisfaction, such as contract termination. During the interview, the implementation of the platform at a Dutch energy supplier and a Dutch bank were discussed. The interview has been conducted with a senior management consultant from Capgemini’s Consulting business unit, Digital Customer Experience.

**Agile coach/former solution architect – General experience**
This interview was conducted with a former architect, now Agile coach, who had done many implementation cases in the past. The interview became more general about the challenges that arise during development and implementation, with a focus on the collaboration between Development and Operations.

**Senior Big Data architect – Data warehouse project**
This interview was conducted with a senior Big Data architect. He reflected upon an implementation case within data warehousing and reporting. The object of implementation was a new piece of software for reporting from the data warehouse, executed for a large manufacturer of imaging and optical products (camera’s, printers etc.).

**Business development lead – Smart Digital Store**
The concept of Smart Digital Store (SDS) is a development from Capgemini and driven by Intel technology. The Smart Digital Store is a platform consisting of multiple applications for retail environments. An example of an application is the Virtual Wall. The interviewee was a business development lead, with a background in Infrastructure Services. As part of the Intel Alliance, he scouts for business applications, using Intel technology.

**Portfolio manager Infrastructural Services – General experience.**
This interview was conducted with a consultant that had formerly been active as portfolio manager within Infrastructure Services. As consultant from Infra, he had been involved indirectly with implementation projects and reflected on his general experience with application deployment.
Results

The findings of both case studies are brought together to give answers to the two research questions presented in the beginning of this report: RQ2: ‘What are the main barriers in innovation implementation?’ and RQ3: ‘What are enablers of innovation implementation?’. The answers are grouped as such.

What are the main barriers of innovation implementation?

Resistance to change
Innovation implementation could have an impact on various employees of the organization’s employees for several reasons. As a result, these employees may become resistant to the innovation.

Adopting new ways of working
En example can be illustrated by the case of t-Police, which is a large ‘out-of-the-box offering’, carrying many standardized business processes. With implementation of this standard software, the adopting company has to conform to completely different organizational routines. As mentioned during the interview, the clients often do not recognize themselves in the new way of working and find themselves unique. When discussing the adoption of the innovation, the client then faces the choice of adopting the software completely standardized or getting it more tailor-made for his organization. It is often witnessed by the architect that the client chooses to conform more to their younger peers, when it requires them to learn new skills to handle the technology.

“But then I don’t meet my KPI’s, so that solution is not for me”. And that is often because those organizations are set up vertically and not Omnichannel.' - senior management consultant DCX -

Pride
In case an innovation is brought in from outside, the responsible manager or department of that particular domain might also be less favorable towards the new initiative. When the innovation takes over someone’s tasks or responsibilities, pride could be a source of resistance. As an example from the Thunderhead case; the digital product enabled the client a completely new way of customer journey mapping, which then both affected the IT department and responsible manager, who had wished it was their own initiative. Because innovations and software developments are most often aimed at supporting and providing value for the business side of the organization, there could be a difference in attitude towards the innovation between different departments of the organization. The t-Police architect also indicated that he experiences different attitudes towards technologies that are being brought in from outside. The architect mentioned that one of the reasons his solution could not be sold to the Dutch police department was that their IT department rather develops innovations themselves.

‘You see for example that the sales side of the business organization finds Salesforce great, while the IT club of that organization thinks: “Well.. we could do that ourselves.”' - solution architect T-Police -
IT Operations department

The client’s IT department is in many cases responsible for maintaining the innovation within the organization. This responsibility might evoke different kinds of concerns towards new initiatives. Especially dealing with ‘on-premise’ implementations, where software is installed on the client’s servers, the applications may need to interact with many other embedded software applications. This complexity could result in insecurities at the IT Operations department of the client, who are responsible for keeping the current system stable. New initiatives may cause instability, and are therefore not considered ideal. Operations departments use acceptance criteria that developers have to meet, before developments can be embedded in the system. If these acceptance criteria are neglected or Operations is not aware of new developments, implementation can occur laboriously and result in project delay. Due to a difference in mindset between Development and IT Operations, collaboration is perceived as challenging.

‘The average IT Operations, and then I mean the average waterfall approach, are quickly inclined to talk about stability. They know what to do to keep the current environment operational’ - Agile coach -

The same difference in mindset can also be a challenge when combining traditionally developed software with modernly developed software, which was mentioned by the Infra portfolio manager. ‘traditional people’ (in favor of traditional software development) desire extensively designed and tested software before implementation, while ‘modern people’ (in favor of more rapid development approaches) ideally want rapid deployment with little testing, to meet the rapidly changing customer demand. This conflicting mindset was mentioned as challenge in application deployment. Many companies apply both approaches for different types of applications and the challenge lies at how to integrate the two different types of development. Poor integration might result in poor system performance.

Business value

A topic treated more from a sale’s point-of-view was the added value of the innovation for the business. In almost all situations, the client only decides to adopt an innovation when it delivers sufficient value to the organization.

Innovation uncertainty

As mentioned by some of the interviewees, the innovations within Capgemini are often developed with a technology push; initiatives are enabled because of new technological developments. The overall perception however, is that in many development cases too little is known about the exact benefits the technology provides for the client. Especially when dealing with emerging technologies, the challenge mentioned by the solution lead of the DiALM was that there are no similar projects conducted yet that can used as reference while developing a first business case. Showing the value of innovation is therefore seen as a difficult task, especially when no concrete application has been developed yet.

‘You’ve got a POC, the concept works, with innovation we can deliver value to.. And then you encounter the next wall. Then the question is literally: “And, now what? Why
should we implement all our assets with drones? What is this going to cost us and more importantly, what will it gain us?’ - solution lead DiALM -

Knowledge elicitation
In order to make an estimation of the potential value that the innovation could deliver, the right client knowledge is needed as input, which is often not easily obtained. Also when a software solution has already been built and implemented elsewhere, client specific knowledge is still needed to setup the solution in such a way that it delivers maximum value for that particular organization. According to the solution lead of Odigo, a cloud platform with many different settings can come across as complex for the client, when he has to decide how to apply it for his organization. It could be that knowledge is needed from one or more organizational levels (strategic, tactical and operational). Having the right people involved and having them understand each other as well is also believed to be one of the biggest challenges, which was for example discussed in the SOC case.

‘I have to say that that is one of the biggest challenges. To, let’s say Strategic, Tactic and Operational level, have the right people involved and that they also understand each other.’ - solution architect SOC -
What are enablers of Innovation Implementation?

Involving the right people
With the findings on innovation implementation barriers also came enablers of innovation implementation. Implementation projects that have their effect on the organization’s employees are ideally accompanied with change management programs. An important first step during the project was believed to involve the right stakeholders. This not only included top management, but also end-users, managers and members of the IT department. These stakeholders not only need to be involved for providing content to the client specific application of the innovation, but also to support the adoption throughout the entire organization, which is done by using ‘Champions’. Both the Thunderhead case as t-Police mentioned that these Champions can then in turn learn other members of the organization about the innovation and get employees excited about adoption.

Workshops
During implementation of t-Police, the selected group of people went through several workshops, where they provided insights for the development team on how they would like to use the innovation. The stakeholders were shown demos off how the solution looks like and works. The POC is eventually an important means that demonstrates what value the innovation can deliver for their business. Other cases where this approach has been mentioned were the ones from Thunderhead and Data warehousing.

‘And that we call a familiarization phase, in which you involve these people; the core-users, the business process owners and the people that are important for the adoption on that side. You involve them and say: look, this system works like this.’ - solution architect t-Police -

Standardized templates
As mentioned by the Big Data architect, standardized forms and templates are a helpful means to apply in such first client meeting. These templates could subsequently support the Business in providing the requirements for the development team.

Cloud platforms and connectors
One returning enabler during the interviews was offering the product via cloud computing, which is a type of offering where the software runs on external servers and could be offered as a service. By choosing to offer ‘Software-as-a-Service’ (SaaS), the innovation could be implemented without affecting existing IT landscape of the client. This thereby reduces the risk of altering existing IT processes and systems, and implementation is believed to be relatively easy, compared to an on-premise implementation. In such a situation the software is ‘laid over’ the existing IT landscape. By using ‘connectors’, the platform can be connected with the required systems of the client. These connectors can convert the incoming and outgoing data to the right format. Application Programming Interfaces (API’s) need to be built for the solution, which subsequently handle the different data requests inside the platform. For the larger solutions discussed in the case studies, the most common connectors have already been built during development of the platform. According to the business development lead of the Smart Digital Store, these are often sector based, since within sectors there are often similar types of landscapes. As example, a Microsoft connector built by Capgemini or one of its partners can subsequently be used for other clients that run on Microsoft as well.

That’s the power of this solution, that we can wrap it around the existing architecture. So a true cloud solution and no 'rip & replace'. We don’t replace anything.’ - Senior management consultant DCX -

Fig. 4.4 Offering software via the cloud
From the cases treated, the platforms Odigo, Smart Digital Store, Thunderhead, DiALM are all cloud offerings. Although the t-Police offering could have been done via cloud, cloud and police organizations remains a sensitive topic in regards to privacy and security, according to the solution architect. Although cloud software can be implemented while avoiding the complexity of a client’s IT landscape, there still needs to be engaged with the IT department to gain insight in the client’s landscape for implementation and receive the necessary security access.

‘With Intel and Cap we try to build as many standard connectors as possible. We usually work sector-based: within the sector are often familiar landscapes. In Europe you know that half runs on SAP and that there are five other options and flavours that are standard.’ - business development lead, Smart Digital Store -

Validated business case
As said, the absence of a concrete business case is believed to be one of the main reasons a client decides not to adopt a certain innovation. The business case includes all benefits and costs for the client’s organization, and when significant benefits are offered, the hassle of implementation could be considered relative. As was mentioned in some of the interviews, the adoption is then forced top down through the organization by management. The problem with innovation however, is that it is often so new that it is difficult to predict what benefits it can bring, especially when there are no similar cases to use as a reference. It is believed to be important to start-off with assumptions for the client’s business and then to validate those assumptions during the POC and Pilot. At the time these phases of the project are completed, the project should have a validated benefits case and should be able to flow fluently over in the Deploy. This validation approach has both been mentioned by the solution lead of the DiALM and the business development lead from SDS.

‘If you would have a good benefits case here, but it is technically not supported that well, the client is still likely to say, “you know, lets add another 6 weeks. I would really like to see how this turns out” - solution lead DiALM -

Modular solution offering
To increase the adoption likelihood of a new software offering, the software could be built up modularly. In this way, clients have the ability to adopt separate parts of the solution instead of being obligated to adopt an entire software package. Partial adoption is believed to have less impact on the current organization, is less costly and thereby less likely to scare off clients. It could also enable a phased implementation approach where the individual solution parts can deliver business value independently and relatively quickly after adoption. The Smart Digital Store is for that reason built up modularly, containing several solutions that can be implemented separately.

As was seen by the business development lead of Smart Digital Store, frond-end solutions are sold relatively quickly in retail, while larger back-ends can only be sold via follow-up projects.

‘And the next step is two connect those two. It’s a sort of roadmap you develop with the client, because everybody moves step by step, and you want to show business value with each step.’ - business development lead, Smart Digital Store -

Automated testing
As an answer to the integration challenge of traditional- and modern software development, automated testing was mentioned. By building a proper standardized test environment that incorporates key functionality tests, developed software could be tested automatically during the development process. Instead of completing the entire development stage, pieces of software could already be tested in between, for example during the night time. This would enable continuous delivery, which is required for a DevOps development approach.
Discussion

At this point answers have been obtained for RQ1, RQ2 and RQ3 through literature reviews and interviews. In the following part of the report, all insights from the previous chapters are combined in a discussion.

It is safe to say that many variables play a role when it comes to the implementation of innovation, which is in the case of the AIE when they go from Devise to Deploy. Which answers were given during the interviews and what was perceived as challenge during implementation depends on the interviewee’s role within the project. Overall, the solution leads, who are mainly responsible for sales and translating the wishes of the client into project requirements had a more sales oriented point-of-view, while the architects mentioned more technical barriers. Also the purpose of the solution and how it is offered played a role: a large transformative solution, such as t-Police, has far more impact on an organization than a supportive security tool such as SOC. The purpose of the innovation that is developed by the AIE thus influences for a large part how the step from Devise to Deploy should be taken.

When devising business applications for instance from drones, 3d-printing or virtual reality, challenges could emerge on both the business side or ‘front-end’ of the organization, and the ‘back-end’. At the front-end, tasks or even entire jobs could be replaced by technology, which consequentially triggers resistance from employees or departments. Also employees that need to handle the new technology can show distrust towards innovations, as was seen in the case study. This is in line with the innovation attributes from Rogers (1995): innovation complexity and compatibility. The more complex the innovation is perceived, the lower the rate of adoption within the organization, while less compatibility with current routines also reduces the willingness to adopt. An important enabler here is the early involvement of key stakeholders in the process, and to co-shape the application for their organization. Familiarization workshops and Champions are examples of such enablers.

In the cases has been seen that engaging with different stakeholders during implementation projects can be challenging. An identified challenge was obtaining the right client knowledge to determine the innovation’s value for that particular organization. This often requires different kind of information from different levels of the organization. As seen in the literature, tacit knowledge is an important contributor to problem finding, problem solving and prediction & anticipation (Leonard and Sensiper, 1998). Due to the innovation’s complexity, the client is often not aware what kind of information is required. Therefore, the tacit knowledge of the client is difficult to access by the consultants of Capgemini. This finding is in line with the study from Carlile (2002), who labeled these knowledge boundaries both as a source and barrier to innovation. Literature showed that these knowledge barriers can be overcome by using the right boundary object. Standardized templates have already been found as a boundary objects that may be able to turn tacit knowledge into explicit knowledge. If a standardized template is applicable to an innovation development project might however be questionable.

Also at the back-end of implementation, many challenges can emerge as well. As the developments of the AIE involve software applications that may have to be implemented in the existing IT landscape of the client, implementation challenges could arise there, as those landscapes are comprised out of an enormous amount of IT processes and systems. Complex innovations may require a company to make enormous architectural changes in the IT landscape, which consequentially results in higher costs. The innovation attribute Relative Advantage from Rogers (1995) (‘do the benefits outweigh the costs?’) is in many cases the biggest determinant for adoption. These major landscape alterations should thus be countered with significant value in order to build a proper business case. Therefore, the impact of the innovation on the existing landscape should be assessed during the innovation process.

Offering the software solution via cloud technology is an important enabler for implementation, since it avoids affecting the existing IT landscape and thereby creates a higher Relative Advantage. Using cloud computing would also enable the possibility to use the innovation for Capgemini’s IP-portfolio. In that situation, the AIE should look into what connectors need to be built, not only for the client within the innovation process, but also for potential clients with similar use cases.

Another challenge found in the case studies was the collaboration between Development and IT Operations. Whether the solution is going to be offered via the cloud or implemented into the existing IT infrastructure, the Operations department has to be involved at some point in the process. Due to conflicting mindsets, this is generally perceived as constraining by Development. Development is in favor of rapid changes, while Operations strives for stability in the current IT landscape. This conflicting mindset is also perceived as a challenge for organizations to move towards a DevOps
development approach. As Smulders (2004) discusses the conflicting learning styles in NPD, this theory might also be applicable to the IT domain, where Development would have the more conceptual way of thinking, while IT Operations applies a more concrete way of thinking. As the conflicting mindset of the two disciplines is perceived as a challenge during innovation processes, both should need to learn how to switch to the opposite learning style. As discussed in literature, this takes time, support and consistent interaction with people of the opposite thinking style.

However, the pragmatic boundary between the two disciplines, where one does easily accepts sacrifices of his invested and embedded knowledge in favor of the other, can be addressed for the AIE’s innovation process by applying the right boundary object. The boundary object should enable Development and Operations to transform their knowledge into new knowledge (Carlile, 2002).

Now that the research findings have been discussed, the problem context will be delineated in the next chapter Design Vision to formulate a design statement.
As was discussed in the previous chapters, many variables influence the transition from Devise to Deploy. This chapter concludes from the previous discussion and thereby delineates the specific challenge to address. A design statement is formulated to give direction to the ideation phase, together with set of design criteria based on the findings from this report.
Design statement

Delineation of the problem context
In the previous chapters, many challenges have been discussed with regards to innovation implementation. Probably by far the largest barrier is the business case, which basically comprises all aspects of the innovation project with regards to investments and returns. In the situation that the business case is found insufficient, clients do not even consider adoption of the innovation and the project comes to a full stop. For many innovation cases, it is however difficult to predict what exact benefits they bring and therefore difficult to anticipate on this. As has been seen, innovations that require the organization to make large architectural IT landscape alterations can lead to an insufficient business case. Besides validating business assumptions to determine the innovation’s value, its impact on the current IT infrastructure should also be assessed during the innovation process.

Involving the right stakeholders
Having the right people involved in the process has been determined as an important enabler for implementation success. Two important stakeholders have been identified from whom the knowledge can add significant value to the innovation process, namely the Business and the IT Operations department of the client organization. The Business is involved to provide the development team with requirements to work with. Examples of Business stakeholders are business managers and end-users within the company. Operations is involved to contribute their knowledge on the maintainability of the initiative. IT Operations captures members of the IT Operations Management department, which could for instance be a type of architect, such as solution-, business- or enterprise architects.

Development in in this case defined as the AIE, although in reality it may also be a specific business unit of Capgemini or a co-creation team of both Capgemini and client-developers. A common division of involvement throughout software development projects is displayed in figure 5.1, where can be seen that Development decreases over time, while Operations’ involvement...
increases. The Business is continuously involved for a small part. By involving those stakeholders, it is assumed that the desirability and feasibility of the innovation increases, while a sense of ownership is created. This consequentially increases their willingness to adopt and thereby eases the step from Devise to Deploy.

The challenge
Collaboration between the stakeholders is perceived as challenging. Considering the fact these are general challenges within IT, they are expected to form a challenge for the innovation process of the AIE as well. While the Business has to contribute tacit knowledge to determine innovation value, the opposing mindset between Development and IT Operations also forms a barrier to successful collaboration. Whether the innovation falls within or outside the current IT infrastructure, the knowledge of Operations can add significant value to the innovation, although the Development party perceives them as ‘innovation killers’. The knowledge boundaries between the stakeholders thus has to be overcome by applying a boundary object that supports collaboration and stimulates alignment between the stakeholders. This boundary object should be able to transform the knowledge of all stakeholders into new knowledge. As a result, work method has been chosen as type of design outcome. This has led to the formulation of the following design statement, which is presented below.

‘To design a work method that supports collaboration between Business, Development and IT Operations and that creates a shared vision for the innovation process.’

Although the case study provided several technical enablers for innovation implementation, such as connectors and modular offerings, with the formulation of the design statement these findings have fallen out of scope. It is assumed that the choice to apply such approaches has to be made for each individual innovation project.
Design criteria

Within this scope, several design criteria and assumptions have been devised to give guidance to the ideation process.

Criteria
- The design involves Developers, IT Operations and Business people (Chapter 5)
- The design creates a shared vision for the innovation process (Chapter 5)
- The design supports the collaboration between Development, IT Operations and Business (Chapter 5)
- The design supports communication between Development, Operations and Business. (Chapter 5)
- The design overcomes all three knowledge barriers: Syntactic, Semantic, Pragmatic. (Chapter 2)
- The design stimulates creativity of the three parties (Chapter 4)
- The design transforms knowledge into new knowledge (Chapter 2)
- The design supports communication on Strategic, Tactical and Operational level. (Chapter 4)
- The design involves discussing architecture changes (Chapter 3)
- The design creates strategic allignment (Chapter 3)
- The design fits within the work method of the AIE (Design Thinking, Lean Start-Up, Agile) (Chapter 3)
- The design has a generic applicability to the innovation process (Chapter 3)
- Frequent client sessions fit into one daypart. (Chapter 3)
- Intensive client sessions have a maximum of 3 full-time days (Chapter 3)

Assumptions
- It is assumed that a large, complex application is build.
- It is assumed that involvement of Business benefits the desirability of the solution and thus eases the stop from Devise to Deploy.
- It is assumed that involvement of Operations benefits the feasibility of the solution and thus eases the step from Devise to Deploy.
- It is assumed that the AIE fulfills the role of development.
- It is assumed that the application needs to communicate with existing software application within the client’s IT landscape.
- It is assumed that the business provides the functional requirements.
- It is assumed that Operations is involved for the nonfunctional requirements.
- It is assumed that the technology used is new to all parties (no previous or example cases exist).
This chapter briefly describes the ideation process that has taken place to address the formulated design statement. Inspirational sources and boundary objects are presented, together with a description of the iterative design approach that has been taken.
Inspiration

The proposed design statement has been addressed with an ideation process, which has ultimately led to a final design. This chapter briefly describes the iterative ideation process that has been taken and sources of inspiration that have been combined to come to a solution.

Parallel thinking: Disney’s Creative Strategy
Firstly, parallel thinking methods that stimulate particular thinking styles have been explored. Such a creativity method is the Disney’s Creative Strategy tool, where a thinking process is divided into three consecutive steps. As the name already gives away, the origin of the approach lies at Walt Disney, who applied three ‘different kind of Walts’ during all his meetings. Although not originally developed by Walt Disney itself, the thinking process that combines the imagination with reality has become a helpful tool for strategy development and idea generation. In three steps, the users of the tool go from Dreamer, where they imagine the solution that they desire, to Realist, where they think about how they would like apply it in reality, to Critic, where they, think about the constraints and ‘why not’s of the idea (Elmansy, 2016). The Disney’s creative strategy tool has eventually become a source of inspiration, since such a parallel thinking process forces its users to think in a particular style collaboratively and could therefore be a helpful tool in synchronizing the mindsets of the AIE’s project stakeholders.

Boundary Objects
Parallel to the exploration process of parallel thinking methods, literature has been explored for suitable boundary objects that could be applied within the context. According to Carlile (2002) a successful boundary object:

‘Establish a shared syntax on language for individuals to represent their knowledge’
‘Provides concrete means for individuals to specify and learn about their differences and dependencies about a given boundary’
‘Facilitates a process where individuals can jointly transform their knowledge.’

Based on these criteria, different types of boundary objects have been explored. Eventually, two approaches have been picked for further application exploration, namely Lego Serious Play and Innovation Roadmapping.
The concept of Serious Play is derived from the playful interaction between children. The mental state that is applied during such an interaction stimulates one's curiosity and willingness to see and understand settings from different angles. Being able to view a problem from different perspectives is an important capability to possess in innovation management, because complex problems are often dealt with. As knowledge boundaries need to be overcome, Serious Play can provide significant value in multidisciplinary context when facilitated efficiently. (Hansen et al., 2014). Serious play externalizes fuzzy mental models and turns them into representative prototypes to spark conversation. (Michael Schrage, 2013). Serious Play can be applied in all kinds of different settings, with different tools, technologies and techniques. In a multiple case study various different settings have been observed where Serious Play has been applied while using Lego. The findings of this study were five major benefits in trans-disciplinary communication (Hansen et al., 2014). These benefits are briefly discussed below.

The facilitation of collective exploration
The process of building a model, followed by telling the story behind the model serves two goals. (1) It provides individuals the means to express their vision in a detailed way, enabled by the many degrees of freedom that Lego can offer. Consequently, (2) the audience of the story obtains a deep understanding of one's vision. In particular introverted people are found to be more expressive by communicating through Lego.

The emergence of collective understanding
Using Lego models stimulates metaphoric thinking. From large objects built to small bricks, each object can represent a metaphor. Metaphors are powerful in communication and are simultaneously of cognitive importance.

Collective concentration and focusing
Maintaining a high level of concentration throughout meetings or workshops is a difficult task. It was found that the playfulness and interaction between fingers and brain is beneficial to the concentration level during the session.

The emergence of a shared and sufficient language
Trans-disciplinary meetings require a mutual language between individuals. As Business English is often applied, discussing a complex problem might be difficult when this is not the native tongue for one of the participants. The 3d-modelling aspect of Lego enables participants to express themselves clearly, without needing a large English vocabulary. Compared to drawing, people express themselves more confidently with the manufactured Lego bricks.
The emergence of individual- and collective commitment.

Whether it was a model that was built individually or collectively, the study showed that participants developed a form of ownership over the 3d-models that they had built, and that their models consequentially represented something meaningful.

The method

To apply Lego Serious Play (LSP) efficiently and to construct reflection and dialogue, the process has to follow three basic phases: Challenge, Build and Share. A facilitator proposes a building challenge to the participants, which subsequently is built by them. This model represents the participant’s reflection to the building challenge. These reflections are then shared to the other members of the session. This is an iterative process where these three steps are constantly applied in that specific order, and where the facilitator constantly proposes new building challenges. Applying LSP requires a skilled facilitator to guide the entire process efficiently. To have sufficient reflection, the minimum length for one session of LSP is 3-4 hours. Ideally sessions of one full day are applied in order to dive deep into a problem (Lego, 2016). An example of an LSP session can be found in Appendix H Ideation.

Application of Lego Serious Play.

LSP is believed to be a powerful tool in multidisciplinary communication and addressing complex problems. It could thus also be a powerful tool during the innovation process of the AIE, where the three different stakeholders Development, Operations and Business have to collaborate successfully. By using Lego bricks, a shared vision can be created in 3d, while Lego also helps in the communication of implementation complexity.

Instead of discussing the complexity of IT landscapes in 2d, the metaphoric way of thinking enables 3d visualization of those complex landscapes, since the different applications could be represented through metaphors. This consequentially stimulates creative problem solving (Casakin, 2007). This is illustrated in figure 6.2 and figure 6.3.

One of the biggest disadvantages of the method is that it requires skilled facilitators. However, Capgemini already has a business unit specialized in creative facilitation, namely their Accelerated Solution Environment.
Innovation roadmapping

A different application has been explored by making use of roadmapping. Roadmapping as an activity has a wide range of applications and mainly captures visualizing a particular journey with its objectives. In this context it could be used to visualize the innovation- or technology strategy. Roadmapping as a process is highly effective in the early stages of innovation, where envisioning creates opportunities (Koen et al. 2002). Simonse et al. (2014) defined three characteristics for Innovation Roadmapping: Mapping innovation elements on a timeline, Time pacing and Synchronizing dialogue.

Mapping innovation elements to a timeline
Innovation Roadmapping is a process that involves mapping innovation aspects on a timeline, which requires three different actions: allocating time, ordering time and synchronization of activities in a time continuum. Innovation Roadmapping thereby creates order in a timeline that could for instance contain technology foresights, market developments and product line evolutions.

Time pacing
Innovation Roadmapping can have a positive impact on strategic alignment and time-related technology investments. The business strategy is translated into concrete milestones on the timeline, which subsequently helps managers to synchronize their activities. Time pacing is about using regular intervals and thereby creating ‘rhythm’ in the organization’s operational activities.

Synchronizing dialogue
The final characteristic of Innovation Roadmapping is the consensus-building aspect. The structured dialogue combined with the visual presentation of the innovation strategy supports an objective discussion and communication with stakeholders (Simonse et al., 2014).

Application of Innovation Roadmapping.
Roadmapping is a tool to visualize a strategy and set clear objectives to achieve a vision. Within the context of the AIE, the technology development is in favor of the client’s business strategy. The development of the application could be plotted on a timeline, while syncing the development’s objective to the client’s strategy. Since implementation might require the Operations party to make IT landscape changes, objectives that are formulated could also be plotted on a timeline. Through roadmapping, the strategy can be clearly translated into operational tasks, which would subsequently support communication between stakeholders from different company levels and thereby create alignment.
Iterative design approach

The final solution, which will be presented in the next chapter, has been developed with an iterative approach; throughout the process, concepts have been discussed several times with consultants from Capgemini. These discussions all took place in an open structure to exchange ideas and thoughts. After the formulation of the design statement, two initial meetings have been held, namely with the AIE CoZone lead and a senior ASE consultant, with the aim to validate first assumptions.

After a period of individual idea generation, two mini-concepts of LSP and Innovation Roadmapping were developed and discussed with a consultant from Capgemini who was positioned as portfolio manager at the Dutch police force. While she acknowledged the problem of development-operations collaboration, she also mentioned that she had never involved IT Operations in the beginning of a product development process and was inspired by the idea.

The concept was subsequently further developed by combining the concepts of Lego Serious Play and Innovation Roadmapping into one, and discussing this with an AIE innovation consultant and company mentor (AIE innovation designer). Additions have been made to the concept from the derived insights.

A larger validation round was held with three different IT governance consultants, who are involved with the AIE: together with several other governance consultants they are currently elaborating on the AIE framework for the Dutch office of Capgemini on the topic of governance. The concept that has been discussed during this round can be found in Appendix H Ideation. The insights from the separate discussions have eventually led to one more optimization round.

‘That vision of in or outside the existing organization may go back and forth 10 times. In my opinion, there can’t be just one session in the beginning where you build that vision.’ - IT governance consultant -

The most important change that took place after this step was dividing the concept of one single session into three separate sessions that could be applied on different moments throughout the innovation process. Several concerns and challenges have been mentioned that could not be addressed directly with optimization.

These concerns are therefore discussed in chapter 8 Evaluation.

Fig. 6.5 Iterations during the ideation process.
The former chapter presents the final design outcome of this project. It is the answer to the presented design statement from chapter 5 ‘To design a work method that supports collaboration between the Business, Development and IT Operations and that creates a shared vision for the innovation process.’ A thinking framework has been developed, which ultimately resulted in three different sessions for the innovation process.
The framework

Inspired by the Disney Strategy Tool, four different process steps have been defined, namely Inspire, Envision, Action with a continuous Reflection. The different steps stimulate a different style of thinking and each has its own purpose during the innovation process. Inspire is a short step, where the business strategy of the client is discussed, along with the need for innovation. In this step, the AIE inspires the client by showing what possibilities are out there. Envision is an ideation step, where a future vision is created collaboratively. Within Action, the vision is made actionable by setting objectives. Parallel to this is a continuous process of reflection, which forces the stakeholders to think about the constraints and ‘why not’s of the initiative. This framework can be applied throughout the Devise phase, while the thinking style shifts from left to right: The beginning mainly captures envisioning with brief reflections, while the end focusses on reflection and action, with brief envisioning steps.

SPARK, MONITOR and CHECK

The process steps can be executed during three different collaborative sessions, namely SPARK, MONITOR and CHECK, which all serve a different purpose and are to be held at different stages of the Devise phase. SPARK is an ideation session, where the three parties, Development, Operations and Business collaboratively create a product vision. MONITOR is a risk assessment session, in which major architectural risks are discussed and ideas are shared on how the innovation can be maintained. CHECK is a more frequent session that can be held during development and is meant as a risk management tool, where dependencies between Development and Operations are discussed. As the development process is an iterative process, one may move back and forth between the sessions when desired. With regards to time, the first of each session is expected to be rather lengthy, because of the large amount of new information that needs to be shared. Depending on the client, the exact length can vary from one to three days. Re-sits, however, are expected to be shorter, because less new knowledge needs to be discussed. Especially the SPARK and MONITOR are sessions where a skilled facilitator is required to guide the process accordingly.

Fig. 7.1 Process framework
The SPARK session is the first one of the three. The input for this session is the business strategy of the client, which functions as a starting point. (1) This strategy is presented on a timeline and, depending on the client, may have a timespan of 5 or even 10 years. Based on the strategy, the AIE has selected a set of technology-, market- and industry trends prior to the session that might be interesting for this client and his domain, and also presents these on a timeline. In the example, a timeline is shown of 10 years, although this may not be applicable for every client and sector, and could therefore vary from project to project. (2) Through a collaborative brainstorm, the participants share the opportunities and threats they see and map these on the timeline. Product- and service ideas could range from now to 10 years. Ideas are subsequently selected based on a reflection to the business strategy and perceived business potential. Important in this step of the process is the opportunity mindset and to keep constraint-thinking to a minimum. The creative process is elaborated on page 53.

(3) The selected ideas are subsequently clustered into Now, Near Future and Future, which is done based on expectations. Now is something you could start building directly, Near Future could be achieved in a couple of years, while Future captures a moment further in time. The exact timespan would vary from project to project, depending on the client’s domain and the chosen type of technology. Following the LSP principle of Challenge, Build, Share, the participants continue the session with building individual models in which they visualize product and service ideas. Throughout the session, shared 3d-models are built for each cluster. By doing this iteratively, sync is created between the Now, Near Future and Future. Those models can subsequently be turned into short-term objectives, long-term goals and a future vision. By conducting this process collaboratively, a shared vision is created between Development,
**Presentation of pre-selected technologies and trends**

**Presentation of business strategy**

**Brainstorm & Plotting ideas on timeline**

**Reflect to strategy & Select on business value and potential**

**Building product vision with Lego**

**Iterative process**

**Identify business Risks**

**Validate assumptions**
Operations and Business of what should be the outcome of this project in the short-term, while syncing this with long-term goals.

As a first session, uncertainties will remain about the innovation and the benefits that it could provide. For this reason, the reflection step is kept brief: (4) key business assumptions should be defined for validation and addressed using the Lean Start-up principle. If the newly found information has enormous impact on the created vision, a new SPARK session could be held to collaboratively re-shape the vision.

MONITOR
MONITOR is a larger reflection session that can be held in mid-Devise to identify the big technical risks and impact, and to further develop the business case. As the major business risks and assumptions have been validated at this point, the technical challenges are put into the equation. (1) These findings are first discussed in a brief envisioning step: what impact did the validation steps have on the created product vision? (2) When consensus is reached, the client’s current IT architecture is evaluated and it is discussed how the innovation can be implemented for the client. In case there has been decided to turn the innovation into an IP-solution, the assessment should be made for potential clients with similar use cases.

When the decision is made to implement the innovation within the existing IT landscape, the relevant part of the architecture can be built with Lego to support communication during the session. Important first questions to ask are: ‘what constraints do we see?’ ‘What can we expect?’ (3) By reflecting to the established product vision and going through an iterative process of discussing and altering the 3d-models, consensus can be achieved. Insights will be obtained on what architecture changes or solution changes have to be made for successful implementation, while looking further ahead in time. The decision could be made to work around the existing infrastructure by building a new environment in the cloud, which could also be discussed through the use of Lego bricks. (4) Subsequently, the insights are plotted on a timeline, ranging from short-term objectives to long-term goals. On this timeline is described how the solution and IT infrastructure should develop over time, such as changes that have to be made in the architecture that would enable innovation implementation, both short-term and long-term. Development objectives that are required for successful implementation, such as building the required connectors and API’s, are also plotted on the roadmap. Through the process of roadmapping, a ‘sync’ between the objectives of both parties can be established. The outcome of MONITOR is thus a shared technology roadmap and a first insight in the business case: how do the earlier defined benefits weigh against the expected transformation costs?

CHECK
The third session, CHECK, is relatively smaller in set-up than the other two and can be held more frequently, for example once every two weeks during a stand-up. In the end-Devise stage, the product has already become more concrete and key process assumptions can be validated through this step. (1) Similar to the MONITOR session, recent insights are shared during a quick envisioning step, where first an agreement needs to be established. Compared to the other two sessions, CHECK is mainly focused on the short term objective. (2) This objective subsequently functions as a reference point where both Development and Operations reflect to from their current process: Development looks from the application that is being built, while Operations reflects from the architecture environment that is currently being transformed or built.

The next step is to define the dependencies between the two and which key assumptions need validation. (3) The functionalities that must be tested need to be identified, and if required, what kind of alterations should be made to either the architecture or the application. (4) The outcome of this session are more concrete objectives of what should change in the development process.
(1) Establish agreement on product vision

(2) Build relevant part of IT landscape

(3) Iteratively make changes to solution and architecture

(4) Solution development

- Set goals & Synchronize
  - Architecture development
  - Short-term objectives
  - Long-term goals
  - Vision

Fig. 7.4 The MONITOR
CHECK

(1) Establish agreement on short term goal

‘How do we want to apply this?

(2) Reflect to goal & Discuss dependencies

(3) Iteratively make adjustments to establish agreement

(4) Solution changes
Set goals & Synchronize
Architecture changes

Fig. 7.5 The CHECK
Continuous engagement
Trends and developments are ongoing and uncertain phenomena. Assumptions based on those trends and technologies should therefore be validated continuously. This should not only be done during the project itself, but also on a long-term basis. Constantly assessing the emerging technologies and their impact on the current strategy of the client and, if needed, invite them to a SPARK to identify new opportunities.

Preparation
There are several things that need to be prepared for the client visit. As a continuous step, the AIE should be up-to-speed with the latest trends and technology developments, which occurs via its eco-system. Apart from the AIE’s own eco-system, Capgemini also possesses its capability TechnoVision, which is a large network of CTO’s and experts that continuously share the latest technologies and trends. Furthermore, the AIE should gain insight in the current business strategy and business value chain of the client, which should give a first idea about what kind of innovations and technologies might be interesting for this particular client.

Since the innovation adoption has to be supported by both Business and IT Operations, it is important to invite the right stakeholders into the project (i.e. Champions). Markham and Aiman-Smith (2001) defined several characteristics of a Product Champion that contribute to NPD. These include recognizing technology and market opportunities, adopting projects as his own, committing personally to projects, generating support from other people in the organization and promoting vigorously for the initiative. For the IT Operations stakeholder it is also important that he has a positive attitude towards change. A champion has to be found however, since these characteristics are not easily created.

Fig. 7.6 Long-term continuous engagement
Fig. 7.7 Preparation objectives
Facilitating the sessions
For successful execution of the different sessions, a skilled facilitator is essential. Especially SPARK and MONITOR are sessions where the participants build models collaboratively and therefore need proper guidance in order to accomplish. An important capability that Capgemini already possesses is the ASE, which is specialized in facilitating creative programs.

The facilitator is responsible for guiding the entire process of the session and to create the perfect ‘flow’. Mihaly Csikszentmihalyi (1996) originally presented the concept of flow, which captures the idea that creativity is at its fullest potential when participants are committed and enjoyed. Therefore, the right balance should be maintained between the challenge and the skill level of the participants.

For this reason it is strictly advised that the first of each session starts with ‘skill-building’ exercises, which are small tasks that get the participants familiar with translating their reflections into 3d-models. An example would be a round of introductions, where participants introduce themselves through building and presenting the 3d-model. Gradually increasing complexity of the building challenges is advised in order to create flow and have efficient LSP sessions. Although the facilitator is neutral during the session, he has a large influence on the process and should maintain an open-ended approach. He has to obtain knowledge about the problem in advance, although it could be required to devise suitable challenges and probes on the spot (Lego, 2016)

Also during the ideation steps, the facilitator should create the right culture for the session. For ideation and gathering creative answers, the general rules are Shared ownership of ideas, Postpone Judgment, Dare to Freewheel and Quality through Quantity. During the ideation session it is important to have participants elaborate on each other’s ideas and to establish a culture where everything can be said: crazy ideas do not exist.

The SPARK session makes use of the familiar associative technique, the Brainstorm, but there are many others. Several examples can be found in the Appendix I Creativity Techniques. Selection of ideas should be done with the entire group, for example via pre-established criteria or more intuitive techniques (Tassoul, 2008.)
Although the concept had been discussed multiple times during the ideation phase, the final outcome has been discussed again with several stakeholders of the AIE. The goal of the evaluation was to validate key assumptions and identify potential risks of the design. Also its fit with both AIE and ASE has been discussed. The comments of the governance consultants from the validation round, discussed in chapter 6, have been taken into account. Suggestions for further improvement could subsequently be given based on this evaluation.
Evaluation

The design has been evaluated with three consultants that are involved with the AIE, namely the AIE CoZone lead, an AIE innovation consultant, who manages the AIE studio, and the company mentor (AIE innovation designer). Besides evaluation with these consultants, additional evaluation sessions have been held with a senior consultant from the ASE and one service coordinator from Capgemini’s business unit Application Development Maintenance (ADM), which maintains back-end systems for clients. The service coordinator therefore reflected from an Operations point-of-view. The purpose of the evaluation step was to assess the key assumptions of the design and to propose steps for further improvement. The questions that have been used can be found in Appendix J Evaluation Guide. The remarks are combined with several concerns mentioned by the three IT governance consultants.

The use of Lego

The application of Lego within the innovation process was received differently during the separate evaluations. The idea to use Lego to visualize your vision has been received well by the majority of evaluators. The general believe was that it could indeed increase creativity and lead to better insights.

“What very good and solid is here, is that you can freely construct your vision, while using lego.” - IT governance consultant

“I get excited about the idea. I think it is nice that you stimulate the creativity of the group participants in this way and that everybody builds his own vision.” - ADM service coordinator

A few concerns with regards to the method have also been shared. For starters, the AIE CoZone lead perceives the use of Lego as too unprofessional and not fitting the image he wants convey towards clients. This concern was partially shared by the AIE innovation consultant who mentioned that not all clients are likely to join such a session.

“There are a few clients that we do not dare to look into the eyes and say: “we are going to start with Lego now”. That is a small issue” - innovation consultant

“I don’t find Serious Play serious enough. You won’t get me at a table with Lego in business context with a client.” - AIE CoZone lead

The ASE uses similar creativity and reflection techniques however, and the ASE consultant does not necessarily perceives client resistance as an obstacle during their sessions.

“What you will see is that people have to look differently to their own model and may have to change their model. Then they talk about it with each other. This even works for CEO’s” – senior ASE consultant

Involving Operations early

The proposition to involve Operations early was supported by all evaluators. IT Operations is seen as an important stakeholder in the project, not only to raise awareness, but also to contribute their knowledge to the project, especially on the maintainability of the initiative. As the conflicting mindset between Development and Operations is a general challenge within the IT domain, one of the governance consultants perceived it as a good first step in bridging this gap.

“I think that you take a good first step here, by doing it like this to create that mindset. Because I think it is a cultural thing for a large part and that people have to learn and develop to master the mindset.” - business & IT alignment consultant

A concern mentioned by all three governance consultants was the probability of Operations to think too much in constraints and thereby limiting the innovation’s potential. It was stressed that finding the right Champion is essential. With regards to operations this would be someone who can maintain an positive attitude towards change, together with an opportunistic mindset. The service coordinator of ADM supported the idea to postpone constraint thinking to the MONITOR session.

Fit with AIE innovation process

One of the key assumptions was the fit with the planned innovation process of the AIE. In time of the evaluation process, the AIE was preparing a co-creation project with a client. The kick-off of this project would also be an extensive ideation session, facilitated by the ASE. The setup of the SPARK would fit well within the Switch Pitch of the AIE. The exact fit with the entire process will however depend on the client and if this client is open to the approach. Although the CoZone Lead is skeptical towards Lego, the idea to address the problem in a more open and creative way was received well.

“If you do it with Lego or Post-its, doesn’t matter, the crux is in the way you cooperate. Everybody is part of the solution and with that I agree.” - AIE CoZone lead
‘This SPARK is something we would also want here’ - AIE innovation designer -

‘I think you can apply our concept very well in this’ - senior ASE consultant -

Strategy
One other concern about the design was the start with the client's current business strategy. As one of the governance consultants mentioned, the current business strategy might be obsolete due to technological developments. Delineating the technology strategy based on the current business strategy might therefore be a pitfall. Furthermore, one other concern was the willingmess of clients to share their entire business strategy with a consulting company. Since some sort of delineation is needed for the innovation process, alternative preparation approaches may be necessary.

‘Companies often think: “those consultants only want to make money from us”. They will therefore never share their complete strategy with us.” - AIE innovation designer -

Brainstorm
A final remark from the ASE consultant was on the current brainstorm in the SPARK. Starting with an open idea generation, based on the strategy alone, might be too ambiguous. Delineating a problem domain with all stakeholders prior to the session is therefore advised, since it would create alignment on the specified problem and prevent potential conflicts from happening during the session itself.

Conclusion
The evaluation of the design with several stakeholders of the AIE has identified both advantages and risks. Although the use of Lego was seen as an effective tool for problem identification and solution generation, there are concerns about its perceived image. It should therefore be stressed that the execution maintains its serious character. Since not all clients are likely to participate in such sessions, alternative methods should be explored. In the next chapter, suggestions for optimization and future steps are given.
Based on the evaluation from the previous chapter, a few optimizations have been made to the final design and presented in this chapter. The additional challenge to address in this chapter was: ‘How can the AIE offer this service to their clients?’. Suggestions are given for further improvement, together with the necessary steps to successfully implement the work method within Capgemini’s AIE.
Optimization

Alternative methods
An identified risk of the design is the use of Lego, since it may be perceived as unprofessional by clients. Therefore, alternative approaches could be used if necessary. For starters, prototyping with craft materials or drawing could be used during the SPARK to enable the envisioning step. However, the 3D-model building is an important process for reflection, while sketching is not expected to generate the same results as LSP. Furthermore, drawing requires the participants to possess a certain skill level before they could express themselves confidently. The use of craft material may therefore be more appropriate. During MONITOR, the IT landscape could be visualized by drawing or using Post-its, since it does not have to be displayed in 3D necessarily. However, metaphoric thinking would be disabled as a consequence. Furthermore, when discussing alterations, a drawing or 3D built model from craft material is not as easily modified as Lego. The process might therefore become more laborious. If these alternative methods offer the same benefits is therefore questionable. It is thus important to discuss the Lego methodology in advance with the client and have a facilitator who can involve people during the process.

Preparation of SPARK
The evaluation showed that the SPARK contained two risks that needed to be addressed, namely the client’s willingness to share its corporate strategy and an open brainstorm based on this strategy. For that reason, an alternative preparation step has been proposed, which is based on the Creative Problem Solving (CPS) model (Parnes, 1992).

The SPARK ideally starts with an idea generation. As concluded from the evaluation, lacking clear delineation might be troubling for effective brainstorming, since a clear problem statement is required. To do this, two different scenarios are used, namely ‘problem-oriented’ (addressing a client problem) and ‘opportunity-oriented’ (having a problem-free start). When looking at the different stages of the CPS model, where each phase consists of a diverging- and converging step, the first three steps are ideally done in the preparation phase of. The earlier proposed activity, ‘get insight in the current business value chain’, is also addressed by this approach. In a problem-oriented situation, the AIE and client stakeholders define a clear problem statement in the process from Mess-Finding to Problem Finding. This problem statement can subsequently be addressed by idea generation. Effective methods to apply in such a preparation meeting are for instance the 5W’s & 1H (Who, What, Where, When, Why and How?) method or progressive abstraction (Why questioning) (Tassoul, 2008). In an opportunity-oriented situation, the direction could be delineated using Search Fields ‘as a meeting point’ between the company’s internal strengths and external opportunities (Buijs, 1983). In preparation of the SPARK, the fact-finding and problem-finding steps may consist of combining the client’s strengths with trends and developments to create search fields. This allows idea generation on both product level and abstract level. In both scenario’s, the SPARK can still start with presentation of the company’s strategy, and technology and trends for inspiration. The defined problem statement or search field can subsequently be turned into H2 statements by the facilitator.

Strategy
One other identified risk from the previous chapter was using the current business strategy to delineate the innovation project. The perceived risk is that the current business strategy might have become obsolete due to technological developments. Appendix K Optimization therefore contains a suggestion of a session where
LSP could be used to discuss the current business strategy and to create a renewed strategy prior to the innovation process. However, as a technology company, Capgemini’s business strategy consulting capabilities might be underdeveloped to properly consult their clients during this session, which should therefore be strengthened first. This may for that reason only be considered as a possibility in the far future.
Implementing a new way of working
Since the AIE has yet to engage with a first client, no comparison can be made between an old and new innovation process. How the implementation of this work method relates to the challenges found in this report is thus unclear. Although the evaluation has revealed that the use of LSP may provoke resistance due to its association with children’s toy. Could be due by the fact that the methodology is completely new to them and thereby causes a form of ‘resistance’ to innovation. Since the first client project has yet to come, it is expected that the first few will remain experimentally for the AIE as well. Therefore, it is not expected that the design can be put into practice soon.

Pilot
Validating the design with an actual pilot has unfortunately been found difficult, since it requires a complex innovation case from start, especially for the SPARK and MONITOR. An attempt to prepare a pilot has been made. Due to a lack of the required knowledge and time, this preparation was unfortunately unsuccessful. For starters, sufficient knowledge is required about IT processes to simulate a case that is representative for implementations of AIE innovation. Second, to properly evaluate the method, a skilled facilitator is required to guide the process.

It may be possible to pilot the CHECK with a development from the CoZone. Although the current projects are mostly web-applications with little implementation complexity, the pilot may still give insight in how the use of Lego supports communication and stimulates creativity of the stakeholders during an implementation discussion. To do so, a fictional implementation case should be created where a CoZone application has to be implemented within a back-end system of ADM (Capgemini’s business unit that builds and maintains back-end systems for clients). Members of this business unit could join to function as the Operations department of the client. Since no shared objective has been created between the participants, the level of commitment could however be less compared to a projects where both parties have been involved from the beginning. Although the goal is to execute the CHECK without the presence of a facilitator, it is advised to have an ASE consultant involved in the pilot. This would not only guide the model building process properly, but it would also give first experience to the ASE consultant to work with LSP and to evaluate the design in practice. If desired training in LSP could be conducted.

Implementation steps
Since it is not expected that the design will be implemented as a whole at once, a gradual implementation approach is presented below. A suggested first step that could directly ease the step from Devise into Deploy would be to invite Operations into the innovation process from the start, in order to create awareness, stimulate acceptance and most important, use their knowledge for the project. Since the ASE will guide the planned ideation process, their own creativity approaches may also work well in the session. As discussed in the previous chapter, more conventional techniques could be used for envisioning, such as sketching and prototyping with craft material. Especially prototyping could enable a similar shared model building process. A simplified MONITOR could be executed with Post-its to visualize an IT landscape and assess implementation impact.

After having experienced a few successful innovation projects and a successful pilot, the method could be applied as a whole with a client that is open to the use of Lego Serious Play. The design has been discussed with a senior ASE consultant to determine how it can be handed over successfully. As indicated, the current version of the design contains sufficient information to be applied by the ASE. Since specific application is highly dependent on the innovation case and the type of client, a certain amount of freedom is still required for each individual session.
This chapter looks back on the graduation process, by reflecting to the initial challenge from chapter 1 and design statement of chapter 5. The chapter discusses to what extent those challenges have been addressed by the solution.
Reflection

This assignment has been initialized by Capgemini's AIE. At the time of the assignment formulation, the initiative had yet to be launched, which may have caused the broadly formulated challenge at the start of the project. This initial briefing, as presented in chapter 1 Introduction, was stated as follows:

‘How can Capgemini AIE optimize its innovation process with their client to ease the step from Devise to Deploy?’

Validation of the defined problem
This broadly formulated challenge has led to a broad and explorative research with the goal to collect as many variables as possible of what might occur within this step from Devise to Deploy. With a large collection of answers and the AIE that is still young, it was challenging to define a clear problem context relevant to the AIE, and for which a solution would subsequently provide significant value. Furthermore, the research was conducted with different types of consultants from Capgemini, which caused the content of the interviews to vary extremely, with often little similarities between them. Generalization of findings was therefore difficult. Despite this, the defined problem could be validated through additional discussions with other consultants. From the challenges identified in the case studies, the challenge of stakeholder collaboration was chosen to address. As shown by literature, this is a general challenge to the innovation domain. The stakeholder collaboration of Development, IT Operations and Business has been found generally challenging for the IT domain and therefore also applicable to the AIE.

Reflection to design statement
The delineation of the problem context subsequently led to the following design statement:

‘To design a work method that supports collaboration between Business, Development and IT Operations and creates a shared vision for the innovation process.’

This design statement was addressed by developing three different sessions where the stakeholders can come together during the innovation process. The objective to support collaboration and create a shared vision was addressed by incorporating existing methodology of Lego Serious Play and Innovation Roadmapping, and applying them in the context of the AIE. If the design has achieved its goal is however difficult to tell. Innovation projects with clients have yet to start, which consequentially means that the expected stakeholder collaboration has not taken place yet. As discussed in the previous chapter Implementation, the exact value the design could deliver to the AIE now has to be determined by putting it into practice, which would probably only be done once the AIE has gained experience with innovation projects.

Reflection to the initial challenge
How the solution has addressed the initial challenge has also not yet been validated, although the broadly formulated challenge allows the outcome to succeed relatively easily. Optimization suggestions for the innovation process have been given, while the proposition to involve Operations early is expected to already ease the transition into deployment, compared to late involvement.

Research opportunities
This design is focused on the stakeholders within the innovation process and to bridge the gap between their knowledge, however, there still remains a challenge during the actual deployment. The threat identified in the Internal analysis was that Deploy ideally occurs in DevOps, although the transition towards this type of collaboration remains a struggle for many organizations. Although the design outcome of this project aims to bridge the gap between stakeholders in the project, this would not automatically result in the right culture within the client’s organization. An interesting research opportunity would be to determine how the AIE could support the client in creating the right IT culture parallel to the innovation development, and thereby creating the ideal conditions for its own innovation implementation.
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