Agile Practices and their impact on organizational culture

Perceptions of IT employees operating in Ireland

Dissertation submitted in partial fulfilment of the requirements for the award degree of Master of Business Administration

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Declaration

I, Ana Paula Vargas de Noronha, declare that this research is my original work and that it has never been presented to any institution or university for the award of Degree or Diploma. In addition, I have referenced correctly all literature and sources used in this work and this work is fully compliant with the Dublin Business School’s academic honesty policy.

Signed: Ana Paula Vargas

Date: 7 January 2018
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Abstract

The Agile methodology was created on the premise of responding to projects uncertainties, involving a set of principles and practices to rapidly develop high-quality solutions, to encourage collaboration among team members, and to deliver greater value to customers. Ever since, Agile Practices have become widely adopted and have proven to increase the likelihood of project success in various dimensions.

However, there are still several people who do not know what agile values are and how they can help to create a healthy and collaborative organizational culture. Some of them believe that the use of Agile Practices can promote an anarchy scenario, where people work in a disorderly way. This lack of knowledge about how Agile Practices may affects the workplace and people’s behavior in a business perspective is also reflected in academic studies. Research on how Agile Practices can produce changes or support the development of the organizational culture is rare. The majority of studies concerns to understand the other way around: how specific and previously established organizational culture factors can affect the use of Agile Practices.

Therefore, the main purpose of the current study is to fill this research gap by exploring perceptions of IT employees on Agile Practices and their impact on Organizational Culture. It also aims to promote greater understanding about perceived benefits and obstacles in adopting Agile Practices. Study findings can be useful to support decision-making of companies that are planning to adopt agile practices and are looking for more information about the values and behaviors that Agile Practices can drive.

This research explores Agile Practices and their impact on Organizational Culture through qualitative analysis. Six IT employees who are currently applying Agile Practices in their daily-work in Ireland were interviewed, providing experiences and opinions regarding the topic. After interpreting results, the main contribution of this study is providing indications that Agile Practices can produce changes on ten organizational culture factors: communication, flexibility, control, collaboration, innovation, feedback, pressure of work, visibility of the tasks, focus on client and continuous improvement.
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1. Introduction

1.1 Context

In the current landscape, where technology is rapidly evolving, and the market is demanding innovation and creativity, many companies are looking for methodologies and work processes that can keep up with fast-changing scenery (Johnson, Scholes and Whittington, 2011). The Agile methodology was created on the premise of responding to project uncertainties, increasing flexibility and agility to manage work (Carroll and Morris, 2015). It was originally designed to improve software development and involves a set of principles and practices to develop high-quality solutions, encourage team-member collaboration and deliver higher value to customers (Dingsøyr, Nerurc and Balijepally, 2012).

Organizations are increasingly embracing Agile Practices for managing projects. According to the Global Project Management Survey (PMI, 2017), 71% of organizations report using Agile approaches sometimes, often, or always, and the Annual State of Agile Survey (Version 1, 2018) showed 25% of respondents declaring that all or almost all of their teams are adopting Agile, whereas only 8% stated it in 2016. Moreover, Agile Practices adoption has proved to be beneficial to companies, increasing likelihood of project success in several dimensions, such as overall stakeholder satisfaction and of meeting the organizational goals (Serrador and Pinto, 2015).

However, adopting Agile Practices in companies presents challenges. Resistance to change values, assumptions and beliefs of employees, in other words, the organizational culture of companies, was pointed out as a significant obstacle of applying agile (Ghani, Bello and Bagiwa, 2015). The Annual State of Agile Survey (Version 1, 2018) presented 53% of respondents highlighting the disagreement between organizational culture and agile values as the most significant challenge for agile adoption.

The majority of research investigate the impact of organizational culture on the use of Agile Practices, indicating which culture conditions are favorable to make this adoption less challenging (Strode, Huff and Tretiakov, 2009) (Junior et al., 2015), but not the other way around. There is not much awareness regarding how Agile Practices can actually produce changes in organizational culture and about what inherent organizational culture factors, such as communication and team-collaboration, are perceived after this adoption (Kupper et al., 2017).
Therefore, this study intends to explore and to provide a greater understanding on how Agile Practices impact the Organizational Culture. It presents a set of perceptions of IT employees regarding the topic, including positive and negative points of view of Agile Practices and how they may affect a company’s identity and behavior. The study findings can also be useful to support decision-making of companies that are planning to adopt agile practices and are looking for more information about the values and behaviors that Agile Practices can drive. This study is focused on perceptions of IT teams operating in Ireland, a country that has attracting several IT investments and thriving in the sector (Savills, 2017).

Firstly, the study introduces secondary research, covering theory and important concepts about Agile and Organizational Culture. Secondly, methodology choices are described. It was applied a qualitative method using semi-structured interviews as a data collection instrument to gather experiences and opinions from the IT employees. The data analysis method of thematic analysis is described, followed by the presentation of the study findings. All results are discussed and related to the existing literature. Lastly, the study conclusions, contributions and suggestions of future research are presented.

1.2 Rationale of Research

Although Agile Practices have been widely used and proven to be successful in different industries (Carroll and Morris, 2015), there are still several people who do not know what agile values are and how they can help to create a healthy and collaborative organizational culture. While some of them believe that the use of Agile Practices can promote an anarchy scenario, where people work in a disorderly way, others are just applying these practices because they have become trendy and are being used by remarkable IT companies (Rigby, Sutherland and Takeuchi, 2016).

This lack of knowledge about how Agile Practices may affects the workplace and people’s behavior in a business perspective is also reflected in academic studies. According to Kupper et al. (2017), research on how Agile Practices can produce changes or support the development of the organizational culture is rare. The majority of current research concerns to understand the other way around: how specific and previously established organizational culture factors can affect the use of Agile Practices.

Even though there are some recent studies which discuss the emergence of an "Agile Culture" by the adoption of Agile Practices, there is no precise definition of what "Agile Culture" is and what are the specific organizational culture factors it involves. Some factors inherent to the
organizational culture, such as communication and team collaboration, may change, but studies are scarce (Junior et al., 2015).

In addition, there is no studies found regarding perceptions of the relationship between Agile Practices and Organizational Culture in Ireland. Previous research related to the topic considered perceptions from practitioners in Malaysia (Asnawi, Gravell and Wills, 2012), The United Kingdom, Australia and India (Sutharshan, 2013), and Switzerland (Kropp and Meier, 2016). Considering that Asnawi, Gravell and Wills (2012) pointed out that cultural characteristics of the population influence how agile practices are perceived in Malaysia, conducting the study with employees operating in Ireland, which present different cultural characteristics, shows also an opportunity to generate new insights about the topic.

1.3 Research Aim

The main purpose of this study is to explore the perceptions of IT employees operating in Ireland on Agile Practices and their impact on Organizational Culture. It also aims to promote greater understanding of thoughts and opinions about benefits and obstacles in adopting Agile Practices.

1.4 Research Question

How IT employees in Ireland perceive Agile Practices and their impact on Organizational Culture?

In order to answer the research question, this study includes also four research sub-questions:

- What do IT employees operating in Ireland say about Agile practices?
- Which are the Agile practices perceived as positive? Why?
- Which are the Agile practices perceived as negative? Why?
- How the application of Agile practices has influence on the organizational culture?

1.5 Dissertation Structure

This study presents seven chapters. Chapter 1 provides an overview of the research, including a background of the study topic, its rationale, purpose, research questions and sub-questions. Chapter 2 presents a critical review of the existing literature about Agile and its relationship with Organizational Culture. Chapter 3 details the research methodology conducted during the study, explaining the reasons for the decisions taken. Chapter 4 provides the study findings, which is discussed and related to the literature review on Chapter 5. Chapter 6 presents
conclusions and recommendations of future research. Lastly, Chapter 6 describes the experiences and learning gained during the process of writing this study.

2. Literature Review

2.1 Introduction

The literature review is a critical summary and foundation for the proposed study (Saunders, Lewis and Adrian, 2012). It includes fundamental concepts and an overview of what has been currently discussed regarding Agile and its relationship with Organizational Culture, the two most relevant topics of this study.

2.2 What is Agile?

Agile is a methodology originally designed to solve project uncertainties in software development. It was formally launched in the IT sector in 2001, when the “Agile Manifesto” was published. Since then it has becoming popular and spread across several industries, boosting markets, improving quality, and increasing team motivation and productivity (Rigby, Sutherland and Takeuchi, 2016).

The methodology emerged as a reaction to traditional methods, which assumed that systems could be thoroughly detailed and specifiable, providing predictable solutions to every problem (Nicholls, Lewis, and Eschenbach, 2015). In the past decades, there was a need for developing complex software that meets a turbulent business environment, where customer requirements are constantly evolving (Dyba and Dingsøyr, 2008). Agile involves a set of principles and practices that provides more flexibility and responsiveness to changes, addressing this current dynamic scenario (Carroll and Morris, 2015).

Some of Agile principles are simplicity, quality, self-management and sustainable development. Having constant interaction between the team and customers are also a priority for Agile. Customers are involved in every stage of the process, removing communication gaps and reducing chances of misunderstanding (Kotaiah and Khalil, 2017).

Furthermore, Agile follows continuous delivery principles, where small parts of the product are regularly delivered and improved considering customer feedback (Maarit, Abrahamsson and Similä, 2013). All those characteristics motivates an atmosphere of innovation, where companies are demanded to be more creative, experiencing less routine and dynamic conditions (Rigby, Sutherland and Takeuchi, 2016).
2.3 The Agile Manifesto

The Agile Manifesto was created by seventeen experienced practitioners of the software community in 2001. They were seeking for a new approach to develop software, since traditional methodologies were not providing satisfactory results to solve uncertainty and complex problems. There was an increased necessity to respond to changes and, at the same time, to deliver faster, better and cheaper software solutions (Dyba and Dingsøyr, 2008). The Manifesto emerged in this scenario and represents a starting point to characterize the agile approach. The Table 1 includes its four core-values.

| Individuals and Interactions over Processes and Tools |
| Working Software over Comprehensive Documentation |
| Customer Collaboration over contract negotiation |
| Responding to Change over following a plan |

*Table 1 - Agile Manifesto Guidelines (Agilealliance.org., 2015)*

In the practitioner’s point of view, the Agile Manifesto is more than a collection of principles, it is a philosophy. They believe that companies which decide to apply these guidelines in their daily work need to rethink their entire organizational culture, but the consequences will be better business benefits (Zaitsev, Gal and Tan, 2018).

2.4 Traditional and Agile Methodologies

Agile methodologies emerged in a scenario where traditional planning tools were not proving to be successful for projects with uncertain scopes. Clients were unsure of which features represented the most value in developing their products, and several requirement changes until the delivery were imminent. In these cases, investing a long-time planning and deciding all activities to be performed was not leading to better results (Nicholls, Lewis, and Eschenbach, 2015).

According to Rigby, Sutherland & Takeuchi (2016), Agile approaches offer several benefits if compared with traditional management methodologies, including the growth of work-team productivity and satisfaction. Other advantages are the reduction of unnecessary employee efforts, such as excessive documentation, repetitive planning, and redundant meetings.
Customers also have numerous benefits, since they are significantly engaged in agile projects, being part of every decision and having full visibility of what is happening. It contributes to the development of valuable products that meet the client needs and adds more predictability and mitigation of risks during the process.

On the other hand, traditional methodologies can be successfully implemented with well-defined projects which have a limited scope. When the team-work and customers agree about what will be delivered in advance, opting for those methodologies can make activities such as planning and designing more straightforward. Besides, clients do not need to be involved in every phase of the process, being mostly required during the requirements gathering stage (Javanmard and Alian, 2015).

As stated by Shaydulin and Sybrandt (2017), both Traditional and Agile methodologies have their strengths and weakness, requiring a proper evaluation in deciding which one fits with the characteristics of the project. Even though there is much discussion regard when using one instead of the other, Agile approaches still have a limited recognition if compared to the traditional approaches (Nicholls, Lewis, and Eschenbach, 2015). Some executives perceive agile methodologies as dangerous and risky, mainly because they do not understand how to apply them. It has happened mostly because many people are resistant to changes and to try new approaches (Rigby, Sutherland and Takeuchi, 2016).

2.5 Agile Frameworks

There are a vast number of frameworks and practices embodying the values and principles of the Agile Manifesto, and companies should carefully consider if they fit to their projects (Miller, 2013). Scrum, Extreme Programming and Lean are frameworks used to scale Agile and are widely adopted. Although they have different characteristics, all of them were building on fundamental concepts that go hand-in-hand with the Agile mindset (Matharu et al., 2015).

2.5.1 Scrum

Scrum is a framework introduced by Jeff Sutherland and Ken Schwaber to add more transparency, inspection, and adaptation during the whole software development process. It includes a set of roles, artifacts, and events designed to tackle complex projects, that were difficult solved by using traditional methodologies. Scrum also emphasizes communication and collaboration, where those involved interact and work together to deliver the greatest value to customers (Rigby, Sutherland and Takeuchi, 2016).
There are three main roles when adopting Scrum: The Product Owner (the customer representative, who creates and prioritizes the software features), the Scrum Master (the responsible to coordinate and facilitate all Scrum practices and activities), and the team (self-organized members in charge of develop the product) (Anwer et al., 2017).

The framework is organized into small and regular time frames called “sprints.” In each sprint it happens some significant events: The Sprint planning (meeting to define what will be implemented in the current period), Daily stand-up meeting (everyday 15 minutes meeting to discuss the progress toward what has been implemented) and Sprint Retrospective (meeting to discuss what went right, what went wrong, and how to improve).

Scrum has been a model of agility and served as a guide for many companies around the world. Its flexible mindset of emerging requirements, combined with high customer engagement, has attracted many companies interested in continually improving and delivering valuable work.

2.5.2 Extreme Programming

Extreme Programming or XP is a lightweight methodology created by the software engineer leader Kent Beck. It is a group of practices that facilitate planned and iterative software development and is supported by a deep level of interaction with customers during the product life-cycle (Matharu et al., 2015). Clients requirements are specified by themselves in Story Cards, tests driven the whole development, and everything that is done should be peer-reviewed and refactored (Anwer et al., 2017).

2.5.3 Lean

Lean is a systematic method initially created to remove waste in the manufacturing process. It is based on just-in-time delivery concepts and derived from the Toyota Production System developed by the mid 1930s. Nowadays, Lean is applied to eliminate any activity that does not add value from the customer's perspective (Coplien and Bjørnvig, 2010).

In the IT industry, Lean is recognized as a software development process which has similar goals of Agile, such as focusing on customers and rapidly responding to their needs. According to Petersen (2010), if there is a practice observed in lean that is not incorporated in agile, it might be a useful complement. Kanban is, for instance, is a popular Lean approach for managing work-processes and also a driver for continuously improvements, which is widely
integrated when adopting Agile. Overall, Lean principles lead to positive results and work effectively when applied where teams are carefully coordinated and synchronized to continually increase end-user value (Coplien and Bjørnvig, 2010).

Figure 1 presents the three frameworks including a set of their internal practices.

![Figure 1 - Agile Frameworks](image)

### 2.6 Agile Practices

#### 2.5.4 Daily stand-up meeting

The daily stand-up meeting is a common practice in Agile software development projects and its main purpose is improving communication among the team members. It also helps to assess team progress, identify impediments, and find ways to improve the work process (Ringstad, Dingsøyr and Moe, 2011). Ideally, daily stand-up meetings should start at a pre-set time, be time-boxed to 15 minutes and present three stages: firstly, each member will communicate what they have done in the previous workday, secondly, they will explain what will be performed in the current day and lastly what are the obstacles that are blocking tasks to be done (Shore and Warden, 2008).

A survey was applied to 221 professional developers regarding the perceived value of the practice of daily stand-up meeting. Firstly, the study shows that 87% of professionals that were adopting Agile methods was performing daily stand-up meeting, indicating that is a widely used practice by the Agile community. Secondly, it presents that the majority of respondents visualize the practice as more positive than negative. The results also show that junior professionals consider it more valuable than senior professionals, which can be because they
get more relevant information and assistance to solve problems through meetings (Stray, Moe and Bergersen, 2017).

According to Shore and Warden (2008), the primary virtue of the daily stand-up meeting is brevity, which is a difficult task to master. Therefore, it is essential that every participant focus on being concise, saying only a few sentences about their status. The authors state as a disadvantage of the practice its the daily interruption of work. On the other hand, Ringstad, Dingsøyr, and Moe (2011) points out its advantage of creating a common understanding with the team, allowing members to be responsible for managing, monitoring and improving their own work process. In other words, daily stand-up meetings, if properly performed, inspire a culture of self-management and empowerment.

2.5.5 Refactoring

As the code of a software is developed and evolved, it can become very complex and harder to understand, maintain and apply necessary changes. Refactoring is a practice that can combat this scenario. It is a process of changing the code structure without changing its behavior, usually performed to improve aspects such as code design, quality, readability, and comprehensibility, making software new features easier to be added (Shore and Warden, 2008).

Agile methods advise refactoring regularly. Because some of the main purpose of Agile is to perform a constant sequence of iterations and to produce code flexible for changes, it is fundamental that the existing code is always clarified and simplified. Furthermore, the more the project suffers from the lack of refactoring, the faster its design quality decline and it leads to less productivity and more schedule pressure (Lan, Balasubramaniam and Tarek, 2010). Refactoring can consume a high portion of the development effort if it is done regularly and can be reasonably time-consuming as it is not always obvious to put in practice. However, it can reduce risks of introducing errors and of code degradation. This focus on avoiding many future problems by keep enhancing the code inspires a culture of continuous improvement (Sommerville, 2016, p. 278).

2.5.6 Pair programming

The practice of pair programming consists of two team members working together in the same piece of code, checking each other’s work and boosting development efficiency. The participants sit at the same computer to share knowledge and ideas, and to decline possible code mistakes (Sommerville, 2016, p. 83). It is considered an innovative technique introduced
in Xtreme Programming and has proved to increase collaboration and motivation among the team (Shore and Warden, 2008).

When starting pair programming, one member will have the role of "Driver" and will be responsible for coding, while the other will have the role of "Navigator" and will continuously review what is being coded. The roles should frequently switch, in at least every half hour, creating dynamism and providing the possibility of both participants use their different skills during the development process (Shore and Warden, 2008).

According to Sommerville (2016), an advantage of pair programming is creating the feeling of collective ownership and responsibility for the code. When a problem emerges, the team as a whole feels responsible for solving it. Another advantage is that the practice represents an informal review of each line of the code by at least two people, which is considered cheaper and easier to organize than code inspections. Lastly, pair programming encourages refactoring, which improves the code structure.

2.5.7 Iterative development

One of the main characteristics of Agile is to develop a project in a sequence of small iterations or, in other words, in repeated cycles. The objective of each process iteration is continuously creating product increments which can be delivered and evaluated by customers. According to Sommerville (2016), iterative development consists of interleaving the process of specification, design, programming, testing, and deployment of a feature. It has a fixed-length timebox, typically between two to four weeks, allowing the team to get frequent feedback from the clients.

Shore and Warden (2008), argue that this practice does not necessarily increase the team productiveness, but it enhances customer involvement throughout the development process. As customers continuously review each software increment, there is more interactivity and flexibility in discussing the next steps and new software requirements, and also fewer costs if unforeseen changes are necessary. This scenario is the opposite of the traditional development life-cycle, which is more rigid and there is a need of obtaining detailed customer requirements during early phases of the process.

According to Leau et al. (2012), because Iterative development allows more refinement of requirements, this practice deliver an end-product that offers higher chances to meet customer needs than traditional approaches. There is also the customer advantage of delaying some
decisions to a future iteration when they have more knowledge about the product features they are looking for and when better technology is available to optimize their choice.

2.5.8 User Stories

User Stories represents a popular agile practice and notation for defining software requirements. Basically, a user story describes a scenario of use that might be experienced by a software user and is recorded in a “story card”. In other words, it briefly narrates a story that encapsulates a customer need. To develop these cards, the software user needs to work closely with the development team, discussing and refining its content, and prioritizing the ones that should be developed first to deliver useful business support (Sommerville, 2016).

The content of user stories should be concise, only capturing essential elements of a requirement, such as who it is for, what it expects from the software and, if desired by the customer, why it is important. The common user story format is: “As a <type of user>, I want <goal>, so that <some reason>.” (Lucassen et al., 2016). This layout main objective is to be simple, easy to be written and to follow customers’ terminology (Shore and Warden, 2008). Once it has been described, the development team should break it into small tasks that will be used to planning the next system iterations (Sommerville, 2016).

According to Shore and Warden (2008), some of the advantages of user stories are the encouragement of a rich dialogue between clients and development team, as well as avoid premature specification of solutions. Establishing and discussing with customers in each small iteration what are the next requirements to be developed, promotes shared understanding, decreases workload and reduces the impact of changes. At the end, user stories became independent software pieces which are delivered frequently, increasing feedback and customer value.

In practice, several user stories are poorly described and not present the necessary quality to be developed. According to Lucassen et al. (2016), the number of methods to assess and improve their content are limited. An available method is called “INVEST”, representing an acronym for the six characteristics that every user story should have: independent, negotiable, valuable, estimable, small, testable. If the user story does not follow some of those criteria it should be reworded, avoiding wrong definitions, team misunderstood and inaccurate task estimation (Agile Alliance, 2018a). Lucassen et al. (2015) carried out a study about the perceived effectiveness of user stories. After collecting 182 responses and performed 21 follow-up interviews, the result showed that practitioners identify the use of methods, such as
INVEST, significant contributors to increase their productivity and to improve the quality of their work deliveries.

2.5.9 Test-driven Development (TDD)

TDD consists of a style of programming, which interleave three main activities: coding, testing, and refactoring. Its purpose is, before writing any code that adds new functionality to the software, writing the test which describes how the new code should behave. Every new increment should pass to all tests before a new increment is added, helping the prevention of several bugs (Agile Alliance, 2018b). Sommerville (2016) describes the TDD process in five steps:

- Identifying a new increment of functionally to be implemented. It is supposed to be small and developed in a few lines of code.
- Writing the test for the new increment.
- Run the test. Initially, it will fail because the new functionality is not yet implemented.
- Implement the functionality with the minimal code to pass the test and re-run the test. It may require refactoring the code to increase its design quality.
- Once all tests run successfully, a new increment of functionality can be developed, and the process returns to the first step.

When TDD steps are appropriately followed, the design of the code, its classes and methods became simple, elegant, and easy to use. This practice promotes a culture of simplicity, feedback and also of continuous Improvement, providing constant alerts of necessary changes and the chance to fix the code before it goes to production (Shore and Warden, 2008). A study carried out by Khanam and Ahsan (2017) evaluated the effectiveness of TDD, its benefits and drawbacks. The authors explore and analyze if the technique impact on several aspects such as software quality, costs effectiveness and team productiveness. They present the advantages of producing self-explanatory code which enhances understandability of the system, of improving software quality by the less likely emergence of bugs, of increasing the development speed in the long run and of facilitating constant feedback about the system. On the other hand, they highlight the problem of the learning curve of the technique, taking sometimes months to developers change their mindset of development and gain proficiency.

2.5.10 Kanban

Kanban is a framework focused on identifying and making continuous improvement on existing processes. Despite it is rather based on Lean principles and served initially as a
system to control the Toyota inventory, Kanban is several times referenced as an agile practice. Usually, agile practitioners use Kanban boards as planning tool to describe how they work, collaborate, learn, and deliver system functionalities (Burrows, 2014).

The board makes the work visible, and its original version has movable tickets that can be transferred through three steps: to do, doing and done. By looking at the board and knowing which work is in progress and which work is blocked, the team has insights of the current "health" of the process and if there are corrective actions needed (Sahota, 2012). This transparency allows the team to recognize and respond immediately to apparent process delays or resource issues (Turner et al., 2012).

Kanban is characterized as a “pull” system. A ticket can only be moved to the next step if there is available appropriate resource to implement it. When it happens, the ticket is “pulled” to follow the process rather than “pushed” to follow a tight schedule. The flow is managed by controlling the Work in Progress (WIP), which represents the “ideal” amount of work to be assigned to a set of resources. Each Kanban step can have its own limited WIP, which must be followed, ensuring that the process goes forward and that the work is delivered constantly (Turner et al., 2012).

The practice has been promoted in the software industry and has showed its ability to improve communication and add transparency among development teams (Ahmad, Markkula and Oivo, 2013). According to Turner et al. (2012), Kanban has evolved the process of developing software by smoothing its workflow and balancing work with resource capability. Ahmad, Markkula and Oivo (2016), conducted a study to analyze Kanban perceived benefits, such as its ease of use and if applying the framework inside organizations has been proved to be valuable and useful. The authors performed a survey including 146 responses of Kanban practitioners from 27 different organizations. Results showed advantages such as reduction of work in progress and improvements in visibility, communication and coordination. The study also shows the challenge of applying Kanban where the organizational culture and people’s mindset is not flexible and also where there are misunderstandings of the framework key concepts.

2.5.11 Retrospective

A retrospective is a learning activity performed after an iteration or release. It is a regular meeting where teams reflect on how to become more effective and how to continuously improve its way of working. In other words, it is a moment where teams inspect how the
iteration has gone, and an opportunity to adapt their behavior and to make short-cycled improvements (Gonçalves and Linders, 2013).

According to Kniberg (2007), not every team is inclined to do retrospectives and its common that they skip the practice moving to the next sprint. Dyba, Dingsøyr, and Moe (2014) state that some teams experience difficulties in converting their retrospective meetings analysis into changes in their actions. They ended up leaving the practice aside because it may take time to see improvements or significant changes. However, “learning is challenging but crucial” (Dyba, Dingsøyr, and Moe, 2014). The authors declare that is very important that retrospectives happen since it’s a moment of sharing knowledge, where the information provided is extremely valuable and can be used to avoid making same mistakes over and over again (Kniberg, 2007).

Retrospectives usually require a facilitator, often the Scrum Master, who provides a set of exercises and techniques to make the meeting goes in the right direction. Some of the exercises are silent writing, satisfaction histograms and timelines. They are applied to get a common understanding of what happened in the iteration and to develop the team next actions (Gonçalves and Linders, 2013).

Some of the benefits of conducting retrospectives are the creation of a culture of trust and transparency, the generation of a sense of collectivity among the team, the discovery of risks earlier, and the opportunity to apply continuous improvement (Gonçalves and Linders, 2013).

2.7 Right Conditions to Apply Agile

According to Rigby, Sutherland & Takeuchi (2016), there are right conditions for applying agile with a high chance of success. An example of a favorable scenario is when customers are involved, collaborating closely and giving quick feedback to the team, since unavailable clients represent a barrier to perform Agile correctly. Another condition refers to the market environment and its predictability. Agile approaches were created to solve project instability and uncertainty, not for situations of predictability and fixed client demands.

The authors also suggest that agile methodologies should initially be introduced gradually into a specific sector of the company. The IT one tends to be the initial choice as software developers are likely to understand agile practices and tools. After achieving potential results in the IT sector, it can be applied to other areas such as marketing, strategic planning activities and resource allocation settlements. What can also be effective is to bring the team-workers
who’s already participated in agile success implementations to the other areas, serving as experienced coaches (Rigby, Sutherland & Takeuchi, 2016).

2.8 Agile Practices and Organizational Culture

According to Zurek (2017), organizational culture is the capacity of a company to establish and align its business around shared beliefs and behaviors. It includes common thoughts about identity, purpose, mission, competencies, and other aspects that influence employee attitudes. As stated by Watkins (2013), organization culture shapes the unique personality of a firm and dictate the way its work-team behave, which can deliver a strategic advantage and long-term business success (Watkins, 2013). Conforming to Lee (2017), it also affects and defines who are the company relevant employees, suppliers, customers and competitors, and how the interactions are established with them.

There are a few studies that have explored the relationship between Organizational Culture and Agile Practices (Strode, Huff and Tretiakov, 2009) (Livari and Livari, 2010) (Sutharshan, 2013) (Junior et al., 2015). The literature associates a suitable use of Agile Practices in organizations with a people-oriented mindset, where there are minimum hierarchy and high values of communication, empowerment, learning, commitment, responsibility, trust, openness and continuous improvement (Siakas and Siakas 2007).

The research performed by Strode, Huff, and Tretiakov (2009), for instance, concluded that OC is significantly related to Agile Practices usage. The authors conducted a multiple case study with nine software development projects in New Zealand and the United Kingdom, finding a set of organizational culture factors that affect how Agile Practices are practiced. After reviewing the literature, they created a model with cultural factors which are required for an appropriated use of Agile Practices and then they defined a list with widely used agile practices. The list of practices included pair programming, daily team meetings, iterative development, and other activities from frameworks such as Extreme Programming and Scrum. After collecting data from questionnaires, including the practice usage value, and performing statistical tests to carry out a cross-case analysis, they found out a correlation coefficient. Organizations that have a significant presence of organizational culture factors such as constant feedback and learning, reliable and collaborative social interaction between their employees and empowerment of people, have a greater extent of agile method techniques used on the project.
According to Sutharshan (2013), there is always a cultural factor associated with the performance of agile practices. The author provides an example of the practice of daily builds of the system, which involves cultural factors such as team engagement and communication, proactive acting and time management. He states that all of these factors influence the success of the agile practice implementation. When is about ‘pair programming’, fundamental cultural factors are trust, transparency, and collaboration (Sutharshan, 2013, p-45).

One of the objectives of Sutharshan (2013) study was finding enabling and limiting cultural factors that impact the implementation of Agile Practices. The author developed a framework matching agile practices and cultural agile attributes using the Hofstede and Hall’s cultural dimensions. The framework suggests that some countries are more suitable for agile implementation with less cultural changes than others. Therefore, the companies placed in those countries should be focused or be more aware of different cultural attributes to apply agile methods successfully. The United Kingdom, for instance, should be focused on ‘transparency’, a specific cultural agile attribute, to implement the practice of ‘frequent delivery’ with better results. On the other hand, India should be focused on ‘open and honest communication’ and ‘dedicated team’ to successfully apply the same practice.

Livari and Livari (2010) also investigated the influence of Organizational Culture on the deployment of Agile Practices. Their objective was specifying types of culture that foster the adoption of Agile Practices using the Competing Values Model (CVM). After testing a set of hypotheses, the author’s findings suggest that a “developmental” Organizational Culture, which does not present hierarchical and bureaucratic structures and is flexible and focused on responding to changes, is compatible with agile methods. The authors also pointed out that not having hierarchical culture orientation does not mean lack of discipline. Although Agile includes ‘lighter’ methods if compared to traditional approaches, it also implies some control to be implemented.

Findings from a systematic mapping of the influences of organizational culture in the adoption of agile methodologies in information systems development showed that there is not enough research in the area to validate the results already found. The results also reveal the necessity of “investigating the national culture”, as a critical factor that influence Organizational Culture in Agile Practices (Junior et al., 2015).

Nevertheless, the systematic mapping pointed out organizational culture factors, such as lack of feedback, teamwork spirit and flexibility to change, as barriers to the application of agile methods. Other negative factors are inappropriate behavior, insubordination, immaturity of the
teams and do not assume ownership of actions. In the systematic mapping conclusions there is a discussion about the reasons why aligning Organizational Culture and Agile Practices can be difficult. The authors presented the lack of consensus on agility concepts, mainly taking into consideration developing an agility mindset, as a boundary to make this alignment happen (Junior et al., 2015).

The majority of research concerns the impact of Organizational Culture on Agile Practices usage, but not the other way around. Strode, Huff, and Tretiakov (2009) highlight that the adoption of Agile Practices can actually produce changes in organizational culture and there is a necessity to perform longitudinal studies to understand the directionality of this relationship fully.

Kupper et al. (2017) state that the establishment of agile principles and practices requires time to become part of the organizational mindset. They pointed out that Agile Practices are responsible for the gradual emergence and maturation of an agile culture, in other words, the usage of the agile practices can systematically develop the organization values, behaviors and beliefs. However, the authors declare that research on factors that promote this development is scarce.

In order to fill this research gap, Kupper et al. (2017) conducted a semi-structured interview with eight agile coaches that resulted in 50 factors that can influence positively or negatively the Organizational Culture development. Some of the selected factors are practices and methods that demonstrated to be valuable instruments to drive a cultural change. Adopting Scrum, for instance, showed a positive perceived impact in several factors such as feedback or common goals/vision. Practices such as test-driven development, pair-programming or retrospectives also were perceived to impact employee communication and transparency positively when scaling a new agile culture.

The other aspect explored in Kupper et al. (2017) study, was how to measure the progress of the transition towards an agile organizational culture. They found out that this measurement is complex as there are many contextual factors to be considered, and cultural changes cannot be measured employing the conventional product or process metrics, such as code quality and performance. In the end, the study findings not generated an exact set of generalized and measurable success factors that support an agile transformation but provided some indication about the perceived impact of agile methods and practices. There are many behavioral and contextual issues since each practitioner handles the transition differently.
The matching between Organizational Culture and Agile Practices has showed to be a critical factor in successful projects. However, there is insufficient research about the topic, including about which actions could be performed and how to solve conflicts when aligning Organizational Culture and Agile Practices. It is also necessary to propose new strategies, actions and models to extend previous findings and have a deeper understand regarding the topic.

3. Methodology

3.1 Introduction

The methodology includes scientific procedures, methods, and techniques that dictate the research process, and which are selected and designed to achieve the study objectives (Saunders, Lewis and Adrian, 2012). The following sections of this chapter describe and detail the methodology strategy, the procedures to collect and analyze data, the sample selection, and the related ethical issues of the research. The research methodology of this study was guided by the Research Onion model developed by Saunders, Lewis and Adrian (2012) and is illustrated in Figure 2.

![Figure 1- Research Onion, based on Saunders, Lewis and Adrian (2012)](image-url)
3.2 Research Philosophy

The research philosophy is connected to how the researcher perceives the world, representing its personal assumptions and beliefs that guide its development of knowledge. It affects the selection of strategies and methods that will be adopted during the research process (Saunders et al. 2009). According to Easterby-Smith, Jackson, and Thorpe (2012), having an awareness of philosophical principles can enhance the quality of the research and contribute to the creativity of the researcher. It also helps in recognition of which designs fit more suitably in the development of a methodology for conducting research, clarifying and indicating different benefits and limitations.

There are different kinds of philosophies in business and management that can be followed such as Positivism and Interpretivism, and they present distinct contribution and value in the way of seeing the world during the research process. Positivism, for instance, emphasizes the model of natural sciences, focused in the observation of a phenomenon in a neutral and objective perspective to discover "general" relationships, developing hypotheses that can be testable and repeatable (Saunders et al. 2009). However, because it predicts only average behavior, Positivism is not extensively suitable to understand individual attitudes and experiences, which can be a critical aspect for the success of studies in the management area. Positivism is not interested in subjective ideas and in intangible human behavior factors such as perceptions and feelings (Fisher, 2010), which are analyzed in this thesis.

On the other hand, Interpretivism assumes that it is essential to understand the differences between individuals in our positions as social actors and that reality is socially constructed. According to Saunders et al. (2009), the world of business and administration is too complex to follow absolute "laws," as it happens in the field of physical sciences. Therefore, the philosophy of Interpretivism is focused on understanding the point of view of the research subject, adopting an empathetic stance. It is producing new knowledge and collecting rich insights and interpretations from people’s feelings and experiences (Easterby-Smith, Jackson, and Thorpe, 2012), which is highly appropriate in the case of organizational behavior (Fisher, 2010).

Since this particular research is about people’s perceptions and interpretations, as well as their stories and experiences, and includes the researcher reflection of results gathered from small sample size, it fits with Interpretivism. The philosophy is favorable because this study aimed to understand and explore, through ‘perceived’ knowledge, human behavior and culture rather than to generalize, providing more detailed data for a complex scenario. Despite
Interpretivism raise questions about the representativeness of data (Saunders et al. 2009), which does not occur in the of Positivism, this research philosophy identifies the value and appreciates distinct and depth people interpretations to explain a studying context-specific.

3.3 Research Approach

Defining the research design requires considering how its theory is going to be developed, in other words, establishing its research approach. According to Saunders et al. (2009), there are three main approaches: Deduction, Induction, and Abduction. Deduction aims to develop the theory first and then to create hypotheses, allowing the possibility of explaining causal relationships between concepts and variables. Its process consists on seven steps: identifying the research question; determine critical concepts and variables from the literature involving the research topic and speculate on how they are related; state testable hypotheses using the previous speculations; select measures for the variables in the hypothesis; collect data to test the hypothesis; analyze the data to understand if it supports or opposes the hypothesis; reveal real results, even if the hypotheses are proven to be true or not (Fisher, 2010).

In contrast to Deduction, induction is focused on the discovery of emerging patterns after the data collection, which means this approach does not apply preexisting theories to formulate hypotheses at the beginning of the research. Theory can be used in order to formulate the overall purpose and to construct the research question, but it is the research observations responsible for developing generalizations, relationships and theories of the study (Gray, 2018). This approach encourages divergent thinking and more flexibility, finding meanings after collecting and exploring data (Fisher, 2010).

Adopting a combination of those two approaches (Deduction and Induction), it is also possible and can provide advantages such as capturing more details of a specific situation (Saunders et al. 2009).

However, for this particular research, it was adopted an inductive approach. This study attempts to provide insights, interpretations and feels of what is happening after the data collection to understand the nature of a particular context. It considers that different scenarios and experiences where the analysis will be executed can influence the results, providing alternative explanations of what is going on and more fragmentary details. All those characteristics are present in the inductive approach (Gray, 2018). The research consists on investigate and describe human perceptions in a specific industry and region, where new theories and ideas could emerge.
3.4 Research Design and Strategy

The research strategy has to be able to answer the research question and achieve the study goals. Many factors influence the decision of which research strategy is more appropriate including the researcher philosophical underpinnings, the extent of existing knowledge and the time and resource available to conduct the study (Saunders et al. 2009).

According to Easterby-Smith, Jackson, and Thorpe (2012), there are three different types of research strategies methods: quantitative, qualitative and mixed. Quantitative methods are focused on achieving reliability and validity through rigid measurement. They consist in collecting data and generalizing it, striving to identify patterns and examine the relationship between variables. They provide an opportunity to assess large sample sizes, using numerical data collection and statistical analysis. Common sources of quantitative data are surveys and observations involving numerical data (Saunders, Lewis and Adrian, 2012).

On the other hand, qualitative methods consist in applying descriptive analysis to inspect data by analyzing behaviors. They focus on gaining a deep understanding of the experiences, thoughts, and opinions of individuals, rather than quantifying a problem by numerical data and statistics. Qualitative research is generally adopted when little is known about a phenomenon or when seeking new perspectives about the study topic (Saunders et al. 2009). It covers several theoretical stances and methods such as observations, interviews and questionnaires, providing rich descriptions and powerful source of analysis (Gray, 2018).

Both qualitative and quantitative methods present limitations. For instance, despite qualitative research should follow a rigorous and logical process, there is still discussion regarding its validity and reliability since its results can be hardly replicated and generalized to the overall population (Easterby-Smith, Jackson, and Thorpe, 2012). According to Greenfield and Greener (2016, p-54), anything qualitative is also time-consuming and difficult to measure, analyze and interpret, requiring careful conduct to avoid biased judgment and misinterpretation.

At the same time, although quantitative methods are successfully applied to topics that can be quantified in numbers, their adoption can be extremally challenging in complex scenarios concerning human behavior, experiences, and interactions. As stated by Greenfield and Greener (2016, p-217), in quantitative research, there may be a loss of critical contextual
details, resulting in unsatisfactory results in decision-making processes, although their rigidity of the scientific method.

Lately, there has been an increasing interest in combining qualitative and quantitative methods in the same study, in other words, adopting a mixed research strategy. There is a belief that applying a variety of different methods can enhance the validity and generalizability of results and, consequently, increase the theoretical contribution of the study (Easterby-Smith, Jackson, and Thorpe, 2012) (Gray, 2018). However, if there is not an effective integration, the risk of not having the aimed fine-grained analysis and of losing the strengths of both approaches are high (Creswell, 2014) (Edmondson and Mcmanus, 2007).

Considering the research objectives of this study and the previous explanations of the chosen Interpretivism philosophy and Induction approach of this research, Qualitative is the most suitable Research Strategy. The bullet points below summarize the characteristics of the Qualitative Research that justify this choice.

- Attempts to find a more thorough comprehension in a highly contextual scenario (Greenfield and Greener, 2016), which it is, in this study, the IT industry in Ireland;
- Aims to understand and explore motives, attitudes and perceptions of an audience (Saunders et al. 2009), which it is, in this study, agile practitioners;
- Provides more flexibility to carry out in-depth analyzes of different views and facets of the same phenomenon (Saunders et al. 2009);
- Encourages creativity, going in a different direction than traditional research (Easterby-Smith, Jackson, and Thorpe, 2012);
- Allows managing data without removing the complexity of the topic (Saunders et al. 2009);
- Enable the research to learn from the participant’s experiences (Creswell, 2014).
- It can be performed considering the time available, since it represents a single strategy and will be focused on a small sample.

The researcher main concerns about this choice were the possible misleading of conclusions because the data collected from a small sample cannot be applied to an entire population. Besides, the bias of the researcher, that has to carry a thoughtful analysis, not influencing results subconsciously.
3.5 Time Horizon

Different research requires different periods of time to be performed and this characteristic is independent of which methodology was selected by the researcher. There are two main types of time-horizon: Longitudinal and Cross-sectional (Saunders et al., 2009). The first type consists in investigating the same scenario several times or continuously. It focuses on repeating the study as dynamicity and changes may emerge over extended time. The second type describes studies that are performed in a specific time frame. It is collecting data once and then analyzing and interpreting, which results in a snapshot of an ongoing situation. Therefore, the time-horizon of this study is Cross-sectional since the data collection was executed at single point of time.

3.6 Sources of Data

There is a common distinction regarding the type of sources researchers use to collect and analyze data. While primary data represents basic and original material for providing ‘fresh’ evidence to the study, secondary data copy, interpret or evaluate material to be found in primary data (Sapsford and Jupp, 2006).

According to Sapsford and Jupp (2006), true research should ideally include knowledge on primary and secondary sources pertinent to the subject of the study, but with special emphasis on primary data. Gray (2018) also states that both sources can be used in conjunction to increase the researcher study legitimacy and to provide richer insights.

In this particular study the primary data was collected through in-depth interviews and the secondary data through academic journals, books and conference papers about the research topic. Details are described in the following sections.

3.7 Secondary Data

As mentioned before, the secondary data refers to existing data, collected for a distinct purpose of a previous study or by someone other than the researcher. It is often used to obtain initial insights into the research question and objectives (Gray, 2018). This source can be accessed by a variety of ways, such as books, journal articles, data held by organizations, market research reports, and even quality national newspapers. An advantage of using secondary data is the possibility of analyzing a large amount of data without spending too much on resources such as time and money (Saunders et al. 2009).
In this particular study, the secondary data played an important role in establishing and delimiting the research topic. In addition, it provided significant information and different points of view on the two key themes that involve this study: Agile and Organizational Culture. There was an investigation regarding who are important names and contributors of those subjects. The purpose was find reliable and relevant information to guide the study data analysis and provide valid assumptions.

3.8 Primary Data

Primary data consists in “the first occurrence of a piece of work” (Saunders et al. 2009) rather than found in a book or journal article. It is the result of researcher's investigation of a business or managerial issue, provided by an analysis of the topic and by the conclusions drawn from it. This type of data is under control and requires much researcher involvement and resources compared to the secondary data collected (Fisher, 2010).

The primary data collected from this qualitative research was through in-depth interviews applied in a systematic and rigorous way to Agile practitioners operating in the IT sector in Ireland. Details of how it was chosen and applied are described in the following section.

3.9 Primary Data Collection Instrument

There are several tool options to apply when choosing a qualitative research and they are used to gather data in an interpretative manner such as from experiences, views or opinions. One of the most common is Interview, representing a data collection tool that can provide valid and reliable information to answer research questions and achieve the research goals (Saunders et al., 2009). As stated by Creswell (2014), some interviews advantages are the researcher greater control over the types of questions and information received, besides the chance of gathering more historical information and details from the participants.

There are different ways to perform and categorize interviews. According to Saunders et al. (2009) a common typology is the classification as one of: Structured Interviews, Semi-Structured Interviews and Unstructured. Structured Interviews consist of an interviewer reading standardized questions usually with pre-coded responses. They are referred to as ‘quantitative research interviews’ since they use questionnaires based on the same set of questions to interview participants and to collect quantifiable data (Saunders et al., 2009). On the other hand, Semi-Structured Interviews generally involve few open-ended questions that
are designed to elicit viewpoints and opinions from the participants. Despite having a guide to follow, the interviewers may go to other topic trajectories when they feel it is appropriate, leading to adding meaningful information (Creswell, 2014). Unstructured Interviews are more flexible and considered informal since there is no predetermined set of questions to ask, although the interviewers are required to have a clear idea about the aspects they intend to explore (Saunders et al., 2009).

This study primary data collection instrument is a Semi-Structured Interview, comprising open-ended questions that gives participants more options for responding and, at the same time, to maintain validity and reliability of the gathered data (Creswell, 2014). The objective was presenting the questions in a format that allows and encourages participants to be open exposing their points of views, experiences and details from the topic asked. The following steps were suggested by Creswell (2014) and were used to conduct this study interviews:

- Define the type of interview will be used.
- Identify the participants.
- Obtain consent from the participants to join the study.
- Establish a suitable and quiet place to perform the interview.
- Audiotape and take brief notes from the answers during the interview.
- Have and follow a plan but be flexible when appropriate.
- Use probes to gather additional information.
- Give to the participants the chance to summarize and clarify their points.
- Be polite and professional during the whole interview.

3.10 Purposive Sampling

To proceed this research, it was necessary to select a group of people which possess common characteristics or experience the same scenario to speak for the target population, in other words, a sample (Saunders et al., 2009). When applying qualitative methods, the sample is usually smaller than 30 units and should be focused in achieving the highest possible quality instead of higher quantity (Greenfield and Greener, 2016). The researcher turned to purposive sampling which means selecting a sample that there may have an inherent disparity in the population of interest. Nevertheless, purposive sampling may lead to remarkable samples since the researcher explore in advance which possible collective features can capture all variations (Greenfield and Greener, 2016). This choice was made considering its viability to yield data to answer the research question in a short period of time (Fisher, 2010).
As previously mentioned, the data collection instrument applied in this study was Interview, a tool that can be efficient and provide meaningful analysis with a small sample (Fisher, 2010). There was selected a group of 6 participants, precisely defined following these three conditions:

- IT professionals, including project managers, business analysts, software engineers, developers, and testers.
- Professionals currently working or had previous experience with agile practices.
- The agile practices were applied in Ireland.

The researcher believed that interviewing IT employees working in distinct positions and backgrounds could be valuable, since that is could provide different information on the subject. The selection of the first respondents was by using the researcher personal contacts in Ireland. Other people interviewed were asked to be nominated by the first respondents or identified through LinkedIn and other social media groups about IT in Ireland. With all of them the researcher negotiated the terms of engagement, the interview topics, how the information would be used, and the guarantee of the confidentiality offered.

### 3.11 Data analysis procedures

Data collected through qualitative research presents non-standardized nature, requiring complex data analysis procedures conducted through the use of conceptualization. All data compiled requires to be properly condensed, categorized and restructured, providing valuable analysis and support for creating theoretical frameworks (Saunders et al., 2009). According to Nowell et al. (2017), data analysis in qualitative research must be conducted in a consistent, precise, and exhaustive manner to be accepted as trustworthy. The methods of data analysis have to be clear and described with enough detail to prove the credibility of the study.

This particular study was guided by thematic analysis, a research method for identifying, investigating, organizing, describing, and creating themes. It should be more than simply summarizing data, but it is interpreting and makes sense of it (Nowell et al., 2017). There are several ways to approach thematic analysis, in this study the following steps were followed (Braun and Clarke, 2006):

- Familiarization with the data: Having a comprehensive understanding of the content through transcribing interactions, reading and re-reading the transcripts, and taking notes of initial ideas.
• Generate initial codes: Coding preliminary and interesting features of the data in a systematic manner. These codes are higher in numbers and more specific than themes.

• Search for themes: Grouping codes into potential themes. It represents the beginning of the interpretive analysis of the related codes.

• Review of themes: Checking if themes cohere together meaningfully and if the distinction between them is clear. In this step can be generated a thematic “map” of the analysis.

• Definition and naming themes: Performing on-going analysis to refine the specifics of each theme. In addition, generating precise definitions and names for each theme. At this point, a unified story of the data requires to emerge from the themes.

• Reporting: Selection of compelling extract examples that are related to the themes. Relating the analysis to the research question, objectives and literature review.

3.12 Ethical issues

Several ethical principles must be applied during the whole process of research. From defining the research topic to collecting, processing, storing and analyzing data, it is essential to act morally and responsibly. It means that every right of those who become the subject of the study or who are affected by it needs to be considered (Saunders et al., 2009).

Considering the choice of semi-structured interview as a data collection instrument, there are several ethical aspects to be analyzed by the researcher. Firstly, each participant will receive an information sheet, including the purpose of the study and how the data collected will be used in the future by the researcher. Participation must be voluntary, and if respondents agree to all of the terms in the sheet, they must sign it. They should be clearly aware that their data will be accessed by the researcher whenever necessary.

During the interviews, it is imperative that the researcher presents issues that are relevant to the subject of the study and that ensure the confidentiality and protection of each participant. Finally, all data collected must be provided without alteration or deletion of information.

3.13 Methodology Limitations

Every methodology has its limitations, which must be considered since they affect the results of the study. In the decision of the methodology strategy, it was considered its advantages and disadvantages and how they could affect and restrict the findings from the current research. Some of the limitations are:
Due to the qualitative nature of the study, the results cannot be generalized for the entire population. The information collected and analyzed is subjective since involves people with different experiences and points of view.

The sample size tends to be limited when performing interviews. It may be necessary to conduct several interviews to found valuable information.

The quality of data collected also relies on the researcher ability to interview. The researcher has to be careful not to have biases that could impact the way they input responses.

4. Data Analysis

4.1 Introduction

Data analysis is the process of turning the obtained data into useful information. It concerns making sense of the collected data, extracting some meaning from it and providing evidence to support the developed theory and to draw a conclusion (Fisher, 2010).

In this study, primary data were collected from semi-structured interviews with IT employees currently working in Ireland. The interviews were organized around a set of seven questions and were recorded and transcribed providing qualitative data, expressed in the form of opinions and feelings of the participants. The six participants present different backgrounds and were encouraged to express their own experiences on the research topic.

There are several ways to analyze the qualitative data from interviews, the method used in this study was thematic analysis. It comprised the steps of familiarization with the data, coding, identifying themes, and allocating and connecting chunks of the data to the identified themes (Braun and Clarke, 2006). Applying this method was essential to identify patterned meaning across the data and to perform a coherent and consistent analysis.

The data analysis presented in this chapter address the following research questions:

- What do IT employees working in Ireland say about Agile practices?
- What are the most widely used Agile practices?
- Which are the Agile practices perceived as positive? And as negative?
- Do agile practices can produce changes in the organizational culture? How?
The purpose of this chapter is to highlight the results of the interviews, revealing different opinions and points of view on these research questions. All these insights were crucial and a basis for interpretations, discussions and to draw the study conclusions.

4.2 Profile of the Participants

Table 2 shows how the interview participants are identified in this study and some of their profile information. Although they all follow the conditions of being IT professionals currently working in Ireland using Agile Practices, they represent a sample that can provide diverse insights about the research topic. Some of them have different roles, work in diverse business areas and have different time experience with Agile in Ireland.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Role</th>
<th>Company Business Area</th>
<th>Time working with Agile in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Security Manager</td>
<td>Management Consulting</td>
<td>4 months</td>
</tr>
<tr>
<td>P2</td>
<td>Software Engineer</td>
<td>Finance</td>
<td>5 months</td>
</tr>
<tr>
<td>P3</td>
<td>Developer</td>
<td>Finance</td>
<td>1 year and 6 months</td>
</tr>
<tr>
<td>P4</td>
<td>Software Engineer</td>
<td>E-Commerce</td>
<td>1 year and 10 months</td>
</tr>
<tr>
<td>P5</td>
<td>Technical Architect</td>
<td>Management Consulting</td>
<td>3 years</td>
</tr>
<tr>
<td>P6</td>
<td>Software Engineer</td>
<td>Security Measurements</td>
<td>4 years and 3 months</td>
</tr>
</tbody>
</table>

Table 2 - Profile of Participants

4.3 What do IT employees working in Ireland say about Agile practices?

One of the objectives from this study was to identify general perceptions of Agile Practices in the view of IT employees working in Ireland, in other words, to understand their thoughts and beliefs about it. This objective is connected to the Question 1 from the interview “What is your opinion of Agile Practices?”.

All participants answered this question providing positive opinions. P1 emphasized that Agile Practices are good and their adoption in Ireland had become very popular nowadays.
However, the participant reported a challenging experience when introducing Scrum in a project in the country. P1 stated that the problem was to belong to a team which had no prior contact with the framework or had not received any training or guidance. The participant exposed that “There is a point that you will fail if you don’t understand exactly what you have to do”. In the course of the time, P1’s team understood how Scrum works, and they managed to deliver the project on time “At the end we have really good results with the methodology”.

P2 stated that Agile practices are “good” because they provide a dynamic environment where small parts of the project can be constantly delivered. The participant compared Agile with Waterfall methodologies, in which the customer receives the project results only after it has been evolved over a long period of time. In P2’s opinion, it is a considerable disadvantage of Waterfall, because customers can be dissatisfied with the results and the team can waste a lot of time redoing what they were previously working on. The participant added positive perceptions regarding the communication between Agile teams and highlighted that when using the methodology “You have more interactions, you force interactions with your team”. P2 exposed “lack of documentation” as a downside of Agile, expressing that more documentation can sometime serve as extra guidance for developers.

P3 also compared Agile with Waterfall to answer the Question 1, saying that the former is more effective because allows more control about the tasks and faster feedback from customers “We always have something to show to the customer and if he doesn’t like it we have just spent two weeks working on it”. The participant also mentioned that by using Agile there is no need to previously collect a lot of requirements and to generate loads of documents, avoiding time that could have been wasted with Waterfall. However, P3 exposed that Agile “is not perfect, of course, I think every methodology has its pros and cons”. For instance, the participant mentioned that applying Scrum in a company that have no experience with the framework can be a challenge, demanding much effort and time. In P3’s point of view “People need some time to get used to Scrum and sometimes it does not work, because it depends on the culture of the company”.

In P4’s opinion, Agile Practices are “really good” because “they are focused on the client needs, on shipping features rapidly to them”. The participant mentioned that, when using agile, the goal of the team is to deliver software fast, but with high quality. P4 also pointed out not developing much documentation as a benefit from Agile. However, the participant mentioned some specific business that, in its opinion, require a more “step-by-step” process and much documentation. such as banks and hospitals. P4 cited web-development as a suitable kind of projects to adopt Agile Practices.
P5 answered that Agile Practices “are really nice practices, actually better than other practices”. The participant exposed that they improve communication and are used to deliver functionalities in a short time “Every two-weeks we deliver some functionality to the clients and they can see how the project is flowing and, at same time, they can ask for changes”. P5 said that, despite of all benefits, there is some aspects to improve, such as unnecessary meetings “Sometimes we have many meetings and we don’t need it”.

P6 exposed that applying Agile Practices represents “a very interesting way to develop a project”. The participant said straight away that a positive aspect of adopting Agile is its possibility of selecting just the practices that fits with the company’s goals. If the team desires, it is possible and favorable to mix Agile practices with other approaches outside of the methodology options. P6 stated that “It is interesting the way you can implement because is not something that you have to be fully committed”.

Table 3 shows a summary of participants’ opinions, including general findings and exploring relationships between responses.

<table>
<thead>
<tr>
<th>What do IT employees working in Ireland say about Agile practices?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The majority of participants provided positive insights about Agile Practices, such as they are “really good” (P4), “really nice” (P5), and represent an “interesting way to develop a project” (P5).</td>
</tr>
<tr>
<td>• “Delivering functionalities faster to customers” was highlighted as an Agile benefit for P2, P3, P4 and P5. In addition, P4 also said that the functionalities are meant to be delivered with quality.</td>
</tr>
<tr>
<td>• P2 and P5 explicitly mentioned that Agile Practices increase and improve communication between the team members.</td>
</tr>
<tr>
<td>• P5 also highlighted as a benefit the possibility to choose just the practices that fit the company’s goals and to mix and complement them with other approaches outside the methodology.</td>
</tr>
<tr>
<td>• P1 and P3 presented opinions regarding the experience of introducing Scrum in a project. They suggested that the framework can generate better results when the team has already guidance or previous experience with it, otherwise applying it can be challenge. Both agreed that it takes time to get used to Scrum if it is the first time the team is using it.</td>
</tr>
</tbody>
</table>
• P2 and P3 compared Agile methodology with Waterfall, saying that the former provides the benefits of faster feedback and handles better when the customer requires changes in the project.

• P3 and P4 exposed that not developing much documentation is an Agile benefit, however, in P2's opinion, the lack of documentation can be a disadvantage when developers need an extra guidance.

• At the same time, P4 believes that projects from some specific business, such as banks and hospitals, requires much documentation and a more “step-by-step” process than what it is proposed by Agile.

• Despite all the benefits, P5 mentioned as an Agile drawback an excessive and unnecessary number of meetings.

Table 3 - What do IT employees working in Ireland say about Agile practices?

4.4 What are the most widely used Agile practices?

Understanding which Agile practices are popular and have been used in Ireland is also another objective from this study and is connected to the second question from the interview “What are the most widely used Agile practices?”.

P1 identifies Scrum and SAFe Agilist as the most widely used Agile Practices in Ireland. In the participant opinion, Kanban is starting to be introduced in the country and Extreme Programming it has been used.

When asked about the most widely used Agile practices, P2 mentioned Planning Poker, Sprint Planning, Sprint Review and Daily Standup Meeting, all practices from the Scrum framework. The participant also mentioned Continuous Integration and Code Reviews.

P3 answered straight away “It’s Scrum, for sure”. The participant mentioned the practices of Sprint Planning, Refinement, Daily Standup Meeting, Retrospective and Pair Programming, while was answering this question.

In P4’s opinion, Scrum is also the most widely used Agile practice. Kanban is still new in its perspective, but it is getting popular lately. When answering the question, P4 also mentioned the practices of Continuous Integration and TDD.

P5 mentioned Daily Standup Meetings, Sprint Planning, Retrospectives, User Stories, Code Reviews and Refactoring. The participant said that eventually its team do Pair Programming.
P6 identifies Daily Standup Meetings as the most widely used Agile practice. The participant answered the question mentioning some other practices that its team is trying to apply: Sprint Planning, TDD, Retrospective and Refactoring.

Table 4 presents a summary of the participant answers.

<table>
<thead>
<tr>
<th>What are the most widely used Agile practices?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All the participants mentioned Scrum practices.</td>
</tr>
<tr>
<td>• P1, P3 and P4 identified straight away that Scrum is the most widely used Agile practice.</td>
</tr>
<tr>
<td>• P2, P5 and P6 answered the question mentioning practices that also belongs to the Scrum framework, such as Daily Standup Meetings, Sprint Planning and Retrospectives.</td>
</tr>
<tr>
<td>• P1 and P4 believes that Kanban is recently getting popular in Ireland.</td>
</tr>
<tr>
<td>• P1 exposed that Extreme Programming (XP) it has been used in Ireland.</td>
</tr>
<tr>
<td>• All other participants mentioned practices that belongs to XP framework, such as Continuous Integration, Pair Programming, TDD and Refactoring.</td>
</tr>
</tbody>
</table>

*Table 4 - What are the most widely used Agile practices?*

### 4.5 Which are the Agile practices perceived as positive? And as negative?

Comprehending positive and negative perceptions of Agile practices is a study objective connected to the third and fourth questions from the interview, which are “What Agile practices are positive? Why?” and “What Agile practices are negative? Why?”.

In general, participants provided more positive insights than negatives. Rather than listing the names of the practices and characterizing them as advantageous or disadvantageous, most participants pointed out that if there is no guidance, no team-member commitment or if practices are not strictly followed, Agile as a whole will not bring the expected benefits. However, some participants manifested specific insights from each Agile Practice. Considering that ten practices were mentioned, the researcher decided to condense both positive and negative perceptions from each practice in their respectively subsection. The researcher opted for this structure aiming to organize the different insights providing a more efficient way to compare the practices positive and negative sides.
Scrum

P1 highlighted that Scrum meetings are positive practices because they improve the communication between teams. The participant stated that “They allow people to listen to each other and then to work together as a team, having better results.” In P1’s opinion, Scrum meetings also help each employee to understand their assignments and what they should prioritize.

P2 exposed a negative aspect regarding Scrum meetings, the participant believes that there are an excessive number of them inside of the framework. P2 stated that “For example, in my company on Wednesdays we basically don’t work. We have sprint review, retrospective, sprint planning and sometimes we even have demo”. The participant suggests that applying Agile with less meetings could still lead projects to better results.

Kanban

P2 identifies Kanban as a good tool to manage the team tasks. In P2's point of view, it also adds value to the team because it makes visible what is currently being developed and what the next steps are “Kanban board helps to organize and to see what is happening”.

P4 believes that Kanban is a practice “focused on delivering features faster to customers” and also focused on establishing a continuous delivery for them. The participant exposed that it guides developers to concentrate on a single small task, avoiding multi-tasking. The work-in-progress limit of tasks established in the Kanban board is what helps this focus and control, in P4’s opinion.

P4 pointed out that a Kanban disadvantage can be when a team have a too simplistic board with few steps. The participant believes that not all boards have all the important steps that a developer should follow. P4 stated that “you kind of miss all the steps of the developer sometimes, like, forget to do one of these phases”. The participant highlights that sometimes is necessary to set external rules to make all those steps happen properly.

Planning Poker

P2 identifies Planning Poker as a “good practice”. In P2’s point of view, it simplifies the way stories are estimated, making the measurement of tasks more flexible and less complex.
Code Reviews

P2 believes that Code Reviews is a very useful practice, because you can have insights and suggestions from different people to improve solutions. However, P2 emphasizes that the advantages of the practice will depend on the team knowledge. If not experienced enough, “Sometimes people spend too much time to review”, which can block developers to keep working to finish a task. P2 also pointed out that team members can provide suggestions not really meaningful for improvements “Sometimes you have some comments that are irrelevant”.

P5 pointed out Code Reviews as a positive practice since it avoids that developers apply changes in the code that could “break” what is already approved and done.

Daily Standup Meetings

According to P3, daily standup meetings provide the benefits of giving insights to the whole team about the status of the current tasks. The participant mentioned that, by performing daily standup meetings, “we can have more control about what is happening in the project”. P3 also exposed the importance to be straightforward and concise when performing the daily standup meetings “We can’t say too much, we have to be really direct, say what we are doing, what we will do tomorrow, and if there are some impediments”. Lastly, P3 highlighted the importance to be transparent when daily standup meetings happen. All meaningful information should be provided to not impact project deliveries.

P5 exposed a drawback of Daily Standup Meetings. The participant said that performing this practice every day being part of a big team sometimes is not useful. P5 mentioned that, at the end of the meetings, the team has already forgotten what the first person said.

Sprint Planning

P3 identifies Sprint Planning as an important practice that facilitates the process of making the next project decisions, taking the opinion of the team as a whole. The participant sees the practice as an opportunity to discuss and to select wisely what will be delivered in the following days. P3 also mentioned some behaviors that the team should adopt if they want to get the best from Sprint Planning. The participant suggests to not get a lot of tasks, increasing the risk of compromising code quality or of generating bugs in the project. It is recommended to select
less tasks that can be well-performed in a suitable pace. P3 added “If we don’t do that we might take more than we can deliver”.

P5 believes that Sprint Planning is positive “because it involves everybody in the team”. The participant exposed that the whole team need to be present and the opinions from those with much experience and those with little are considered to make estimations.

**Retrospectives**

P3 pointed out Retrospectives as “very positive” and one of the main ceremonies in Agile. In the participant’s opinion, it provides an opportunity to discuss what have happened, to make corrections and also to improve what is necessary for the next iterations, in the P3’s words, to “have a progressive growth”.

P3 also highlights the importance of not using Retrospectives to “point fingers”. The participant mentioned a previously experience which its team were blaming others for mistakes, instead of using this moment to identify actions for improvements “Those things were terrible, and the team relationship got really bad”. As a solution P3 pointed out not providing a directly feedback to a specific person. The feedback needs to be constructive and about the team performance as a whole. The participant believes that is essential to follow the script, behave properly, and to “Be careful to not make Retrospective a war between team members”.

In P5 point of view, Retrospectives are “useful” and a “way to improve ourselves as a team”.

P6 believes that Retrospectives are “the most interesting” Agile Practice because the whole team is involved and is providing feedback. The participant pointed out that is a way to identify what is working and what is not.

**Pair Programming**

P3 believes that pair programming is a very effective Agile practice and a valuable opportunity to share knowledge “If a senior is working with a junior we can share knowledge and learn faster. It is exactly what happens with the team which I am working for”. In the participant’s point of view, junior developers can evolve faster when they are performing pair programming with a more experienced developer. P3 sees the practice beneficial not only for the developers individually, but for the company as a whole that will produce more code in an efficient way.
Continuous Integration

P4 believes that Continuous Integration “helps a lot in Agile”. In the participant point of view, it contributes to maintain the quality of the software and also to deliver the whole product faster to the customer.

TDD

P4 exposed that the practice of TDD helps to maintain the quality.

Table 4 shows a summary of participants' positive and negative opinions on the ten agile practices mentioned in the interviews.

<table>
<thead>
<tr>
<th>Agile Practice</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrum</td>
<td>P1 believes Scrum improves communication and collaboration between team members. It also allows team members to be fully aware of their tasks and what they should prioritize.</td>
<td>In P2's opinion, Scrum proposes many meetings that are not always necessary to achieve good results.</td>
</tr>
<tr>
<td>Kanban</td>
<td>P2 manifested that Kanban increases visibility in projects, helping the team members to manage current and future tasks. P4 believes Kanban allows faster and continuous delivery to customers. It also allows the mindset and performance of single-tasking.</td>
<td>P4 pointed out that some Kanban boards can simplify or miss important steps of processes, which may require external rules to make the workflow efficient.</td>
</tr>
<tr>
<td>Planning Poker</td>
<td>P2 sees Planning Poker as a practice as a simple and efficient way to measurement tasks.</td>
<td></td>
</tr>
<tr>
<td>Code Reviews</td>
<td>P2 exposed that Code Reviews are useful because they represent a way to share knowledge and improve solutions. P5 believes it diminishes risks of breaking the code.</td>
<td></td>
</tr>
<tr>
<td>Agile Practice</td>
<td>Perspective</td>
<td>Observations</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Daily Standup Meetings</strong></td>
<td>Positive</td>
<td>P3 believes Daily Standup Meetings gives insights to the whole team, allowing greater control of the tasks. It can provide more benefits if team members are direct and transparent regarding the status of their tasks.</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>P5 believes is not always useful in big teams, since first participant pronouncements can be forgotten.</td>
</tr>
<tr>
<td><strong>Sprint Planning</strong></td>
<td>Positive</td>
<td>In P3’s opinion, it facilitates the process of making future decisions wisely, taking the opinion of the team as a whole. P5 sees benefits in taking into account the opinions of team members with different knowledge and experience.</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>In P3’s opinion it is an opportunity of continuous improvement. P5 believe it is useful to improve the team as a whole. P6 believes it is interesting because involves feedback from each member of the team.</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>P3 believes that it can be detrimental to the team's relationship if the participants blame others instead of providing constructive feedback.</td>
</tr>
<tr>
<td><strong>Retrospectives</strong></td>
<td>Positive</td>
<td>P3 consider Pair Programming as an opportunity to learn faster and to share knowledge between seniors and juniors. The participant believes it can generate more code efficiently.</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>P4 believes it allows faster software delivery to customers.</td>
</tr>
<tr>
<td><strong>Pair Programming</strong></td>
<td>Positive</td>
<td>P4 exposed it helps to maintain the quality.</td>
</tr>
<tr>
<td><strong>Continuous Integration</strong></td>
<td>Positive</td>
<td>P4 believes it allows faster software delivery to customers.</td>
</tr>
</tbody>
</table>

**Table 5 - Which are the Agile practices perceived as positive? And as negative?**

### 4.6 Do agile practices can produce changes in the organizational culture? How?

Understanding how Agile Practices impact the organizational culture is an objective of this study. Therefore, participants were asked in what manner Agile Practices are responsible to
affect and develop values, behaviors and beliefs inside of companies. The data collected and analyzed to answer this issue is connected to the last question of the interview “Do you think agile practices can produce changes in the organizational culture?”.

P1 exposed that agile practices “definitely” produce changes in the organizational culture, and the communication is the more affected aspect. The participant stated that “Everyone can interact properly with the team” and also that agile practices allow that each member of the team to easily identify their roles in the project.

P2 also pointed out that they surely produce changes, providing a lot of insights of the topic. Firstly, the participant mentioned that Agile Practices motivate the team to perform their jobs. In the participant point of view, the motivation comes from the constant interaction, discussions, and presentation of work to the whole team. Secondly, P2 believes that Agile Practices promotes an environment of less pressure, especially in Ireland “Two times in a month a stayed one extra hour to finish something, but because I want it. Nobody would say to you to stay”. Thirdly, Agile practices promote autonomy and flexibility to try new things “If you think there is something good that you can use, you use it”. According to P2, Agile presents a vast number of practices, which represent options that teams have freedom to choose and to apply inside companies. The participant exposed that it is essential to understand and evaluate which one fits and can add value. Lastly, P2 emphasizes the Agile mindset of always aiming for quality, stating that “When using Agile people are very strict about code coverage, code must be well-developed”.

According to P3, agile practices produces changes in the team behavior, but it takes time because “who have to change is the people that are working there, is not that Scrum will do a magic”. The participant believes that the ones who are not used to have regular meetings or to provide feedback may identify the use of Agile practices as “tough”. In P3’s opinion, “Culture is the most difficult aspect to improve in a company, because it involves people and people are difficult to change everywhere”. People who are already used to work with traditional methodologies can find difficulty in adapting to Agile. In any case, P3 exposed that after adapting to it, agile promotes a culture of faster feedback to the customer and more control of the performed tasks. In the participant opinion it also increases visibility, which allows a more solid vision about the future of projects. Lastly, P3 added that it generates more dynamism if compared to other methodologies, which can be one of the reasons why it has been considered a successful approach.
P4 also believes they produce changes. The participant first pointed out the increase of flexibility and the possibility to define and to adjust the work processes. P4 mentioned also the focus on the client and on improving communication, exposing as well that Agile Practices can “remove all the impediments in the communication with the client”. P4 stated that using Agile the team “have a really good communication with the client, not only at the end of the development”. Agile Practices also promote “continuous talk and continuous refinement”, in P4’s opinion.

In P5’s opinion, by the time Agile Practices is being applied, the team can interact with customers adapting and improving what is necessary until the end of the project. The participant pointed out that “Agile develops more communication between the team” and when using Scrum “everybody is the same”. P5 mentioned that, in Agile teams, the opinion of each member counts equally, they listen to everyone regardless their job positions or previous experience. The participant stated that “Any person can come and say ‘listen, maybe we can introduce this, maybe we can change this’”.

P6 thinks that Agile Practices promote the culture of tracking what the team is doing and also of evaluating what needs to be done the future. The participant also mentioned the possibility of visualizing what is blocked and of “showing results to the team to know what we are going to achieve”. Other comments were that promote feedback from clients and improves how the team communicate. Regarding Scrum, the participant added that the presence of the Scrum Masters, who is always fully aware of what is happening, allows problems to be solved faster.

Table 5 presents the opinions of the participants regarding which factors are promoted or change in the culture of organizations which are applying Agile Practices.

<table>
<thead>
<tr>
<th>Do agile practices can produce changes in the organizational culture? How?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Innovation</td>
</tr>
<tr>
<td>Feedback</td>
</tr>
<tr>
<td>Less Pressure Workspace</td>
</tr>
<tr>
<td>Progress Visibility</td>
</tr>
<tr>
<td>Focus on the client</td>
</tr>
<tr>
<td>Continuous improvement</td>
</tr>
</tbody>
</table>

Table 1 - Do agile practices can produce changes in the organizational culture? How?

5. Discussion

5.1 Introduction

In this chapter, the study results are interpreted and related to the research question and existing knowledge. It includes explanations of the results that were consistent with the literature and those that were somehow unexpected or controversial. For the purposes of the current study, perceptions collected from interviews about Agile Practices and their impact on organizational culture are related to previous research about the topic. Literature about perceived benefits, drawbacks and about organizational values, behaviors and beliefs
developed by the usage of Agile Practices are compared to the study findings, reinforcing and extending knowledge of the area.

5.2 Agile Practices

When asked about opinions of Agile Practices, the study participants exposed perceptions of the following three main aspects: benefits, popularity, and boundaries when applying the practices. The data analyzed from the interviews show participants providing considerably more positive than negative perceptions of Agile Practices. They mentioned benefits such as quick delivery of features, improved communication, regular feedback, greater team collaboration, quality assurance, higher transparency and visibility of tasks, opportunity to innovate, and higher project control.

These results are highly related and stands the theory of what the Agile Manifesto has proposed since its inception in 2001 (Agilealliance.org., 2015). When the Manifesto was created, the goal was to promote a process focused on fast delivery, quality and meeting customer needs. Some other Agile objectives are embracing changes, encouraging teams to work collaboratively and improving continuously (Dyba, Dingsøyr and Moe, 2014) (Carroll and Morris, 2015) (Rigby, Sutherland and Takeuchi, 2016).

Participants also exposed the perception of greater adoption and popularity of Agile Practices in Ireland, adding that they are what is working now and what is proving to be successful in the current scenario. Evidence shows that organizations are increasingly embracing agile techniques for managing projects (PMI, 2017). The Global Project Management Survey (PMI, 2017) found that 71% of organizations report using Agile approaches sometimes, often, or always and the Annual State of Agile Survey (Version 1, 2018) has 25% of their respondents reporting that all or almost all of their teams are adopting Agile, whereas just 8% stated that in 2016. There is data also showing that this adoption has proved to bring favorable outcome to companies, since 61% of respondents stated that "most" or "all" of their agile projects have been successful (Version 1, 2018).

However, participants reported that applying Agile Practices can take very long until become effective. They pointed out that is required much cultural change, which is a challenge for companies. Much literature also highlights organizational culture as a critical factor in the success of applying Agile (Strode, Huff and Tretiakov, 2009) (Livari and Livari, 2010) (Sutharshan, 2013) (Junior et al., 2015). Changes in behaviors and ways of interaction are not simple, therefore companies that already have high values in aspects such as communication,
learning, empowerment and continuous improvement are half-way done to adopt Agile Practices achieving immediate improvements (Siakas and Siakas 2007).

The research from Kupper et al. (2017) suggests that this cultural change by the usage of Agile demands some preparation and could be facilitated if there is an explicitly appointed transition team or coaching to manage the process. This aspect was also pointed out by participants of this study, which emphasized that having guidance, mainly from team members with knowledge and previous experience, can make the adoption of Agile Methods, such as Scrum, easier and less time-consuming. It is also related and reinforces results from Kropp and Meier (2016) research, which highlights that having experienced members in the team is a key factor in the transition process of applying Agile and from Rigby, Sutherland and Takeuchi (2016), which exposes the importance to gone through training to understand and adopt Agile.

Besides the general perceptions on Agile Practices, there are some specific findings that can be correlated with previous studies:

**Scrum**

Several participants highlighted improvements on communication by the usage of Scrum. They pointed out that the framework encourages interactions and reduces the frustration of miscommunication, which is a purpose of Scrum (Rigby, Sutherland and Takeuchi, 2016). However, one participant pointed out an excessive and unnecessary number of Scrum meetings, which interrupts hours of development. The study conducted by Kautz, Johansen and Uldahl (2014), which analyzed the perceived impact of Scrum Development on productivity, is in agreement that the framework led to more meetings which, in fact, led to more interruptions. Nevertheless, the meetings still produce positive effects on productivity as they create better visibility and knowledge about the tasks, allowing employees to tackle unforeseen challenges better and to solve problems within the teams.

**Kanban**

The visibility and transparency promoted by Kanban allows the team to recognize and to respond immediately to process bottlenecks and maintain a steady flow (Turner at al., 2012). Contributions regarding visibility and task-management were also pointed out by the participants of this current study. They added as another advantage the focus on developing single small tasks, instead of performing multi-tasking. These observations can be related to
the findings of the survey conducted by Markkula and Oivo (2016) about Kanban benefits of coordination and reduction of work in progress. Performing and focusing on small tasks that can ensure that the process goes forward and that the work is delivered constantly is perceived as positive by the participants.

Problems found in the literature such as misunderstanding of core principles of Kanban, difficulties on establishing a suitable limit of WIP and the physical distances between team members were not mentioned by the participants of this study (Markkula and Oivo, 2016). However, one of the participants exposed the problem of having a Kanban board with few and simple steps, requiring external rules to make the software development process flow correctly. One of the results presented in Markkula and Oivo (2016) research is that Kanban is a basic controlling tool that needs to be supported with additional practices.

**Retrospectives**

Gonçalves and Linders (2013) stated that Retrospectives are an opportunity to create a culture of continuous improvement. However, Kniberg (2007) declared that not every team is inclined to apply this practice. Three of the six participants in this study reported that they apply Retrospectives in Ireland, stating that it is useful and beneficial in the continuous improvement of the way they work. The other three participants have not mentioned the practice during the interviews, which may mean that they do not use it. Dyba, Dingsøyr, and Moe (2014) has identified that some agile teams do not apply Retrospectives because the practice may take some time to present significant results or changes, which might be a reason for skipping it. Nevertheless, research shows that Retrospectives can be extremely valuable to avoid making same mistakes over and over again (Kniberg, 2007), which can be reasons why participants mentioned positive aspects about the practice.

In addition, Gonçalves and Linders (2013) stated some Retrospective risks, such as emotional ones. P3 exposed an experience where team-members were blaming each other for mistakes instead of analyzing what they can improve. The purpose of Retrospectives is to reflect on the way of working to become more effective by providing constructive feedback, avoiding unhealthy relationships.

**Planning Poker**

In this study, Planning Poker was perceived as positive because it simplifies the way the stories are estimated, making task measurement less complex. Although in the literature this practice is identified as a subjective and based-judgment estimate, it is one of the most widely
used ways to evaluate the effort in Agile and has proven to produce accurate estimates (Mendes, Britto and Neiva, 2014).

**Daily Standup Meetings**

Some of the Daily Stand-up Meetings benefits found in the literature are improvements in the communication among the team and assessment of task progress (Ringstad, Dingsøyr and Moe, 2011), all positive aspects highlighted by participants from this study. It also matches with the perceived positive value presented in the survey from Stray, Moe and Bergersen (2017).

A research performed by Stray, Lindsjørn and Sjøberg (2013) identified 13 obstacles that reduce Daily Standup Meetings efficiency. Although the most common obstacle found in the author’s article is meetings that last longer than they should (more than 15 minutes), they discuss two other issues raised by participants from this current study: meetings that are held too often and many people attending to those meetings. Two aspects also pointed out by participants from this study as Daily Stand-up Meeting problems. Lindsjørn and Sjøberg (2013) suggest considering whether it is worthwhile to meet every day and recommend an optimum group of 5 people to attend these meetings.

**Code Reviews**

Code Reviews are considered an essential practice for assuring source code quality. Nevertheless, recent studies show that finding appropriate code reviewers can be a complex and time-consuming task and that not every Code Review provides useful and informative comments to ensure code quality (Lipcak and Rossi, 2018). These findings are in agreement with the perception of a participant from this study, who highlighted unmeaningful suggestions as a Code Review problem. Nelson and Schumann (2004) and Bosu, Greiler, and Bird (2015) pointed out that Code Review performed by highly skilled and experienced professionals are perceived to provide more proper information and better recommendations.

**Sprint Planning**

Research conducted by Mahnic and Rožanc (2012) includes perceptions regarding Scrum meetings from professional developers and students. Professional developers perceived Sprint Planning as one of the most important practices and a success factor of Scrum-based software projects. The practice was also mentioned by two participants in this current study
which provided only positive insights about it. Both exposed the benefits of making future decisions wiser, considering the collective opinion of the team.

Pair Programming, Continuous Integration and TDD

In comparison to all practices discussed in this study, these three practices were the least mentioned by the participants, although only positive opinions were given about them.

Pair Programming was pointed out as an efficient manner to learn and share knowledge between team members, both aspects identified as some of the most positive effects of the practice in the survey with 28 developers developed by Vanhanen and Lassenius (2007). Continuous Integration was mentioned as a way to deliver software faster to customers, which is related to time-saving. A study about developer's perceptions on the practice provides a strong support that Continuous Integration improves developer productivity because it facilitates parallel development, but very weak support for the time saving (Stahl and Bosch, 2013). TDD was highlighted as a practice that helps in maintaining code quality. “Improvements in code quality” was perceived as a benefit by developers in the exploratory research conducted by Choma, Guerra and Silva (2018). The research revealed more comprehensive view of the effects of TDD on software design, which was not mentioned by participants from the current study.

5.3 Agile Practices impact on Organizational Culture

Agile practices have proven to be considered valuable tools to drive cultural change within companies (Kupper et al., 2017), which is in agreement with the opinion of all participants in this study who argued that Agile Practices can produce changes in organizational culture.

Changes in the communication appear to be the most striking, as they were mentioned by five of the six participants. They perceived that Agile Practices promote a constant interaction between team members. The first principle of the Agile Manifesto is “Individuals and Interactions over Processes and Tools” (Agilealliance.org., 2015), which implies that one of the Agile goals is to encourage communication. There are also substantial research reinforcing communication as an inherit organizational culture factor and a key to establish Agile principles and values in an organization (Dyba and Dingsøyr, 2008) (Strode, Huff and Tretiakov, 2009) (Junior et al., 2015) (Kupper et al., 2017). One participant highlighted that belonging to a large team can interfere negatively the communication promoted by Agile,
which leads to another point found in the theory, that small teams break down barriers and allow easier and informal communication, ideal to Agile scenarios (Liubchenko, 2016).

Participants also pointed out the higher flexibility to accommodate and to respond quickly to changes. It can be associated to the principle from the Agile Manifesto “Responding to change over Following a Plan”. According to Livari and Livari (2010) Agile Practices should promote and emphasize flexibility and spontaneity in the culture of the companies. Junior et al. (2015), also identify flexibility as an organizational factor that must be presented and motivated in companies that adopt Agile Practices. The authors highlighted as a challenge enhancing employee behavior to achieve flexibility and responsiveness, but they claim that it is necessary if companies want to achieve the whole benefits proposed by Agile.

However, flexibility does not mean lack of control or stability. Livari and Livari (2010) argue that the flexibility of Agile Practices actually improves stability, because changes in Agile projects can be predictable and manageable, which leads to what is perceived by two participants of this study. They pointed out that Agile Practices increase control and tracking of tasks, allowing for a solid view and better predictions about the next steps of the project.

The increased collaboration among team members through the adoption of Agile Practices was also emphasized by participants, which stands the theory that Agile teams have to work together effectively guided by consensus-driven decisions (Dingsøyr, Nerurc and Balijepally, 2012). In addition, one of the participants pointed out a feeling of equality, respect and less hierarchy. The participant believes that each team member is heard, and their opinions count equally, which are same results observed in the research from Tulfo et al. (2014) and Siakas and Siakas (2007).

Although teamwork and collaboration are essential to make Agile work (Asnawi, Gravell and Wills, 2012) and many Agile Practices encourage team members to openly and respectfully discuss and solve issues together (Whitworth and Biddle, 2007), one study participant highlighted an experience that goes against this scenario: team members blaming individuals, instead of transferring the responsibility of mistakes to the whole team. According to Tolfo et al. (2014), the “culture of blame” in Agile teams is common but can really become an obstacle. If people in organizations express values that are opposed to Agile, such as individuality and disrespect, they will cause problems rather than create improvements (Strode, Huff and Tretiakov, 2009).
One participant pointed out that Agile Practices promote a culture of innovation and of trying new approaches. According to Livari and Livari (2010), Junior et al. (2015) and Rigby, Sutherland and Takeuchi (2016), a key success factor of Agile is presenting management that values innovation. However, Tolfo et al. (2014) stated that showing motivation and disposition to innovate and taking risks are only a few on a broader set of values that are necessary to be rooted in the culture of companies and they do not correspond to a lack of planning. Participants recognized openness to innovation, but they did not fail to point out that they perform regular activities such as planning, tracking, and control in in their daily-work and that they are positive and important activities. It indicates that they do not attribute Agile to a disorderly and anarchy scenario, which is a wrong attribution performed by some people (Rigby, Sutherland and Takeuchi, 2016).

Agile Practices also encourage the culture of constant feedback in the participant’s opinion, helping to enhance team-work and being a base for continuous improvement. Many studies consider feedback as a factor of organizational culture that is significantly correlated and improved with the use of Agile Practices (Junior et al., 2015) (Strode, Huff and Tretiakov, 2009). Scrum, for instance, was a perceived to impact feedback positively by participants, which is one of the findings presented in research from Whitworth (2007) and Kupper et al. (2017). According to Whitworth (2007), the sense of immediacy created by feedback increases the motivation and energy of the work environment. This aspect was perceived by one of the participants, who pointed out that the constant interaction, discussion and presentation of work promoted by Agile Practices motivates team members to perform their jobs.

Just one participant exposed that Agile Practices lead to a culture of less pressure in the work-environment. This point of view can be associated to a key principle of the Agile Manifesto of having a Sustainable Pace, in which team members prioritize tasks and wisely invest their time and energy in delivering features constantly, representing a silver bullet to respond to pressures on the software industry (Murphy et al., 2013). However, studies conducted by Hoda, Noble and Marshall (2011) and McHugh, Conboy and Lang (2012), pointed out a perceived pressure of delivering the team iteration goals by agile practitioners, along with the need for continuous learning and improvement. Nevertheless, Hoda, Noble and Marshall (2011) perceive some amount of iteration pressure necessary to motivate teams to accomplish their committed goals.

Participant’s perceptions of higher visibility of the tasks, a greater focus on the client and continuous improvement are all expected organizational culture aspects associated to a
suitable use of Agile Practices (Siakas and Siakas, 2007) (Sutharshan, 2013), reinforcing what is known about the area.

It is important to mention that other organizational culture factors such as trust, leadership and self-organization were not explicitly mentioned by participants in the current study but are addressed in several studies, such as the ones from Siakas and Siakas, (2007), Strode, Huff and Tretiakov, (2009), Junior et al. (2015) and Kupper et al. (2017). Even though, it can be seen a correlation with those organizational culture factors and the ones exposed by participants from this study. Visibility, for instance, is identified in the research from McHugh, Conboy and Lang (2012) as essential to enhance trust among agile team members. Making the whole team aware of the current progress and of what they intend to do, increases congruence and vigilance, factors that place greater trust within the team. Lastly, it must be pointed out that the participants did not argue that Agile Practices promote types of culture or behaviors that could be detrimental and an obstacle to the success of Agile projects, such as isolation, secrecy, timidity and procrastination (Strode, Huff and Tretiakov, 2009).

6. Conclusions and Recommendations

The study aimed to understand how IT employees in Ireland perceive Agile Practices and their impact on organizational culture. To achieve this goal, a qualitative research was conducted with six IT employees who were interviewed revealing experiences and opinions on the topic of study. After collecting and interpreting the data, the main results were a broad group of Agile Practices benefits and a few obstacles to applying them. In addition, study findings reveal a set of organizational culture factors that are perceived to be changed and developed by the use of Agile Practices.

Agile Practices seem to be widely used and to bring successful results by IT teams based on Ireland, which is in agreement with the proven growth in popularity of Agile Practices (PMI, 2017) and the increased number of successful stories in Agile projects worldwide (Version 1, 2018). Scrum was pointed out as the most popular practice, providing many improvements on team members communication. Although the study findings show mostly positive opinions of Agile Practices, participants highlighted the difficulty in applying them in scenarios where team members do not have previous experience or knowledge, emphasizing the importance of having proper guidance or training to achieve better and faster results.

Major contributions of the study are related to how Agile Practices can produce changes and develop organizational culture factors within companies, since the majority of previous
research explored the other way around: how organizational culture factors promotes a successful transition and adoption of Agile Practices within companies (Kupper et al., 2017). The current study indicates changes on ten organizational culture factors: communication, flexibility, control, collaboration, innovation, feedback, pressure of work, visibility of the tasks, focus on client and continuous improvement. Although the vast majority of perceptions are that these organizational culture factors are positively changed by the use of Agile Practices, this study findings point out perceptions that modifying culture takes time and is challenging.

Care should be used in interpreting the results, since the current study was conducted with a small number of participants and it is based on personal opinions due to its qualitative nature. Even though findings cannot be generalized and they provide just an indication, the study contributes by extending knowledge about the topic and showing more evidence regarding the relationship between the use of Agile Practices and Organizational Culture. In addition, the study findings can be useful and support decision-making of IT employees who are planning to adopt Agile Practices and do not understand what kind of values and behaviors can be established in their companies by their use.

Although some literature discusses the emergence of the “Agile Culture” by the adoption of Agile Practices, the concept of “Agile Culture” is identified as recent and does not have a precise definition of what it actually is. This study exposes the need for further exploring of which elements characterize this culture. The performing of rigorous empirical studies, using different methods such as statistical analyses, could enhance and generate further insights about this concept.

In addition, Agile Practices may not be solely responsible for changing the culture of an organization, which sometimes promote and are influenced by other management or “non-developing” practices. Future research could consider the effects of these other variables in conjunction. Lastly, an interesting research opportunity would be verifying and compare if employees from different roles such as managers and developers have different perceptions of the impact on Agile Practices on the organizational culture.

7. Reflections

7.1 Learning development

The process of writing this MBA thesis was a challenging and intensive learning experience. All stages of the process, from choosing the study topic, conducting secondary research,
designing the methodology, collecting and analyzing data, and discussing and interpreting results, required much critical and learning reflection.

- **Choosing the study topic**

The first challenge was to decide the topic of the study. The researcher was looking for a subject that could have a positive impact on her career, that presented originality but at the same time a problem that could be solved, that was manageable in size for the time available and, above all, that could be enthusiastically pursued by her. Finding a topic that fulfilled all these points took longer than expected, but the moment the researcher began to read deeply about the subject and to discuss with different lecturers, especially with her supervisor, this task became less difficult. When the topic was finally established, the researcher was pleased with finding the subject interesting, current and that could provide valuable knowledge to the previous literature.

- **Conducting secondary research**

In the researcher's opinion, the step of searching and collecting data of previous studies was quite exhausting sometimes. There were several times when the research read articles that ended up not bringing any new and valuable information for her study. It is part of learning not to be frustrated because of this and to understand that new knowledge can always be useful. At the same time, there were many times when the researcher found articles that were remarkable in her opinion and very valuable for her research. Therefore, conducting secondary research had an immeasurable value in this study, especially when discussing the study findings.

- **Designing the methodology**

This step also required a lot of reading and new knowledge from the researcher. There are several different kinds and paths to follow when defining the research methodology. The initial researcher idea was to follow a quantitative strategy. After having a deeper understanding of the topic, discussing a couple of times with the supervisor, and considering the researcher personal values and goals, the researcher understood the reasons why the qualitative strategy would be better for her study.
Collecting and analyzing data

From the many options of data collection instruments in qualitative study, the researcher opted for interviews, which represented an efficient and even pleasant way in obtaining insights from the participants in the researcher’s opinion. Before applying interviews, the researcher took significant time to write appropriate interview questions that could not directly influence participant’s responses and that would allow them to feel comfortable in providing thoughts and insights on the subject. As the participants had different personality styles being more communicative than others, during the interviews it was necessary to sometimes try different approaches and use all the prompt questions. The researcher was able to improve his communication and listening skills in each interview. After data collection, the entire thematic analysis process required effort and was difficult, many initial themes were revised and changed a couple of times. However, in the end, thematic analysis was very helpful for conducting discussions and interpretations of the findings.

Discussing and interpreting results

This step was pointed out by the researcher as the most challenging, since it involved complex activities, such as interpreting, comparing and contrasting the findings of the study with the literature. It required a lot of critical thinking and creativity to define the chapter structure and find out what really stood out from the results. At first, the researcher found it difficult to write the discussion, but then she could relate results that reinforced what is already known about the area also providing and some different opinions.

Many obstacles were overcome, making the entire dissertation writing process rewarding. The researcher perceived self-improvements on many skills during the entire process, such as critical thinking, problem-solving, time-management and written and verbal communication, all valuable to succeed in her professional life. All acquired knowledge and learning, combined with the supervisor’s guidance during the process, allowed the researcher to conclude this study having a better self-awareness about herself and her career prospects.

7.2 Style of Learning

According to Kolb (2014), people learn from experiences, which are widely affected by aspects such as personality, attitudes and motivations. The author study about understanding and explaining human learning behavior, establishing four distinct learning styles which are based on a cycle of four stages of learning (Figure 3).
Regarding the four stages of learning, the Concrete Experience involves carrying out a particular action, immersing oneself in the “doing” of a task. The Reflective Observation is about reviewing and understanding the effects of the task that has been done and experienced. The Abstract Hypothesis comprises conceptualizing and interpreting the events that have happened, finding the relationships between them (this stage can give rise to new ideas, or changes in the existing abstract hypothesis). Lastly, Active Testing involves implementing and applying what was learned in future situations, resulting in new experiences.

Regarding the learning styles, the Accommodating are the people who seek new experiences, they are open-minded and relies on intuition rather than logic to make decisions. The Diverging are the ones able to look at scenarios from different perspectives. They tend to be imaginative, sensitive and to collect data before defining any conclusion. The Assimilating are the ones focused on coherent ideas and concepts rather than people. They feel uncomfortable with subjective approaches. Lastly, Converging are people who are attracted to experiment theories and to find solutions in a practical manner.

After performing the Learning Style Diagnostic developed by Honey and Mumford (1992), the researcher was identified as a Diverging. It is noticed that this result is in agreement with several decisions taken throughout the writing process of this current study, mainly the choices regarding the methodology. Interpretivism, the research philosophy of this study, concerns understanding and exploring human behavior and their culture, which can be related with the personality and diverging learning style of the researcher, who are interested in people and looking at situations in a more sensitive perspective. The choice of a qualitative nature and of
interviews as the instrument to collect data also can be related to a Diverging learning Style. This decision supports the interests of the researcher in group activities and in interacting and listening to the ideas and experiences of other people.

Overall, this learning style diagnosis may also be related to the researcher characteristics to obtain a constant and an in-depth look at the literature and to access a large number of articles before making decisions throughout the whole process of writing this study.

8. References


