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Observing leadership in practice: Comparing behavioural leadership patterns to theoretical frameworks in organisations undergoing an agile transformation

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OBSERVING LEADERSHIP IN PRACTICE: COMPARING BEHAVIOURAL LEADERSHIP PATTERNS TO THEORETICAL FRAMEWORKS IN ORGANISATIONS UNDERGOING AN AGILE TRANSFORMATION

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"Leaders are one element of an interactive network that is far bigger than they"
(Marion & Uhl-Bien, 2001)

ABSTRACT

Observing leadership in practice: Comparing behavioural leadership patterns to theoretical frameworks in organisations undergoing an agile transformation

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Driven by the trend of digitisation, organisations are required to undergo fundamental transformations to remain competitive in today´s markets. A widely embraced practice to guide people through such transitions lies in the integration of large-scale agile frameworks and the right leadership is seen as a crucial element for organisations to further such changes. Agile practitioners, however, often lack practical means to conceptualise leadership behaviours essential for managing their teams through these projects. This issue is also reflected in academia, which still needs more empirical evidence on how and to what extent leadership behaviour unfolding in agile practice, is related to established leadership theories. This study aims to shed light on how leadership is applied in an organisation that adopts large-scale agile practices (RQ1) to evaluate empirical examples regarding theoretical leadership frameworks (RQ2), and to better contextualise their relationship in terms of associated behavioural outcomes in agile teams (RQ3). We assess our model using data from a case study, combining in-depth observation and an integrated survey in two sub-units of a multinational life insurance company that applies the scaled agile framework (SAFe). A total of sixteen meetings were observed, covering about thirty informants, and video footage of approximately ten and a half hours was recorded. Our findings reveal that a various set of leadership patterns are practised, shared among different team members that organise themselves in shifting constellations of leadership roles. While only allowing a limited understanding of leadership-role relationships, the findings stress the importance of transformational, relations-oriented, and shared leadership as positive indicators of a cooperative and supportive working environment, based on open communication and trust. These behaviours tend to enable more knowledge sharing, an alignment of needs, and reduce decision-making obstacles. On the other hand, the results exhibit mixed indications related to transactional and task-oriented leadership. These behaviours seem to help agile teams ensure alignment of task requirements with stakeholders while at the same time challenging the teams' need for autonomy. These insights provide a heuristic value to agile practitioners to reflect on how they apply leadership. Also, the outcomes create incentives for academia to further investigate the meaning of identified behaviours and their impact on existing leadership frameworks.

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CHAPTER 1

1. INTRODUCTION

Leadership is frequently recognised as a critical success factor for healthy organisations, agile or not (Vermeeren, Kuipers, & Steijn, 2014) (Theobald, Prenner, Krieg, & Schneider, 2020). However, one of the greatest challenges that leaders face today are lacking practical means that they can leverage to enable people and organisations the way for adaptability to constantly changing market threats and opportunities (Scott & Davis, 2015) (Nold & Michel, 2016). Since the turn of the millennium, the phenomenon of digitisation is of rising importance and it is setting the pace for numerous businesses, such as healthcare-, finance- and public services (Bhavnani, Narula, & Sengupta, 2016) (Alt, Beck, & Smits, 2018) (Sabbagh, et al., 2012). To stay competitive in markets, organisations need to integrate disruptive technologies such as cloud computing into their business models. This requires them not only to consolidate their IT-infrastructures, but to fundamentally adapt their organisational structures to novel role definitions and business processes (Moşteanu, 2020) (Henriette, Feki, & Boughzala, 2015). To face the complexity and uncertainty involved in such organisational transformations, large-scale agile frameworks such as SAFe (Laanti, 2014) have proven themselves to be established process frameworks to accompany such projects (Dingsøyr, Nerur, Balijepally, & Moe, 2012) and their application comes along with corresponding leadership behaviours.

Decades full of research studies, including questionnaires and interviews unveiled diverse leadership style classifications for leaders, such as the concepts of transformational and transactional leadership (Bass & Bass, 2009) or the theory of task-oriented and relations-oriented leadership (Yukl, Gordon, & Taber, 2002). Yet, more research is required to better understand how leadership behaviour applied in practice, especially in organisations using large-scale agile frameworks, resonate with these theories. Thus, we may be able to better distinguish which leadership behaviours are actually considered to be most effective in a corporate context (Behrendt, Matz, & Göritz, 2017) (Yukl, 2012) (Larsson & Vinberg, 2010). In particular, the idea of shared leadership, which is associated with agile operating teams (Stettina & Heijstek, 2011) challenges established leadership theories such as the ones mentioned above, given that this practice asks for self-organised teams in which leadership is not necessarily concentrated around one central leader (Moe, Dingsyr, & Kvangardsnes, 2009).

1.1 Motivation

It seems reasonable to assume that leadership styles such as transformational leadership may be an essential driver of successful agile projects (Aryee, Walumbwa, Zhou, & Hartnell, 2012). It relies on a flexible leadership style, emphasising motivational, inspirational, and visionary behaviours to encourage emotional involvement of employees (van Kelle, Visser, Plaat, & van der Wijst, 2015). Furthermore, its informal communication style enables an environment of trust and quick reactions to emerging problems as well as changing project requirements, which are common characteristics in agile projects (Nerur & Mahapatra, 2005) (Dingsøyr, Nerur, Balijepally, & Moe, 2012). Thus, academia already knows a lot about underlying competency requirements of leadership behaviours in agile project environments that define in theory how to empower people for team performance. Yet, the leadership literature still requires a better qualitative understanding of exemplary behavioural patterns that successful leaders apply in practice to implement these behaviours (Yukl, 2012). Those leaders who are doing it rightly are missing the language and frameworks to expound what they are doing in order to enable people and organisations to be agile (Uhl-Bien & Arena, 2018).

The choice of this topic is based on a personal experience in project management in the consulting industry, whereby I was part of a team that served a client in the public sector as an IT service provider. Regarding this experience, the complex nature of the project was shaped by an atmosphere of uncertainty, whereby the challenge was to guide the client through an IT consolidation and IT transformation process. Specifically, the fascination for behavioural patterns involved between leaders and assigned project teams and the recognition to what extensive degree the applied leadership behaviour can impact project success was an essential part of the motivation to conduct this study.

1.2 Subject Relevance

Based on established leadership styles such as transformational leadership more qualitative research is required to better understand the psychological linkages underlying these styles that drive teams to perform in an organisation that applies a large-scale agile framework. This means that the different affecting behavioural patterns through which leaders in these organisations impact their team members need to be more closely determined to evaluate whether their behaviour is compliant with these styles or if new taxonomy dimensions need to be added to established leadership frameworks (Yukl, Gordon, & Taber, 2002) (Van Knippenberg, Van Knippenberg, De Cremer, & Hogg, 2005) (Moe, Aurum, & Dyba, 2012).

Do leaders in organisations that apply large-scale agile frameworks practice leadership behaviours compliant with established leadership theories such as transformational leadership? If so, do these leadership theories reflect all the behavioural routines of these leaders?

So far, a broad variety of research methods were used to examine leadership behaviours and their effectiveness (Antonakis, et al., 2004), most commonly using quantitative survey research with questionnaires (Muenjohn & Armstrong, 2008). Yet, applying quantitative survey measures alone to determine leadership behaviours and their effectiveness comes along with inherent limitations. It puts the focus mainly on what generic leadership style a leader applies and how it impacts organisational performance (Aryee, Walumbwa, Zhou, & Hartnell, 2012), meanwhile leaving out contextual factors that explain why the leader is conducting a certain leadership behaviour (Yukl, 2012). The integration of qualitative research methods may allow us to gain more insights into why the leader is applying certain leadership behaviours (Antonakis, Avolio, & Sivasubramaniam, 2003) and which situational factors influence their behaviour (Larsson & Vinberg, 2010) (Van der Voet, Kuipers, & Groeneveld, 2016). Qualitative data collection methods such as observation of agile teams in their actual decision environments may help us to gain more insights into how agile teams face decision making obstacles, their impact on agile development and how decisions are aligned on a tactical and on a strategical level from a leadership perspective (Drury, Conboy, & Power, 2012).

1.3 Problem definition

The behavioural patterns linked to established leadership theories that leaders in organisations using large-scale agile frameworks leverage to drive their organisational units are still to be determined. This is because it is not yet entirely evident how the self-organised team characteristics of agile environments correlate with established leadership theories (Moe, Dingsyr, & Kvangardsnes, 2009). Contrary to traditional project management, where leadership is clearly allocated to individuals anchored in hierarchical structures, in agile environments leadership is far less transparent and delegated within and across teams (Cockburn & Highsmith, 2001). A leadership practice which has gained more attention in academia (Gockel & Werth, 2011) and which is commonly practised in self-organised, agile project environments (Stettina & Heijstek, 2011) is based on the theory of shared leadership. This means that it relies on the team to delegate leadership to the person that holds the appropriate knowledge, abilities and skills for a certain problem that the team has to deal with at a certain moment (Langfred, 2000). Therefore, to become more agile, individuals in these

teams are also required to incorporate behavioural patterns that allow more knowledge sharing, delegating responsibility and trusting in people, into their leadership behaviours (van Kelle, Visser, Plaat, & van der Wijst, 2015) (Theobald, Prenner, Krieg, & Schneider, 2020). However, when introducing agile methods to their organisational structures, companies are often encountering issues to integrate effective leadership behaviours that support teams working in an agile way and empirical findings on agile leadership are controversial. It is either clearly delineated which roles in an agile setting take over leadership roles, nor what specific leadership behaviour is most effective (Moe, Dingsyr, & Kvangardsnes, 2009). This means that we need to gain a better understanding of both how people on an individual level practise leadership behaviours underlying recommended leadership theories such as transformational leadership and how these behaviours evolve in an agile environment that values leadership behaviours to be shared among team members (Moe, Aurum, & Dybå, 2012) in a "*team that is by definition self-organizing*" (Spiegler, Heinecke, & Wagner, 2021).

1.4 Purpose of the Study

To be capable to support organisations in an agile transformation, the research objectives qualitatively explore what leadership behaviours are applied and assess how these are related to respective theoretical leadership frameworks and associated behavioural reactions in the context of an organisation that applies a large-scale agile framework. Specifically, this project aims to provide empirical examples of behavioural patterns that can be identified in applied leadership routines in an organisation that utilises agile program- and portfolio management. Furthermore, it aims to investigate if and how identified leadership behaviours can be linked to the associated behavioural responses of team members as well as to established leadership theories. We use the examples of the Release Train Engineer (RTE), Product Manager (PM), System Architect (SA), Product Owner (PO) and Scrum Master (SM) to determine how both leading roles and members of large-scale agile teams apply leadership behaviours. This study aims to contribute to the existing literature on leadership and agility, by providing insights into which leadership behaviours are suitable in organisations that apply large-scale agile frameworks. Investigating the behaviours of the roles indicated above may provide valuable insights for organisations undergoing an agile transformation to reflect on their leadership behaviours.

The research questions of this study are listed below:

1. What practical examples of leadership behaviours can be derived from an organisation that applies a large-scale agile framework?
2. How are applied leadership behaviour routines linked to theoretical leadership frameworks in an organisation that applies a large-scale agile framework?
3. How are applied leadership behaviour patterns related to behavioural reactions in an organisation that applies a large-scale agile framework?

1.5 Structure of the Study

In order to carry out this study a systematic literature review was conducted to examine the theoretical foundations on leadership studies as well as common leadership practices in an agile corporate context. Furthermore, the literature review encompasses an introduction to agile development, respective competency requirements and challenges related to established leadership and team roles. Moreover, a single case study was carried out as a methodological instrument to analyse the research questions presented above. In the first stage, a qualitative in-depth observation was carried out, whereby the focus lay on examining the linkage between applied leadership behaviours, associated behavioural responses and theoretical leadership frameworks. This is followed by surveys that are conducted with the informant groups to determine perceived leadership behaviour, teamwork quality as well as the agile maturity level of respective teams in the second stage. Subsequently, an analysis of observed data and retrieved survey responses was carried out to evaluate their linkage to the existing theoretical foundations discussed. Eventually, this work concludes with an assessment of the empirical findings of the study in terms of their validity, how they contribute to research and an outlook for further research related to the topic.

CHAPTER 2

2. STATE OF THE ART

This chapter aims to provide an overview of the state of the art in leadership- and in agile development research. In this regard, it initially offers insights into the understanding of leadership, and it presents a historical and contextual delineation of the term. Furthermore, the limitations of the traditional understanding of leadership in a modern corporate environment are discussed and specifically which leadership theories are emphasised in an agile corporate context. In this regard, two established leadership behaviour theories from academia will be examined in more detail. The second part of this chapter concentrates on the concept of agile development, including its common characteristics, team- and leadership competency requirements as well as common frameworks for agile practices. The focus of the frameworks presented leans towards companies going through large-scale agile transformations.

2.1 Leadership

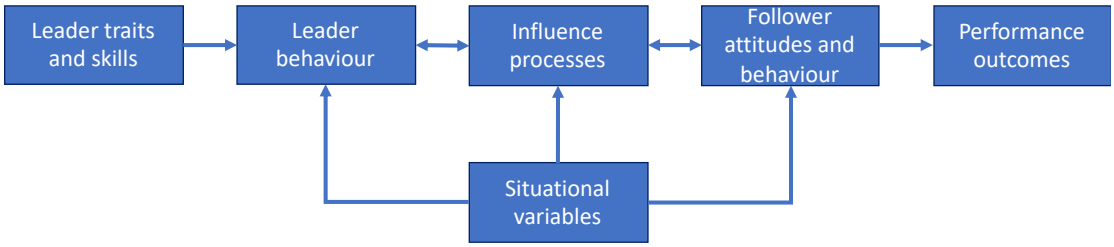
Leadership is a term that entails different characteristics and a various set of respective competency requirements that differ deeply based on the given context of its application. Initially, a definition and a delimitation of the term is given. This is followed by a historical overview of its meaning and accompanied challenges in practice. Furthermore, two common classifications of leadership behaviour are presented and how leadership is understood in the context of an agile working environment. Eventually, the leadership measurement frameworks used for this study will be shortly introduced.

2.1.1 Understanding and delimitation

It is hardly possible to establish one uniform definition of leadership, due to the complexity of its nature and conditioning situational factors such as corporate culture or applied industry. According to (Bass & Bass, 2009) "*the choice of an appropriate definition should depend on the methodological and substantive aspects of leadership in which one is interested*". However, several scholars from multiple national backgrounds could agree on one generic definition that depicts "*leadership as the ability to influence, motivate, and enable others to contribute to the effectiveness and success of the organizations of which they are members*" (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

To gain a better understanding of the term leadership, one needs to regard three essential characteristics in its context: The leaders' characteristics, the characteristics of the led group (further referred as followers) as well as the characteristics of the situation, in which leadership comes into play. Typical characteristics of a leader encompass aspects such as the values held, leadership behaviour and the leaders' influence tactics on the followers. Characteristics that define the followers involve the level of identification with the leader, effort put into the tasks and commitment to tasks, as well as job satisfaction and satisfaction with the leader. Shared characteristics of both the leader and the followers include their traits, skills, and expertise as well as emotional affect and confidence. Furthermore, significant situational characteristics that affect leadership cover type- and size of the organisational unit, task structure and -complexity or environmental uncertainty and -change (Yukl & Gardner, 2020).

Figure 1: Causal relationships among leadership variables
(Yukl & Gardner, 2020)



The figure depicted above illustrates the relationship between the primary types of leadership variables. It indicates the leaders' characteristics on the left side, the followers' characteristics in the top-right part and situational characteristics on the bottom part. In this work, the focus of analysis lies on the variable of leader behaviour, which is represented by a various set of leadership frameworks. The most common ones are described more closely later. Also, this work provides some insights into the follower behaviours by illustrating associated behavioural responses of observed leadership behaviours.

2.1.2 Historical development

When classifying the understanding of leadership, the most commonly used definitions focus on leadership behaviour, leadership as a process and leadership as a differentiated role (Bass & Bass, 2009). Leadership as a differentiated role refers to a traditional understanding of leadership claiming that leadership in groups arises "*as a position from the interaction*

process" (Bass & Bass, 2009) between an assigned leader and the group members. The roles differ from each other based on respective influence, indicating that the leader influences and the other people solely respond to the instructions given (Gibb, 1958) (Gordon, 1955). Later on, leadership research shifted the focus into the direction of '*leadership as a process*' concerning the attributions and interpersonal behaviours of both the leader and the followers. This concept emphasises that leadership is a process that relies on a two-way interplay between the leader and the team (Bass & Bass, 2009). It implies that any team member can exercise leadership, based on an ongoing role-exchange process rather than only the officially designated leader (Homans, 1950) (Dansereau, Graen, & Haga, 1975). Meanwhile, '*leadership as a behaviour'* is of rising academic and practical relevance. It relates to the type of behaviour a leader applies in the interaction process with its subordinates (Yukl & Gardner, 2020). In a practical context, it requires leaders not only to engage in coordinating and controlling the team members´ activities, criticising or praising them. It also asks leaders to show to be considerate of members wellbeing and coaching them among the journey of team performance (Bass & Bass, 2009). However, these leadership behaviour categories are not clearly delineated, since research has produced a huge variety of behaviour classifications with many similarities in their definitions (Van Knippenberg & Sitkin, 2013). Two common leadership behaviour classifications, which encapsulate different behavioural dimensions will be more closely discussed later.

In order to better understand the historical development of leadership up to its current meaning, the following table aims to illustrate a chronological development of the understanding of leadership over the last century.

Table 1: Historical chronology of leadership

Decade	Understanding
1920´s	Imposing the leaders' will on the followers and inducing obedience, respect, loyalty and cooperation (Bass & Bass, 2009)
1930´s	Leadership as a process to coordinate members to follow a certain instruction (Bass & Bass, 2009)
1940´s	Leadership as the ability to guide and persuade the followers beyond the impacts of power, position, or circumstances (Bass & Bass, 2009)
1950´s	Leadership attributed to leaders by authorities based on their actions in a group context (Bass & Bass, 2009)
1960´s	Leadership as the ability to influence others in a shared direction (Bass & Bass, 2009)

1970´s	Leadership as an influence that is regarded differently from member to member as an impacting enhancement over simply following the routine instructions of the organisation (Katz & Kahn, 1978)
1980´s	Leadership as an inspiring, impactful process that directs the activities of a group that is organized towards purposeful action (Rauch & Behling, 1984) (Richards & Engle, 1986)
1990´s	Leadership as the joint influence of the leader and the led, driven by the intent to make changes that reflect common purposes through evolutionary processes (Schein, 1992)
2000´s	Leadership assigned to a person that is considered to be responsible and accountable for the actions of a firm (Bass & Bass, 2009)
2010´s	Leadership as an informal or formal situationally based purpose-affecting process between a leader and a follower, team, or organisation (Antonakis & Day, 2018)

Based on the table depicted above it stands to reason that throughout the 20th century the understanding of leadership has more and more shifted from a leader as an individual to whom unquestioned allegiance must be given to leadership as a shared function and competency that is delegated to the person who is considered to be most capable to lead depending on changing contextual factors such as changing project demands.

2.1.3 Challenges and demands

According to (Avolio, 2007) the fact that traditional leadership focuses too much on the centrality of the leader itself and takes less account of essential elements, such as context and followers, is considered to be a central point of criticism on traditional leadership behaviours. Particularly, in modern organisations that are shaped by changing organisational structures, the overexposure of the role of individual leaders as an indicator of organisational change needs to be viewed critically. Recent research emphasises that for the successful implementation of organisational change, the relevance of leadership behaviours that go beyond people in positions of authority through forms of distributed leadership such as spontaneous and intuitive collaboration (Ospina & Foldy.E.G., 2010), becomes more relevant (Ford & Ford, 2012). In this regard, there is an appeal to dedicate an inclusive perspective, acknowledging leadership as a shared function between a leader and the led group. Institutions are required to embrace flexible and adaptive leaders to outlast in today´s environments shaped by uncertainty. This asks them to leverage leadership behaviours, given a diverse set of contextual determinants (Yukl, 2008) such as corporate culture, size, industry and type of products developed (Aydogdu & Asikgil, 2011) (Yang, Wang, Chang, Guo, & Huang, 2009) (Nerur & Mahapatra, 2005).

However, even though comprehensive research on leadership as behaviour has been conducted over the last half century, resulting in a diverse set of behavioural taxonomies, further evidence on effective leadership behaviours in a corporate context is still needed (Yukl, 2012) (Larsson & Vinberg, 2010). Also, it is not consistently defined yet when leadership actions are labeled as a behaviour in one study and as an activity in another one. Related to that, some studies frame the term as a communicational tool to indicate different leadership behaviours and actions. However, these studies lack more specific context about the indicators of communication content, delivery, and guidance in a leaders' competence to carry out effective outcomes related to organisational change (Ford & Ford, 2012). According to (McFarland, Senn, & Childress, 1993) modern leadership needs to have a sensitive, humanistic dimension, using various competencies to qualify a person as a leader. It is not exclusively assigned to one person anymore and it needs to facilitate excellence in others.

The following chapter aims to give an overview of the most established leadership behavioural style classifications that academia emphasises (Bass & Riggio, 2006) (Yukl, 2012).

2.1.4 Classifications of leadership behaviour

From an organisational perspective, the executives leadership behaviour is determined to be a strong indicator on various facets of a firm´s strategy, culture, and specifically on its performance (Avolio, 2007) (Yukl, 2008) (Larsson & Vinberg, 2010) (Dewettinck & Van Ameijde, 2011) (Vermeeren, Kuipers, & Steijn, 2014). However, identifying unique categorisations of leadership behaviours that are meaningful and relevant to all leaders, still poses a challenge in academia. This is because most behaviour categories are based on observed behaviour to derive abstractions of the world, thus only hardly providing objective sense and tangible attributes of the real world (Yukl & Gardner, 2020). Yet, there are some broad leadership style theories in place that have been determined comprehensively in research. Given the abstracted set of behavioural attributes that underlying behaviour classifications of these theories comprise, they will be used as a basis to derive a behavioural coding framework later in this study. The most common classifications of leadership behaviour are discussed in the subsequent sections.

Transformational, transactional and passive avoidant behaviour

Particularly, the leadership behaviour classifications of transactional- and transformational leadership have acquired considerable academic relevance comprising leadership behaviours in which leaders shape their interactive behaviour with those that they influence (Bass & Bass, 2009) (Burns, 1978). Transformational- and transactional leadership are based on the "*full-range leadership theory*" suggested by (Avolio & Bass, 1991). The theory underlying this classification serves as a basis for the examination of the transactional leaders focus on interchanging benefits with led teams for performance and the transformational leaders focus on motivating and guiding led teams to achieve higher goals (Bass, 1985). This concept is considered to be one of the most established leadership theories (Bryman, 1992). It encompasses three typologies of leadership styles, which are depicted by nine different scales: Transformational, transactional and laissez-faire leadership (Antonakis, Avolio, & Sivasubramaniam, 2003). In this regard, these leadership styles serve as fundamental instruments to study leaders in various sectors, such as business or government service (Afsar, Badir, Saeed, & Hafeez, 2017) (Van der Voet, Kuipers, & Groeneveld, 2016) (van Kelle, Visser, Plaat, & van der Wijst, 2015). The motivation and the scales that each of the typologies involve are depicted in the table below:

Table 2: Full Range Leadership Model

Typologies	
Leadership style	**Transformational leadership**
Motivation	Stimulates the awareness of followers about relevance of intended deliverables and the means to achieve these and proactively prompts followers surmounting their personal interests for the sake of the group (Burns, 1978) (Bass, 1985)
Scales	**Idealized influence (attributed):** Relates to the leaders´ social competencies, indicating whether viewed as self-aware and empowered, and whether leader is seen as aligned with overarching ideals and builds trust among followers (Antonakis, Avolio, & Sivasubramaniam, 2003)
	Idealized influence (behaviour): Refers to missionary and charismatic leadership actions that are aligned with values and beliefs (Antonakis, Avolio, & Sivasubramaniam, 2003) **Inspirational motivation:** Relates to the means by which leaders motivate their followers by being optimistic about the future, emphasising ambitious goals and transmitting an optimal vision (Antonakis, Avolio, & Sivasubramaniam, 2003)
	Intellectual stimulation: Relates to leadership actions that challenges followers logical reasoning to find solutions to difficult problems through creative thinking (Antonakis, Avolio, & Sivasubramaniam, 2003)

	Individualized consideration: Relates to leadership practices that promote to followers' development, satisfaction, and self-actualization through counselling, assistance and listening to the followers individual needs (Antonakis, Avolio, & Sivasubramaniam, 2003)
Leadership style	**Transactional leadership**
Motivation	Leader recognizes the work-related needs of followers and aims to ensure that they get rewarded when they put in effort and meet performance expectations (Bass, 1985)
Scales	**Contingent reward:** Relates to leadership actions clarifying task responsibilities and rewarding compliance with the responsibilities with psychological or materialistic incentives (Antonakis, Avolio, & Sivasubramaniam, 2003)
	Management-by-exception: Active: Refers to leader behaviour focusing on monitoring deviations and intervenes with corrections in the case of mistakes happening or followers acting noncompliant with defined standards (Antonakis, Avolio, & Sivasubramaniam, 2003)
Leadership style	**Passive Avoidant leadership**
Motivation	Leader lacks proactive involvement in motivating followers or in identifying and meeting their needs, characterized by delayed decision-making and the absence of rewards, feedback and involvement (Skogstad, Einarsen, Torsheim, Aasland, & Hetland, 2007)
Scales	**Management-by-exception: Passive:** Leader only intervenes after a mistake or noncompliance has already occurred (Antonakis, Avolio, & Sivasubramaniam, 2003)
	Laissez-faire: Leader rejects to intervene in his/her role as a leader by absence and avoidance of neither agreements nor transactions between the leader and the followers (Skogstad, Einarsen, Torsheim, Aasland, & Hetland, 2007)

Task-oriented and relations-oriented leadership behaviour

A more integrative approach to aggregate the many diverse leadership behaviours was conducted by (Yukl, Gordon, & Taber, 2002), aiming to establish a meaningful conceptual framework to map and categorise these behaviours through a hierarchical taxonomy, including three meta-categories:

1. Task-oriented behaviour
2. Relations-oriented behaviour
3. Change-oriented behaviour

Based on this model, (Yukl, 2012) proposes a hierarchical taxonomy of leadership behaviours (HTLB) that leaders entail, covering three meta-categories and respective component behaviours as determinants of team-, work unit- and organisational performance. (Yukl, Gordon, & Taber, 2002) emphasise that this model may be useful in deducing broader theories regarding effective leadership. The recent version of the HTLB is illustrated in the table below:

Table 3: Hierarchical taxonomy of leadership behaviours
(Yukl, 2012)

Taxonomies	
Meta-category	**Task-oriented leadership**
Motivation	Guaranteeing that human resources accomplish their work in a reliable and efficient way in compliance with the organisations' mission
Components	**Clarifying:** Expounding and communicating task responsibilities and realistic goals and setting deadlines and priorities as well as performance policies
	Planning: Decision-making regarding priorities and goals, scheduling activities and allocating respective responsibilities and resources
	Monitoring operations: Evaluating if people do assigned tasks adequately and work is progressing as intended to track issues and assessing whether change required regarding planning
	Problem solving: Solving deviations from usual operations and behaviours from members considered to be destructive or illegal
Meta-category	**Relations-oriented leadership**
Motivation	Increasing the quality of human resources through stimulating competencies of members and relationships with them and stimulating their sense of mission and organisational identification
Components	**Supporting:** Acting respectful, building collaborative relations, and supporting people in facing stressful situations
	Developing: Increasing competencies and self-awareness of team members to enable their professional development
	Recognizing: Showing appreciation to others for effective performance, notable achievements, and important inputs to the work-unit
	Empowering: Providing autonomy to subordinates over decisions about the work
Meta-category	**Change-oriented leadership**
Motivation	Stimulating innovative working approaches, group learning, and adjustment to environmental changes
Components	**Advocating change:** Explaining the urgency of a needed change by stimulating peoples´ consciousness of problems to an extent that does not lead to despair
	Envisioning change: Expressing a compelling vision that clearly illustrates realistic goals for the members
	Encouraging innovation: Encourage members to view problems from different angles and solving them by stimulating their creative mindset
	Facilitating collective learning: Improving existing strategic directions and working routines and supporting experiments and research projects to discovering new ones

Regarding the table illustrated above (Yukl, 2012) also adds a fourth meta-category to the HTLB, which is defined as external leadership behaviour. It focuses on the leaders' behaviour of acquiring essential information and resources from outside a led team, respectively the higher organisational units, on behalf of the organisational or team interests.

However, given the fact that the observation setup of this study does not allow to observe related behaviours to this dimension, its application is out-of-scope in context of this study. Therefore, it was not depicted more closely.

(Yukl, Gordon, & Taber, 2002) indicate that more qualitative research is needed to assess how accurately the defined components measure intended behaviour models, respectively if additional behavioural components can be identified. However, according to (Yukl, 2012) the HTLB depicted above is an appropriate instrument for creating an observation guideline.

Shared leadership behaviour

Another leadership behaviour that has gained more attention in academia as an opposed model to individual leadership paradigms of transactional- and transformational leadership, is the theory of shared leadership (Gockel & Werth, 2011). This leadership style practice is quite common in self-organised, agile project environments (Stettina & Heijstek, 2011) and as the name already indicates, it emphasises that leadership should be shared among team members, rather than focused around one central leader (Moe, Dingsyr, & Kvangardsnes, 2009). Concerning this matter, shared leadership relies on the team to delegate leadership to the person that holds the appropriate knowledge, abilities and skills for a certain problem that the team has to deal with at a certain moment (Langfred, 2000). This means that the person that is hold most competent to act as a leader is affected by different situational aspects, for instance task requirements, the setup of an organisation or characteristics of individuals in teams (Gockel & Werth, 2011). Shared leadership does not ask for the whole team to be incorporated when decisions are made, but it is necessary to communicate made decisions to the whole team (Moe, Aurum, & Dybå, 2012). Particularly for teams which are confronted with complex tasks, this leadership behaviour is considered to play an essential role, ranging from problem identification to the implementation of a solution approach (Pearce & Sims Jr, 2002) (Dang, Waldman, & Zhang, 2014).

2.1.5 Leadership behaviour measurement frameworks

To effectively measure applied leadership behaviours in the scope of this work, several leadership frameworks from academia and the industry were analysed based on their study purpose, respective scope, applied methodology, constraints, academic validity and availability. Due to lack of academic validity, a missing relation to the intended study focus of

this work or missing access rights to the framework, the fourth and fifth framework depicted below were excluded for further application considerations in terms of this study. Meanwhile, the first three frameworks listed subsequently were considered to be potential instruments to determine applied leadership behaviours in the context of this study.

1. Multifactor Leadership Questionnaire (MLQ)
2. Shared Leadership Questionnaire (SLQ)
3. Leadership Behaviour Description Questionnaire (LBDQ)
4. Hogan Development Survey (HDS)
5. Leadership Circle Profile 360 assessment (LCP)

A specified description and related evaluation criteria to the frameworks depicted above can be found in **appendix A**. Given the complexity involved in measuring shared leadership as per the SLQ within the case study design and given timeframe of this work, this tool has been excluded for further consideration. However, an own coding framework has been established to add observed behaviours which correlate with the shared leadership theory in the observed case study group. Furthermore, the LDBQ has not been considered, due to its outdated and narrowed content structure. Consequently, the MLQ which leans on the full-range leadership theory and some elements of the HTLB as presented by (Yukl, 2012) in the section above (see Table 3) were utilised as inspiration for data collection in terms of this work. Specifically, this means that the MLQ-dimensions were used as a basis to create a coding book for observation. Observed leadership behaviours that could not be mapped on these dimensions were based on codes derived from the HTLB or vice versa. For instance, the concept of change-oriented leadership by (Yukl, 2012) presented in the chapter above was not used as a coding set, since its dimension was fairly covered in the transformational leadership dimension presented by (Bass, 1985). In this regard, the behaviours which were coded based on one of the frameworks primarily relate to behaviours, whereby no direct linkage with regard to the other one could be made.

2.2 Agile development approach

Originally emerging from practical experiences of consultants and thought leaders in the software industry, agile development has become an established project management approach for running projects that are characterised by continuously changing project requirements and a high variability of tasks in today´s IT-driven markets (Dingsøyr, Nerur, Balijepally, & Moe, 2012) (Nerur & Mahapatra, 2005). The subsequent chapter aims to

introduce the concept of agile methods in more concrete terms, and it aims to clarify how it distinguishes itself from traditional project methods. Also, it presents certain team competency demands that come along with agile development and it indicates the link of agile development to leadership theories discussed in the chapter above. Finally, common agile frameworks used in practice, both on a team- and organisational level are depicted.

2.2.1 Project management characteristics

Traditional project management builds on the idea that problems are completely specifiable and for each problem there is a predictable solution in place (Nerur & Mahapatra, 2005). In this regard, the focus of a project team lies on comprehensive planning of its activities, anchored in institutionalised processes and extensive documentation. Also, team members are assigned to specialised, individual roles (Boehm, 2002) (Nerur & Mahapatra, 2005). Furthermore, project managers agree on detailed contractual agreements with customers about the totality of systems to be delivered at the beginning of the project (Cockburn & Highsmith, 2001). Agile methods are considered to be a response to these project methods. Agile projects value strong and continuous relationships over strict contracts and role assignments by enabling an iterative, feedback-intense development approach instead of fixed agreements at the project start (Cockburn & Highsmith, 2001). This means that agile development emphasises business value to be delivered instantly at the start of a project in short iterative development cycles that enable fast verification and feedback-based corrections for created prototypes (Nerur & Mahapatra, 2005) (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). This is ensured by promoting the direct involvement of customers and stakeholders into project management to actively guide and shape the product or service development process. By working incrementally, agile teams reduce time from decision-making to receiving feedback from the customer. Hence, the risk of non-fulfilment of agreed on requirements is reduced, leading to higher customer satisfaction (Dingsøyr, Nerur, Balijepally, & Moe, 2012) (Ceschi, Sillitti, Succi, & De Panfilis, 2005) (Cockburn & Highsmith, 2001) (Miller, 2001).

Furthermore, unlike in traditional, plan-driven project management where communication within the project team is formalised by comprehensive documentation and process guidelines, agile methodologies emphasise strong and informal communication and the people´s creativity in order to stimulate their sense of community, morale and information sharing. Also, administrative work such as producing documentation is kept to a minimum (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). This concept aims to help project teams to

transmit valuable information more quickly in contrast to extensive documentation- and process guidelines that are considered to restrict the project effectiveness in traditional project management (Cockburn & Highsmith, 2001) (Dingsøyr, Nerur, Balijepally, & Moe, 2012) (Miller, 2001).

The table illustrated below is inspired by (Nerur & Mahapatra, 2005) (Boehm, 2002) and aims to illustrate how agile and traditional development approaches differ from each other.

Table 4: Agile & traditional development in comparison
(Nerur & Mahapatra, 2005) (Boehm, 2002)

	Traditional development	**Agile development**
Central assumption	Entirely specifiable, and built thorough systems through comprehensive planning	High-quality prototypes through continuous testing and optimization based on rapid feedback and change
Primary objective	High assurance	Rapid value
Control	Process centric	People centric
Management style	Command and control	Cooperation and leadership
Role Assignment	Individual – Favours specialisation	Role interchangeability and self-organizing teams
Customers role	Important	Critical and dedicated
Communication	Formal	Informal
Project Cycle	Directed by activities or tasks	Directed by product features
Desired organisational structure	High, bureaucratic formalization	Participative, and flexible - Encouraging cooperative social action
Technology	No restriction	Favours software-based development

2.2.2 Team and leadership competency demands

Agile teams build on a set of individuals with a mixed set of expertise as a team productivity driver (Melo, Cruzes, Kon, & Conradi, 2013) while in traditional project management it is more common to compose teams based on similar expertise specialisations. The successful application of agile methodologies is contingent to self-organised, cross-functional teams since it relies on breaking department silos and composing different expert units (e.g. business and IT) into one multi-disciplinary team. Furthermore, agile teams need to be well-informed teams allowing for modifications to requirements at any process phase of development, when demanded by the customer (Dingsøyr, Nerur, Balijepally, & Moe, 2012).

Additionally, agile development asks for people with strong communication styles and collaborative decision-making skills (Nerur & Mahapatra, 2005). It is strongly team-driven, and leadership is considered to be a fundamental factor to accomplish team performance

(Guzzo & Dickson, 1996). Regarding this, agile teams are not considered to be leaderless teams, but teams that continuously organise themselves in diverse constellations. Decision-making processes need to be quick and rely on mutual trust, respect, and a collaborative atmosphere (Cockburn & Highsmith, 2001). This means that agile project environments rely on leadership behaviours that enable knowledge sharing, trusting in people, seeking consensus, and delegating more due to the self-organised characteristics of agile teams (Cockburn & Highsmith, 2001) (Medinilla, 2012) (Theobald, Prenner, Krieg, & Schneider, 2020). To meet these demands, agile leaders need to demonstrate a set of behaviours, including constantly communicating a vision, defining purposes, and setting project directions, but also motivating team members through face-to-face- and team communication (Theobald, Prenner, Krieg, & Schneider, 2020). This requires a leader to show full commitment to helping and serving others to grow. In other words, the leader should not force others obey him or her, but present „*a sense of community and shared management*" (Medinilla, 2012). In order to stimulate a trustworthy environment of shared values and strong interpersonal relationships it is also essential for the leader to hold an informal communication style (van Kelle, Visser, Plaat, & van der Wijst, 2015).

Furthermore, according to (Leffingwell, 2010) agile leaders need to apply behaviours that provide team members independence to design and coordinate product development activities. Also, (Leffingwell, 2010) emphasises the importance of an environment that allows team members to develop their knowledge and skills by rewarding innovative working approaches and risk-taking when solving challenging problems. At the same time, leaders need to show empathy and assistance when team members make mistakes. This means that the responsibility of agile leaders entails empowering and helping teams with their development tasks by actively teaching and coaching them and providing personal, professional, strategical, and technical guidance as well as resources each employee needs to stimulate self-management and decentralized decision-making.

2.2.3 Frameworks and roles

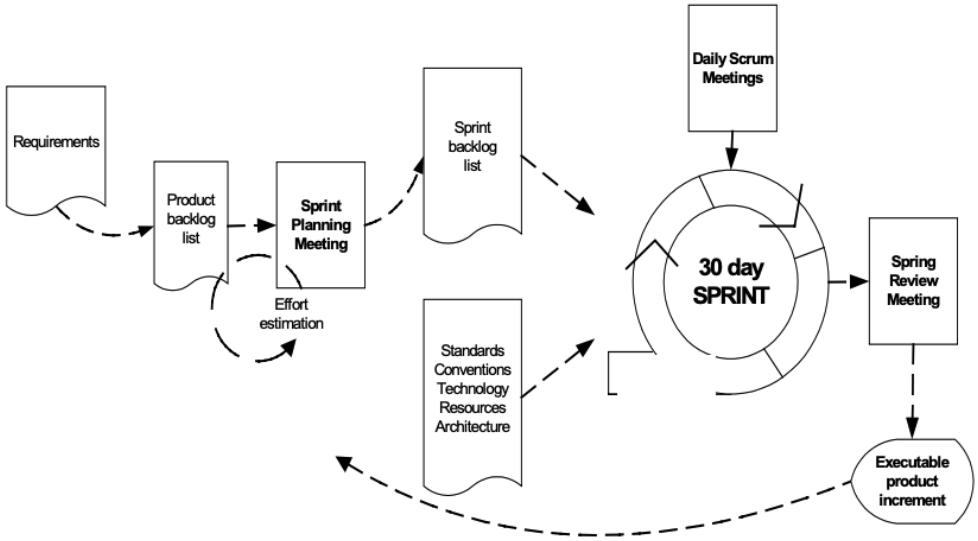
In this sub-chapter we introduce two common frameworks used for agile development. First, we discuss the methodology of Scrum that concentrates its scope of application at the level of a single team in an organisation. Then, we present the SAFe which specialises in scaling agile development practices from a single-team level across different organisational levels by enabling central coordination of multiple teams operating agile practices. The focus

of the analysis of this work, which will be discussed in more detail in the next chapter, lies on multiple-team coordination meetings of an organisation that applies the SAFe.

Single-team level

Scrum has become one of the most commonly utilised agile methodologies, particularly in the software industry (Campanelli & Parreiras, 2015). It serves as a process framework to manage complex situations and problems (Schwaber & Sutherland, 2011). The focus of Scrum lies less on a certain development technique to be applied, but more on the functionalities that require to be mastered by team members to deliver development flexibility in a continuously changing environment (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). This means that development builds on different variables such as requirements, time scope and resources, which are commonly changing during the development process and therefore ask for team flexibility (Schwaber & Sutherland, 2011). When looking at the different components that are part of Scrum practices on a single team level one needs to distinguish between Scrum roles, activities, and artifacts (Rubin, 2012).

Figure 2: Structure of Scrum framework
(Abrahamsson, Salo, Ronkainen, & Warsta, 2017)



As indicated in the figure above, in a Scrum-driven project every sprint is initiated with a meeting called "*sprint planning*" (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). It involves the internal Scrum team as well as the customer, whereby the customer communicates its requirements to the Scrum team. On the basis of the requirements identified, the so-called product backlog bundles and prioritises a list of specified tasks to be done by the team during

the overall project. Meanwhile, the sprint backlog represents a component of the predefined product backlog items. The sprint backlog exhibits the tasks that the team selects in a sprint planning to be implemented within a certain sprint execution (illustrated in the circle in Figure 2). There are no specified rules indicating how and in what order the team needs to accomplish the tasks during a sprint execution (Schwaber & Sutherland, 2011). So-called *Daily-Scrum meetings* serve the team to keep track of task progress during a sprint execution, giving individuals space to share problems to be solved or identified modifications that need to be removed (Abrahamsson, Salo, Ronkainen, & Warsta, 2017) (Rubin, 2012). When all the components of a sprint backlog are finalised, so-called product increments (Rubin, 2012), respectively a new product iteration is delivered (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). The sprint is ended with a sprint review -and retrospective (Rubin, 2012). During the sprint review, sprint results are presented to management and the customer in order for the participants to evaluate the product increments and deciding on subsequent activities (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). Meanwhile, the sprint retrospective gives the Scrum team space to discuss effective and ineffective practices of Scrum, aiming to inspect and improve the sprint process for their further collaboration (Rubin, 2012). The table depicted below is inspired by (Schwaber & Beedle, 2002) (Schwaber & Sutherland, 2011) (Knaster & Leffingwell, 2018) and illustrates the roles of a Scrum team and their responsibilities.

Table 5: Scrum roles on a single team level
(Schwaber & Beedle, 2002) (Schwaber & Sutherland, 2011) (Knaster & Leffingwell, 2018)

Role definition	**Responsibilities**
SM	• Getting the tasks in the product backlog done by comparing team members progress reports with defined sprint goals and assisting and consulting team members with tasks • Enabling team meetings through priority and scope setting • Coaching self-management to team members to facilitate high-performing team dynamics • Conducting daily Scrums and ensuring that obstacles such as interpersonal conflicts are removed, and decisions promptly made
PO	• Acting as a customer interface for developer questions by ensuring the team meets the user needs • Creates, prioritizes, controls, and maintains the product backlog, aiming to maximize the delivered product value • Ensures that the product backlog is visible to everyone by clearly communicating product goals • Defines the product backlog, supports teams with specifying it during development and validates it against acceptance criteria

Team member	• Responsible for meeting the goal it commits to at a sprint planning to build a product increment of value for an iteration • Freely decides on the amount of backlog it addresses • Holds full decision-making power to convert product backlogs into product increments to fulfill sprint targets • Creates and refines user stories and acceptance criteria by defining, building, testing, and delivering stories in support of features

Multiple-team level

The Scrum roles discussed in the section above limit their scope of application to a single team level within an organisation. However, agile development methods are increasingly applied at larger scales throughout different organisational levels, encompassing agile projects that involve more than two teams (Stettina, van Els, Croonenberg, & Visser, 2021). This comes along with several challenges, encompassing for instance „*inter-team coordination*“ and “*large project organization*“ (Dingsøyr & Moe, 2013), which are less common in small-scale agile development. One of the most commonly applied frameworks aiming to scale agile practices from the team level to the larger business objectives on an organisation level to counteract the challenges mentioned above, is the so-called SAFe (Laanti, 2014). It aims to reduce inter-team dependencies and to optimise programs and value streams to accompany organisations with their agile transformation (Knaster & Leffingwell, 2018). Recent studies indicated a positive relationship between this framework and the improvement of different components of organisational performance, such as productivity, responsiveness, quality, workflow health, employee satisfaction and engagement (Stettina, van Els, Croonenberg, & Visser, 2021). The table listed subsequently is inspired by (Schwaber & Sutherland, 2011) (Knaster & Leffingwell, 2018). It aims to complement responsibilities to the roles presented in the section above and further lists roles that are considered to be relevant to manage Scrum projects on a multi-team level.

Table 6: Scrum roles on an organisational level
(Schwaber & Sutherland, 2011) (Knaster & Leffingwell, 2018)

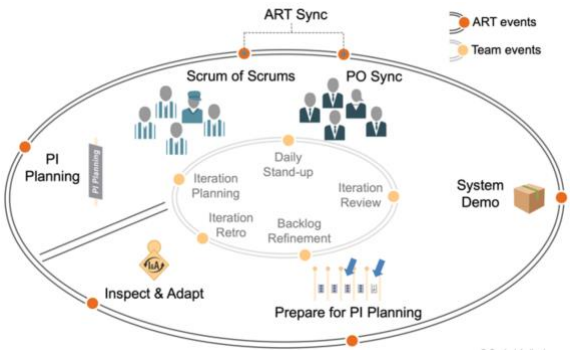
Role definition	Responsibilities
SM	• Supporting the organisation with the training of Scrum by guiding employees in adopting practices to handle complex tasks and improving communication between Scrum teams and stakeholders • Coordinating and improving inter-team communication and corporation

PO	• Collaborating with Product Management to plan program increments (PIs) and to deliver the larger scope of product value
SA	• Defining the overall system architecture and communicating technical visions around developed products, determining subsystems, and identifying the interfaces between them
PM	• Working with customers to understand their needs, creating an overall product vision and moderating POs by continuously communicating needs and the product vision, defining system features, and participating in validation of product features • Managing program backlog and ensuring that products and solutions developed by teams meet economic business goals of the portfolio
RTE	• Acts as a chief SM for the agile teams by moderating SMs on a single-team level through continuously coaching and guiding them • Integrates team increment objectives into PI objectives to align agile teams to organisational mission and vision • Working with Product Management, POs, and other stakeholders to help ensuring strategy and execution alignment

Two other roles that are not discussed in the table above due to their irrelevance in the observed case study, relate to the solution architect and the business owner.

In the context of large-scale agile development in organisations, all the agile team units are bundled together into a so-called "*Agile Release Train*" (ART). Based on cross-functional capabilities, the teams incrementally develop solutions together in a value stream, aligned to a shared technology and business mission. Regarding this, the ART follows a schedule determined by the selected program increment (PI) (Knaster & Leffingwell, 2018). As the name already indicates, a PI is the organisational pendant to a product increment on a single team layer. It describes a time frame of usually 8 to 12 weeks, in which an ART delivers its incremental value by means of validated systems to its end-users. The figure depicted below provides an overview of the ART events.

Figure 3: Overview of ART events
(Scaled Agile, Inc, 2021)

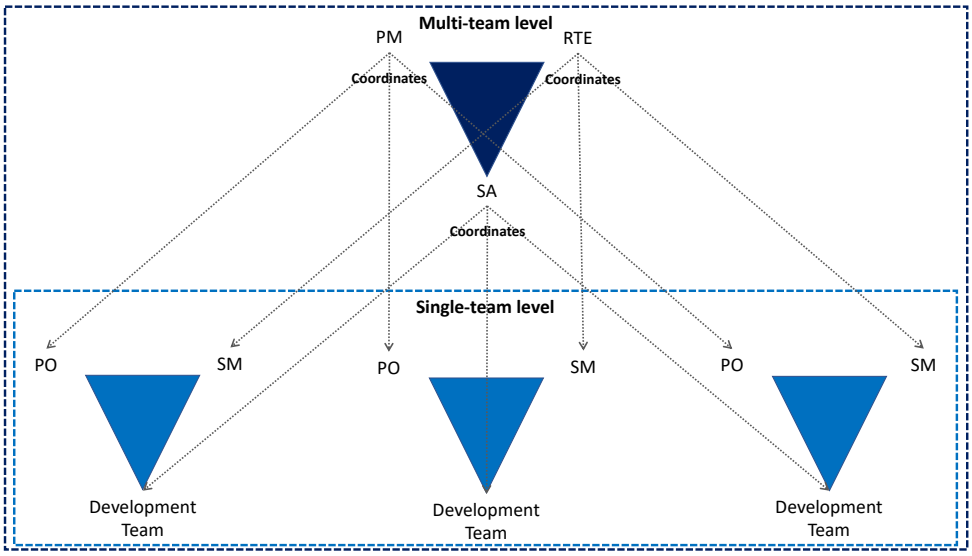


Given the figure above, subsequently we are going to elaborate on the different components that are part of the ART events.

1. PI Planning: Estimation of deliverables and dependencies with other agile teams and trains by defining PI objectives and aligning teams to a shared vision and mission
2. ART Syncs:
    a. Scrum of Scrums (SoS): Organised for SMs and it supports the coordination of dependencies in the ART and enables visibility into progress and impediments
    b. PO Sync: Organised for POs and Product Management to provide them visibility into the progress status of the ARTs feature development regarding its predefined PI objectives
3. System Demo (SD): Allows the stakeholders to provide feedback about the usability and effectiveness of the developed system
4. Preparation for the next PI Planning: Maintaining management alignment for planning, backlog, and content
5. Inspect & Adapt: Application of actions required to improve the reliability, quality, and speed of the next PI (Scaled Agile, Inc, 2021)

The focus of analysis within this study lies on SoS, PO Syncs and SDs, specifically on the behavioural patterns of respective leadership figures such as the RTEs, PMs, SAs, POs and SMs and how leadership is shared within the meetings. The figure illustrated below indicates the cross-team coordination responsibilities of each of these roles.

Figure 4: Interaction between organisational & team level in ARTs
(Scaled Agile, Inc, 2021)



2.2.4 Organisational challenges

When reflecting on the distinctions between agile development and traditional development discussed earlier, agile development entails new forms of communication, coordination, and collaboration in projects. While traditional project environments are shaped by strong command and control structures and hierarchies, indicating that leaders tend to enforce their own values through the use of coercive power to lead teams (Medinilla, 2012) (Theobald, Prenner, Krieg, & Schneider, 2020), agile development builds on the idea of involving the members of the team in all facets of development (Beck, 2000). And this shift from traditional, hierarchical decision-making to shared decision-making comes along with a number of challenges (Moe, Aurum, & Dybå, 2012) (Drury, Conboy, & Power, 2012). The first of these challenges is that although agile environments emphasise team member involvement in all aspects of development, in these project environments people often rely on the SM or another leadership figure to make decisions on behalf of the team. Consequently, the team often loses its autonomy rather than engaging all the team members (Drury, Conboy, & Power, 2012). Secondly, the autonomous character of teamwork becomes a challenge when individual goals need to be aligned in situations where a realistic plan with clear priorities is missing. This is partly because the rapidly changing iterations and requirements in agile projects lead to uncertainty and a lack of ownership and information about tasks. Consequently, individual goals obtain more priority towards team goals and people fail to communicate decisions within the team (Moe, Aurum, & Dybå, 2012). To conclude, another reason that may explain this phenomenon is that agile teams concentrate too much on short-term tactical decisions measured in weekly iterations and too little on long-term strategic decisions. This means that the work in time-bounded iteration cycles may stimulate a short-term focus on the iteration-specific goals and too little time on prioritising long-term strategical decisions in an agile team (Drury, Conboy, & Power, 2012).

2.2.5 Link to leadership theories

There is some disagreement in the literature about ideal leadership behaviours that are best suited in the context of agile project management. According to (Moe, Dingsyr, & Kvangardsnes, 2009) agile development requires a combination of transformational leaders as project managers and shared leadership distributed among the group members of an agile team. Also, (van Kelle, Visser, Plaat, & van der Wijst, 2015) emphasise that the strong focus on people and interactions in agile projects substantiates the assumption that transformational

leadership behaviours may be an essential success indicator. Another consideration that stresses a positive relationship between transformational leadership and project characteristics of empowered teams with complex tasks can be derived from (Pearce & Sims Jr, 2002).

According to (Spiegler, Heinecke, & Wagner, 2021) the concept of agile leadership is anchored in the SM who should enable the team to work autonomously and lead itself. In contrast to that, (Moe, Dingsyr, & Kvangardsnes, 2009) (Schwaber, 1997) argue that leadership should be divided among the SM, PO, and the team. They emphasise that agile development prefers a leadership behaviour that substitutes the traditional project managers' role with the SMs role of a coordinator or facilitator to make decisions in daily meetings and approving them with management. Besides that, they indicate that the PO manages, controls, and presents the product backlog and features to be developed. However, to integrate this kind of shared leadership, (Moe, Dingsyr, & Kvangardsnes, 2009) appeal that training and development is required for both the vertical leaders (management) and the team members themselves. At this point, it is not completely clear yet how the roles defined above share leadership in an agile team. Meanwhile some studies indicate that leadership should be focused on the SM (Moe, Dingsøyr, & Dybå, 2010), other studies claim that the whole team should take on leadership responsibilities (Srivastava & Jain, 2017).

CHAPTER 3

3. METHODOLOGY

In this chapter, we are going to elaborate on the selected research approach and the research strategy followed to answer the research questions presented. Also, we will discuss in more detail how we systematically proceeded to develop the theoretical foundations of this work and the research design we methodically applied to collect the data. Eventually, we will briefly explain what kind of meetings we looked at for the analysis of this study.

3.1 Research approach

With the research gap and research questions imposed in chapter 1.4, we believe that the most appropriate methodological instrument for this study would be a sequential exploratory mixed method research design as per the work of (Saunders, Lewis, & Thornhill, 2009). This approach was chosen to increase the contextual understanding of both assessed leadership and (agile) team behaviours for the reader. It also helps us to better interpret certain behaviours that result from one approach and to balance the method effects of the other approach, allowing for greater validity of the conclusions drawn (Bryman, 2006) (Molina-Azorin, 2011) (Collis & Hussey, 2003).

In order to conduct this study, we make use of the full-range leadership theory (see Table 2) and the HTLB (see Table 3) to deductively test research question 1. Meanwhile, to create a better theoretical understanding of applied leadership behavioural patterns (research question 2) and associated behavioural responses (research question 3) in agile settings, this study aims use the data collected to reflect inductively on the theoretical premises suggested by the data (Saunders, Lewis, & Thornhill, 2009).

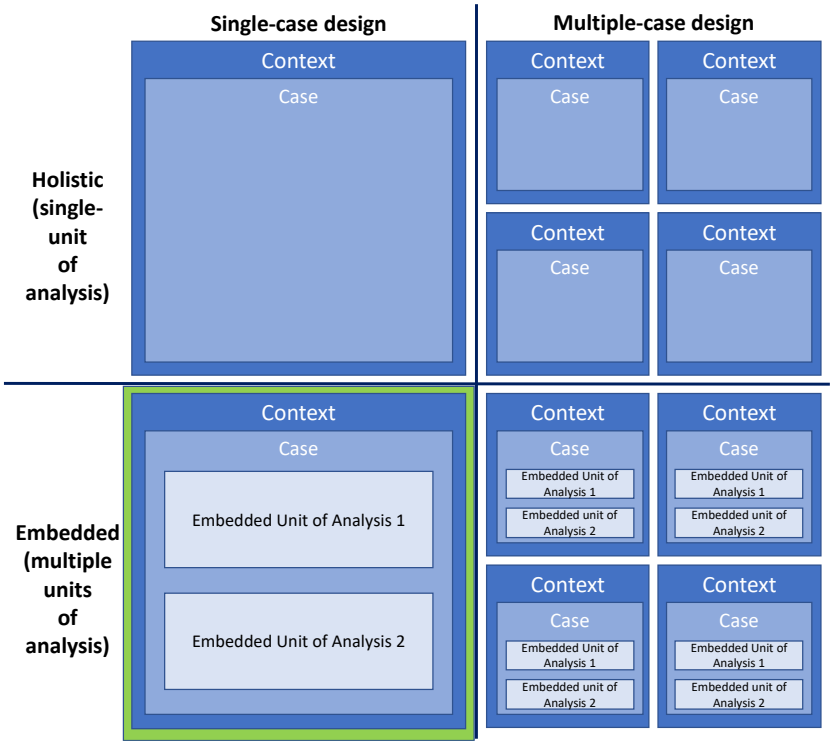
In addition to that, to enhance the contextual understanding of how agile maturity is perceived in the informant groups, this study employs the agile transformation model as per the work of (Laanti, 2017). In addition to that, the teamwork quality construct as well as the team performance and personal success conceptualisations developed by (Hoegl & Gemuenden, 2001) are utilised to provide a broader understanding of how collaborative teamwork interactions and individual performance are perceived in the observed meetings.

3.2 Research strategy

In this section, we will elaborate on the research process conducted for this study. During the first stage, a systematic literature review was conducted to establish the theoretical

foundations for this study by means of collecting secondary data. According to (Bulmer, Sturgis, & Allum, 2009) once secondary data are obtained and further analysed, it may serve for the purpose of providing different or additional knowledge, interpretations or conclusions related to a study. The literature review is followed by an embedded single-case study design, applying a combination of in-depth observation and an integrated survey within two sub-units of analysis to collect primary data from agile practitioners. Regarding this, a case study explores a research topic within a specific real-life context (Yin, 2009). The case study design that will be applied within this study is illustrated in the figure below:

Figure 5: Case study design
(Yin, 2009)



3.2.1 Literature review

The literature review which sets the first stage of the study was conducted to determine existing scientific literature on leadership behaviour classifications. The focus of the analysis lies on empirical studies that broach the issue of behavioural leadership patterns in the context of organisations that apply agile frameworks. In order to delve into the current research to obtain the most relevant theoretical foundations from academia the subsequently listed six research databases have been accessed for this study:

- Google Scholar: https://scholar.google.com/

- IEEEXplore: https://ieeexplore.ieee.org/
- SAGE Journals: https://journals.sagepub.com/
- Science Direct: https://www.sciencedirect.com/
- ACM Digital Library: https://dl.acm.org/
- Leiden University Catalogue: https://catalogue.leidenuniv.nl/

Furthermore, to retrieve relevant academic works related to this study this work utilised relevant keywords for a full-fledged internet search. The search queries that have been applied to the presented research databases are listed in the table below:

Table 7: Applied search queries for this study

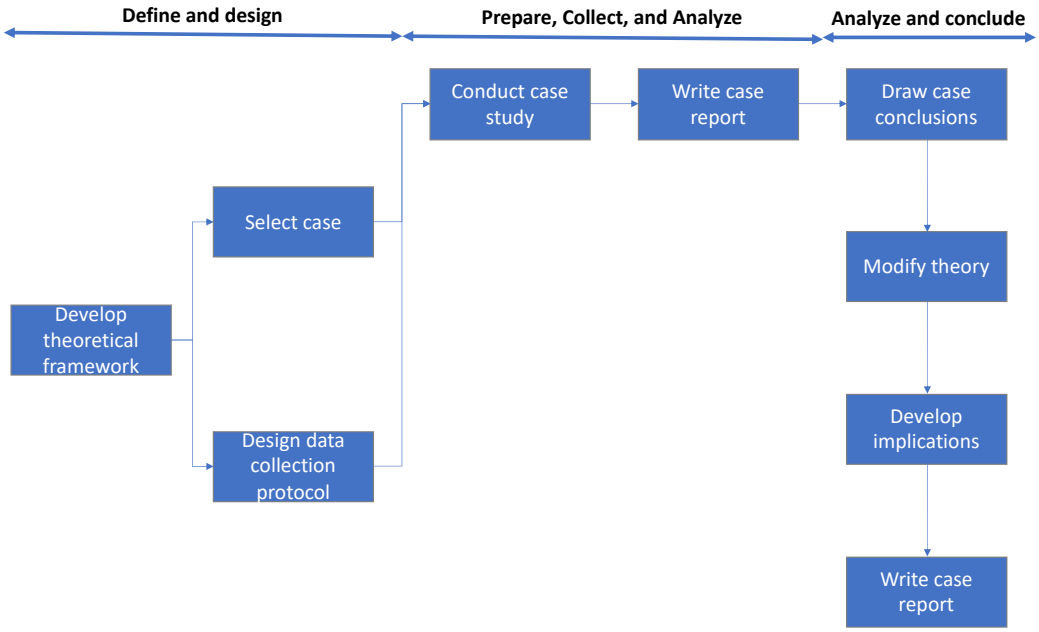
Leadership foundations	**Agile development foundations**
Leadership	Agile leadership
Leadership (as) behaviour	Agile AND (leadership OR development OR methodology OR methods OR
Leadership (as) process	project management OR frameworks OR processes OR portfolio OR roles)
Leadership (behavioural) styles	Scrum AND (roles OR processes)
Leadership measurement	Scaled agile (frameworks)
Leadership framework	
Leadership development	

Naturally, not all of the results have been used for the final analysis. That is due to the irrelevance of the study itself, its non-significance for this study´s contribution, or other reasons.

3.2.2 Case study design

According to (Yin, 2009) a case study is an adequate methodology to investigate a phenomenon in a practical context on the basis of previously presented theoretical premises. It specifically aims to provide answers to 'How?'-questions addressing "*a contemporary set of events over which the researcher has little or no control"* (Yin, 2009) and therefore it is commonly used in exploratory research. (Eisenhardt & Graebner, 2007) emphasise that it is considered to be a convenient method for the purpose of gaining a richer understanding of the context of the research and related processes. The following figure shows the procedure that we methodically applied.

Figure 6: Research method procedure
(Yin, 2009)



As already indicated in chapter 2.2.3, with regard to the case selection for this study we focus our analysis on ART-meetings during a PI-execution within the case study organisation. The selected events of ART syncs and SDs provide a good ground for comparable figures, since they happen on a weekly or biweekly routine. In addition to that, these meeting types share similar characteristics in that they focus on coordinating dependencies and development progress between multiple teams (SoS and PO Syncs), and they are usually shaped by a feedback-intense atmosphere (e.g. SDs). Also, as these meeting types focus on relevant planning actors at different organisational levels (e.g. RTE, PM, SM, PO) coming together to assess important decisions, observing these events may give us a better insight into how operational level decisions are aligned with the program level.

Case profile

The case study was carried out at a multinational life insurance company. Subsequently, the respective organisational setup of the meetings that have been observed, is depicted in more depth. The scope of informant groups to be observed covers two ARTs, each operating six sprints per PI. In this regard, the ARTs hold weekly ART syncs, once for POs and once for SMs. Furthermore, these meetings are divided into ‘Planning & Review’-meetings to plan upcoming system features as well as ‘Refinement’-meetings to plan the delivery of current

system features. Also, both ARTs operate SoS-meetings, which happen on a weekly routine for one ART and every second week for the other ART. The first ART that was analysed encompasses five assigned teams and the second ART covers seven assigned teams. In the following, a short overview of the involved teams is given.

- ART 1: Delivers automation solutions as in value streams for insurances and banks through generic IT services (e.g. robotics, machine learning) to classify and delegate incoming mail attachment documents. This train encompasses 6 agile teams.
    - Team 1: Business process management, developing API applications such as generic payment processes
    - Team 2: Platform development for building robots and business process management processes, document classification and barcode reader services
    - Team 3: Handling generic output management of the firm, when people aim to send messages to customers
    - Team 4: Handling Human Resources such as legal rights of internal employees
    - Team 5: Management of supply applications such as Microsoft 365-tooling
    - Team 6: Focus on virtual assistant solutions to provide chatbots, live chats and Async-messaging
    - Team 7: Services for input management and archivists
- ART 2: Cloud & Support Services, including 5 agile teams
    - Team 1: Platform management to handle the complete IT infrastructure (e.g., updates for operating systems, switching mobile contracts)
    - Team 2: Handling incident tooling to manage office hours support, agile process management and IT-user support for business applications
    - Team 3: Transformation services, providing templates which teams can use for cloud applications
    - Team 4: Helping teams to move applications to the cloud as well as helping them managing cloud costs and usage management.
    - Team 5: Delivering all kinds of tooling for software release processes (e.g., checks for code quality and ISA principal compliance in software delivery processes)

CHAPTER 4

4. DATA COLLECTION STRUCTURE

In this chapter we are going to elaborate on the methods and resources utilised to collect, analyse, structure and interpret the data examined in this study. Initially, we will expand on the scientific data collection methods we used and how we used them. Then, we will explain in more detail which techniques, sources and tools we specifically made use of in order to collect, structure and interpret the data.

4.1 Data collection methods

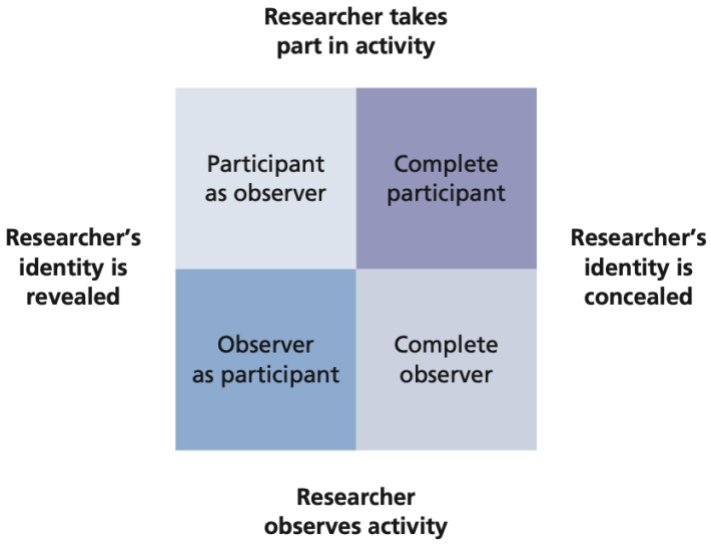
The choice of the various research methods to collect data depends on certain constraints, such as the available time horizon given for the research, the costs, resources, and the available tools which are needed for the specific study (Saunders, Lewis, & Thornhill, 2009). As (Yin, 2009) expounds, the most commonly applied instruments to gather data in qualitative case study research are interviews, direct observations as well as documentation. In the following section, we explain which instruments we utilised to collect data and how we utilised these instruments.

4.1.1 Analysis setup

This study encompasses more than a single phase of analysis and data collection. The primary data collection method used for this research is in-depth observation. This method is considered to help a researcher to understand the event studied based on *„the subjective and socially constructed meanings expressed"* (Saunders, Lewis, & Thornhill, 2009). Since the main research question of this study is concerned with what agile practitioners do (see research question 1 and 3, chapter 1.4), observation serves as an appropriate instrument allowing to systematically observe, record, analyse and describe people as well as interpreting their behaviour. As per the work of (Bass & Bass, 2009) this research method also correlates with the fact that the most recommended terminologies in observational research concentrate on behavioural aspects of leadership and their conformity with observed performance. As indicated in the figure below, one needs to distinguish between four different roles that the researcher can take on in a qualitative observation. For this study the research was conducted in the role "observer as participant**"**. This means that the researcher was primarily involved in

observing the informants, and the identity and role is known to the observed informants (Saunders, Lewis, & Thornhill, 2009).

Figure 7: Typology of participant observation research roles
(Saunders, Lewis, & Thornhill, 2009)



Another method utilised for this research are surveys. This tool is frequently used as a research strategy in business and management research and particularly in leadership research (Bass & Bass, 2009). Surveys aim to answer '*what'*, '*how much'* and '*how many'* questions and therefore are convenient for exploratory research (Saunders, Lewis, & Thornhill, 2009). Furthermore, survey strategies are both relatively easy to understand and to explain.

4.1.2 Planning data collection

Given the fact that the MLQ rater form is a scientifically validated, standard tool to assess leadership behaviours associated with the full-range leadership theory (Bass & Avolio, 1996) (Bass & Yammarino, 1991) (Eagly, Johannesen-Schmidt, & Van Egen, 2003), this study uses this tool for inspiration to identify applied leadership behaviours in the informant groups. Also, we utilise the MLQ to assess the self-perceived leadership by means of a survey being sent to the observed informants. In addition to that, this instrument covers one dimension that measures the perceived leadership effectiveness, -satisfaction and extra efforts, which will be used in the survey, however excluded from the observation analysis. Furthermore, as already indicated in chapter 3.1, the coding guideline established by (Yukl, 2012) (see **appendix C**) was additionally used for inspiration to identify leadership behaviours whereby the MLQ-

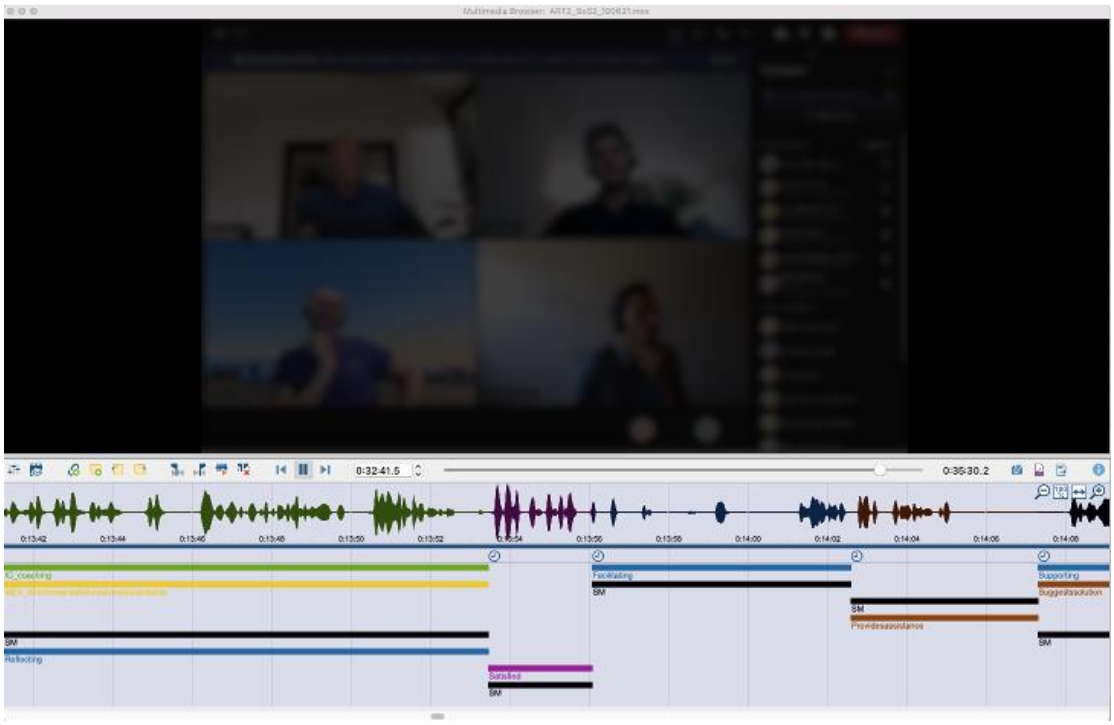
framework was not appropriate to match these to theory. Moreover, to assess the agile maturity, the agile maturity transformation model as per the work of (Laanti, 2017) was utilised as part of the survey. The model distinguishes between five different stages of agile maturity, mapped on three different organisational layers (portfolio-, program- and team level). In this regard, the survey requires the respondents to assess the respectively perceived maturity level in form of ranked ordinal data. A more specific explanation can be found in **appendix B**. Also, to determine the teamwork collaboration level between the observed ART members, the teamwork quality model as per the work of (Hoegl & Gemuenden, 2001) was used in the survey. The construct is an empirically validated tool to measure six different teamwork quality dimensions, encompassing coordination, communication, balance of member contributions, effort, mutual support, and team cohesion (social interaction within a team and task-related). It builds on the assumption that all these dimensions are present in teams that indicate highly collaborative behaviours (Hoegl, Parboteeah, & Gemuenden, 2003).

To collect observational data, a structured observation as per the work of (Saunders, Lewis, & Thornhill, 2009) was carried out. This observation approach aims to depict how often certain behaviours happen. Its selection is because it can be replicated to present comparisons between observed informant groups and observed results can be easier interpreted. It does not only support observing the frequency of events, but also to analyse relationships between observed events.

4.1.3 Data management

As the number of codes can increase quickly and affect the progress of the analysis (Saldaña, 2009), the records of emerging codes, a compilation, their content descriptions and data examples are kept by using the CAQDAS-program *MAXQDA* (MAXQDA, 2021), referenced and recommended as per the work of (Saunders, Lewis, & Thornhill, 2009) (Saldaña, 2009). This program also serves to count and group the established coding schemes. Concerning this, observed meetings were recorded and imported as video-files into the program to be coded. Subsequently, speaker changes in the recorded files were marked with timestamps to map the records into a sequence of actively speaking roles. This set the basis for the next step, to code each of these segments with the respectively assigned roles, leadership behaviours practised, and behavioural reactions associated with practised leadership behaviours. The figure listed below illustrates how the meetings were coded.

Figure 8: Excerpt of a coded video fragment with timestamps



4.2 Process of assessing and analysing the survey data

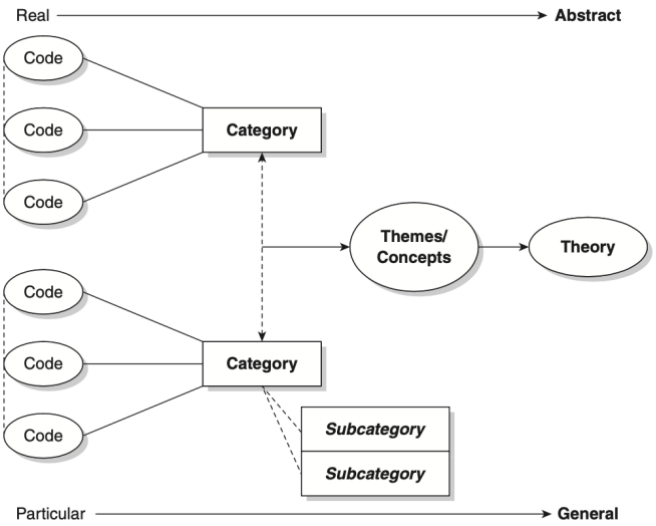
To measure the self-perceived leadership behaviours and leadership outcomes of observed informants in the survey, forty-five items that represent the scales of transformational, transactional, and passive-avoidant leadership behaviours, leadership effectiveness, -satisfaction and -extra effort were collected based on the MLQ. Each of the statements requires the respondents to rate the level of perceived frequency as per ranked ordinal data (Saunders, Lewis, & Thornhill, 2009) in a range of five different frequency levels. Furthermore, to measure agile maturity, three questions that ask the participants for an assessment of the agile transformation maturity on a team-, program- and portfolio level based on five different maturity levels were used to calculate an average score per observed ART. Additionally, based on a five-point rating scale (Hoegl, Parboteeah, & Gemuenden, 2003), six questions indicating the criteria to assess teamwork quality, two questions indicating criteria to assess team performance and two questions indicating criteria for a personal success assessment, were used to derive the mean ratings per ART. The adapted questionnaire based on the models presented above, including the instruction guideline can be found in **appendix B.**

The next chapter will delve into the procedure applied to code, categorise, and interpret the observed data, which are part of the qualitative observation.

4.3 Process of coding and analysing the empirical data

This study aims to codify observed data through a process that separates, (re-)groups and links qualitative data to derive an interpretation and meaning (Grbich, 2007), based on similar characteristics (Bernard, 2006). As already indicated, two leadership frameworks from theory (full-range leadership theory and HTLB) were selected as "off-the-shelf" coding schedules to conduct the data collection, since the respectively assigned behaviours are considered to fit the research questions of this study (Chorney, McMurtry, Chambers, & Bakeman, 2015). Meanwhile, the creation of the coding scheme to investigate the theory of shared leadership, for which we did not have a pre-established coding framework, is built upon the codes-to-theory model according to (Saldaña, 2009) as listed subsequently:

Figure 9: Codes-to-theory model for qualitative inquiry
(Saldaña, 2009)



Based on the model depicted above, this study inductively investigated behaviours and their meaning in the observed meetings which were at a later point associated with the shared leadership theory discussed in chapter 2.

Considering that qualitative research involves "*a deep reflection on the emergent patterns and meanings of human experience*" (Saldaña, 2009), multiple cycles of coding mechanisms were carried out to refine initially established codes. In the following two sub-chapters we will elaborate on the coding mechanisms used.

4.3.1 First Cycle Coding

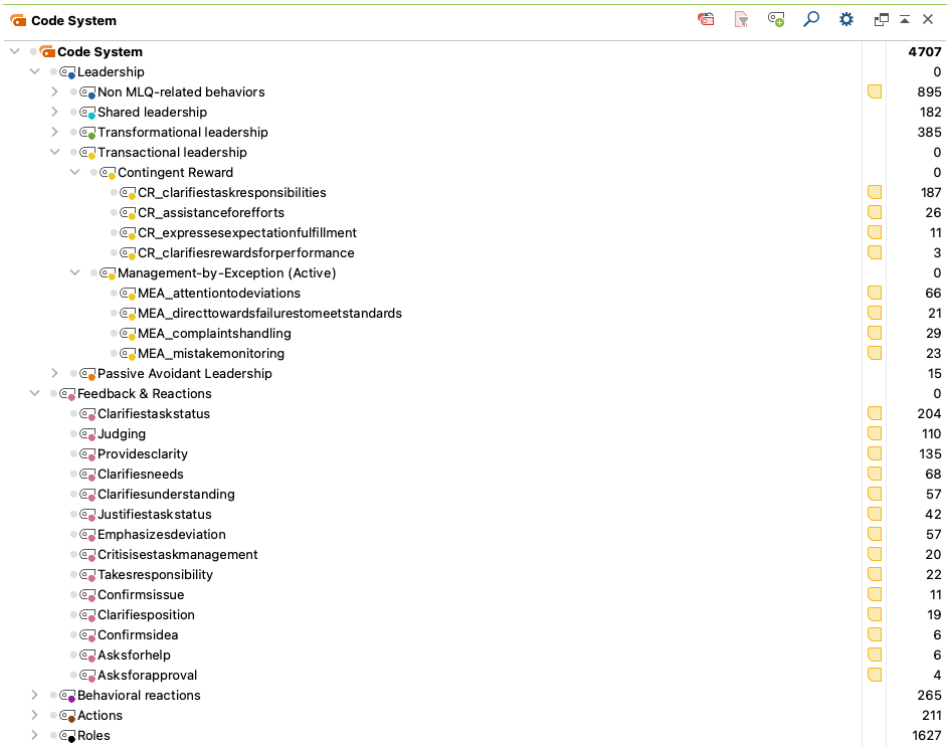
In the context of this work, several coding methods were analysed and tested for their suitability. To code observed data, a selection of coding schemes as per the work of (Saldaña, 2009) was used for this study. An overview of the applied coding schemes is illustrated in the table below.

Table 8: Assessed first cycle coding methods for this study (Saldaña, 2009)

Classification	Understanding
Grammatical methods	**Magnitude coding:** Attaches an additional alphanumeric code to an existing coded category to display its frequency, intensity, or presence
	Simultaneous coding: Encompasses the overlapping appearance of two or more codes applied to certain units
Elemental methods	**Descriptive Coding:** refers to summarizing short phrases in form of a simple noun that marks the basic topic of a paragraph of qualitative data
	Structural coding: A content-based term depicting a topic of enquiry is applied to a fragment of data that serves as a framework for observation linked to a certain research question
	Process coding: Used solely to capture actions in the data by coding observed activities and more general conceptual actions to identify the processes of human action
Affective methods	**Values coding:** Applying codes to data that represent the values, beliefs, and attitudes of observed informants that reflect their perspectives
	Emotion coding: Labels the emotions that the participant experienced, or that the researcher infers about the participant
Exploratory methods	**Provisional coding:** Based on a preliminary list derived from academia that suit the research questions and conceptual setting of the study a preestablished set of codes is applied to qualitative data
	Hypothesis coding: Applies a preestablished, researcher-generated list of codes to qualitative data to assess a defined hypothesis. The codes are designed before being analysed based on a prediction/theory about expected findings

Regarding the table depicted above, this study makes use of simultaneous coding by combining multiple coding mechanisms, which is appropriate when the content of the data proposes various interpretations that require and warrant more than one code. The motivation of this approach builds on the fact that complex social interactions do not happen in isolated units and this method serves as a tool to investigate interrelationships (Glesne, 2006).

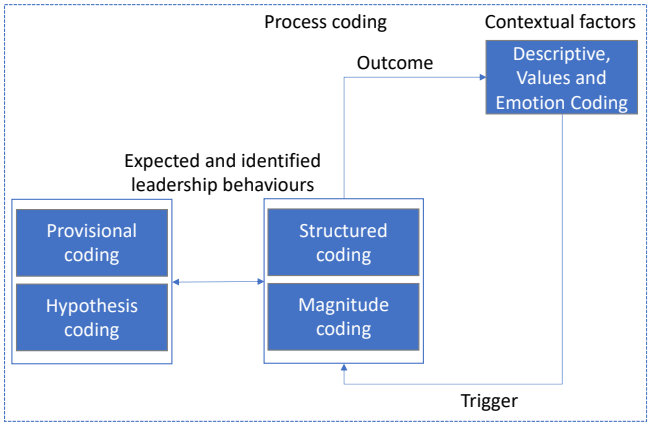
Figure 10: Excerpt from the coding system in MAXQDA



Looking at the figure illustrated above, it indicates an excerpt from our coding system in the software MAXQDA used. It shows that our coding framework represents different leadership dimensions, which are partly inspired by the full-range leadership theory (Table 2) and the HTLB (see Table 3). This concept is compliant with the method of hypothesis and provisional coding (see Table 8). Regarding this, to capture leadership behaviours that could not be assigned to categories inspired by the full-range leadership theory, we added the category '*Non MLQ-related behaviours*' and '*Shared leadership'* behaviours. While the code tree '*Non MLQ-related behaviours*' mainly builds upon the HTLB and the linked observation codebook established by (Yukl, 2012) as illustrated in **appendix C**, the code tree '*Shared leadership*' indicates an inductively created coding set that was later linked to the theory of shared leadership. Besides, the figure above also shows that we have counted the frequency of identified leadership behaviours and associated behavioural responses, a method which is compliant with structured and magnitude coding (see Table 8). In this manner, the figure above indicates that the coding trees related to leadership behaviours were complemented by two coding trees that capture the team members' behavioural reactions. These reactions were coded based on descriptive, emotional and value coding. Since the coding of the behavioural responses focused on timestamps directly following timestamps where certain leadership behaviours were coded to capture their trigger-outcome relationship, this approach is based

upon the concept of process coding. The figure below shows how the coding schemes used are interrelated.

Figure 11: Applied coding structure



4.3.2 Second Cycle Coding

Once every observed video has been iterated and assigned to identified codes, each observed video has been recoded a second time. This approach aims to verify whether novel codes from the latest observation findings can be integrated into initially observed videos and thus to increase the consistency and reliability of the overall findings. Also, to increase the quality and significance of the findings, duplicate codes or codes that contain thematic similarities have been merged or classified into similar categories. Eventually, codes that have been underrepresented (coded 0-5 times max) have been excluded from the analysis Finally, for each identified code memo definitions have been established to provide more context for each code based on specifically assigned behavioural routines. The final version of the coding set, including the memos can be found in **appendix D**.

CHAPTER 5

5. RESEARCH RESULTS

As part of this research project agreement sixteen meetings were observed in the case study organisation in the period between 31 May 2021 and 17 June 2021. The observation scope encompasses two ARTs and observed meeting types include three ART Syncs, eight PO Syncs, three SoSs and two SDs. In total, approximately thirty informants were observed. Regarding this, we recorded a video footage comprising about ten and a half hours and we applied 4707 codes to the observed data. In addition to that, a survey was conducted with the informant groups to understand the context a little better with regards to the relationship between observed and perceived leadership behaviour. Furthermore, the survey has determined the perceived level of teamwork quality, leadership outcomes, team performance, personal success as well as the level of agile maturity in the ARTs. Initially, this chapter provides an overview of the observed meetings. Then, we are going to elaborate on the survey outcomes related to the observed informant groups. Lastly, we are going to present the results of the observational analysis conducted, which constitutes the focus of this study.

5.1 Summary of observed meetings

Due to the given governmental regulations in the observation period with regards to the ongoing pandemic of the coronavirus disease 2019 in the country where the observed organisation is located, all the observations had to be done remotely. This means that instead of a physical set-up the meetings have been continuously hold online, asking both the informant group and the researcher to join the meetings from home through the digital business communication platform 'Microsoft Teams' hosted by the case study organisation. In the two tables depicted subsequently the observed meeting types, the respective meeting time, the meeting date, discussed topics and involved roles are illustrated for both ARTs.

Table 9: Observed meetings of ART 1

Meeting Type	Meeting time	Date	Discussed topics	Involved roles
ART Sync	1:00:15min	**31 May, 2021**	Check in, Announcements, Program board update, feature delivery, SD topics, items in actions, risks, IT maturity dashboard	**PM, SA, QCT, RTE** 6x POs, 3x SMs

PO Sync (Standup)	27:20min	**3 June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 6x POs
ART Sync	53:08min	**7 June, 2021**	Check in, Announcements, Program board update, feature delivery, SD topics, items in actions, risks, IT maturity dashboard	**PM, SA, QCT, RTE** 6x POs, 3x SMs
PO Sync (Standup)	23:08min	**10 June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 6x POs
ART Sync	1:00:05min	**14 June, 2021**	Check in, Announcements, Program board update, feature delivery, SD topics, items in actions, risks, IT maturity dashboard	**PM, SA, QCT, RTE** 6x POs, 3x SMs
SD	46:51min	**14 June, 2021**	Delivered features will be discussed	**Everyone in the ART and external stakeholders**
PO Sync (Standup)	23:44min	**17. June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 6x POs

Table 10: Observed meetings of ART 2

Meeting Type	Meeting time	Date	Discussed topics	Involved roles
PO Sync – Review & Planning	50:32min	**31 May, 2021**	Opening/Check-in, Review (Benefit tracking, SD), Planning (Which features can be picked up in the next sprint)	**PM, SA, QCT, RTE** 3x POs
SoS	43:40min	**3 June, 2021**	Status, impediments, and experiences/learnings	**RTE** 4x SMs
PO Sync	28:52min	**3 June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 3x POs
PO Sync Refinement	55:18min	**7 June, 2021**	Check in, Refinement: What do we do in the next two sprints and are the features ready for sprint? Is the priority correct? Features from funnel to review/analysis/backlog. Benefit tracking, Epics from Ready process, new features	**PM, SA, QCT, RTE** 3x POs
SoS	35:30min	**10 June, 2021**	Status, impediments, and experiences/learnings	**RTE** 4x SMs
PO Sync (extra)	19:00min	**10 June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 3x POs

SD	44:36min	**14.June 2021**	Opening, Restore tooling, Cost optimization, Knowledge management, Cloud migration	**Everyone in the ART and external stakeholders**
SoS	41:26min	**17. June 2021**	Status, impediments, and experiences/learnings	**RTE** 4x SMs
PO Sync	13:43min	**17 June. 2021**	Check in, informal	**PM, SA, RTE, QCT** 3x POs

The tables illustrated above depict one role that has not been presented in the literature review (see chapter 2.2.3). The so-called 'QCT' is a role introduced by the case study organisation that is not defined in the SAFe. It stands for a representative of a quality control team, which is responsible for ensuring that all organisational regulations are followed in the development of new services or products.

5.2 Survey self-assessment results

Initially, this chapter aims to provide an overview of the results of the conducted survey with regards to the perceived leadership behaviour, respective leadership outcomes, agile maturity, teamwork quality, team performance and personal success from the perspective of the observed informant groups. The survey has been distributed with 5-point-Likert scale questions. The results of the survey are only used to provide the reader additional context over the organisation examined for illustrative indications, since we did not measure any statistical correlations between the variables. The focus of this study lies on the qualitatively investigated observations presented in chapter 5.3.

5.2.1 Leadership behaviour self-assessment

Initially, the following section provides more insights into how the observed informant groups perceived their leadership behaviour and associated leadership outcomes. Regarding this, the stack bar diagrams illustrated in **appendix G** depict the total percentage distribution of the perceived leadership behaviour and leadership behaviour outcomes of both ARTs, based on the 5-point scoring scales of the MLQ. 5 participants from ART 1 and 7 participants from ART 2 have participated. To collect these data, for each dimension item of the MLQ the indicated self-assessment of the participants on the 5-point scale (Not at all, Once in a while, Sometimes, Fairly Often, Frequently) has been counted. Subsequently, the average score of

each of the possible answer scales listed above was calculated for all items that represent one dimension together, depending on the total number of participants. Then, the five different average answer scales of the items that form a dimension together have been averaged per dimension. Consequently, the average score of all the dimensions that map a leadership behaviour together have been averaged per possible answer scale to calculate how often each answer scale is represented per leadership behaviour. The same procedure has been implemented for the dimensions 'Extra Effort', 'Effectiveness' and 'Satisfaction' that represent the leadership outcomes. However, these three dimensions have not been considered to map an overall average per answer scale for the leadership outcomes to highlight each of these dimensions individually.

The diagrams in **appendix G** show that most participants of both ARTs perceive their leadership behaviour to be 'fairly often' associated with transformational leadership and 'sometimes' related to transformational leadership. Furthermore, most of the participants from ART 1 believe that passive-avoidant leadership is 'not at all' anchored in their behaviours. Meanwhile, most of participants from ART 2 think that passive-avoidant leadership is 'once in a while' part of their behaviours. Regarding leadership outcomes, the diagrams indicate that most of the participants in ART 1 are of the opinion that their leadership behaviours 'sometimes' tends to stimulate the team members to do more than they are expected to do, while most participants of ART 2 consider this to be 'fairly often' the case. Besides, most ART 2 participants assume that their leadership behaviour is 'frequently' perceived as being effective by the team members. In contrast, most participants of ART 1 believe that this is only 'fairly often' the case. Meanwhile, most participants of ART 1 claim that their leadership behaviour 'frequently' leads to satisfied team members, while this is considered only to happen 'fairly often' according to the majority of participants in ART 2.

The table depicted below exemplifies the overall scales of perceived leadership behaviour and outcomes of leadership behaviour in the Likert scale range from (0) Not at all to (4) Frequently. The results are presented once for all survey participants and once filtered by participants based on the ART to which they belong. 5 participants of ART 1 and 7 participants of ART 2 took part in the survey. For each leadership behaviour, outcome of leadership behaviour and respectively assigned dimensions the ART in which their scale is higher, is marked in grey. Given the numbers in the table, it can be noted that the perceived scale of transformational leadership as well as the scale of all leadership outcome dimensions (Extra Effort, Effectiveness, Satisfaction) are higher in ART 2 than in ART 1. Meanwhile, the

scales of transactional- and passive avoidant leadership behaviour are both higher in ART 1 than in ART 2.

Table 11: Self-assessment of leadership scales in ARTs

Transformational Leadership	**ART1**	**ART2**	**Both units**
Dimension	Scale	Scale	Scale
Idealized Influence (Attributes)	2,50	2,57	2,54
Idealized Influence (Behavior)	2,70	2,75	2,73
Inspirational Motivation	2,80	2,75	2,77
Intellectual Stimulation	2,80	2,64	2,71
Individual Consideration	2,80	2,96	2,90
Overall Average	2,72	2,74	2,73
Transactional Leadership	**ART1**	**ART2**	**Both units**
Dimension	Scale	Scale	Scale
Contingent Reward	2,70	2,39	2,52
Management-by-Exception (Active)	1,85	1,89	1,88
Overall Average	2,28	2,14	2,20
Passive Avoidant Leadership	**ART1**	**ART2**	**Both units**
Dimension	Scale	Scale	Scale
Management-by-Exception (Passive)	1,35	1,29	1,31
Laissez-Faire	1,20	0,96	1,06
Overall Average	1,28	1,13	1,19
Outcomes of Leadership	**ART1**	**ART2**	**Both units**
Dimension	Scale	Scale	Scale
Extra Effort	2,47	2,62	2,56
Effectiveness	3,00	3,18	3,10
Satisfaction	3,00	3,07	3,04
Overall Average	2,82	2,96	2,90

Scale ratings

(0) Not at all (1) Once in a while (2) Sometimes (3) Fairly often (4) Frequently, if not always

To derive the numbers for the table illustrated above the MLQ scoring keys have been used to group each survey item by their dimension. Then, the total scale by dimension has been calculated. In this regard, for each item the total given points have been captured, divided by the maximum possible points that could be given per item. Following the manual of the MLQ, answers indicating a perceived scale of ‘Frequently’ have been assigned 4 points, a scale of ‘Fairly often’ has been assigned 3 points, a scale of ‘Sometimes’ has been assigned 2 points, a scale of ‘Once in a while’ has been assigned 1 point and a scale of ‘Not at all’ has been assigned 0 points to calculate the total given points. Blank answers have been excluded in the calculation.

5.2.2 Agile maturity

In this section, we are going to explain in more detail how we assessed the perceived level of agile maturity for both ARTs. In this respect, stack bar diagrams have been created as displayed subsequently by mapping the percentage distribution of the 5-point scoring scales on a team-, program- and portfolio level per ART. The 5-point scoring scales used to outline the perceived level of agile maturity are defined as following: 'Beginner', 'Novice', 'Fluent', 'Advanced' and 'World-Class'. An explanation of the score ratings can be found in **appendix B.**

Figure 12: Perceived level of agile maturity in ART 1

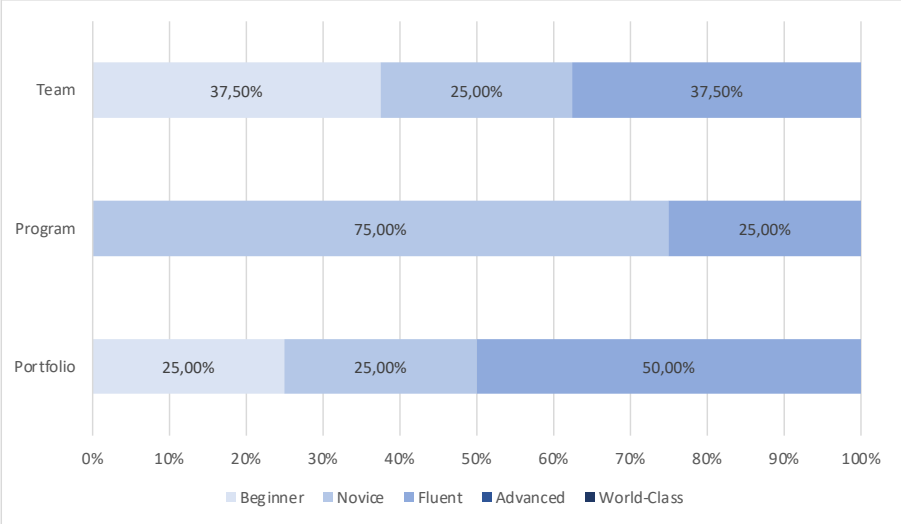
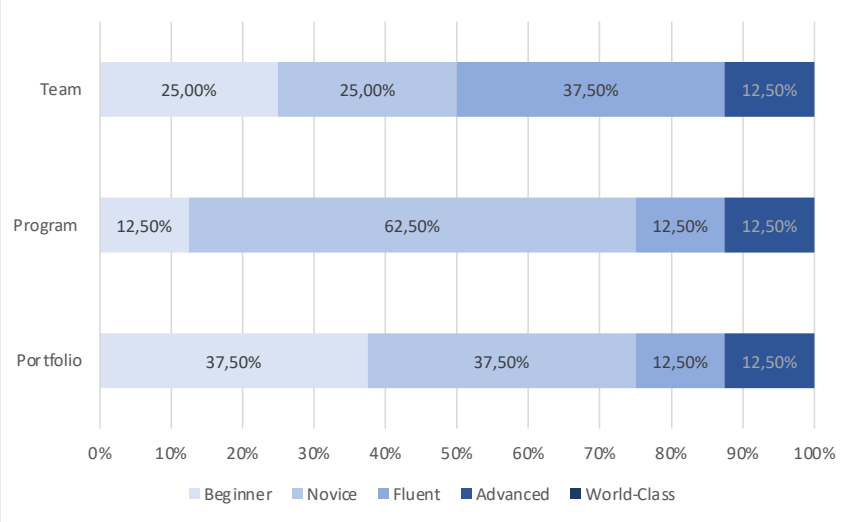


Figure 13: Perceived level of agile maturity in ART 2



The stack bar diagrams depicted above indicate the total percentage distribution of the perceived level of agile maturity of both ARTs. 8 participants of each ART have participated. Similarly, to the procedure applied to derive the results for the perceived leadership behaviours and their outcomes, for each organisational level (team, program, and portfolio) the indicated self-assessments of the participants on the 5-point scale have been counted to calculate the average score of each of the possible answer scales listed above to show how often each answer scale is represented in the three different organisational levels. One can derive from the figures depicted above that most participants of ART 2 consider themselves to be at a 'Fluent' level of agile maturity, while most participants of ART 1 see themselves either on a 'Beginner' or on a 'Fluent' agile maturity level from a team perspective. Furthermore, when looking at a program perspective, most of both ARTs participants claim to be on a 'Novice' agile maturity level. Finally, on a portfolio level most participants of ART 1 claim that they are on a 'Fluent' agile maturity level. On the other hand, most participants of ART 2 consider the organisation to be either on a 'Beginner' or 'Novice' agile maturity level.

Table 12: Self-assessment of agile maturity scales in ARTs

Agile Maturity	ART 1	ART2	Both units
Level	Scale	Scale	Scale
Team	1,00	1,38	1,19
Program	1,25	1,25	1,25
Portfolio	1,25	1,00	1,13
Overall Average	1,17	1,21	1,19

Scale ratings

(0) Beginner (1) Novice (2) Fluent (3) Advanced (4) World-Class

The table represented above depicts the total level of perceived agile maturity using the Likert scale range from (0) Beginner to (4) World-Class, once for all survey participants and once filtered by participants based on the ART to which they belong. For each of the three indicated organisational levels the ART in which the perceived scale of agile maturity is higher is marked in grey. When looking at the numbers in the table, one can see that the perceived scale of agile maturity is higher in ART 2 than in ART 1 on a team level. However, the perceived degree of agile maturity on a portfolio level is higher in ART 1 than in ART 2. Meanwhile, on a program level both ARTs participants indicate the same scale of agile maturity.

5.2.3 Teamwork quality

Eventually, this section points out the perceived degree of teamwork quality, team performance and personal success as assessed by the informant groups. 5 participants from ART 1 and 7 participants from ART 2 have filled in the section of the survey relevant to determine the level of the variables mentioned above.

Figure 14: Perceived teamwork quality in ART 1

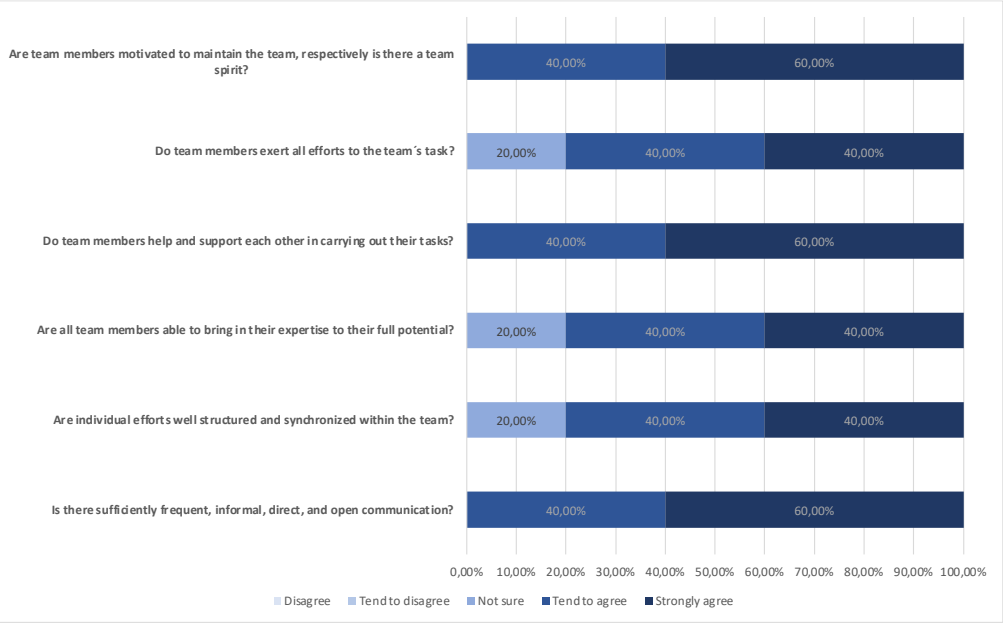
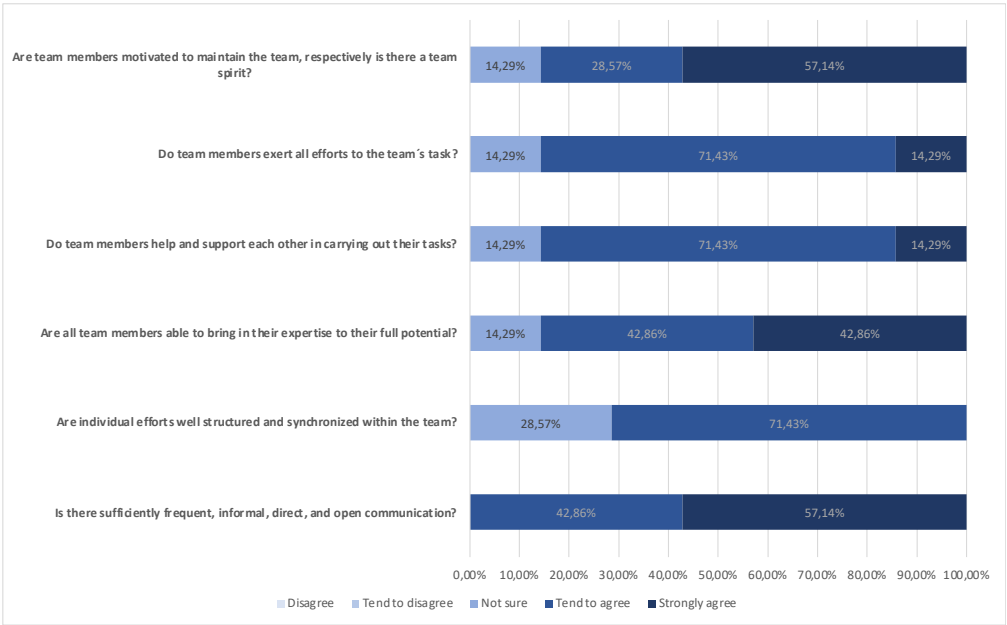


Figure 15: Perceived teamwork quality in ART 2



Figures 14 and 15 pictured above represent the percentage distribution of each question related to teamwork quality per ART. The results have been derived with the same procedure as for the MLQ-items in chapter 5.2.1. This means that for each component the indicated self-assessment of the participants on the 5-point scale has been counted and consequently averaged for each of the possible answer scales to evaluate how often each answer scale is represented. Contrary to the MLQ based 5-point scale, a different wording has been used for the scales in here, namely (0) Disagree, (1) Tend to disagree, (2) Not sure, (3) Tend to agree and (4) Strongly agree. Regarding this, the overall assessment of perceived teamwork quality indicates that most participants from both ARTs strongly agree that a cohesion is guaranteed by team members motivating each other to maintain the team. Also, most participants of both ARTs strongly agree that they experience a sufficient, informal, direct, and open communication in their teams. Similarly, the majority of both ARTs participants tend to agree or strongly agree that all team members are able to bring in their expertise to their full potential. With regards to coordination, most participants of ART 2 strongly agree that individual efforts are synchronised within the team, while most participants of ART 1 tend to agree or strongly agree regarding this experience. Furthermore, most participants of ART 2 tend to agree that their team members exert all efforts to the teams' task, while the majority of ART 1 participants either tend to agree or strongly agree to seeing this happening. Moreover, when looking at aspects of mutual support, most participants of ART 1 strongly agree that their team members help and support each other in carrying out their tasks. On the other hand, most participants of ART 2 tend to agree to experience mutual support.

Two other components that were addressed in the survey are team performance and personal success. Following on from the first component, most participants in both ARTs tend to agree that in terms of the effectiveness of their teams measured by results, their ARTs can be considered successful. With regards to the perceived team performance components, most participants of both ARTs tend to agree that going by the results both a proper team efficiency (scheduling and budgeting) and team effectiveness are given. Also, personal success has been measured. Regarding this, the survey participants were firstly asked to indicate how often they could draw a positive balance for themselves in their ART and whether they would do this type of collaborative work again. Most participants of ART 2 tend to agree that this the case, while most participants of ART 1 either tend to agree or strongly agree that this the case. Secondly, the participants were asked whether they were able to acquire important know-how through their ARTs. The majority of ART 1 participants tend to agree that this is the case and most participants from ART 2 either tend to agree or strongly agree that this is the case.

Table 13: Self-assessment of collaboration scales in ARTs

Teamwork Quality	ART1	ART2	Both units
Component	Scale	Scale	Scale
Is there sufficiently frequent, informal, direct, and open communication?	3,60	3,57	3,58
Are individual efforts well structured and synchronized within the team?	3,20	2,71	2,92
Are all team members able to bring in their expertise to their full potential?	3,20	3,29	3,25
Do team members help and support each other in carrying out their tasks?	3,60	3,00	3,25
Do team members exert all efforts to the team´s task?	3,20	3,00	3,08
Are team members motivated to maintain the team, respectively is there a team spirit?	3,60	3,43	3,50
Overall Average	3,40	3,17	3,26
Team Performance	**ART1**	**ART2**	**Both units**
Component	Scale	Scale	Scale
Going by the results, can the ART be regarded as successful?	3,00	2,57	2,75
Going by the results, can the ART be considered to be done in a cost- and time-efficient way?	2,60	2,86	2,75
Overall Average	2,80	2,71	2,75
Personal Success	**ART1**	**ART2**	**Both units**
Component	Scale	Scale	Scale
Could you draw a positive balance for yourself in this ART, respectively would you do this type of collaborative work again?	3,20	2,86	3,00
Were you able to acquire important know-how through this ART?	3,20	3,29	3,25
Overall Average	3,20	3,07	3,13

Scale ratings
(0) Disagree (1) Tend to disagree (2) Not sure (3) Tend to agree (4) Strongly agree

Eventually, the table depicted above provides a comparison of the perceived scales of teamwork quality, team performance and personal success, once for both observed units and once filtered by participants per ART. A 5-point-Likert scale represents the perceived frequencies from (0) Disagree to (5) Strongly agree. For each question, the ART in which the respective degree is higher is highlighted in grey. A closer look at the table reveals that, except for the component 'balance of member contributions', all other components of teamwork quality are more pronounced in ART 1 than in ART 2. With respect to team performance, the scale of effectiveness is higher in ART 1, while the scale of efficiency is higher in ART 2. Moreover, when looking at the perceived personal success components, it can be noted that the scale of work satisfaction is much higher in ART 1, while the scale of learning is slightly higher in ART 2. The overall averages indicate that the scale of each of the determined variables is higher in ART 1 than in ART 2. To calculate the numbers in the table above, for each component the total given points have been captured, divided by the maximum possible points that could be given per component. To calculate the total given points, 4 points have been assigned to answers indicating a scale of ‘Strongly agree, 3 points have been assigned to answers indicating a scale of ‘Tend to agree’, 2 points have been assigned to answers indicating a scale of ‘Not sure’, 1 point has been assigned to answers indicating a scale of ‘Tend to disagree’ and 0 points have been assigned to answers indicating a scale of ‘Disagree’. Blank answers have been excluded in the calculation.

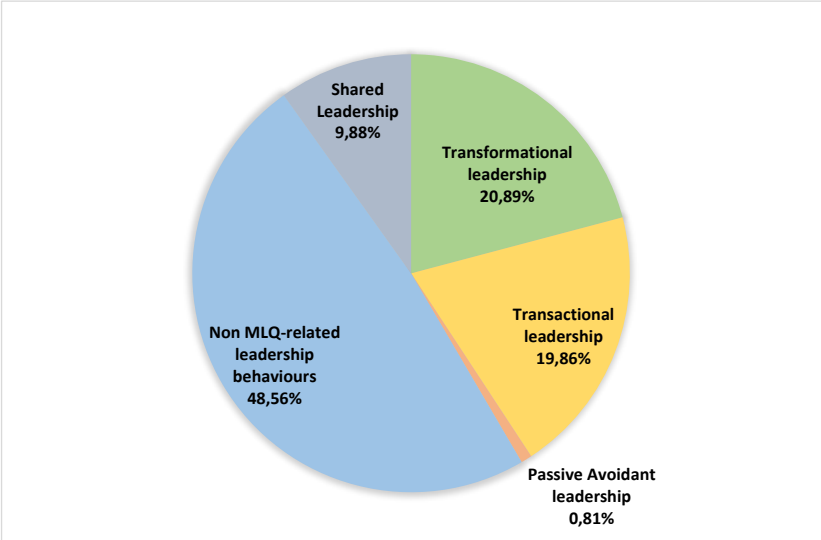
5.3 Qualitative analysis of observed leadership behaviours

This sub-chapter aims to present the results of the qualitative analysis conducted. Initially, an overview of the most observed leadership dimensions as well as related leadership behaviours are depicted. Regarding this, we also present empirical examples of behaviours related to the most frequent leadership behaviours observed. Following, a distribution of the leadership dimensions per role is described. Then, an overview of the co-occurrences of leadership behaviours is given. Also, leadership behaviours are illustrated per ART and per meeting type. Eventually, the outcomes of leadership behaviours are depicted, indicating what kind of behaviour has followed a certain leadership behaviour in the observations.

5.3.1 Applied leadership behaviours

To get a more comprehensive picture of the leadership dimensions observed in the informant groups, the figure below constitutes their respective distributions. Using the software MAXQDA, in which all the codes were administered, the percentage distribution was automatically derived.

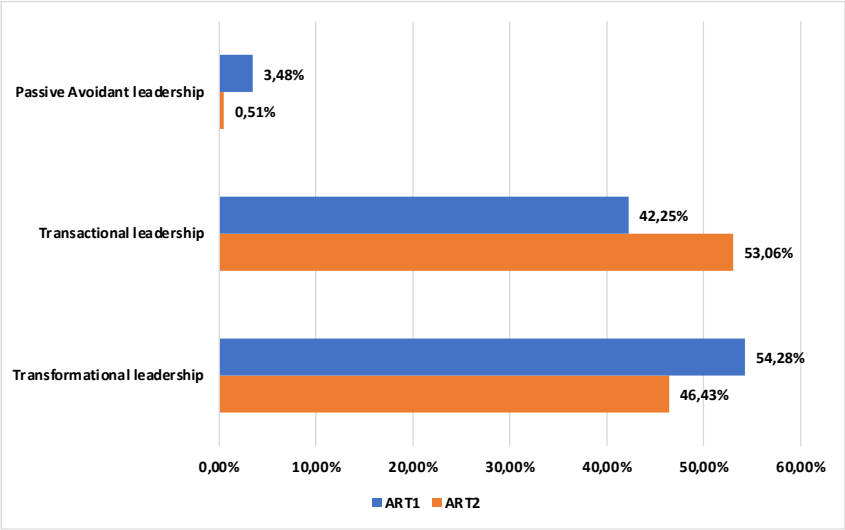
Figure 16: Distribution of observed leadership dimensions



When looking at the figure above, it is noticeable that the non MLQ-related leadership behaviours were observed most frequently with a share of 48,56%. This is followed by transformational leadership with 20,89% and transactional leadership with a share of 19,86%. Thus, these two dimensions have an almost equal share in the observations. Meanwhile, shared leadership holds a share of 9,88% and passive-avoidant leadership is hardly represented with

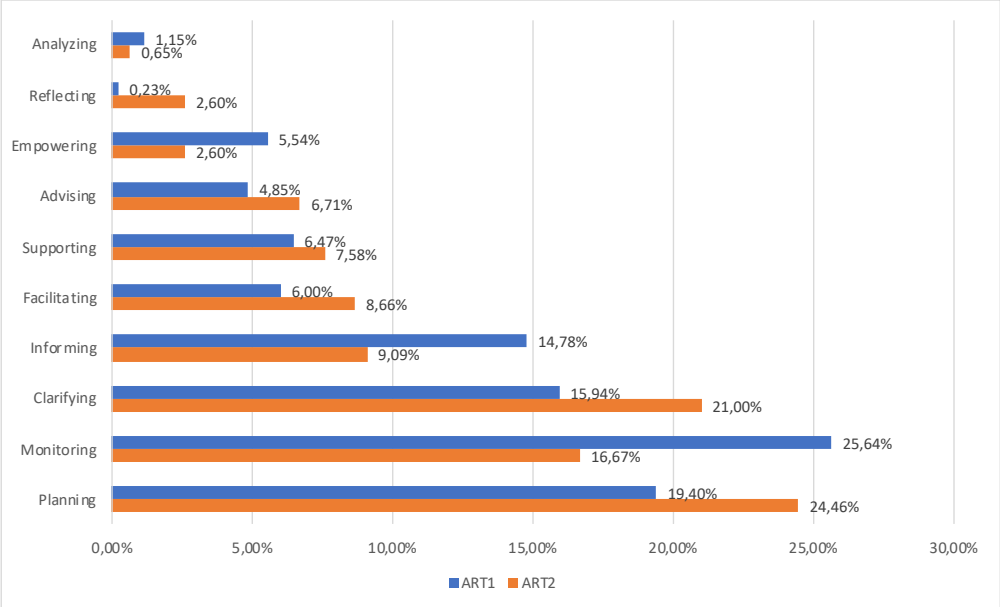
only 0,81%. Since all the meeting documents were kept in separate document groups labeled by ART, MAXQDA easily allows us to filter applied codes by ART.

Figure 17: Distribution of MLQ-dimensions per ART



A closer look at the percentage distribution of the MLQ-dimensions per ART (see Figure 17 above) reveals that transformational leadership was predominantly observed in ART 1. Meanwhile, transactional leadership was predominantly observed in ART 2. With regards to the distribution of passive-avoidant leadership, one can see that this dimension was mainly observed in ART 1.

Figure 18: Distribution of non-MLQ related leadership behaviours per ART



Furthermore, the figure listed above shows the most frequently observed non-MLQ related leadership behaviours filtered by ART. In this manner, it is striking that 'Planning' is the most frequently observed behaviour in ART 2 with a share of 24.46%, followed by 'Clarifying' with 21.00%. Meanwhile, 'Monitoring' was the most frequently observed behaviour in ART 1 with a share of 25.64%, followed by 'Planning' with a share of 19.40%. 'Analysing' and 'Reflecting' were the least observed behaviours in both ARTs.

5.3.1.1 Empirical examples of most frequent leadership behaviours

Table 14: Most frequently observed leadership behaviours

Leadership Type	Leadership Behaviour	Frequency	Percentage
Non-MLQ related leadership behaviour	Plans, schedules and coordinates activities	197	10,69%
Non-MLQ related leadership behaviour	Monitors progress and quality	188	10,20%
Transactional - Contingent Reward	Clarifies task responsibilities	187	10,15%
Non-MLQ related leadership behaviour	Clarifies goals, deadlines and priorities	166	9,01%
Non-MLQ related leadership behaviour	Informs about general topics of relevance	106	5,75%
Shared leadership	Delegates decision-making	99	5,37%
Shared leadership	Shares decision-making collectively with the team	83	4,50%
Transformational - Intellectual Stimulation	Seeks different perspectives when solving problems	72	3,91%
Transactional - Management by Exception (Active)	Pays attention to deviations	66	3,58%
Non-MLQ related leadership behaviour	Facilitates inter-team communication	66	3,58%
Non-MLQ related leadership behaviour	Supporting people with stressful situations	63	3,42%
Non-MLQ related leadership behaviour	Advising on how to manage tasks and planning	52	2,82%
Transformational -Individualized Consideration	Shows empathy for individuals	44	2,39%
Transformational - Idealized Influence (Attributed)	Builds respect for individuals	36	1,95%
Non-MLQ related leadership behaviour	Empowering individuals in making important decisions	36	1,95%
Transformational - Idealized Influence (Attributed)	Encourages pride in others	32	1,74%
Transactional - Management by Exception (Active)	Handles complaints	29	1,57%
Transformational - Idealized Influence (Behaviour)	Shows sense of purpose	27	1,47%
Transactional - Contingent Reward	Provides assistance for efforts	26	1,41%
Transformational -Individualized Consideration	Treats people as individuals	24	1,30%
Transformational - Idealized Influence (Behaviour)	Emphasises collective sense of mission	23	1,25%
Transactional - Management by Exception (Active)	Actively monitors mistakes	23	1,25%
Transformational - Inspirational Motivation	Talks enthusiastically about goals	22	1,19%
Transactional - Management by Exception (Active)	Directs towards failures to meet standards	21	1,14%
Transformational - Intellectual Stimulation	Critical questioning of assumptions	17	0,92%
Transformational - Idealized Influence (Attributed)	Displays sense of power	16	0,87%
Transformational - Intellectual Stimulation	Stimulates creativity in others	14	0,76%
Non-MLQ related leadership behaviour	Reflecting on experience to stimulate feedback	13	0,71%
Transformational - Intellectual Stimulation	Suggests innovative way of working	12	0,65%
Transactional - Contingent Reward	Expresses expectation fulfilment	11	0,60%
Transformational - Inspirational Motivation	Talks optimistically about the future	11	0,60%
Transformational - Idealized Influence (Behaviour)	Talks about values and beliefs	8	0,43%
Non-MLQ related leadership behaviour	Proactively analysing systems	8	0,43%
Transformational - Inspirational Motivation	Confident about goal achievement	7	0,38%
Transformational - Idealized Influence (Attributed)	Goes beyond self interest	6	0,33%
Transformational - Inspirational Motivation	Visionary about the future	5	0,27%
Transformational -Individualized Consideration	Stimulates personal development of others	4	0,22%
Passive Avoidant - Management-by-Exception (Passive)	Passive action-taking	3	0,16%
Passive Avoidant - Laissez Faire	Avoids making decisions	3	0,16%
Passive Avoidant - Laissez Faire	Avoids getting involved	3	0,16%
Transformational -Individualized Consideration	Spends time coaching	3	0,16%
Transactional - Contingent Reward	Clarifies rewards for performance	3	0,16%
Transformational - Idealized Influence (Behaviour)	Indicates an ethical mindset	2	0,11%
Passive Avoidant - Management-by-Exception (Passive)	Responsive to arising problems only	2	0,11%
Passive Avoidant - Laissez Faire	Delays responding to urgent questions	1	0,05%
Passive Avoidant - Management-by-Exception (Passive)	Demonstrates chronic problem solving	1	0,05%
Passive Avoidant - Laissez Faire	Is absent when needed	1	0,05%
Passive Avoidant - Management-by-Exception (Passive)	Fails to interfere	1	0,05%

The table depicted above shows a concrete overview of the frequency and percentage of all observed leadership behaviours in the organisation. The overview was established with

the aid of MAXQDAs code frequencies feature. The behaviours are sorted by frequency from top to bottom. The respective leadership types are also referenced. It can be seen that ‘Plans, schedules and coordinates activities’ was the most frequently observed leadership behaviour with a share of 10.69%, followed by ‘Monitors progress and quality’ with a share of 10.20% and ‘Clarifies task responsibilities’ with a share of 10.15%. The first two behaviours are non-MLQ related leadership behaviours, while the third is a transactional leadership behaviour. On the other hand, the table below reveals that 3 behaviours belonging to passive-avoidant leadership, namely 'Demonstrates chronic problem solving', 'Is absent when needed', and 'Fails to interfere' were the least observed behaviours with a respective share of 0.05%.

The leadership behaviours that account for at least one percent of the total observed leadership behaviours are elaborated on subsequently with speaking quote examples according to Table 14 presented above. All leadership behaviours associated with passive-avoidant leadership are therefore excluded from this listing.

Speaking quotes for shared leadership behaviours

As the sixth and seventh most frequently observed leadership behaviours, ‘Delegates decision-making’ and ‘Shared decision making’ mark the Shared leadership dimension with a percentage of almost 10% together. An example of ‘Delegates decision-making’ would be the RTE leaving the decision how to proceed the meeting or with certain actions to the group or certain group members: “*Shall we just do a round and then discuss whatever needs to be discussed*?” (ART1_POSync2), “*<PO X>, anything you want to share*?” (ART1_POSync3), or “*<PO X>, do you want to start with this task during this PI or not*?” (ART2_POSync1). Meanwhile, examples that highlight the behaviour of Shared decision-making relate to behaviours whereby for instance the PM addresses the RTE to make a decision collectively: “*That is something I gonna discuss with <person X>, or <RTE X> is this something you need to discuss*? *What´s wise?*” (ART1_POSync1), or “*Are you okay with it when we put the task on ready then*?” (ART1_Sync1).

Speaking quotes for non-MLQ related leadership behaviours

Exemplary recorded quotes for the predominantly observed leadership behaviour ‘Plans, schedules and coordinates activities’ would be “*Let´s make a quick round and see what´s happening”* (ART1_POSync1, ART2_POSync5) or “*Let´s start with a check-in*” (ART1_Sync3), in which the RTE introduces the meetings and appeals to the team to briefly

share updates. Other examples refer to the SM explicitly handing over the word to a certain sub-unit: "*Let´s start with <team X>*" (ART2_SoS2), or the PM initiating a discussion "*Let´s discuss this and make an alternative proposal*" (ART2_POSync4), and the SM stating "*Let´s go through the matrix team by team first and then we go through the KANBAN board*" (ART2_SoS1), "*On the agenda next is announcements, do we have any announcements, <PM X>?*" (ART1_Sync1, ART1_Sync3). At the same time, the behaviour 'Plans, schedules and coordinates activities' refers to a SM taking in the role of a timekeeper by saying "*Thanks, when looking at the time, we gonna continue with <team X> and then finish afterwards with <team Y>*" (ART2_SoS1). This behaviour is followed by 'Monitoring progress and quality*'* indicating behaviours whereby people are mostly directly or indirectly addressed through the RTE, expected to report updates: "*Any updates about Sprint 4? Anything to say about some features?*" (ART1_Sync2), "*Anything from this that needs to be added into the progress column*?" (ART2_POSync1), or by the PM to get a picture how well they handle their progress: "*Have you tried to stress it? What is actually the load that you can handle?*" (ART1_SD), "*Does that mean that you have finished one of the first features that you came up with this high?*" (ART1_Sync1), "*Is it already solved? You can tell it now, it´s fine.*" (ART1_POSync1).

For the fourth most observed leadership behaviour 'Clarifies goals, deadlines and priorities', examples refer to the PM talking about priorities: "*I think it is quite preliminary to escalate this, because I didn't know any of the strategy issues at the moment*" (POSync1), or the RTE indicating "*I invite them to get it on the list and to prioritise this. We cannot do everything. They need to choose. They cannot say this is the priority and then come from another angle, that´s not how it works*" (ART1_POSync2). Another example refers to the PM clarifying overall goals: "*It was just a discussion for the features for the PI. That doesn't really mean that you need to take that in, but they might need you.* […] *However, you don't really need to see this as something you need to do. This is a candidate feature for the next PI, so you just take it up in your list, we will discuss it during the next Ready meeting and then it´s up to you in the PI planning meeting if you can make it or not*" (ART1_POSync3), or the RTE saying "*I don't know when the next meeting from the SMs is planned, but we want to have it on the agenda over there*" (ART2_SoS1).

The next most frequently observed leadership behaviour relates to 'Informs about general topics of relevance'. One example would be the RTE updating the SMs about topics from other meetings: "*Maybe good to know, we discussed the network implementation yesterday in <meeting X> and they said they will continue it as a pilot, so based on the learnings they will ask other teams to continue with it. That´s why I also cancelled the other*

meetings because they will continue on a small-scale, asking 4 or 5 teams to pick this one up" (ART2_SoS1).

The tenth most frequently observed leadership behaviour relates to 'Facilitating inter-team communication'. Similarly, to the shared leadership dimension, it mainly comes into play through the RTE stimulating people to share their thoughts on ongoing discussions: "*Let´s make a quick round. <PO X>, anything from your end to discuss?*" (ART1, POSync1), "*Are there any other questions for the POs?*' (ART1_SD), "*Any other questions for the developer about this feature*?" (ART2_SD). This leadership behaviour is followed by two other non-MLQ related leadership behaviours, namely 'Supporting' and 'Advising'. Supporting is applied through behaviours of positive regard such as "*You can use me for escalation, so I can do that. Just drop me an email and I will get in contact with the stakeholders, as well*" (ART1_POSync3), "*Do you need any help from me here, <PO X> or is it going okay*?" (ART1_Sync1), "*What I can do for you is give <person X> a call about this and tell him that we have a serious problem with this. Would this be something that would help*?" (ART2_POSync4), "*Keep in mind if some the people in your team are facing technical issues with <team X>, reach out to me, so I can check the issue for them*" (ART2_SoS2). The behaviours illustrated above were initiated by PMs, SMs and RTEs.

Behaviours of 'Advising' have been identified when for instance POs or SMs consulted the RTE or PM on certain actions to be done: "*As you know we went live last weekend with the software to production, I think it´s wise to have a small attention to the developers who worked over the weekend. It should be in place to send a thank you*" (ART1_POSync1), "*I think this tool is something that you should first talk about in the <team X>. It´s an overview I got in the training and we´ll see if we can do it in the other teams, as well*" (ART1_Sync2), "*<Person X> is a good specialist in all kinds of security stuff in communications, maybe he can give you a good demo about that or tell you more*" (ART2_SoS1).

On position fifteen of the most frequently observed leadership behaviours is 'Empowering individuals in making important decisions' with a percentage of 1,95%. As the name already indicates it was observed when people have been empowered in making decisions or being provided autonomy to plan their activities: "*You know we have a lot of slots. If you want two slots, that´s also possible. Don´t limit yourself in this brainstorming phase*" (ART1POSync3), "*I think it´s a good idea to raise a flag. Please do so, <PO X>, saying that in <team X> there might be a problem supporting this feature*" (ART2_POSync3).

Speaking quotes for transformational leadership behaviours

In eighth place is the most frequently observed transformational leadership behaviour 'Seeking different perspectives when solving problems', which belongs to the category Intellectual Stimulation. As the name already indicates it is mostly used by the RTE to stimulate other people to bring in their ideas on solutions and issues discussed: "*If you have any ideas what you want to bring to the table, what could be interesting for our customers of course, please let me know*" (ART1_Sync1), "*Some SMs were saying the <program X> will take some time already during this PI. So, the question is what do we do about it*?" (ART2_POSync1). Also, SMs have applied this behaviour a lot to reflect on their issues: "*I was wondering what you do with things like storage solutions. Are those also automatically deleted*?" (ART2_SD), "*I am a bit struggling with something that you guys might struggle with, as well. It concerns the tracking of story points when they can´t be done in a sprint. How are you dealing with it? Please elaborate on it and feel free to discuss it with me*" (ART2_SoS3).

On position thirteen we have the transformational leadership behaviour 'Shows empathy for individuals' from the category Individualized Consideration, and on position fourteen we have 'Builds respect for individuals' from the category Idealized influence (Attributed). Practical examples for 'Shows empathy for individuals' refer to the RTE connecting to addressed frustrations from team members with understanding: "*I can imagine. But if we spent all the hours, then that´s it what it is right now. And if it´s not good enough, let´s make clear that we have a capacity issue there*" (ART1_POSync3) or a PO acting with empathy on behalf of a team member "*She doesn't have the capacity and she doesn't expect to have the capacity any time sooner*" (ART2_POSync3). 'Building respect for individuals' could be identified when for instance people acknowledged the work being done by others: "*I want to give an applause. They put a lot of hard work in here*" (ART1_Sync1), "*The team was really happy with the presentation by <SM X> in the system demo. That was a good one that helped to give more insights in your team. Thanks for that*" (ART2_SoS1).

An observational example of the leadership behaviour 'Encourages pride in others' would be the PM saying, "*Very cool, very nice to hear that we are solving issues here*" (ART1_SD) or the RTE stating "*You did a really nice retro. I love that*" (ART2_SoS1). Behaviours of providing a sense of purpose are for instance stimulated by the PM saying "*It would help me if all <meetings X> that ask for my presence are planned way ahead. It helps.*" (ART1_POSync1) or the RTE claiming "*If we deviate, if everybody does it differently, then we*

cannot use any of these in the right way […] *we will have a look at these things* […] *and then eventually if needed define actions on track*" (ART2_SoS2).

Furthermore, exemplary speaking quotes for the leadership behaviour 'Treats people as individuals' are the RTE stating "*Look at it. If it´s too much work, we postpone it to next PI*" (ART1_POSync2) or the PM claiming "*I hear there´s a lot coming up when you´re telling that you are working overtime. Is there something that we can do to help you as a team*?" (ART1_Sync2).

'Emphasises a collective sense of mission' was observed, when for instance the PM indicates "*We can help you. At least our job is to help you, so we try that*" (ART1_Sync2) or the RTE saying "*Something that I asked for is that we would be in the office with the whole train […] to show that we are <ART X>. […] Also, this would be an opportunity to align results with other trains, for which we set up certain days in the office*" (ART2_POSync1).

An exemplary leadership behaviour emphasizing 'Talks enthusiastically about goals' include the RTE saying "*So, be prepared. I will show you the last standings. So, here it is. Well, that´s a surprise, <PO X>*?" (ART1_Sync1).

Speaking quotes for transactional leadership behaviours

As the third most frequently observed leadership behaviour 'Clarifies task responsibilities' belongs to the transactional leadership dimension of Contingent reward. It comes into play mainly by the RTE or the PM guiding their teams on what to do: "*I suggest having a meeting with your group, your local change team to state how far their responsibility reaches*" (ART1_POSync1), or "*That´s why we need a good administration in Jira. If they are linked to a feature, they need to be linked to a feature*" (ART2_POSync2).

The ninth most frequently observed leadership behaviour is another transactional behaviour, namely 'Pays attention to deviations'. This behaviour belongs to the category Management-by-exception (active). Related examples would be the PM indicating "*This is taking a long time. <person X> said, that she´s starting next week. But when I hear this, it doesn't sound like it´s starting next week*" (ART1_POSync1), the RTE stating "*Let´s make clear that we don't have any more capacity. That we have a problem*" (ART1_POSync3) or the SM claiming that "*The difference between the plan and realisation is really far lower than in the beginning of these sprints*" (ART2_SoS1).

Meanwhile, a common observed example for the transactional leadership behaviour of 'Handles complaints' relates to the RTE indicating "*If that is something. in the CMDB, then*

please contact <person X>" (ART1_POSync1) or "*We will make a remark about it to <person Y> this week in our <meeting X>*" (ART1_Sync1). Another example refers to the SA claiming "*The rule is when you have findings that you have not planned, to immediately resolve those, because you´re not complaint*" (ART2_POSync1).

Besides, exemplary speaking quotes that are coded with 'Provides assistance for efforts' are the QCT stating "*If I can give you a hand on that, please let me know*." (ART1_POSync2), the PM saying, "*Do you need help to fill it in*?" (ART2_POSync2) or the RTE claiming "*What I can do is I can give <person X> a call about this and tell we have a serious problem about the approach. Is this something that would help?*" (ART2_POSync4).

Behavioural examples that have been coded with 'Monitoring mistakes' would be the RTE indicating "*Somebody needs to make sure that this is correctly administrated, otherwise it keeps showing up there*" (ART1_Sync1), "*Can you make sure that the tasks indicate that it is implemented by someone and not that it relates to someone?*" (ART1_Sync3) or "*The stories realised in sprint one are missing. You didn't realise anything? I don't believe that*" (ART2_SoS1).

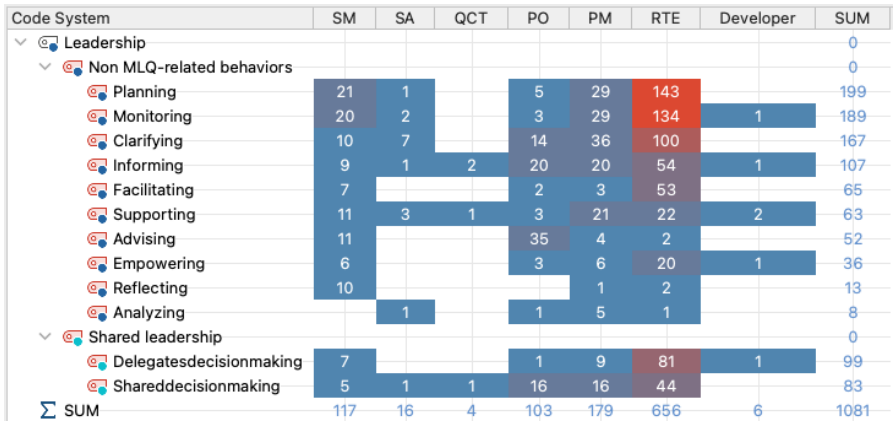
Eventually, examples emphasising the transactional leadership behaviour 'Directs towards failures to meet standards' would be the SM stating "*The longer this drags out the more severe issues going to result, because there´s no dedicated support, no lifecycle-management, nothing done. It´s just a matter of time that things won´t be in support anymore. It just needs to be addressed quickly*" (ART1_Sync3) or the RTE claiming "*I advise to go to <person X> to get it to the list and prioritise this. We cannot do everything right? This is how it goes they need to choose. They cannot say this is a priority and by the way, this one you should also do and coming from another angle. That´s not how it works*" (ART1_POSync2).

5.3.1.2 Distribution of coded leadership dimensions per role

This sub-chapter provides more insights into how often the observed leadership behaviours have been counted per role type in both ARTs. To obtain this data view, each timestamp in the observed video files was coded based on the speaking role. At the same time, each timestamp was coded with a specific or multiple (leadership) behaviours in the case that the behaviour could be interpreted. This procedure allows us to make use of the Code Relations Browser featured my MAXQDA to determine the co-occurrences of each single leadership behaviour and observed role profiles in the informant groups. The resulting visualisations illustrated in the tables 15-18 subsequently indicate the relationship between the leadership

behaviours (shown in the first column on the left) and respectively co-mapped role types (first row from above) in the observed meetings.

Table 15: Non-MLQ related and shared leadership behaviours per role type



Code System	SM	SA	QCT	PO	PM	RTE	Developer	SUM
Leadership								0
Non MLQ-related behaviors								0
Planning	21	1		5	29	143		199
Monitoring	20	2		3	29	134	1	189
Clarifying	10	7		14	36	100		167
Informing	9	1	2	20	20	54	1	107
Facilitating	7			2	3	53		65
Supporting	11	3	1	3	21	22	2	63
Advising	11			35	4	2		52
Empowering	6			3	6	20	1	36
Reflecting	10				1	2		13
Analyzing		1		1	5	1		8
Shared leadership								0
Delegatesdecisionmaking	7			1	9	81	1	99
Shareddecisionmaking	5	1	1	16	16	44		83
SUM	117	16	4	103	179	656	6	1081

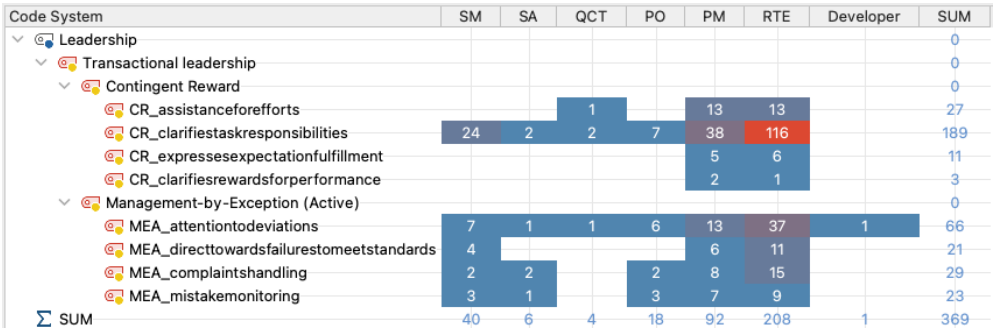
The table depicted above shows the frequency of non-MLQ related and shared leadership behaviours per role type. In this sense, most behaviours of these categories are assigned to the RTE. This role has been predominantly coded with ‘Planning, scheduling, and coordinating activities’, ‘Monitoring progress and quality’ and ‘Clarifying goals, deadlines, and priorities’. This is followed by the shared leadership behaviour ‘Delegating decision-making to others’ as the fourth most observed behaviour, which is also mainly assigned to the role of the RTE.

Table 16: Transformational leadership behaviours per role type

Code System	SM	SA	QCT	PO	PM	RTE	Developer	SUM
Leadership								0
Transformational leadership								0
Idealized Influence (behavior)								0
IIB_collectivesense				1	12	9	1	23
IIB_senseofpurpose			1		5	21		27
IIB_valuesandbeliefs	1			1		6		8
IIB_ethicalmindset					2			2
Idealized influence (attributed)								0
IIA_buildsrespect	6	1			19	10		36
IIA_prideencouraging	4			1	9	17	1	32
IIA_displayssenseofpower	1			1	5	9		16
IIA_goesbeyondselfinterest			1		2	3		6
Individualized Consideration								0
IC_empathic	1	1		2	13	28		45
IC_treatspeopleasindividuals				1	6	18		25
IC_personaldevelopment	1					3		4
IC_coaching	1				1	1		3
Inspirational Motivation								0
IM_talksenthusiasticallyaboutgoals	1			1	3	16	1	22
IM_optimisticaboutthefuture	3					8		11
IM_confidentaboutgoalachievement	1			1		5		7
IM_visionary				1	1	3		5
Intellectual stimulation								0
IS_perspectiveseeking	10			1	5	56		72
IS_creativitystimulating	1		1	1	2	9		14
IS_criticalquestionning	4			1	4	7	1	17
IS_innovativeworking	1			2	2	6	1	12
SUM	36	2	3	15	91	235	5	387

Secondly, the table pictured above indicates the frequency of transformational leadership behaviours per role type. Here one can once again see that this leadership behaviour was predominantly observed in the role of the RTE. The most frequently observed behaviour in this context is ‘Seeking different perspectives when solving problems’ which belongs to the scale of Intellectual Stimulation. This is followed by ‘Considering individuals as having different needs from others’ (coded as empathic) which belongs to the scale of Individualized Consideration (see Table 2).

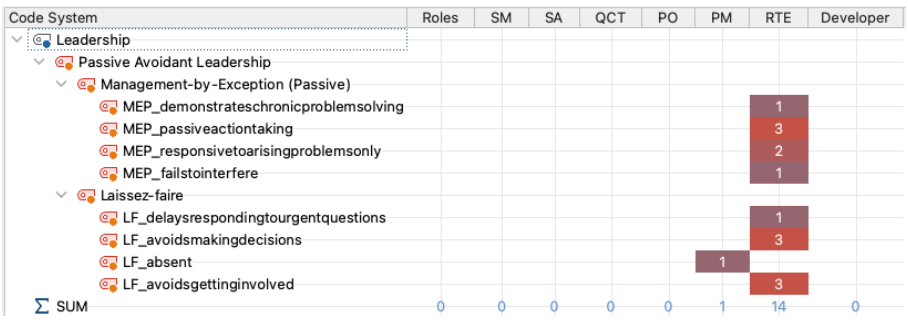
Table 17: Transactional leadership behaviours per role type



Code System	SM	SA	QCT	PO	PM	RTE	Developer	SUM
Leadership								0
Transactional leadership								0
Contingent Reward								0
CR_assistanceforefforts			1		13	13		27
CR_clarifiestaskresponsibilities	24	2	2	7	38	116		189
CR_expressesexpectationfulfillment					5	6		11
CR_clarifiesrewardsforperformance					2	1		3
Management-by-Exception (Active)								0
MEA_attentiontodeviations	7	1	1	6	13	37	1	66
MEA_directtowardsfailurestomeetstandards	4				6	11		21
MEA_complaintshandling	2	2		2	8	15		29
MEA_mistakemonitoring	3	1		3	7	9		23
SUM	40	6	4	18	92	208	1	369

Thirdly, the table presented above displays the frequency of transactional leadership behaviours per role type. Again, most of transactional leadership behaviours are assigned to the RTE. ‘Clarifies task responsibilities’ is the most frequent transactional leadership behaviour in here, which belongs to the scale of Contingent Reward. This behaviour is also the second most frequently observed behaviour in the matrix assigned to the PM.

Table 18: Passive-avoidant leadership behaviours per role type



Code System	Roles	SM	SA	QCT	PO	PM	RTE	Developer
Leadership								
Passive Avoidant Leadership								
Management-by-Exception (Passive)								
MEP_demonstrateschronicproblemsolving							1	
MEP_passiveactiontaking							3	
MEP_responsivetoarisingproblemsonly							2	
MEP_failstointerfere							1	
Laissez-faire								
LF_delaysrespondingtourgentquestions							1	
LF_avoidsmakingdecisions							3	
LF_absent						1		
LF_avoidsgettinginvolved							3	
SUM	0	0	0	0	0	1	14	0

Fourthly, the table shown above provides an overview of the frequency of passive-avoidant leadership behaviours per role type. This behaviour was observed 14 times with the RTE and once with the PM. However due to its underrepresentation a dominant behaviour cannot be derived.

5.3.1.3 Co-occurrence of leadership behaviours

This subchapter aims to illustrate the co-occurrences of leadership behaviours from different leadership categories. The related visualisations depicted in **appendix F** are based on the Code Relations browser featured my MAXQDA, as well. The visualisations represent two different leadership dimensions mapped on each other to display the frequency of the co-occurrences of their respectively assigned behaviours. Subsequently, the most frequent co-occurrences of all combinations of leadership behaviours are depicted.

Non-MLQ related leadership & transformational leadership behaviours

The highest co-occurrence of observed leadership components from the non-MLQ related leadership behaviours and the transformational leadership dimension (from left to right) are the following:

- Monitors progress and quality & Seeks different perspectives: 16
- Plans, schedules and coordinates activities & Seeks different perspectives: 15
- Empowering individuals in making decisions & Encourages pride in others: 10
- Plans, schedules and coordinates activities & Talks enthusiastically about goals: 10

Non-MLQ related leadership & transactional leadership behaviours

The highest co-occurrence of observed leadership components from the non-MLQ related leadership behaviours and the transactional leadership dimension (from left to right) are the following:

- Plans, schedules and coordinates activities & Clarifies task responsibilities: 59
- Monitors progress and quality & Clarifies task responsibilities: 53
- Clarifies goals, deadlines and priorities & Clarifies task responsibilities: 48
- Monitors progress and quality & Pays attention to deviations: 20
- Clarifies goals, deadlines and priorities & Pays attention to deviations: 12
- Clarifies goals, deadlines and priorities & Handles complaints: 11
- Supporting & Assistance for efforts: 11
- Monitors progress and quality & Monitors mistakes: 10

Shared leadership behaviours & other dimensions

The highest co-occurrences of observed leadership components from the shared leadership and the other leadership behaviours (from right to left) are the following:

- Plans, schedules and coordinates activities & Delegates decision-making: 38
- Plans, schedules and coordinates activities & Shared decision-making: 24
- Monitors progress and quality & Delegates decision-making: 18
- Facilitates inter-team communication & Delegates decision-making: 16

- Seeks different perspectives & Delegates decision-making: 16
- Clarifies task responsibilities & Delegates decision-making: 13
- Plans, schedules and coordinates activities & Shared decision-making: 10

Transformational & transactional leadership behaviours

The highest co-occurrences of observed leadership components from the transformational and the transactional leadership behaviours (from left to right) are the following:

- Clarifies task responsibilities & Displays sense of power: 6
- Clarifies task responsibilities & Builds respect for individuals: 5
- Clarifies task responsibilities & Seeks different perspectives: 5

Since co-occurrences between components of passive-avoidant leadership and other leadership categories could only be observed in less than 10 cases and maximum one time per combination, the description for this part has been excluded in here due to its underrepresentation. However, the co-occurrences of this dimension and other leadership dimensions can also be found in **appendix F**.

5.3.1.4 Leadership behaviour per ART

This subchapter aims to illustrate the frequency of leadership behaviours from different leadership dimensions per ART. Related to this, the tables 19-22 shown below indicate the frequency of each leadership behaviour of a certain leadership dimension. Built with the aid of the Code Matrix browser feature provided by MAXQDA the cells in the tables indicate the total frequency of a certain leadership behaviour per ART.

Table 19: Non-MLQ related and shared leadership behaviours per ART

Code System	ART1	ART2	SUM
Leadership			0
Non MLQ-related behaviors			0
Planning	84	113	197
Monitoring	111	77	188
Clarifying	69	97	166
Informing	64	42	106
Facilitating	26	40	66
Supporting	28	35	63
Advising	21	31	52
Empowering	24	12	36
Reflecting	1	12	13
Analyzing	5	3	8
Shared leadership			0
Delegatesdecisionmaking	47	52	99
Shareddecisionmaking	52	31	83
SUM	532	545	1077

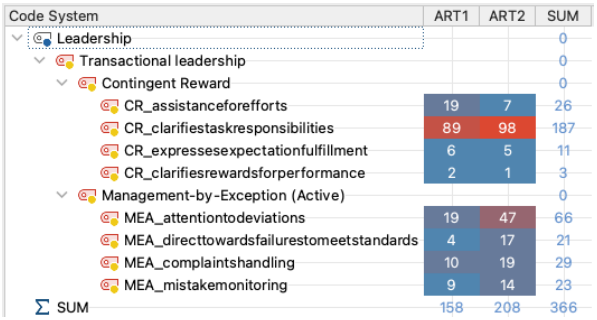
Firstly, the table depicted above shows that the highest frequency of non-MLQ related leadership behaviours in ART 1 is assigned to ‘Monitors progress and quality’, followed by ‘Plans, schedules and coordinates activities’ and ‘Clarifies goals, deadlines and priorities’. Meanwhile, the highest frequency of non-MLQ related leadership behaviours in ART 2 is assigned to ‘Plans, schedules and coordinates activities’, followed by ‘Clarifies goals, deadlines and priorities’ and ‘Monitors progress and quality’. Regarding the shared leadership dimension, the frequency of ‘Delegates decision-making’ is slightly predominant in ART 2, while the frequency of ‘Shared decision making collectively with the team’ is slightly predominant in ART 1.

Table 20: Transformational leadership behaviours per ART

Code System	ART1	ART2	SUM
Leadership			0
Transformational leadership			0
Idealized Influence (behavior)			0
IIB_collectivesense	20	3	23
IIB_senseofpurpose	14	13	27
IIB_valuesandbeliefs	2	6	8
IIB_ethicalmindset	2		2
Idealized influence (attributed)			0
IIA_buildsrespect	25	11	36
IIA_prideencouraging	22	10	32
IIA_displayssenseofpower	7	9	16
IIA_goesbeyondselfinterest	4	2	6
Individualized Consideration			0
IC_empathic	23	21	44
IC_treatspeopleasindividuals	14	10	24
IC_personaldevelopment	1	3	4
IC_coaching	1	2	3
Inspirational Motivation			0
IM_talksenthusiasticallyaboutgoals	12	10	22
IM_optimisticaboutthefuture	4	7	11
IM_confidentaboutgoalachievement	2	5	7
IM_visionary	2	3	5
Intellectual stimulation			0
IS_perspectiveseeking	34	38	72
IS_creativitystimulating	7	7	14
IS_criticalquestionning	3	14	17
IS_innovativeworking	4	8	12
SUM	203	182	385

Secondly, the table presented above indicates that the highest frequencies of transformational leadership behaviours in both ARTs are assigned to ‘Seeking different perspectives, when solving problems’. The second highest frequency in ART 1 is assigned to ‘Builds respect for individuals’, followed by ‘Shows empathy for individuals’. The later one is the second most common one in ART 2 and ‘Critical questioning of assumptions’ is the third most common one in ART 2.

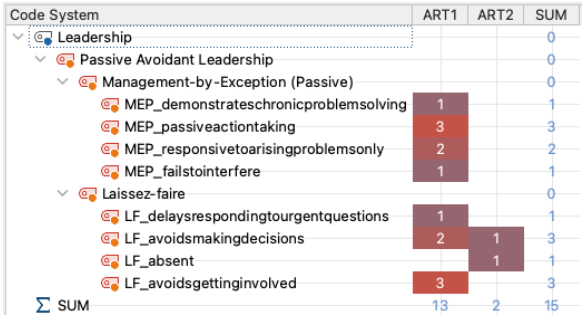
Table 21: Transactional leadership behaviours per ART



Code System	ART1	ART2	SUM
Leadership			0
Transactional leadership			0
Contingent Reward			0
CR_assistanceforefforts	19	7	26
CR_clarifiestaskresponsibilities	89	98	187
CR_expressesexpectationfulfillment	6	5	11
CR_clarifiesrewardsforperformance	2	1	3
Management-by-Exception (Active)			0
MEA_attentiontodeviations	19	47	66
MEA_directtowardsfailurestomeetstandards	4	17	21
MEA_complaintshandling	10	19	29
MEA_mistakemonitoring	9	14	23
SUM	158	208	366

Thirdly, the table displayed above emphasises that the highest frequency of transactional leadership behaviours in both ARTs is assigned to ‘Clarifies task responsibilities’. In ART 2, this behaviour is followed by ‘Pays attention to deviations’, while in ART 1 ‘Pays attention to deviations’ and ‘Provides assistance for efforts’ share the second highest frequency. The third highest transactional leadership behaviour is in both ARTs assigned to ‘Handles complaints’.

Table 22: Passive-avoidant leadership behaviours per ART



Code System	ART1	ART2	SUM
Leadership			0
Passive Avoidant Leadership			0
Management-by-Exception (Passive)			0
MEP_demonstrateschronicproblemsolving	1		1
MEP_passiveactiontaking	3		3
MEP_responsivetoarisingproblemsonly	2		2
MEP_failstointerfere	1		1
Laissez-faire			0
LF_delaysrespondingtourgentquestions	1		1
LF_avoidsmakingdecisions	2	1	3
LF_absent		1	1
LF_avoidsgettinginvolved	3		3
SUM	13	2	15

Fourthly, the table described above reveals that the highest frequency of passive-avoidant leadership behaviours. The two most frequent behaviours in this dimension are assigned to ‘Passive action taking’ and ‘Avoids getting involved’ in ART 1, followed by ‘Responsive to arising questions only’ and ‘Avoids making decisions’. In ART 2 only two passive avoidant leadership behaviours have been counted once each, namely ‘Avoids making decisions’ and ‘Is absent when needed’.

5.3.1.5 Leadership behaviour per meeting type

This subchapter aims to demonstrate the frequency distribution of the different leadership behaviours per meeting type. Related to this, the tables referenced in **appendix H** give an overview of these distributions. Regarding the non-MLQ related leadership behaviours,

it can be noted that ‘Plans, schedules and coordinates activities’ is the most common one in both PO Syncs and SDs, the behaviour ‘Monitors progress and quality’ the most frequent one in ART Syncs, and eventually the behaviour ‘Clarifies goals, deadlines and priorities’ the most common one in SoSs. Furthermore, when looking at the transformational leadership dimension, the numbers indicate that ‘Seeking different perspectives when solving problems’ is the most dominant behaviour in ART Syncs, PO Syncs and SoSs. Meanwhile, ‘Encourages pride in others’ is the most common leadership behaviour in SDs. Besides, the distribution view of the transactional leadership dimension reveals that the behaviour ‘Clarifies task responsibilities’ is the most observed leadership behaviour in all the meeting types. Eventually, passive avoidant leadership behaviours have only been observed in ART Syncs and PO Syncs. Related to that, ‘Passive action taking’ is the most counted behaviour in ART Syncs, while both ‘Responsive to arising problems only’ and ‘Avoids getting involved’ are the most frequent behaviours in PO Syncs.

5.3.2 Leadership outcomes

This sub-chapter aims to provide insights into the behaviours that followed the practice of a particular leadership behaviour in the observed informant groups. To determine this trigger-outcome relationship, a complex coding query was applied via MAXQDA by iterating over each defined leadership dimension and outputting the frequency of every coded behaviour that was triggered as a response to a specific leadership behaviour practised. In this regard, the tables referenced in **appendix E** represent for each leadership behaviour the frequency of occurrence of each behaviour that was part of a timestamp in the observed video files that followed a timestamp to which the triggering leadership behaviour was assigned. The dark blue columns represent the leadership behaviours, and the light blue columns illustrate the behavioural responses which were triggered by a certain leadership behaviour.

Firstly, when looking at Table 23**,** one can see the outcomes of non-MLQ related leadership behaviours. Here, it is noticeable that the most common behavioural response that followed when a person practised the leadership behaviours ‘Planning, scheduling and coordinating activities’, ‘Monitoring progress and quality’ and ‘Clarifies goals, deadlines and priorities’ was another person exhibiting transactional leadership behaviours. Meanwhile, when a person practised the leadership behaviours ‘Informing about general topics of relevance’, ‘Supporting people with stressful situations, ‘Advising on how to manage tasks and planning, ‘Empowering individuals in making decisions’, ‘Facilitating inter-team communication’ or ‘Reflecting on experience to stimulate feedback’ this resulted mostly in

another person practising transformational leadership behaviours in each case. The most non-leadership related behavioural reaction that was observed as a result from a person practising the leadership behaviours 'Planning, scheduling and coordinating activities, 'Monitoring progress and quality, 'Informing about general topics of relevance', 'Facilitating inter-team communication' and 'Reflecting on experience to stimulate feedback' was another person clarifying his or her task status. Meanwhile, the most common non-leadership related behavioural response related to a person that practised the leadership behaviour 'Supporting people with stressful situations' was another person clarifying his or her needs that need to be fulfilled towards the team. Besides, when a person applied the leadership behaviour 'Advising on how to manage tasks and planning activities' this mostly led to another person judging and openly talking about current issues as the most frequent non-leadership related response. And the most frequently observed non-leadership related outcome of a person practising the leadership behaviour 'Empowering individuals in making decisions' was another person providing more clarity about how tasks are coordinated and implemented.

Secondly, the analysis of behaviours that were triggered by MLQ-related leadership behaviours (see Table 24) reveals that the most common outcome of a person practising a transformational leadership behaviour was another person responding with practising a transactional leadership behaviour. And the most common response to a person applying transactional leadership behaviours was another person exhibiting the leadership behaviour 'Clarifying goals, deadlines and priorities'. When a passive avoidant leadership behaviour was observed, the most frequently following reaction was another person revealing a transactional leadership behaviour. Thus, similarly to the reactions of non-MLQ related leadership behaviours, all the MLQ-related leadership behaviours observed in a person resulted mostly in other people exhibiting leadership behaviours, as well. On the other hand, the most common non-leadership related behaviour triggered by a person practising transformational or transactional leadership behaviours was another person clarifying the status of respectively assigned tasks. Contrary, the most common reaction of people to a person leading passive-avoidant was judging and openly sharing their opinions about current issues.

Eventually, the outcomes of shared leadership behaviours (see Table 25) reveal that the practice of 'delegating decision-making' or 'sharing decision-making' with the team mostly led to another person showing a leadership behaviour of 'Planning, scheduling and coordinating activities'. Meanwhile, the most common non-leadership related outcome of a person 'sharing decision-making' or 'delegating decision-making' was another person clarifying the status of assigned tasks that the person is working on.

CHAPTER 6

6. DISCUSSION

This chapter reflects on the research findings depicted in the chapter above. Initially, the key insights from the comparison of the qualitatively assessed leadership behaviours with the informants survey self-assessments are briefly presented. We then elaborate on the qualitative observations to reveal how leadership is practised in the informant groups. Furthermore, this chapter aims to answer how the applied leadership behaviours are linked to the leadership frameworks presented in the literature review, and we discuss the impact of the leadership behaviours practised on the teams observed. In addition to that, this chapter takes up the evaluations of the surveys in order to assess them in terms of their relationship to the identified leadership behaviours. Next, the results of this work are critically evaluated with respect to the research questions, against the background of the scientific foundations presented, to provide an outlook on how our findings contribute to academia. Lastly, the limitations of this study are highlighted, and we provide a possible research agenda to follow up on the results of this work.

6.1 Key findings

When comparing the results of the MLQ-related leadership dimensions between the observations of the informant groups and the self-perceived leadership behaviours of the participants in the surveys, both method results confirm that overall transformational leadership is applied slightly more than transactional leadership in the sum of both ARTs and that passive-avoidant leadership plays only a minor role in terms of its application. It should be emphasised, however, that in the qualitative observations we also mapped leadership behaviours that could not be clearly assigned to the MLQ-dimensions and for which we established further leadership dimensions. Given that the comparison depicted above therefore does not fully reflect all of the leadership behaviours which were applied in the informant groups, in the following sub-chapter, we will discuss the qualitative findings in a little more detail to better understand how they impacted our assessment of the leadership behaviours practised in the ARTs.

6.1.1 Linkage between observed leadership and leadership frameworks

This sub-chapter aims to provide insights into observed leadership behaviours and how they are linked to the three major leadership frameworks discussed in this work, respectively

the MLQ-dimensions which are based on the full-range leadership theory (Avolio & Bass, 1991), the dimensions of task-oriented and relations-oriented leadership which are based on the HTLB established by (Yukl, 2012) and the theory of shared leadership (Gockel & Werth, 2011) discussed in chapter 2.1.4.

Observed leadership behaviours not inspired by the MLQ

During the qualitative observations we established two leadership dimensions in our coding framework in addition to the coding set which was inspired by the MLQ-dimensions. One of the newly defined dimensions was named as "*Non MLQ-related leadership behaviours*". The respectively assigned behavioural coding items are mainly inspired by the coding guideline established by (Yukl, 2012) (see **appendix C**). The second newly defined leadership dimension was named as "*Shared leadership*". As the name already indicates it was inspired by the theory of shared leadership.

In particular, the results for the non-MLQ related leadership behaviours observed played a significant role in the case study organisation with a predominant coding percentage of 48,56% compared to other established leadership dimensions (see Figure 16). This dimension includes not only leadership behaviours that were associated with the coding guideline by (Yukl, 2012), but also newly identified leadership behaviours. These behaviours encompass 'Reflecting on experience to stimulate feedback', 'Facilitating inter-team communication', 'Advising on how to manage tasks and planning', 'Informing about general topics of relevance', and 'Analysing progress statuses'. In the following, we will elaborate on these observations.

'Reflecting on experience' is a behaviour that predominantly arised during the observations of the SoS-meetings (see Table 35). Exemplary examples would be a SM indicating, "*What we always try to find out when we have those vital changes is what relation will be changed and if possible, directly test it after the change and then they can do some tweaks. I don't know if it´s possible for you?*" (ART2_SoS2) or "*I am a bit struggling with something that you guys might struggle with, as well. It concerns the tracking of story points when they can´t be done in a sprint. How are you dealing with it? Please elaborate on it and feel free to discuss it with me"* (ART2_SoS3).

Even though the behaviour 'Reflecting' only holds a share of 0,71% it can be noted that it might be essential, since it stimulated a constructive discussion in the respective meetings. However, one can debate if it cannot simply be merged with the relations-oriented leadership

behaviour of ‘Supporting people with stressful situations’ as proposed by (Yukl, 2012) or the transformational leadership behaviour ‘Seeking different perspectives when solving problems’, since the characteristics of these behaviours have a strong similarity. The observation of ‘Reflecting’ links very well to prior academic works emphasising periods of “*thought-action reflection that foster an environment of learning and adaptation*” (Nerur & Mahapatra, 2005) as an important indicator in agile environments. The behaviour ‘Reflecting’ was mainly related to SMs reflecting on their experiences of overcoming specific project management challenges in order to help others with similar challenges, or people who practised this behaviour expected to receive feedback from others on similar experiences in order to overcome their own challenges. Furthermore, for the identified behaviours ‘Facilitating inter-team communication’ and ‘Advising on how to manage tasks and planning’ which hold a share of 5,75% and 2,82% one can derive a tendency that these behaviours may be either task-oriented leadership behaviours or transactional leadership behaviours due to their strong focus on achieving a common understanding of task-related activities in the team. ‘Facilitating’ was mainly observed in the RTE (see Table 15) and it depicts a leadership behaviour where a person intends to stimulate communication and collaboration between teams by moderating a meeting and engaging team members to ask open questions or share general task-related thoughts. An exemplary speaking quote for this behaviour would be the RTE asking into the general round: “*Are there any other questions for <PO X> or <PO Y>? No questions?*” (ART1_SD). Meanwhile, ‘Advising’ was predominantly observed in POs. As the name already suggests it was mainly related to people advising others on how to perform certain tasks, for instance by guiding them through work-related activities to provide a better understanding. An exemplary speaking quote for this behaviour would be a PO addressing the RTE and saying, “*If you are going to mention it <RTE X>, one of the arguments you can also use is that my team has a huge impact on other teams, as well. So, we really need to test thoroughly, otherwise other teams might not be able to deploy anymore*” (ART2_POSync4). Also, for the leadership behaviour ‘Informs about general topics of relevance’ which holds a share of 5,75% it can be assumed that it is related to task-oriented leadership behaviours. This behaviour was observed when people coordinated ongoing cross-team administrative topics by explaining organisational and task-related contexts to enable a better understanding of specific topics. An empirical example would be the RTE updating the SMs about topics from other meetings: “*Maybe good to know, we discussed the network implementation yesterday in <meeting X> and they said they will continue it as a pilot, so based on the learnings they will ask other teams to continue with it. That´s why I also cancelled the other meetings because they will continue*

on a small-scale, asking four or five teams to pick this one up" (ART2_SoS1). Eventually, 'Analysing progress statuses' relates to situations in which leading positions actively analyse live demos of systems or presentations (e.g., ART1_SD, ART1_Sync1, ART2_POSync4) and comment on their thoughts to trigger quality-related feedback reactions in the round. However, due to its strong similarity with the leadership behaviour 'Monitors progress and quality' one can exclude it from further discussions regarding any relevance.

Moreover, as already indicated above this study came up with independently developed leadership behaviours that were either directly linked to the HTLB established by (Yukl, 2012) nor the MLQ that (Avolio & Bass, 1991) proposed based on the full-range leadership theory. These behaviours include 'Shared decision-making' and 'Delegates decision-making' which together form the dimension shared leadership. The behaviour 'Shared decision-making' refers to situations in which leading positions share an opinion or propose a decision regarding certain activities and ask others for their approval to make sure that decisions are communicated and made collectively with the team. Example quotes for this behaviour relate to the PM addressing the RTE to make a decision collectively: "*That is something I gonna discuss with <person X>, or <RTE X> is this something you need to discuss*? *What´s wise?*" (ART1_POSync1), or "*Are you okay with it when we put the task on ready then*?' (ART1_Sync1). Meanwhile, 'Delegates decision-making' for instance refers to behaviours whereby a certain team member is addressed with the question if he or she wants to share anything without specifically being expected to share anything. An example of 'Delegates decision-making' would be the RTE leaving the decision how to proceed the meeting or with certain actions to the group or certain group members: "*Shall we just do a round and then discuss whatever needs to be discussed*?" (ART1_POSync2), "*<PO X>, anything you want to share*?" (ART1_POSync3), "*<PO X>, do you want to start with this task during this PI or not*?" (ART2_POSync1). It is assumed that when the person which practises the behaviour 'Delegates decision-making' addresses a specific person it is driven by the motivation that the addressed person holds the contextually most appropriate knowledge to discuss the decisions to be made related to a problem at hand (Langfred, 2000).

Linkage between observed behaviours and MLQ-dimensions

It stands out that only one of the top seven most observed leadership behaviours was directly linked to the coding set, which is based on the MLQ-framework (see Table 14). However, it needs to be noted that frequently the non-MLQ related leadership behaviours were

coded in combination with behaviours that were also assigned to the MLQ-leadership dimensions, particularly to the transactional leadership dimension (see chapter 5.3.1.3). Related to the findings depicted above, (Yukl, 2012) also emphasises that the HTLB, which maps some of the observed non-MLQ related leadership behaviours, can be utilised to expound behaviours that the transformational and transactional leadership taxonomies do not map. This suggestion was also the indicator why two different leadership frameworks were used for this study. For some observed behaviours, one of the used frameworks suited the context better than the other one. And as already indicated, for some observations both frameworks were suitable to map a certain observed behaviour. Regarding this, (Yukl, 2012) highlights that there is a strong connection between relations-oriented leadership behaviours as per the HTLB and the MLQ-dimension of transformational leadership as well as between task-oriented leadership behaviours and the MLQ- dimension of transactional leadership. For instance, with a predominant percentage of over 20% the leadership behaviours 'Plans, schedules and coordinates activities' and 'Monitors progress and quality', which were labeled as task-oriented leadership behaviours clearly dominate the observed meetings. However, these behaviours can be also related to the transactional leadership dimension as suggested by (Bass, 1985). In this manner, 'Plans, schedules and coordinates activities' relates to situations where a person coordinates and schedules project activities and identifies upcoming milestones to efficiently utilise (human) resources. An exemplary speaking quote would be: "*Let´s make a quick round and see what´s happening"* (ART1_POSync1, ART2_POSync5), or "*Let´s go through the matrix team by team first and then we go through the KANBAN board*" (ART2_SoS1). While the task-oriented leadership behaviour 'Monitors progress and quality' refers to situations where a person reviews task-related quality and progress to evaluate the performance of other team members. Exemplary speaking quotes would be: "*Any updates about Sprint 4? Anything to say about some features?*" (ART1_Sync2), or "*Does that mean that you have finished one of the first features that you came up with this high?*" (ART1_Sync1).

As the most observed leadership behaviour directly associated with the MLQ-dimensions the behaviour 'Clarifies task responsibilities' holds a percentage of 10,15% of all observed leadership behaviours. It belongs to the transactional leadership dimension of Contingent reward and relates to leadership behaviour emphasising clarification of role and task requirements (Antonakis, Avolio, & Sivasubramaniam, 2003). It comes into play mainly by the RTE or the PM guiding their teams on what to do: "*I suggest having a meeting with your group, your local change team to state how far their responsibility reaches*" (ART1_POSync1), or "*That´s why we need a good administration in Jira. If they are linked to*

a feature, they need to be linked to a feature" (ART2_POSync2). On the other hand, the leadership behaviour 'Seeking different perspectives when solving problems' is the most observed transformational leadership behaviour. It belongs to the category Intellectual Stimulation, which emphasises leader actions intending to challenge others' creative thinking to solve difficult problems (Antonakis, Avolio, & Sivasubramaniam, 2003). It is mostly used by the RTE or SMs to stimulate other people to bring in their ideas on possible solutions and issues discussed: "*If you have any ideas what you want to bring to the table, what could be interesting for our customers of course, please let me know*" (ART1_Sync1). With a percentage of almost 30% in comparison to the presence of other transformational leadership dimensions, Intellectual stimulation is the most represented category of the transformational leadership dimension in the qualitative observations. However, it was only coded about half as often (50,66%) as the transactional leadership category of Contingent reward described above, which marks the most predominant MLQ-leadership dimension observed in the case study organisation.

Looking more closely at the MLQ-leadership dimensions discussed and reflecting them on the behavioural recommendations that (Theobald, Prenner, Krieg, & Schneider, 2020) presuppose for agile leaders, our observations reveal a connection between the MLQ-dimensions and these behaviours recommended for agile leaders. In the following paragraph we are going to elaborate on identified behaviours practised in the ARTs which represent this relationship.

In this regard, (Theobald, Prenner, Krieg, & Schneider, 2020) assume that agile leaders need to display a set of behaviours, including continuously communicating a vision, defining purposes, and motivating team members, both individually and through team communication. When we consider these behaviours against the background of the leadership frameworks presented in this study, it stands to reason that these behaviours are mainly associated with transformational leadership behaviours. The associated behaviours are ranked somewhere in the middle between position 18 and 36 out of 48 observed leadership behaviours (see Table 14). The specifically related transformational leadership behaviours are 'Provides a sense of purpose' (share of 1,47%) from the category Idealized Influence and four behaviours from the category Inspirational Motivation, namely 'Talks enthusiastically about goals' (share of 1,19%), 'Talks optimistically about the future' (share of 0,60%), 'Confident about goal achievement' (share of 0,38%) and 'Visionary about the future' (share of 0,27%). Thus, with a common share of 3.91% of all leadership behaviours observed, one can conclude that it was

challenging to identify the leadership behaviours depicted above in the informant groups, and it is therefore not entirely clear what the share of these behaviours indicates about how the observed teams are to be evaluated with regard to the recommended agile leadership behaviours discussed.

In this paragraph we are going to illustrate some examples related to the behaviours listed above. Exemplary speaking quotes for 'Talks optimistically about the future' relate to statements such as "*I am sure that they will approve it, but we need to say there is something about having a plan to hand this over*" (ART2_POSync2). Furthermore, speaking quote examples related to 'Confident about goal achievement' would be "*Let me say I think we will get it through, if he says he hands over his tasks to <team X>"* (ART2_POSync2), or "*Let´s have a look at the IT maturity dashboard […] This is looking very good, I must admit. <X percent> of the vulnerabilities are managed*" (ART1_Sync3). An exemplary quote related to the behaviour 'Visionary about the future' would be: "*There are a lot of opportunities still ahead, right*?" (ART1_SD).

Furthermore, other leadership behaviours which are considered relevant in agile environments according to (Leffingwell, 2010) are the behaviours of rewarding innovative working approaches and risk-taking when team members solve challenging problems to help them developing their knowledge and skills. Also, (Leffingwell, 2010) stresses that leaders need to show empathy and provide assistance when team members make mistakes. This includes behaviours of empowering and coaching them to stimulate self-management. The observed leadership behaviours from our coding set that can be associated with these considerations are 'Supporting people with stressful situations' (share of 3,42%), 'Advising on how to manage tasks and planning' (share of 2,82%), 'Showing empathy for individuals' (share of 2,39%), 'Empowering individuals in making important decisions' (share of 1,95%), 'Suggesting innovative ways of working' (share of 0,65%) and 'Spending time coaching' (share of 0,16%). Thus, the relations-oriented leadership behaviours of 'Supporting' and 'Empowering' (see Table 3), 'Advising' (independently developed task-oriented leadership behaviour) and the transformational leadership behaviour 'Shows empathy' are fairly present with together a total percentage of 10,58%, ranked in the top third most observed behaviours. Meanwhile, for the transformational leadership behaviours 'Innovative working' and 'Spends time coaching' that hold a share of 0,81%, it can be noted that it was difficult to identify these behaviours which are stressed by (Leffingwell, 2010) as important components of leading in agile environments. Subsequently, empirical examples are given to indicate how the leadership behaviours depicted above were practised.

Exemplary speaking quotes emphasising behaviours of 'Supporting' would be "*You can use me for escalation, so I can do that. Just drop me an email and I will get in contact with the stakeholders, as well*" (ART1_POSync3). While the behaviour 'Shows empathy for individuals' comes to the fore through the RTE connecting to addressed frustrations from team members with understanding: "*I can imagine. But if we spent all the hours, then that´s it what it is right now. And if it´s not good enough, let´s make clear that we have a capacity issue there*" (ART1_POSync3) or a PO acting with empathy on behalf of a team member "*She doesn't have the capacity and she doesn't expect to have the capacity any time sooner*" (ART2_POSync3). Furthermore, a quote example for the behaviour 'Empowering' is related to the RTE claiming, "*You know we have a lot of slots. If you want two slots, that´s also possible. Don´t limit yourself in this brainstorming phase*" (ART1_POSync3). Meanwhile, an exemplary quote related to the behaviour 'Suggests innovative way of working' would be "*We also have a meeting with <person X> just to discuss how nice it would be if we would have an <ART X> running for our firm so that we can easily plan things with them, too. So, they would be in the same heartbeat, the same rhythm and the same cadence […] I think that would make things better*" (ART2_SoS1). Eventually, the behaviour 'Spends time coaching' was for instance captured, when an RTE claims, *"The question is about how big you make this. If you can limit the implementation to a very small part of your customer, then the risk is not that big. That´s how you can manage this, of course"* (ART1_POSync2).

Most of the behaviours presented in this section and the section above were linked to one of the established leadership frameworks presented in this study based on the full-range leadership theory or the HTLB. In the following two sections we are going to depict the behaviours that relate to leadership theories for which no predetermined frameworks were given in more detail.

Interplay of practised leadership behaviours and linkage to shared leadership

Our findings can be linked to the concept of shared leadership which emphasises the idea of self-organised teams and discourages the idea of one central leader in agile environments (Stettina & Heijstek, 2011) (Moe, Dingsyr, & Kvangardsnes, 2009). It comes into play in the case study (see chapter 5.3.1.2), even though the behaviours associated with the created dimension of shared leadership only takes in about 10% of the observed leadership behaviours. The results from the qualitative observations have shown that the teams organised themselves in diverse constellations of leadership applications, an observation that also

(Cockburn & Highsmith, 2001) highlight by claiming that leadership roles are far less transparent and delegated within and across teams in agile teams. This pattern could be mostly observed in the SoS-meetings, in which one could see a constant shift between leading roles during the meetings. This means that in each of these meetings, different individuals emerged as more present leaders compared to others. Furthermore, it was also noticeable that during the SDs (e.g. ART1_SD) we could observe a trend of different developers emerging as transformational leaders through behaviours of critically reflecting on each other's solutions to stimulate innovative ways of working, talking enthusiastically about goals or emphasising a collective sense of mission.

The observations discussed above support the assumption that leadership can be practised by any team member (Moe, Dingsyr, & Kvangardsnes, 2009) (Gockel & Werth, 2011), based on an ongoing role-exchange process (Dansereau, Graen, & Haga, 1975). In addition, our observations also revealed a frequent distribution of leadership behaviours associated with all of the leadership dimensions presented in this study across different roles (see chapter 5.3.1.2), thus emphasising the practice of leadership as a shared function. One example illustrating this observation is that leading roles such as the RTE or PM often clarify task responsibilities and sprint deadlines, however not individually, but together with the collective: "*That is something I gonna discuss with <person X>, or <RTE X> is this something you need to discuss*? *What´s wise?*" (ART1_POSync1), "*Are you okay with it when we put the task on ready then*? (ART1_Sync1), or "*I advise to go to <person X> to get it to the list and prioritise this. We cannot do everything right? This is how it goes they need to choose*" (ART1_Sync1). In this manner, people continuously ask if the team members agree with suggestions on planning activities. The observations depicted above are a good example of (Moe, Aurum, & Dybå, 2012) theory that shared leadership does not ask for the whole team to be involved in decision-making, but that it is at least necessary to communicate made decisions to the whole team. From these observations one can also conclude that team members are treated as equally powerful and knowledgeable employees rather than subordinate team members. Several times, people are explicitly asked for their approval when it comes to making decisions about respectively assigned tasks by the leading roles: "*Have you tried to stress it? What is actually the load that you can handle?*" (ART1_SD).

Prior assumptions indicating that leadership tends to be shared among the team members in an agile environment (Moe, Dingsyr, & Kvangardsnes, 2009) are also strengthened by the fact that we often observed combinations of shared leadership behaviours and behaviours associated with the other presented leadership dimensions in the informant groups

such as the task-oriented leadership behaviour ‘Planning, scheduling and coordinating activities’ and the shared leadership behaviours ‘Shared decision-making’ or ‘Delegates decision-making’ (see chapter 5.3.1.3). These examples also highlight that collaborative decision-making skills as highlighted by (Nerur & Mahapatra, 2005) to be an essential factor for agile development, are fairly present in the observations.

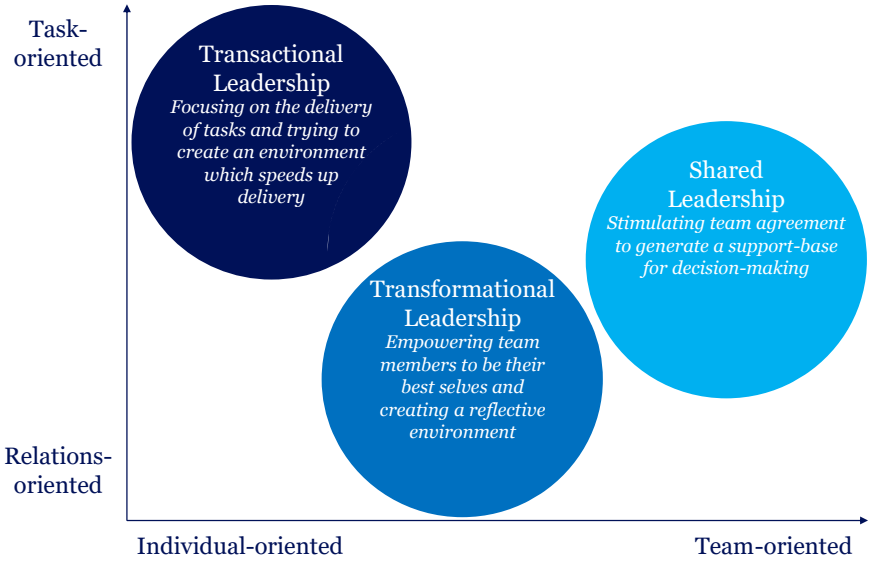
Linkage between observed behaviours and servant leadership

In some situations, it could be observed that leading positions were asking the team members on how they can help others independently of a certain task assignment. Exemplary examples would be the RTE claiming, “*Anyone having any open questions for me? Is everything clear to you? Any other business to discuss?*”. This kind of behaviour was primarily coded with the relations-oriented leadership behaviour ‘Supporting’ or the shared leadership behaviour ‘Delegates decision-making’. However, one could also debate a connection of this kind of behaviour to the theory of servant leadership, which was not discussed during this work. As the name already indicates the theory of servant leadership emphasises that it should be a leaders’ intent to mainly serve others by devoting great attention to the team members´ needs, sharing power, and helping them in their development and performing as highly as possible (Sendjaya & Sarros, 2002). But since servant leadership is yet regarded a novel research field for scientists (Van Dierendonck, 2011), particularly yet lacking descriptive empirical research (Whetstone, 2002) as well as validated measures to identify related behaviours (Antonakis, Ashkanasy, & Dasborough, 2009) it has not been incorporated into this work.

Indications on the relationship between explored leadership theories

Based on the qualitative exploration of the leadership theories in the context of the observations of this work, the figure below shows the assumed relationship between the major leadership theories discussed. In this regard, we believe that the investigated leadership theories of transactional, transformational and shared leadership can be mapped onto two dimensions to outline their relationship to each other.

Figure 19: Relationship between explored leadership theories



Looking at the figure depicted above, the horizontal axis represents the contrast between leadership behaviours that tend to be directed at individuals of the team and leadership behaviours that are addressed to the team as a whole. In this regard, transational leadership was positioned on the left side, since we observed that the practice of related leadership behaviours was mostly addressed towards individuals, for instance by leaders monitoring the task progress of individuals and clarifying respective task responsibilities. In contrast, we positioned shared leadership on the right side, since underlying behaviours were mainly directed towards the team as a whole, for example by individuals aiming to stimulate the collective to discuss proposed ideas and decision proposals regarding the management of tasks. Furthermore, we placed transformational leadership in the centre on the horizontal axis. On the one hand, it entails leadership behaviours that are addressed towards individuals such as spending time on coaching them or showing empathy and paying attention to their needs. On the other hand, the practice of transformational leadership reveals behaviours intended to reach the whole group, for instance by individuals communicating a collective sense of mission or seeking different perspectives when solving problems. When looking at the vertical axis, we scaled the explored leadership behaviours onto task-oriented and relations-oriented leadership behaviours. As already discussed earlier, there is a strong association between task-oriented leadership behaviours and transactional leadership behaviours as well as between transformational leadership behaviours and relations-oriented leadership behaviours. Therefore, transactional leadership was placed at the top and transformational leadership at the bottom of the figure.

However, the figure also shows that we positioned shared leadership in the centre of the vertical axis. This representation is based on the assumption that we believe that shared leadership behaviours entail both task-oriented and relations-oriented leadership incentives. On the one hand, this is due to the incentives of shared leadership behaviours to reach team agreement through collective decision-making processes, and thus acknowledging people´s contributions by empowering them and making them feel respected and integrated as a person (relations-oriented leadership behaviour). On the other hand, we assume that people who practised shared leadership behaviours intend to leverage all information and human resources in order to manage tasks in an efficient and effective manner (task-oriented leadership behaviour).

6.1.2 Indications on impact of assessed leadership behaviours

The sub-chapter above focused on discussing what leadership behaviours were mainly practised in the informant groups studied and how their behaviours are linked to established leadership frameworks and underlying theories. Meanwhile, this sub-chapter provides further insights into the impact of the leadership behaviours assessed on the teams observed and how contextual factors such as the perceived agile maturity level or the characteristics of the meeting types observed may be related to our findings.

Survey indications on perceived leadership outcomes and associated drivers

When looking at the perceived outcomes of leadership as measured by the MLQ (see chapter 5.2.1), it can be noted that the participants of both ARTs believe that their leadership behaviour is ‘fairly often’ perceived as satisfying and as being effective by other team members. Also, regarding the perceived level of teamwork quality (see chapter 5.2.3) which was measured as per the teamwork quality construct by (Hoegl & Gemuenden, 2001) the data reveal that most of the participants of both ARTs state that they ‘tend to agree’ that their teams indicate highly collaborative behaviours (Hoegl, Parboteeah, & Gemuenden, 2003). Similarly, for the assessments of team performance and personal success, most of the participants of both ARTs ‘tend to agree’ that the results of their ARTs can be considered both effective and efficient, and that their ARTs allowed them to acquire important know-how and that they could draw a positive balance for themselves. Considering the assessments on perceived leadership outcomes, teamwork quality, team performance and personal success indicated above and the fact that the participants rated their leadership behaviour to be slightly more transformational compared to the other MLQ-dimensions (see chapter 5.2.1), one may draw the tendency that

transformational leadership behaviours may be a slightly higher driver of the positive working environment in the observed ARTs. However, since we did not measure any statistical correlations between the variables leadership behaviour, leadership outcomes, teamwork quality, team performance and personal success in the survey assessments, we cannot validate this assumption. Nonetheless, we know that former works emphasise a positive relationship between transformational leadership and agile teams (van Kelle, Visser, Plaat, & van der Wijst, 2015) (Moe, Dingsyr, & Kvangardsnes, 2009). These studies, however, only considered the MLQ-dimensions to measure this relationship. While we also considered other leadership frameworks such as the HTLB by (Yukl, 2012) and an independently developed framework inspired by the theory of shared leadership (Gockel & Werth, 2011) to assess this relationship in the observations of this study. In this regard, to better understand how the leadership behaviour dimensions of the leadership frameworks utilised in the observations are related to the observed teams, the following section will discuss the qualitatively observed behavioural reactions related to the practice of specific leadership behaviours in a little more detail.

Indications on observed leadership and associated behavioural reactions

In this section we are going to elaborate on the qualitatively observed behavioural reactions related to the practice of specific leadership behaviours. Initially, a closer look at the qualitatively observed leadership outcomes presented in **appendix E** reveals that when people practised leadership behaviours, this observation was mostly directly followed by the observation of other people practising leadership behaviours, as well. For instance, in situations in which a leader applied a transformational leadership behaviour, the most frequently following reaction was another person practising transactional leadership behaviours or task-oriented leadership behaviours such as ‘Planning’ and ‘Clarifying’. Furthermore, when individuals practised the non-MLQ related leadership behaviours ‘Supporting’, ‘Empowering’, ‘Reflecting’, ‘Advising’, ‘Facilitating’ and ‘Informing’ this predominantly led to other team members reacting with transformational leadership behaviours. Meanwhile, people that showed leadership behaviours of ‘Planning, ‘Monitoring’ or ‘Clarifying’ predominantly led to other team members reacting with transactional leadership behaviours. The observations depicted above indicate a constant switch of different people emerging as leaders and applying different types of leadership behaviours. Thus, one can see that the idea of shared leadership which is associated with agile operating teams (Stettina & Heijstek, 2011) clearly challenges established leadership theories (Moe, Dingsyr, & Kvangardsnes, 2009) such as the concepts of

transformational and transactional leadership (Bass & Bass, 2009) or the theory of task-oriented and relations-oriented leadership (Yukl, Gordon, & Taber, 2002). Even though behaviours related to these theories can be identified in the informant groups, the observations challenge us to understand how to interpret the impact of the application of certain leadership behaviours, considering that people mostly react by practising different types of leadership behaviours as a reaction to another person practising leadership behaviours, as well. The ratio of behaviours that were coded as leadership behaviours and behaviours that were not coded as leadership behaviours is 59,86% versus 40,14%. When looking at the most observed reactions of team members that are not labeled as leadership behaviours, it becomes clearer how each of the discussed leadership behaviours impacts other people. We will elaborate on that in the section below.

A frequently triggered reaction following the application of transformational leadership were team members asking the team for more clarity and context regarding specific tasks to be better capable to understand, coordinate and work on them. Also, frequently it could be observed that transformational leadership led to employees talking more openly about their mistakes (e.g., ART2_POSync1). This observation can be related to the assumption that the informal communication style of transformational leadership enables an environment of trust and quick reactions to emerging problems which are common characteristics of agile projects (Nerur & Mahapatra, 2005) (Dingsøyr, Nerur, Balijepally, & Moe, 2012). On the other hand, a frequently observed reaction stimulated by the practice of transactional leadership were people clarifying the status of their tasks ensuring that their task management is aligned with externally communicated requirements. At the same time, the practice of transactional leadership often led to people openly judging about how certain general issues happening around them challenged their way of working. Related to passive-avoidant leadership behaviours, a judgmental reaction was the most frequent reaction. Given the reactions related to both transformational and transactional leadership behaviours discussed above, one can debate whether both people openly talking about their own mistakes, but also people criticising issues not directly related to them, are valued behaviours in agile environments that emphasise a collaborative social process based on extensive communication and collaboration to guarantee an atmosphere of trust (Cockburn & Highsmith, 2001) (Nerur & Mahapatra, 2005).

When looking at the qualitative observations of reactions triggered by non-MLQ related leadership behaviours it can be noted that several of these behaviours, namely the task-oriented leadership behaviours ‘Monitoring’, ‘Planning’, ‘Facilitating’ and ‘Informing’ were most frequently followed by other people sharing the status of assigned tasks or task dependencies

that he, she or the respective team is working on. Furthermore, the task-oriented leadership behaviour 'Clarifies goals, deadlines and priorities' predominantly led to other people confirming communicated (task-related) demands, for instance regarding their content structure or planned deadline for delivery. And similarly, to the reactions of transactional leadership behaviours discussed above, the independently established behaviour of 'Advising' (assumed to be task-oriented) mostly impacted other people to openly share their opinion about task-related issues in a judgmental way. Meanwhile, similarly to frequent reactions of people practising transformational leadership, the relations-oriented leadership behaviour 'Supporting' predominantly triggered people to clarify their needs towards the superordinate role or the team, mainly driven by the intention to solve an issue or unclarity related to how to handle a challenge. Also, the relations-oriented leadership behaviour 'Empowering' resonates with a common outcome of the practice of transformational leadership. Both behaviours frequently impelled other team members to provide more clarity and context about how they coordinate and implement tasks.

Eventually, when one of the shared leadership behaviours 'Delegates decision-making' or 'Shared decision-making' was practised, both of them most frequently triggered other team members to take a lead by practising leadership behaviours of 'Planning, scheduling and coordinating activities'. The second most observed reaction to a person practising the behaviour 'Delegating decision-making' was another person asserting transformational leadership behaviours. Meanwhile, the second most behavioural responses following a person practising the behaviours 'Shared decision-making' refer to other people practising the task-oriented leadership behaviours 'Monitoring' and 'Clarifying'. So, we see that shared leadership behaviours primarily have the effect of stimulating other team members to take on more authority in guiding and coordinating the management of tasks. This observation strengthens the assumption discussed in chapter 6.1.1 indicating that leadership tends to be a shared function between leading roles and other team members (Yukl, 2008) (Moe, Dingsyr, & Kvangardsnes, 2009) (McFarland, Senn, & Childress, 1993).

Assumptions on predominant leadership behaviours in the observations

The behavioural reactions related to all leadership frameworks discussed in the section above indicate that each of these frameworks seems to be an essential element in the observed ART-meetings. The data suggest to us that both task-oriented and transactional leadership as well as relations-oriented and transformational leadership behaviours are relevant indicators

that people get their work done and that their tasks are aligned with externally communicated requirements, but also that people clarify their needs, when struggling with a challenge. What stood out, however, is that the task-oriented and transactional leadership behaviours together mark the most observed leadership behaviours in the qualitative observations with a share of 62,34%. Meanwhile, transformational and relations-oriented leadership behaviours hold a common share of 26,97%. In light of these insights we assume that not only transformational leadership (van Kelle, Visser, Plaat, & van der Wijst, 2015) (Moe, Dingsyr, & Kvangardsnes, 2009) but also transactional leadership is positively related to the observed agile working environment. Yet, one might also assume that the low survey evaluation on the perceived agile maturity level may explain the predominance of task-oriented leadership behaviours in the observed ARTs. The participants clearly indicate a trend towards a 'Novice' level of agile maturity on all organisational layers in both ARTs, which means that there is still space to further anchor an agile way of working into their project management structures as per the work of (Laanti, 2017) (see **appendix B**). This means that it is assumed that the observed case study sub-units would possibly show a somewhat more dominant presence of the transformational leadership behaviours with a higher indication of the agile maturity level in the self-assessments. This assumption is based on a study by (van Kelle, Visser, Plaat, & van der Wijst, 2015) emphasising that transformational leadership is positively related to the degree of agility in agile environments. Meanwhile, another contextual aspect that may explain the predominance of task-oriented leadership behaviours in the observed teams may be related to the structure of the applied SAFe as presented in chapter 2.2.3. For instance, SoS-meetings have per framework guideline a task-oriented character with a focus on coordinating dependencies in the ART by enabling visibility into progress and impediments. Similarly, PO Syncs aim to coordinate the progress status of the ARTs feature development with regards to predefined PI objectives. Therefore, these guidelines given by the framework may also explain why the task-oriented leadership behaviours described above take in a predominant role in the observed ART-meetings.

6.2 Answering research questions

R1) What practical examples of leadership behaviours can be derived from an organisation that applies a large-scale agile framework?

Overall, we identified a various set of 48 different leadership behaviours practised in the observed informant groups. Particularly, transactional leadership behaviours such as

‘Clarifying task responsibilities’ or the task-oriented leadership behaviours ‘Plans, schedules and coordinates activities’ and ‘Monitors progress and quality’ stood out during the observations. Also, the transformational leadership behaviour ‘Seeking different perspectives when solving problems’ was frequently observed. A relations-oriented leadership behaviour that often emerged was ‘Supporting people with stressful situations’. Furthermore, we identified leadership behaviours which were not inspired by the leadership frameworks discussed in this work. The respectively practised leadership behaviours encompass ‘Reflecting on experience to stimulate feedback’, ‘Facilitating inter-team communication’, ‘Advising on how to manage tasks’ and ‘Informing about general topics of relevance’. Regarding this, especially the behaviour ‘Reflecting’ protruded among these behaviours. It refers mainly to people reflecting on their experiences in overcoming challenges in project management in order to help others with similar challenges or expecting others to share their experience in order to overcome own challenges. Two other leadership behaviours practised which were considered to be essential in the observed environment are 'Shared decision-making' and 'Delegates decision-making'. These behaviours leaned on an independently established leadership framework related to the shared leadership theory. When these behaviours were applied, they entailed a better understanding of how decision-making processes are collectively practised by agile practitioners (Drury, Conboy, & Power, 2012). We mainly associated these behaviours with situations where individuals first communicated proposed decisions to team members and then made them collectively after pondering on possible decisions with the team.

R2) How are applied leadership behaviour routines linked to theoretical leadership frameworks in an organisation that applies a large-scale agile framework?

The observed leadership behaviours in this study represent all of the discussed leadership frameworks in this work. Our outcomes indicate that most of the applied leadership behaviour routines were associated with task-oriented leadership as per the HTLB by (Yukl, 2012). In second place comes leadership behaviours related to transformational leadership, which is based on the full-range leadership theory (Avolio & Bass, 1991). Third most frequently, the observed leadership behaviours were linked to transactional leadership, another leadership dimension based on the full-range leadership theory. This is followed by leadership behaviours that were associated with the theory of shared leadership, and then behaviours which were labeled as relations-oriented leadership as per the HTLB. Eventually, representative behaviours corresponding to the passive-avoidant leadership dimension as per

the full-range leadership theory were barely identified. What is particularly noticeable is the fact that many of the leadership behaviours applied were linked to more than one of the leadership frameworks discussed (see chapter 5.3.1.3), since certain leadership taxonomies such as task-oriented and transactional leadership could not always be clearly delineated. Also, contrary to most of the other observed leadership behaviours, our observations related to the shared leadership theory are based on an inductively created coding framework. In this regard, the observations suggest that the behaviours that were associated with the shared leadership theory are very much in evidence in the teams observed. This can be explained, on the one hand, by the high proportion of behaviours associated with the created shared leadership dimension itself and, on the other hand, by the fact that most of all the identified leadership behaviours practised in the observed units were distributed among multiple roles in the observed meetings.

Furthermore, the qualitative exploration of behaviours related to the full-range leadership theory, the HTLB and the shared leadership theory enabled us to indicate how the transformational, transactional and shared leadership behaviours may be related to each other. The relationship we indicate in this respect is based on the assumption that these behaviours can be mapped into task-oriented and relations-oriented leadership behaviours on the one hand and into individual-oriented and team-oriented leadership behaviours on the other hand.

Lastly, despite the fact that some of the observed leadership behaviours correspond to behaviours recommended in theory for agile practitioners and that we associate most of these behaviours with transformational and relations-oriented leadership behaviours, we cannot draw a clear conclusion about the significance of the observed proportion of these behaviours. On the one hand, this is due to the fact that it was very difficult to identify most of the respective behaviours (e.g. ‘Spends time coaching’, ‘Talks enthusiastically about goals’) in the given meeting types observed. In addition, this is due to the fact that our observations focused on investigating the frequency of a certain behaviour and less on the quality of the practice of a certain behaviour.

R3) How are applied leadership behaviour patterns related to behavioural reactions in an organisation that applies a large-scale agile framework?

Based on the observations discussed in chapter 6.1.2, it can be inferred that task-oriented and transactional leadership behaviours may be relevant indicators to make people getting tasks done and to stimulate them keeping their task management aligned with externally communicated requirements. However, at the same time these leadership behaviours might

confront employees and drive them to get too judgmental about how external factors limit their autonomy or capability to work on their tasks.

Meanwhile, the data discussed suggest that relations-oriented and transformational leadership behaviours may be essential drivers to encourage employees to talk more openly about how they manage their tasks, to improve a shared understanding in the team about how individuals work rather than just what they work on. Also, these leadership behaviours help people to share their needs more openly, when struggling with assigned responsibilities.

Considering that all the leadership behaviours described above are associated with behavioural responses that are essential in an agile environment, we firmly believe that in the context of the meetings observed, a certain balance in the application of the different leadership behaviours that are associated with all of the leadership frameworks discussed, is crucial. This precludes the assumption that one specific leadership framework underlying the observed behaviours should be regarded as 'best practice' and supports the assumption that the complementary use of the various leadership frameworks is vital. This means that the application of specific leadership behaviours may be more adequate than others depending on the context (Larsson & Vinberg, 2010). Good examples underpinning this assumption are the observed SoS-meetings. In particular, the application of transformational and relations-oriented leadership behaviours such as 'Seeking perspectives when solving problems' or 'Reflecting on experience' in these meetings fostered an environment of learning by encouraging participants to engage in constructive discussions about how to help individuals who are struggling with challenges related to coordinating specific activities. Similarly, when shared leadership behaviours were practised, we often observed that these behaviours led to individuals feeling more empowered and integrated, thus encouraging them to take more authority in leading and coordinating the management of tasks to relieve the burden on other decision-making bodies. Meanwhile, as already indicated above the task-oriented and transactional leadership behaviours were considered essential in situations where individuals had to be reminded of how to deliver their tasks in alignment with communicated requirements.

6.3 Research Contribution

In summary, the qualitative observations of our study indicate that our primary classification of established non-MLQ related leadership behaviours into task-oriented and relations-oriented leadership behaviours as well as their linkage to transformational and transactional leadership behaviours impedes our understanding of which leadership behaviours play a decisive role in an organisation that applies a large-scale agile framework. The

qualitative observations have shown that task-oriented and transactional leadership behaviours, which together hold a share of 62,34% of all observed leadership behaviours, may be essential drivers to stimulate employees to get their tasks done and keeping their task management aligned with externally communicated requirements. We assume that this is most likely due to the coordinative nature of ART-meetings, which focus on the alignment of dependencies and development progress between several teams. When task-oriented and transactional leadership behaviours were practised, the team members mainly confirmed communicated demands and made clear what the status of their responsibilities is, for instance regarding deadlines. So, it seems that these behavioural leadership patterns may be relevant to guarantee a continuous verification and feedback-based corrections for development outcomes in compliance with external stakeholder needs. This is a central characteristic in agile environments (Nerur & Mahapatra, 2005) (Abrahamsson, Salo, Ronkainen, & Warsta, 2017). Yet, to a certain degree transactional and task-oriented leadership behaviours also affected employees to get judgmental about how external factors limited their autonomy or capability to work on their tasks. Examples of their judgment included employees arguing about too many task dependencies on other people, how unrealistic the fulfilment of certain requirements were or how formally some of the requirements were communicated to them (e.g., ART2_SoS3). This may be linked to the problem that these leadership behaviours challenge the idea of collaborative decision-making skills which are emphasised in agile environments (Nerur & Mahapatra, 2005). This asks for agile leaders to apply behaviours that provide team members independence to design and coordinate their activities (Leffingwell, 2010). In other words, the issue of people frequently reacting in a judgmental manner to transactional and task-oriented leadership behaviours might be related to people being unwilling to commit to decisions that other people make on their behalf, and thus confronting their need for autonomy (Drury, Conboy, & Power, 2012) due to the idea that agile frameworks build on the inclusion of team members in all facets of development (Beck, 2000).

On the other hand, the observations have shown that the practice of relations-oriented and transformational leadership behaviours, which together hold a share of 26,96% of all observed leadership behaviours, helped leading roles to encourage employees talking more openly about how they handle their tasks to enable the team gaining a shared understanding on how their work is done and not just on what they are doing. At the same time, these leadership behaviours stimulated employees to openly talk about their mistakes and clarifying their needs towards the team and superordinate positions when they needed support with solving an issue related to a task. The practice of these leadership behaviours helped employees to be better

capable to understand, coordinate and work on their assigned tasks. Thus, the observations depicted above can be linked to the assumptions that transformational and relations-oriented leadership behaviours may enable an environment of trust and quick reactions to emerging problems which are common characteristics of agile environments (Nerur & Mahapatra, 2005) (Dingsøyr, Nerur, Balijepally, & Moe, 2012). This means that these leadership behaviours tend to stimulate collaborative social interactions which are shaped by a comprehensive communication and collaboration as enablers of a trustworthy atmosphere (Cockburn & Highsmith, 2001) (Nerur & Mahapatra, 2005).

Also, the outcomes of shared leadership behaviours were mainly associated with a positive working environment in the observed teams. The practice of shared leadership behaviours mostly stimulated other team members to take a lead in helping individuals and the team on planning-, monitoring- or requirements clarifying activities. In addition, the practice of shared leadership behaviours encouraged people in acknowledging and supporting each other's work by communicating trust. Particularly, given the insights emphasised in chapter 6.1, it is assumed that the feedback of the person being addressed by a person which practises the behaviour 'Delegates decision-making', is relevant to making decisions related to the ongoing discussion, because the addressed person is assumed to hold the contextually most appropriate knowledge and skills to do so. This idea of shared leadership is also proposed by (Langfred, 2000). The behavioural reactions related to the practice of shared leadership described above let us presume that it needs leaders to show full commitment to helping and serving others, not by making them follow him or her, but by presenting a sense of community (Medinilla, 2012). Also, the outcomes of shared leadership strengthen the idea that agile leaders need to enable knowledge sharing, trusting in people, seeking consensus, and delegating more (van Kelle, Visser, Plaat, & van der Wijst, 2015). Besides, the findings depicted above support prior assumptions claiming that it needs a combination of transformational leaders as project managers and shared leadership distributed among the group members of an agile team (Moe, Dingsyr, & Kvangardsnes, 2009).

Moreover, during our observations it stood out that a distribution of leadership behaviours among different roles and team members is exemplified in practice. This indicates that leadership roles are far less transparent and delegated within and across agile teams due to their self-organised characteristics. This means that agile teams are not considered to be leaderless teams, but teams that continuously organise themselves in diverse constellations (Cockburn & Highsmith, 2001) by sharing leadership with each other (Yukl, 2008) (Moe, Dingsyr, & Kvangardsnes, 2009) (McFarland, Senn, & Childress, 1993).

Eventually, however, our observations only provide indications on effective leadership behaviours, however not clear answers to the appeal in academia to find clear outcomes on effective leadership behaviours (Yukl, 2012) (Larsson & Vinberg, 2010), particularly in an agile environment (Moe, Dingsyr, & Kvangardsnes, 2009).

6.4 Limitations and Avenues for Future Research

This study made use of an exploratory mixed method research design as per the work of (Saunders, Lewis, & Thornhill, 2009) and allowed us to gain various insights into the determined case study organisation. This approach aimed to increase the validity of the qualitative findings by corroborating them through a survey self-assessment with the informant groups. However, both the applied methods as well as constraints such as available time horizon given to the researcher, pose certain threats to the validity and reliability of this research project (Yin, 2009). This chapter aims to highlight the limitations of this study and in addition to that, it provides an outlook on a possible research agenda to follow up on the results of this work.

6.4.1 Threats to validity

The used method of qualitative observation allows for a high ecological validity due to our capability to analyse the informants and the activities associated with them in their natural setting. However, it may also be one of the probably biggest limitations to the reliability and validity of the results of this work, since the used method of participant observation presented us with the difficulty of becoming familiar with the setting to gain a general understanding of the interpersonal and cultural aspects in the case study organisation to be able to interpret it (Saunders, Lewis, & Thornhill, 2009).

Firstly, our lack of understanding with the setting may have partly led to observer errors, respectively the unintentional misinterpretation of what has happened. One example related to this issue may lie in the fact that the observations were done in an online environment, therefore limiting the researcher to the observation of what was said and in what voice tone it was said. This means that this environment deprived us from observing aspects such as gestures and body postures, which may be additional indicators to assess certain leadership behaviours such as the transformational leadership behaviour '*Displays sense of power and confidence*'. Another example related to the observer error may be that we primarily observed behaviours as leadership behaviours, rather than non-leadership related behaviours, given the research

goals of this study. However, one leadership behaviour that was barely coded, is passive-avoidant leadership. Regarding this, it often posed a challenge for us to distinguish whether a person which may have practised this behaviour did not intervene in a meeting because he or she is not required to or because he or she is simply not willing to intervene. To reduce these difficulties in understanding, we would need to be more familiar with the observed environment. We attempted to mitigate the occurrence of observer errors by coding the observed video sessions multiple times as illustrated in chapter 4.3, which was possible due to the online setting of the work and our ability to record the sessions.

Secondly, another and probably central issue that may limit the validity and reliability of the research results is anchored in the observer bias. It is common that the researcher does not have the necessary time horizon required to develop a comprehensive understanding to interpret the setting objectively (Saunders, Lewis, & Thornhill, 2009). In the given context, we were not familiar with the internal case study organisations' structures and informant groups prior to the study and the period of analysis was also limited in time. Consequently, research findings may be reduced to our own subjective disposition regarding the interpretation of events in the observed setting. This issue may be particularly reflected in the observed frequencies of different (leadership) behaviours. This means that the order of observed behaviours may be biased by us capturing behaviours that we are more familiar with more often than behaviours whereby we lacked a contextual understanding to appropriately interpret them. We tried to mitigate the observer bias by watching similar publicly available project meeting types of other organisations. Then, these videos were coded, and the sample codes were discussed and reviewed together with the first supervisor.

Thirdly, the observer effect may be another critical cause reducing the validity and reliability related to data collected (Saunders, Lewis, & Thornhill, 2009). This means that the behaviours of the observed informants may be affected by the simple presence of the researcher in the meetings, implying that the informants for instance try to practice more transformational leadership behaviours than transactional leadership behaviours (Monahan & Fisher, 2010). This may result in invalid and unreliable data (LeCompte & Goetz, 1982) (Spano, 2005). Regarding this, we aimed to mitigate the observer effect by turning off our own camera during the meetings and by engaging as less as possible in the interactions between the informant groups.

Besides the issues related to the qualitative observation depicted above, another aspect that may threaten the reliability and validity of the work is related to the ratio of observed meeting types and roles. Due to administrative limitations in the case study setting, certain

meeting types such as PO Syncs were far more observed than other meeting types (e.g., SoSs). Also, the ratio of observed meetings was slightly higher in ART 2 than in ART 1 (56,25% versus 43,75%). Therefore, the reliability and validity of indications such as leadership share distributions between both sub-units of analysis, but also between the different role types may be threatened due to limited comparable figures regarding the two observed sub-units and role types. This limitation also considers the fact that the position of the RTE was held by the same person in both sub-units. This may threaten the content validity of the data by reducing the degree at which the measure applied is logically supposed to reflect precisely what it was supposed to measure (Saunders, Lewis, & Thornhill, 2009).

Furthermore, also the survey assessments of this study come along with certain threats to validity and reliability of the results. One of the threats is rooted in the limited survey response rate. Only about 50% of the informant group population participated in the survey, therefore only providing indications on measured variables. This also limits the validity and reliability of the triangulation, respectively the combination of data from both methods to ascertain if the findings from the survey assessments corroborate with the qualitative observations.

Additionally, the social desirability bias may limit the reliability and validity of recorded survey outcomes, indicating that participants may tend to provide answers to the survey according to a social norm, rather than the actual situation (Sjöström & Holst, 2002). For instance, participants may have indicated higher scores on perceived teamwork quality, because this seems to be more socially acceptable, even though their true perceptions differ from their responses. We attempted to mitigate this bias by guaranteeing that all responses are treated confidentially.

Eventually, another factor that may threat the validity of the research results refers to the leniency bias of the assessed survey respondents. Especially, considering that the MLQ leader self-assessment form has been utilised to determine the perceived leadership behaviours, it seems reasonable to assume that respondents may have rated themselves higher than they should, given that they know themselves well and may be "*ego involved*" (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This bias was tried to be mitigated by pointing out to the participants to answer the survey questions to the best of their knowledge and belief.

6.4.2 Avenues for future research

This study focused on examining practised leadership behaviours in an organisation that applies a large-scale agile framework and illustrated that leadership is subject to an environment, in which it emerges in different forms of application. In this regard, we conducted a single case study to examine this phenomenon in a specific practical context. This allowed us to gain a comprehensive understanding of the context of the research and related processes (Eisenhardt & Graebner, 2007). However, to better generalise gained insights and increase their external validity, (Yin, 2009) suggests discussed theories to be tested through replicating the findings in further studies. This may help to validate if related findings correlate with presented theories. This chapter proposes a research agenda to show how future studies can expand on the results of this work.

This study has shown that qualitative research allows us to gain more insights into why a leader is applying a certain leadership behaviour (Yukl, 2012) (Antonakis, Avolio, & Sivasubramaniam, 2003). However, this study has only to a limited degree revealed how situational factors (e.g. meeting and role type) are related to applied leadership behaviour (Larsson & Vinberg, 2010). Therefore, future research could follow up on this topic by slightly changing the design of the qualitative methodology of the study to gain more insights into such contextual aspects. This means that other researchers may profit from more valid data by engaging in the role of participant-as-observer (see Figure 7) to determine this topic. This would allow the researcher to take part as a fully accredited participant in the informant group. Thus, the researcher may gain more contextual knowledge about behaviours of the informant groups and increase his or her familiarity with the setup. Also, since both sub-units of analysis were embedded in one single case organisation (see Figure 5), it is suggested to consider a multiple case study design with independent sub-units for future research on this topic. This enables the researcher to reduce the potential impact of interdependencies between the sub-units, and thus increases the content validity of data per sub-unit (Saunders, Lewis, & Thornhill, 2009). In this respect, future research should also consider to incorporate case study organisations operating in different industries, due to both applied leadership and the way people apply agile frameworks arising differently, depending on corporate culture, industry and types of products developed (Aydogdu & Asikgil, 2011) (Yang, Wang, Chang, Guo, & Huang, 2009) (Nerur & Mahapatra, 2005). This may help us to gain more insights into how different contextual factors expound why a leader is practicing specific leadership behaviours

and to better evaluate whether identified leadership behaviours during this work may be generalised from different cases.

Furthermore, during the qualitative observations it stood out that the shares of observed leadership behaviours only have limited significance, as they only indicate how often a certain leadership behaviour was applied. However, they do not give any indication regarding the quality of leadership behaviours used. Regarding this, a certain leadership behaviour may have been observed less frequently than others. Yet, its application may have a stronger impact on the overall outcomes of applied leadership. Therefore, it could be an incentive for future research to slightly change the structure of the applied coding method of magnitude coding (see Table 8) to look more into quality aspects of practised leadership behaviours. This means that in order to increase the significance of qualitatively observed leadership, one should not only count the frequency and presence of a particular leadership behaviour, but also assign an intensity value to each occurrence of a particular leadership behaviour to evaluate its quality. This may allow us to gain a better understanding of the relationship between the use of certain leadership behaviours and associated behavioural responses.

Besides, given that research has produced a huge variety of leadership behaviour classifications with many similarities in their definitions (Van Knippenberg & Sitkin, 2013) and since this qualitative study has shown that these classifications cannot always be clearly delineated, future research is also appealed to reflect how appropriately conventional leadership frameworks such as the MLQ (Bass & Avolio, 1996) (Eagly, Johannesen-Schmidt, & Van Egen, 2003) suit the context of measuring organisations such as the one at hand. One aspect in particular that indicates that the MLQ is not fully reliable to measure all leadership behaviours practised in an organisation that applies a (large-scale) agile framework is the fact that this mixed-method study has shown that its items do not fully reflect all behaviours found in agile practice. Therefore, it might be an incentive for leadership scholars to ponder how the MLQ-framework may be adapted to better reflect behaviours that suit the agile practice. Regarding this, the independently established leadership behaviours of this work can serve as a baseline. A fundamental assumption that may be evaluated is whether the MLQ-framework focuses too much on assessing leadership behaviours addressed towards individuals, whereas the observations have shown that leadership behaviour is often addressed towards the collective.

It is suggested that future research not only shifts the perspective to different applications of methodologies to gain additional insights into the topic of this study. At the

same time, research is called upon to shed more light on content-related aspects of this work that could only be fragmentarily touched upon in the scope of this study.

Firstly, this work has already shown that behaviours of shared and distributed leadership entail teams that are highly collaborative, and therefore these leadership behaviours may be positive indicators of agile environments (Ospina & Foldy.E.G., 2010) (Ford & Ford, 2012) (van Kelle, Visser, Plaat, & van der Wijst, 2015) (Theobald, Prenner, Krieg, & Schneider, 2020). However, the question how leadership can be effectively distributed among the different roles in an organisation that uses a large-scale agile framework and in particular what leadership behaviours need to be practised by these roles, requires greater attention in future research (Schwaber, 1997) (Moe, Dingsyr, & Kvangardsnes, 2009). Due to the limited timeframe of this study, it has only provided tendencies of leadership behaviour preferences for certain roles in a company that applies SAFe. Future research needs to follow up on these findings to better understand how these preferences for certain leadership behaviours resonate with the self-organised team characteristics of agile environments (Cockburn & Highsmith, 2001) in terms of effectiveness. Regarding this, further studies are also advised to ensure that each agile meeting and role type in the observation frame is equally represented to limit threats to reliability and validity of the findings.

Moreover, another suggestion that may help us to better understand the relationship between agile maturity and applied leadership, is to further investigate the agile maturity assessment model used in this study by integrating it into further studies to examine their relationship in organisations that apply large-scale agile frameworks. This means that future research may shed more light on how agile maturity is related to the presented leadership dimensions in this work, since this relationship has barely been considered in this project. In this regard, future studies may build on the assumption that the extent of relations-oriented and transformational leadership behaviours as well as the identified shared leadership behaviours may be more pronounced with a higher degree of agile maturity. This may contribute to research better understanding which leadership behaviours organisations should put the focus on, when introducing agile methods to their organisations (Spiegler, Heinecke, & Wagner, 2021).

Eventually, even though this study provided some indications on how decision-making processes come into play in an organisation that applies a large-scale agile framework, more qualitative research is needed to better understand how agile teams face decision-making obstacles and how decisions are aligned on a tactical and on a strategical level from a leadership perspective (Drury, Conboy, & Power, 2012).

CHAPTER 7

7. CONCLUSION

This study investigated applied leadership behaviours in an organisation that uses a large-scale agile framework and devised empirical examples of these behaviours. We illustrated through qualitative observation how these behaviours are practised and provided indications on how they are linked to theoretical leadership frameworks and what behavioural reactions come along with their application. Prior studies either utilised different methodologies (van Kelle, Visser, Plaat, & van der Wijst, 2015) or examined an indirect relationship (Moe, Dingsyr, & Kvangardsnes, 2009).

Concerning the first research question it can be concluded that a various set of leadership behaviours are practised in the observed teams, distributed among different roles (Ford & Ford, 2012) that organise themselves in shifting constellations of leadership. These findings confirm the assumptions of prior research on leadership being shared and distributed among different agile roles (Moe, Dingsyr, & Kvangardsnes, 2009). However, the results also confirm that a clear demarcation between established theoretical leadership classifications is only possible to a limited extent due to similarities in their definition (Van Knippenberg & Sitkin, 2013). Furthermore, new leadership behaviours were identified and anchored primarily in the task- and relations-oriented leadership framework as per the work of (Yukl, 2012). In addition, we identified two behaviours associated with the concept of shared leadership, particularly providing more insights regarding decision-making processes in an organisation applying SAFe (Stettina & Heijstek, 2011) (Moe, Aurum, & Dybå, 2012).

Regarding the second research question we evaluated both the presence and frequency of leadership behaviours practised by linking them to the full-range leadership theory, the HTLB and the theory of shared leadership. Also, we observed behaviours that are recommended as agile leadership behaviours in theory. We conclude that leadership behaviours linked to theoretical leadership styles recommended in the agile literature such as transformational leadership are practised in the case study organisation. Meanwhile, we could only roughly assess how the frequency of identified leadership behaviours should be evaluated with respect to the leadership behaviours recommended in the agile literature. We assume that for the practical value of the recommended behaviours observed, particularly when considering them for training purposes, it is more advisable to set the focus of future qualitative studies in this field on quality aspects of the leadership behaviours practised that correspond to recommended agile leadership behaviours rather than on the frequency of their occurrence.

When looking at the third research question, we conclude that transactional and task-oriented leadership behaviours may be relevant to ensure requirements alignment of tasks with external stakeholders (Nerur & Mahapatra, 2005) (Abrahamsson, Salo, Ronkainen, & Warsta, 2017) in organisations adopting large-scale agile frameworks (Laanti, 2014) (Dingsøyr & Moe, 2013), however at the same time challenge the team members need for autonomy (Drury, Conboy, & Power, 2012). On the other hand, transformational and relations-oriented leadership behaviours facilitate an environment of open communication and trust, thus enabling better knowledge sharing and an alignment of needs (Nerur & Mahapatra, 2005) (Dingsøyr, Nerur, Balijepally, & Moe, 2012). Also, the observation of shared leadership stimulated a cooperative and supportive environment of committed team members (Medinilla, 2012) and indicated how agile teams may face decision-making obstacles (Drury, Conboy, & Power, 2012). These findings correlate with prior research assumptions that both transformational leadership (van Kelle, Visser, Plaat, & van der Wijst, 2015) and shared leadership (Moe, Dingsyr, & Kvangardsnes, 2009) are meaningful in agile environments.

Our novel research based on qualitative data, unveiled new insights into why a leader applies a certain leadership behaviour (Antonakis, Avolio, & Sivasubramaniam, 2003) within a specific real-life context (Yukl, 2012). In contrast to former research, we identified exemplary leadership behaviours to explain what language agile leaders use in practice when applying certain leadership behaviours (Uhl-Bien & Arena, 2018). These examples include behaviours that prior research emphasises to be positive indicators for agile development (van Kelle, Visser, Plaat, & van der Wijst, 2015) (Moe, Dingsyr, & Kvangardsnes, 2009). This may help agile practitioners reflect better on how they apply leadership, rather than being challenged to the question what generic leadership style they need to implement (Yukl, 2012). Furthermore, our work identified leadership behaviours not covered by existing leadership frameworks. This provides incentives for academia to further examine their significance and debate whether these behaviours may require an adaptation or extension of existing frameworks (Yukl, Gordon, & Taber, 2002).

Although our approach can be considered a novel attempt to examine the specific meaning of applied leadership behaviour and its contextual impact on the observed teams, the significance of our results needs to be viewed cautiously regarding their validity, due to the limited data examined. This study serves as an indication, however it does not provide clear answers to which behaviours are considered to be most effective in (large-scale) agile organisations (Moe, Dingsyr, & Kvangardsnes, 2009), since the observation of behaviours only partly allows us to derive abstractions and provide objective sense of the real world (Yukl &

Gardner, 2020). However, established leadership theories provide a directive value in encouraging new research and enable a common language in the field to debate, compare and to assess their findings (Behrendt, Matz, & Göritz, 2017). This is what this study sought to illuminate by discussing how practical behaviours in agile environments, built on the idea of shared leadership (Stettina & Heijstek, 2011) (Moe, Dingsyr, & Kvangardsnes, 2009), can be reflected upon based on these leadership frameworks.

To better understand how the roles observed in this project share leadership in agile teams (Moe, Dingsøyr, & Dybå, 2010) (Srivastava & Jain, 2017) in a manner that "*contributes to the effectiveness and success of the organizations of which they are members*" (House, Hanges, Javidan, Dorfman, & Gupta, 2004) future research is encouraged to further investigate the identified leadership behaviours, both qualitatively and quantitatively. A crucial question in this context is how established leadership frameworks such as the MLQ can better quantify the assessment of shared leadership by considering aspects such as shared and collective decision-making (Drury, Conboy, & Power, 2012).

In summary, the conclusions one can draw from the data analysed in this work regarding the relevance of each of the leadership behaviours presented depend heavily on the contextual perspective from which one views them. This means one needs to reflect on what kind of outcomes a company values the most in terms of effectiveness in a certain situation (Bass & Bass, 2009) (Larsson & Vinberg, 2010). In other words, the application of leadership behaviours needs to be tailored to a specific organisation and its current needs (e.g. operating industry) and most likely also to its state of agile maturity (Stettina, van Els, Croonenberg, & Visser, 2021) (Spiegler, Heinecke, & Wagner, 2021). What is indisputable, however, is "*that we know much less about how leaders make organizations effective than how leaders are perceived*" (Kaiser, Hogan, & Craig, 2008). Therefore, identifying unique categorisations of leadership behaviours that are contextually meaningful to organisations still poses and will always pose a challenge in academia.

APPENDICES

APPENDIX A

Leadership measurement framework

Name	Criteria
MLQ	**Goal**: Assessing full range of leadership styles
	Scope: Measurement of effectiveness of leadership behaviours to support leaders developing their leadership skills • Transformational leadership: Five dimensions • Transactional leadership: Two dimensions • Passive/Avoidant behaviour: Two dimensions • Outcomes of leadership: Three dimensions (Bass & Avolio, 2004)
	Method: Quantitative Confirmatory Factor Analysis to evaluate leaders' self-assessment and leader assessment from the perspective of superior and/or subordinated roles
	Constraints: Transformational leadership only measured style that provides average score of subscales
	Validity: Validated and accepted in several types of organisations and cultures. Validity limited, when only applying the leader-self assessment form (Yukl, 2012) (Dumdum, Lowe, & Avolio, 2013) (Eagly, Johannesen-Schmidt, & Van Egen, 2003) (Walumbwa, Lawler, Avolio, Wang, & Shi, 2005)
	Licence: Commercialized (Mind Garden, Inc., 2019)
SLQ	**Goal:** Assessing shared- and vertical leadership behaviour as by the whole team, not the individual leader to verify how the team members collectively interact with each other to achieve the mutual objectives (Gockel & Werth, 2011)
	Scope: Each member of the team evaluates leadership behaviours that the team practises to determine a team-level average score. Afterwards, the shared leadership rating is derived (Gockel & Werth, 2011) • Aversive leadership: 2 scales • Directive leadership: 2 scales

	• Transactional leadership: 4 scales • Transformational leadership: 6 scales • Empowering leadership: 6 scales • Team Effectiveness: 7 scales (Pearce & Sims Jr, 2002)
	Method: Multiple regression analyses to determine how shared leadership related to vertical leadership as well as effectiveness; Individuals once rate their team members as a unit (shared leadership) and once the vertical team leader (Pearce & Sims Jr, 2002)
	Constraints: Team members need to rate the average of other team member leadership behaviours. Unclear how the evaluation is done by the team members and to whom the references relate. Averages do not tell to what extent individuals influence each other (Gockel & Werth, 2011)
	Validity: Not clear
	Licence: Open source (Pearce & Sims Jr, 2002)
LBDQ	**Goal:** Assessing task-oriented and relationship-oriented leadership behaviour models
	Scope: Evaluates leadership behaviour dimensions of "Initiating Structure" and "Consideration" by providing a technique that lets team members describe the leader behaviour of designated leaders. Contains 12 scales and 100 items in total. 2 dimensions of leadership behaviour: • Initiating Structure (Task-oriented leadership) • Consideration (Relation-oriented leadership) (Fisher College of Business, 2021)
	Method: Quantitative - The ratings are averaged for each scale to gain an overall leadership behaviour index (Halphin, 1957)
	Constraints: May be outdated
	Validity: Scientifically utilised in educational and industry context (Halphin, 1957) However, might be outdated.
	Licence: Open Source
HDS	**Goal:** Assessing leadership behaviour based on the Big Five personality traits model theory (Rothmann & Coetzer, 2003)

	Scope: Contains 154 items scored for 11 personality scales of personality disorders, including 33 sub-dimensions serving to identify leadership weaknesses and strengths (Hogan & Hogan, 2001)
	Method: Quantitative survey, applying factor analysis (Hogan & Hogan, 2001)
	Constraints: Certification required, no direct link to established leadership theories (Hogan Assessments, 2021)
	Validity: Used in more than 400 research studies (Hogan Assessments, 2021)
	Licence: Pricing information not available
LCP	**Goal:** Measuring a leaders' creative competencies and reactive tendencies, leadership theory unknown (Full Circle Group, 2021) (Anderson & Adams, 2015)
	Scope: Measures five dimensions of leadership effectiveness: • Egocentric leadership • Reactive leadership • Creative leadership • Integral leadership (Full Circle Group, 2021) (Anderson & Adams, 2015)
	Method: Quantitative assessment (Anderson & Adams, 2015)
	Constraints: Clear framework description and manual not found, could barely be linked to established leadership style theories from academia
	Validity: Several case studies conducted with universities (Anderson & Adams, 2015)
	Licence: Commercialized, price not determined

APPENDIX B

Questionnaire – Leadership, agile maturity and teamwork quality

This anonymous survey is intended as a supplement to the Agile Release Train observations. *The survey aims to capture your self-assessment about perceived leadership behaviour, agile maturity and teamwork quality. This self-assessment helps you to reflect on how you see yourself in comparison to the general observations. To be able to analyse the data, we need full responses. Please make sure to answer all the questions.*

---

1. Which Agile Release Train are you part of?

a. Automation ☐

b. Cloud & Support ☐

c. Other ☐

2. What role do you hold?

a. Release Train Engineer ☐

b. Product Manager ☐

c. System Architect ☐

d. Product Owner ☐

e. Scrum Master ☐

f. Quality Control Terminator ☐

g. Other ☐

This block is to describe the agile transformation maturity level of your organisation as you perceive it. Please answer all items on this answer sheet. ***If an item is irrelevant, or if you are unsure or do not know the answer, leave the answer blank****.*

Score Ratings	**Explanation**
Beginner	Basics exist: Organisation has decided to restructure for large-scale agility, understood that adaptive and flow-based models more effective than traditional models
Novice	Large scale agile in use: Organisation abandons traditional way of working and takes agile model as primary or only way of working
Fluent	Large scale agile internalized: Most of the organisations decisions based on quick experimentation and rapid experimental releases
Advanced	Agile first thought: Agility part of company values and strategy, new development efforts approached with an agile mindset
World-Class	Best in class: Organisation invented its own approach to agility

Three organisational layers (Portfolio, Program, and Team) of agility are listed below. Each layer indicates five different levels of maturity. Indicate at what level you perceive your organisation to be in each of these layers.

Portfolio Layer				
Beginner	Novice	Fluent	Advanced	World-class
• Prioritized portfolio • Work identified as Epics • Owner nominated backlog tool support	• Portfolio work is continuous • Systematic and fast rolling decision-making • Agile metrics	• Options thinking in portfolio decision-making • Measuring feedback • Guidance based on data collected and trends	• Detecting and utilizing fast business opportunities • Agility part of values and company strategy	• Ability to innovate new businesses that increase client competivenss
Program Layer				
Beginner	Novice	Fluent	Advanced	World-class
• Agile projects/programs • Incremental planning and execution • Agility to embrace change	• Agile release trains in use • Agile roles in use and defined and carry responsibility • Incremental demos guide future development • Organized for lean-agile way-of-working • Value stream thinking	• Agile budgeting and cost follow-up • Networked leadership • Systematically speeding up production releases • Agile metrics • Acceptance test planned first before features	• Continuous positive feedback from customers from fast deliveries • Ability to create systems and services previously impossible	• Ability to respond rapidly to challenging customer needs • Networked, empowered, self-controlled, adaptive organization
Team Layer				
Beginner	Novice	Fluent	Advanced	World-class
• Fast fixes as needed • Scrum in use • Dedicated build environment • Version control	• Automatic testing integration and deployment efforts	• Test-first approach • Systematically removing impediments	• No errors released • Production code practically error-free	• Production releases multiple times per day

3. Where in the Portfolio layer of the Agile Transformation Model do you consider your organization currently?

a. Beginner: Prioritized portfolio; Work identified as epics; Owner nominated; Backlog tool support ☐

b. Novice: Portfolio work is continuous; Systematic and fast rolling decision-making; Agile metrics in place ☐

c. Fluent: Options thinking in portfolio decision-making; Feedback measurement; Guidance based on data collected and trends ☐

d. Advanced: Detecting and utilizing fast business opportunities; Agility part of values and company strategy ☐

e. World-class: Ability to innovate new businesses that increase client competitiveness☐

4. Where in the Program layer of the Agile Transformation Model do you consider your organization currently?

a. Beginner: Agile projects/programs; Incremental planning and execution; Agility to embrace change ☐

b. Novice: Agile release trains in use; Agile roles in use and defined and carry responsibility; incremental demos guide future development; Organized for lean-agile way-of-thinking; Value stream thinking ☐

c. Fluent: Agile budgeting and cost follow-up; Networked leadership; Systematically speeding up production releases; Agile metrics; Acceptance tests planned first before features ☐

d. Advanced: Continuous positive feedback from customers from fast deliveries; Ability to create systems and services previously impossible ☐

e. World-class: Ability to respond rapidly to challenging customer needs; Networked, empowered, self-controlled, adaptive organization ☐

5. Where in the Team layer of the Agile Transformation Model do you consider your organization currently?

a. Beginner: Fast fixes as needed; Scrum in use; Dedicated build environment; Version control ☐

b. Novice: Automatic testing; Integration and deployment efforts ☐

c. Fluent: Test-first approach; Systematically removing impediments ☐

d. Advanced: No errors released; Production code practically error-free ☐

e. World-class: Production releases multiple times per day ☐

In this block you can describe how you perceive your behaviour. Please answer all items on this answer sheet. Judge how frequently each statement fits yourself in the Agile Release Train that you are part of. ***If an item is irrelevant, or if you are unsure or do not know the answer, leave the answer blank****.*

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6. I express confidence that goals will be achieved

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

7. I express satisfaction when others meet expectations

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

8. I emphasize the importance of having a collective sense of mission

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

9. I delay responding to urgent questions

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

10. I suggest new ways of looking at how to complete assignments

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

11. I help others to develop their strengths

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

12. I get others to look at problems from many different angles

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

13. I consider an individual as having different needs, abilities, and aspirations from others

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

14. I avoid making decisions

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

15. I direct my attention toward failures to meet standards

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

16. I articulate a compelling vision of the future

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

17. I display a sense of power and confidence

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

18. I keep track of all mistakes

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

19. I consider the moral and ethical consequences of decisions

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

20. I concentrate my full attention on dealing with mistakes, complaints, and failures

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

21. I act in ways that build others´ respect for me

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

22. I demonstrate that problems must become chronic before I take action

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

23. I treat others as individuals rather than just as a member of a group

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

24. I go beyond self-interest for the good of the group

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐

e. Not at all ☐

25. I show that I am a firm believer in 'If it ain´t broke, don't fix it.'

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

26. I make clear what one can expect to receive when performance goals are achieved

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

27. I spend time teaching and coaching

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

28. I specify the importance of having a strong sense of purpose

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

29. I talk enthusiastically about what needs to be accomplished

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

30. I wait for things to go wrong, before taking action.

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

31. I discuss in specific terms who is responsible for achieving performance targets

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

32. I instill pride in others for being associated with me

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

33. I talk optimistically about the future

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

34. I seek differing perspectives when solving problems

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

35. I am absent when needed

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

36. I talk about my most important values and beliefs

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

37. I avoid getting involved when important issues arise

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

38. I focus attention on irregularities, mistakes, exceptions, and deviations from standards

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

39. I fail to interfere until problems become serious

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

40. I re-examine critical assumptions to question whether they are appropriate

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

41. I provide others with assistance in exchange for their efforts

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

42. I am effective in meeting others´ job-related needs

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

43. I am effective in representing others´ to higher authority

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

44. I am effective in meeting organizational requirements

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

45. I lead a group that is effective

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

46. I get others´ to do more than they are expected to do

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

47. I heighten others´ desire to succeed

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

48. I increase others´ willingness to try harder

a. Frequently, if not always ☐
b. Fairly often ☐
c. Sometimes ☐
d. Once in a while ☐
e. Not at all ☐

49. I use methods of leadership that are satisfying

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

50. I work with others´ in a satisfactory way

a. Frequently, if not always ☐

b. Fairly often ☐

c. Sometimes ☐

d. Once in a while ☐

e. Not at all ☐

This section aims to capture the quality of collective teamwork interactions in your team, based on the factor's communication, coordination, balance of member contributions, mutual support, effort, and cohesion. Please answer these questions from the perspective of your Product Owner-team (PO Sync) or your Scrum Master-team (Scrum of Scrums)

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51. Is there sufficiently frequent, informal, direct, and open communication?

a. Strongly agree ☐
b. Tend to agree ☐
c. Not sure ☐
d. Tend to disagree ☐
e. Disagree ☐

52. Are individual efforts well-structured and synchronized within the team?

a. Strongly agree ☐
b. Tend to agree ☐
c. Not sure ☐
d. Tend to disagree ☐
e. Disagree ☐

53. Are all team members able to bring in their expertise to their full potential?

a. Strongly agree ☐
b. Tend to agree ☐
c. Not sure ☐
d. Tend to disagree ☐
e. Disagree ☐

54. Do team members help and support each other in carrying out their tasks?

a. Strongly agree ☐
b. Tend to agree ☐
c. Not sure ☐
d. Tend to disagree ☐
e. Disagree ☐

55. Do team members exert all efforts to the team´s task?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

56. Are team members motivated to maintain the team, respectively is there a team spirit?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

57. Going by the results, can the Agile Release Train be regarded as successful (customer demands and increment goals met, product stable and proved in operation)?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

58. Going by the results, can the Agile Release Train be considered to be done in a cost- and time-efficient way (within schedule and within budget)?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

59. Could you draw a positive balance for yourself in this Agile Release Train, respectively would you do this type of collaborative work again?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

60. Were you able to acquire important know-how through this Agile Release Train?

a. Strongly agree ☐

b. Tend to agree ☐

c. Not sure ☐

d. Tend to disagree ☐

e. Disagree ☐

APPENDIX C

Definitions of leadership behaviours inspired by the HTLB[1]

Planning: develops short-term plans for the work; determines how to schedule and coordinate activities to use people and resources efficiently; determines the action steps and resources needed to accomplish a project or activity.

Clarifying: clearly explains task assignments and member responsibilities; sets specific goals and deadlines for important aspects of the work; explains priorities for different objectives; explains rules, policies, and standard procedures.

Monitoring: checks on the progress and quality of the work; examines relevant sources of information to determine how well important tasks are being performed; evaluates the performance of members in a systematic way.

Supporting: shows concern for the needs and feelings of individual members; provides support and encouragement when there is a difficult or stressful task and expresses confidence members can successfully complete it.

Empowering: involves members in making important work-related decisions and considers their suggestions and concerns; delegates responsibility and authority to members for important tasks and allows them to resolve work-related problems without prior approval.

[1] (Yukl, 2012)

APPENDIX D

Codebook

Code System

Leadership	0
Non MLQ-related behaviours	0
Planning	197
Monitoring	188
Clarifying	166
Informing	106
Facilitating	66
Supporting	63
Advising	52
Empowering	36
Reflecting	13
Analysing	8
Shared leadership	0
Delegatesdecisionmaking	99
Shareddecisionmaking	83
Transformational leadership	0
Idealized Influence (behavior)	0
IIB_collectivesense	23
IIB_senseofpurpose	27
IIB_valuesandbeliefs	8
IIB_ethicalmindset	2
Idealized influence (attributed)	0
IIA_buildsrespect	36
IIA_prideencouraging	32
IIA_displayssenseofpower	16
IIA_goesbeyondselfinterest	6
Individualized Consideration	0
IC_empathic	44
IC_treatspeopleasindividuals	24
IC_personaldevelopment	4
IC_coaching	3
Inspirational Motivation	0
IM_talksenthusiasticallyaboutgoals	22
IM_optimisticaboutthefuture	11
IM_confidentaboutgoalachievement	7
IM_visionary	5

Intellectual stimulation	0
IS_perspectiveseeking	72
IS_creativitystimulating	14
IS_criticalquestionning	17
IS_innovativeworking	12
Transactional leadership	0
Contingent Reward	0
CR_assistanceforefforts	26
CR_clarifiestaskresponsibilities	187
CR_expressesexpectationfulfillment	11
CR_clarifiesrewardsforperformance	3
Management-by-Exception (Active)	0
MEA_attentiontodeviations	66
MEA_directtowardsfailurestomeetstandards	21
MEA_complaintshandling	29
MEA_mistakemonitoring	23
Passive Avoidant Leadership	0
Management-by-Exception (Passive)	0
MEP_demonstrateschronicproblemsolving	1
MEP_passiveactiontaking	3
MEP_responsivetoarisingproblemsonly	2
MEP_failstointerfere	1
Laissez-faire	0
LF_delaysrespondingtourgentquestions	1
LF_avoidsmakingdecisions	3
LF_absent	1
LF_avoidsgettinginvolved	3
Feedback & Reactions	0
Clarifiestaskstatus	204
Providesclarity	135
Judging	110
Clarifiesneeds	68
Emphasizesdeviation	57
Clarifiesunderstanding	57
Justifiestaskstatus	42
Takesresponsibility	22
Critisisestaskmanagement	20
Clarifiesposition	19
Asksforhelp	6
Asksforapproval	4
Behavioural reactions	0

Confirming	95
Unclarity	53
Satisfied	37
Challenged	34
Rejecting	22
Enthusiastic	16
Optimistic	12
Confidentspeaking	12
Actions	0
Asksforclarity	112
Expressessenseofduty	37
Suggestssolution	24
Providesassistance	18
Showsinitiative	9
Autonomous	7
Apologizes	4
Roles	0
SM	215
SA	18
QCT	22
PO	521
PM	220
RTE	592
Developer	39

Leadership

Non MLQ-related behaviours

Planning

Coordinating and scheduling project activities to efficiently utilize resources and people; Establishes work-related plans to identify the next project-related milestones

Monitoring

Assesses essential information to evaluate task performance;
Reviews task-related quality and progress and/or systematically evaluates how members perform

Clarifying

Defines work-related goals, priorities, rules and deadlines; Clarifies responsibilities and the assignments of tasks

Informing

Navigates through the system functionalities; Explains organisational and task contexts to facilitate a better understanding of certain topics

Facilitating

Stimulating inter-team communication and collaboration by moderating the call and engaging team members to ask open questions or share general thoughts

Supporting

Builds collaborative relationships and helps team members handling stressful situations

Advising

Advising team members and/or leading positions on how to manage certain tasks and upcoming planning structures; Presenting and/or guiding through work-related content to provide a better understanding to team members to manage tasks

Empowering

Gives members authority related to handling important tasks and related problems, without requiring permission: Includes members concerns and ideas when making relevant decisions related to work

Reflecting

Reflecting on own past experience with project management challenges to help others with related issues or expecting to receive feedback from other team members related to similar experiences

Analysing

Determines and evaluates overall progress of agile teams by proactively scanning through a system

Shared leadership

Delegatesdecisionmaking

Asking team members if they want to share something (e.g. a task update) without directly addressing them and expecting them to share something

Shareddecisionmaking

Shares an opinion or proposes a decision regarding task management and planning and asks the team for their approval; Makes decisions collectively with the team, for instance regarding whom needs to share status updates next

Transformational leadership

Idealized Influence (behaviour)

IIB_collectivesense

Underlines how relevant it is to hold a collective sense of mission

IIB_senseofpurpose

Sets out how important it is to have a strong sense of purpose

IIB_valuesandbeliefs

Discusses beliefs and values that he/she holds most dear

IIB_ethicalmindset

Takes into account the ethical and moral implications related to a decision

Idealized influence (attributed)

IIA_buildsrespect

Behaves in a manner that grows others´ respect for him/her

IIA_prideencouraging

Arouses pride in other people for being connected to him/her

IIA_displayssenseofpower

Behaves confidently and acts powerful

IIA_goesbeyondselfinterest

Transcends own interests for the good of the group

Individualized Consideration

IC_empathic

Takes into account that each person has different skills, ambitions and needs than others

IC_treatspeopleasindividuals

Views people as individuals and not just as team members

IC_personaldevelopment

Supports other people to grow their strengths

IC_coaching

Invests time to coach and teach others.

Inspirational Motivation

IM_talksenthusiasticallyaboutgoals

Speaks with enthusiasm about what has to be achieved

IM_optimisticaboutthefuture

Speaks with optimism about the future

IM_confidentaboutgoalachievement

Is confident about the achievement of goals

IM_visionary

Communicates a vision of the future that is persuasive

Intellectual stimulation

IS_perspectiveseeking

Seeks different perspectives, when solving problems

IS_creativitystimulating

Engages people to view problems from a variety of perspectives

IS_criticalquestionning

Reviews critical assumptions to scrutinize their appropriateness

IS_innovativeworking

Proposes new methods for getting tasks done

Transactional leadership

Contingent Reward

CR_assistanceforefforts

Offers assistance to others in return for their endeavours

CR_clarifiestaskresponsibilities

Specifies responsibilities for the achievement of the performance targets

CR_expressesexpectationfulfillment

Shows contentment when other people fulfill the expectations

CR_clarifiesrewardsforperformance

Clearly states what people can expect to gain if performance targets are met

Management-by-Exception (Active)

MEA_attentiontodeviations

Draws attention to faults, irregularities and discrepancies from norms

MEA_directtowardsfailurestomeetstandards

Draws the attention of people to non-compliance with norms in order to fulfil expectations

MEA_complaintshandling

Focuses fully on handling setbacks, complaints and mistakes

MEA_mistakemonitoring

Keeps an eye on all mistakes

Passive Avoidant Leadership

Management-by-Exception (Passive)

MEP_demonstrateschronicproblemsolving

Shows that action needs to be taken only when problems are becoming chronic

MEP_passiveactiontaking

Indicates to firmly believe in fixing thinks only when they are broke

MEP_responsivetoarisingproblemsonly

Awaits until something goes wrong before he/she takes action

MEP_failstointerfere

Does not intervene until the problems are getting serious

Laissez-faire

LF_delaysrespondingtourgentquestions

Responds delayed to questions that are urgent

LF_avoidsmakingdecisions

Avoids making decisions

LF_absent

Shows absence when people need him/her

LF_avoidsgettinginvolved

Is not willing to interfere when major issues come up

Behavioural Reactions

Clarifiestaskstatus

Clarifies the status of assigned tasks or task dependencies and the planning of activities that he/she or the respective team is working on

Providesclarity

Provides clarity about how tasks are coordinated, implemented. Answers contextual background questions asked by superordinate

Judging

Talks openly and/or shares opinion about issues

Clarifiesneeds

Addresses a demand towards the team and/or a superordinate that needs to be fulfilled to solve an issue or unclarity associated with a task or planning activity

Emphasizesdeviation

Highlights a deviation from a planned schedule or defined KPIs regarding task assignments (e.g. due to dependencies to other teams) and associated concerns

Clarifiesunderstanding

Clarifies personal understanding about a certain situation such as how to interpret specific task requirements or planning aspects such as deadlines or why things have been done a specific way

Justifiestaskstatus

Provides specific arguments to justify the status of assigned tasks or planning activities, for instance by addressing associated issues or dependencies that lower down the progress

Takesresponsibility

Mainly related to taking responsibility for problem-solving tasks

Critisisestaskmanagement

Criticises the ineffectiveness/inefficiency or lack of quality of how task/project management (e.g. task documentation and tracking or prioritization of tasks) is being handled

Clarifiesposition

Arguments on personal capacities regarding what he/she can do and what he/she can´t do

Asksforhelp

Asks for help with solving an assignment/task or planning of activities

Asksforapproval

Asks for approval in order to proceed with a certain task/assignment such as communicating a result to assure to be compliant with expectations and formalities

Confirming

Confirms a (task-related) suggestion/update/question from a team member/leading position regarding its content-, planning-structure or delivery status; Confirms an issue that has been formerly communicated by a team member

Unclarity

Unclarity or vague knowledge about responsibility, status and/or procedure/fulfillment of an assigned task

Satisfied

Expresses satisfaction about the personal state of mind (e.g. due to making progress with personal/job-related experiences) or receiving help from colleagues in assisting personal responsibilities

Challenged

Emphasizes to be challenged with current responsibilities such as assigned tasks, involvement in planning activities, e.g. due to too many (organisational) issues/dependencies involved; Indicates skeptical attitude regarding upcoming assignments

Rejecting

Expresses towards leading position/other team member that there is no update to report and/or need to address related to a task/planning activity or personal matters

Enthusiastic

Shows enthusiasm about the current status of assigned tasks and/or planning of activities and/or when guiding others through personal results

Optimistic

Expresses optimism related to delivering currently assigned tasks/planning activities or overcoming currently experienced challenges regarding assigned tasks or planning activities

Confidentspeaking

Expresses confidence by making own point of view very clear

Asksforclarity

Asks for clarity, an update and/or more context regarding a specific task or planning activity to be capable to understand/answer, coordinate and/or work on it (e.g. a deadline)

Expressessenseofduty

Expresses sense of duty and emphasizes obligation to take care of a task or planning activity on behalf of the team

Suggestssolution

Suggests a solution to fix an issue or to increase the effectiveness/efficiency of collaboration related to a task or planning activity addressed by oneself or another team member

Providesassistance

Provides assistance and/or confirms support to help other team members with their tasks/planning activities

Showsinitiative

Shows initiative in taking over a task and/or planning activity on behalf of the team

Autonomous

Independent decision-making for certain actions or tasks

Apologizes

Apologizes, for instance for a deviation based on overstress or being overchallenged with tasks

Roles

SM

SA

QCT

PO

PM

RTE

Developer

APPENDIX E

Leadership Outcomes

Table 23: Outcomes of non-MLQ related leadership behaviours

Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency
Planning	Transformational	63	Monitoring	Transformational	47	Clarifying	Transformational	61	Informing	Transformational	31
	Transactional	86		Transactional	88		Transactional	94		Transactional	30
	Passive Avoidant	0		Passive Avoidant	3		Passive Avoidant	1		Passive Avoidant	1
	Shared decision making	31		Shared decision making	11		Shared decision making	14		Shared decision making	8
	Delegates decision making	41		Delegates decision making	20		Delegates decision making	9		Delegates decision making	16
	Clarifiestaskstatus	47		Clarifiestaskstatus	82		Clarifiestaskstatus	21		Clarifiestaskstatus	19
	Providesclarity	32		Providesclarity	47		Providesclarity	12		Providesclarity	15
	Judging	13		Judging	22		Judging	20		Judging	13
	Clarifiesneeds	6		Clarifiesneeds	10		Clarifiesneeds	13		Clarifiesneeds	5
	Emphasizesdeviation	17		Emphasizesdeviation	22		Emphasizesdeviation	8		Emphasizesdeviation	5
	Clarifiesunderstanding	7		Clarifiesunderstanding	10		Clarifiesunderstanding	13		Clarifiesunderstanding	7
	Justifiestaskstatus	10		Justifiestaskstatus	14		Justifiestaskstatus	5		Justifiestaskstatus	2
	Takesresponsibility	3		Takesresponsibility	2		Takesresponsibility	8		Takesresponsibility	2
	Critisisestaskmanagement	4		Critisisestaskmanagement	2		Critisisestaskmanagement	3		Critisisestaskmanagement	2
	Clarifiesposition	1		Clarifiesposition	3		Clarifiesposition	9		Clarifiesposition	3
	Confirming	18		Confirming	15		Confirming	22		Confirming	6
	Unclarity	7		Unclarity	10		Unclarity	6		Unclarity	6
	Satisfied	5		Satisfied	4		Satisfied	3		Satisfied	4
	Challenged	5		Challenged	11		Challenged	4		Challenged	1
	Rejecting	6		Rejecting	2		Rejecting	2		Rejecting	2
	Enthusiastic	4		Enthusiastic	3		Enthusiastic	2		Enthusiastic	5
	Optimistic	2		Optimistic	1		Optimistic	0		Optimistic	0
	Confidentspeaking	3		Confidentspeaking	0		Confidentspeaking	0		Confidentspeaking	1
	Asksforclarity	29		Asksforclarity	34		Asksforclarity	18		Asksforclarity	11
	Expressessenseofduty	10		Expressessenseofduty	8		Expressessenseofduty	10		Expressessenseofduty	2
	Suggestssolution	4		Suggestssolution	1		Suggestssolution	6		Suggestssolution	1
	Providesassistance	4		Providesassistance	2		Providesassistance	1		Providesassistance	1
	Showsinitiative	0		Showsinitiative	1		Showsinitiative	2		Showsinitiative	2
	Autonomous	1		Autonomous	2		Autonomous	1		Autonomous	0

Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency
Supporting	Transformational	38	Advising	Transformational	26	Empowering	Transformational	25	Facilitating	Transformational	25	Reflecting	Transformational	9
	Transactional	20		Transactional	20		Transactional	10		Transactional	14		Transactional	4
	Passive Avoidant	0		Passive Avoidant	0		Passive Avoidant	0		Passive Avoidant	0		Passive Avoidant	0
	Shared decision making	7		Shared decision making	4		Shared decision making	3		Shared decision making	13		Shared decision making	2
	Delegates decision making	7		Delegates decision making	5		Delegates decision making	4		Delegates decision making	18		Delegates decision making	0
	Clarifiestaskstatus	10		Clarifiestaskstatus	6		Clarifiestaskstatus	7		Clarifiestaskstatus	13		Clarifiestaskstatus	3
	Providesclarity	6		Providesclarity	8		Providesclarity	10		Providesclarity	6		Providesclarity	1
	Judging	6		Judging	14		Judging	3		Judging	2		Judging	6
	Clarifiesneeds	11		Clarifiesneeds	6		Clarifiesneeds	2		Clarifiesneeds	2		Clarifiesneeds	0
	Emphasizesdeviation	6		Emphasizesdeviation	4		Emphasizesdeviation	0		Emphasizesdeviation	5		Emphasizesdeviation	1
	Clarifiesunderstanding	3		Clarifiesunderstanding	4		Clarifiesunderstanding	1		Clarifiesunderstanding	3		Clarifiesunderstanding	0
	Justifiestaskstatus	2		Justifiestaskstatus	6		Justifiestaskstatus	2		Justifiestaskstatus	1		Justifiestaskstatus	0
	Takesresponsibility	1		Takesresponsibility	3		Takesresponsibility	2		Takesresponsibility	2		Takesresponsibility	0
	Critisisestaskmanagement	2		Critisisestaskmanagement	0		Critisisestaskmanagement	2		Critisisestaskmanagement	0		Critisisestaskmanagement	0
	Clarifiesposition	1		Clarifiesposition	4		Clarifiesposition	0		Clarifiesposition	2		Clarifiesposition	0
	Confirming	6		Confirming	5		Confirming	4		Confirming	2		Confirming	0
	Unclarity	4		Unclarity	2		Unclarity	1		Unclarity	1		Unclarity	0
	Satisfied	4		Satisfied	0		Satisfied	2		Satisfied	3		Satisfied	1
	Challenged	2		Challenged	2		Challenged	1		Challenged	2		Challenged	2
	Rejecting	0		Rejecting	0		Rejecting	0		Rejecting	6		Rejecting	0
	Enthusiastic	0		Enthusiastic	1		Enthusiastic	3		Enthusiastic	0		Enthusiastic	0
	Optimistic	0		Optimistic	0		Optimistic	1		Optimistic	0		Optimistic	0
	Confidentspeaking	3		Confidentspeaking	4		Confidentspeaking	2		Confidentspeaking	1		Confidentspeaking	0
	Asksforclarity	5		Asksforclarity	4		Asksforclarity	4		Asksforclarity	8		Asksforclarity	1
	Expressessenseofduty	4		Expressessenseofduty	4		Expressessenseofduty	2		Expressessenseofduty	3		Expressessenseofduty	0
	Suggestssolution	5		Suggestssolution	10		Suggestssolution	0		Suggestssolution	0		Suggestssolution	0
	Providesassistance	4		Providesassistance	2		Providesassistance	4		Providesassistance	2		Providesassistance	2
	Showsinitiative	3		Showsinitiative	1		Showsinitiative	1		Showsinitiative	0		Showsinitiative	0
	Autonomous	1		Autonomous	1		Autonomous	2		Autonomous	0		Autonomous	0

Table 24: Outcomes of transformational, transactional & passive-avoidant leadership behaviours

Trigger	Outcome	Frequency	Trigger	Outcome	Frequency	Trigger	Outcome	Frequency
Transformational Leadership	Shared decision making	26	Transactional Leadership	Shared decision making	17	Passive Avoidant Leadership	Shared decision making	2
	Delegates decision making	37		Delegates decision making	21		Delegates decision making	2
	Planning	62		Planning	84		Planning	1
	Monitoring	50		Monitoring	90		Monitoring	3
	Clarifying	49		Clarifying	92		Clarifying	0
	Informing	25		Informing	25		Informing	1
	Facilitating	19		Facilitating	11		Facilitating	0
	Supporting	31		Supporting	22		Supporting	0
	Advising	16		Advising	17		Advising	0
	Empowering	22		Empowering	11		Empowering	0
	Reflecting	7		Reflecting	6		Reflecting	0
	Analyzing	2		Analyzing	0		Analyzing	0
	Transformational	0		Transformational	81		Transformational	3
	Transactional	85		Transactional	0		Transactional	5
	Clarifiestaskstatus	49		Clarifiestaskstatus	81		Clarifiestaskstatus	1
	Providesclarity	41		Providesclarity	50		Providesclarity	0
	Judging	31		Judging	42		Judging	4
	Clarifiesneeds	30		Clarifiesneeds	23		Clarifiesneeds	1
	Emphasizesdeviation	16		Emphasizesdeviation	27		Emphasizesdeviation	0
	Clarifiesunderstanding	15		Clarifiesunderstanding	19		Clarifiesunderstanding	0
	Justifiestaskstatus	4		Justifiestaskstatus	25		Justifiestaskstatus	0
	Takesresponsibility	6		Takesresponsibility	12		Takesresponsibility	1
	Critisizestaskmanagement	7		Critisizestaskmanagement	9		Critisizestaskmanagement	3
	Clarifiesposition	6		Clarifiesposition	6		Clarifiesposition	2
	Confirming	28		Confirming	37		Confirming	0
	Unclarity	16		Unclarity	16		Unclarity	2
	Satisfied	19		Satisfied	5		Satisfied	1
	Challenged	8		Challenged	13		Challenged	1
	Rejecting	12		Rejecting	1		Rejecting	1
	Enthusiastic	9		Enthusiastic	1		Enthusiastic	0
	Optimistic	7		Optimistic	2		Optimistic	0
	Confidentspeaking	7		Confidentspeaking	2		Confidentspeaking	0
	Asksforclarity	36		Asksforclarity	27		Asksforclarity	1
	Expressessenseofduty	7		Expressessenseofduty	18		Expressessenseofduty	0
	Suggestssolution	7		Suggestssolution	8		Suggestssolution	0
	Providesassistance	4		Providesassistance	4		Providesassistance	1
	Showsinitiative	3		Showsinitiative	3		Showsinitiative	0
	Autonomous	3		Autonomous	3		Autonomous	0

Table 25: Outcomes of shared leadership behaviours

Trigger	Outcome	Frequency	Trigger	Outcome	Frequency
Delegates decision making	Planning	47	Shared decision making	Planning	28
	Monitoring	21		Monitoring	16
	Clarifying	16		Clarifying	16
	Informing	17		Informing	9
	Facilitating	16		Facilitating	7
	Supporting	2		Supporting	4
	Advising	6		Advising	6
	Empowering	4		Empowering	5
	Transformational	38		Transformational	0
	Transactional	21		Transactional	0
	Passive Avoidant	1		Passive Avoidant	1
	Delegates Decision making	0		Delegates Decision making	5
	Shared decision making	15		Shared decision making	0
	Clarifiestaskstatus	25		Clarifiestaskstatus	20
	Providesclarity	8		Providesclarity	11
	Judging	6		Judging	9
	Clarifiesneeds	7		Clarifiesneeds	3
	Emphasizesdeviation	4		Emphasizesdeviation	7
	Clarifiesunderstanding	3		Clarifiesunderstanding	0
	Justifiestaskstatus	0		Justifiestaskstatus	4
	Takesresponsibility	2		Takesresponsibility	1
	Critisisestaskmanagement	1		Critisisestaskmanagement	2
	Clarifiesposition	1		Clarifiesposition	0
	Confirming	4		Confirming	7
	Unclarity	3		Unclarity	4
	Satisfied	2		Satisfied	5
	Challenged	5		Challenged	4
	Rejecting	15		Rejecting	0
	Enthusiastic	1		Enthusiastic	3
	Optimistic	1		Optimistic	3
	Confidentspeaking	1		Confidentspeaking	2
	Asksforclarity	8		Asksforclarity	1
	Expressessenseofduty	5		Expressessenseofduty	3
	Suggestssolution	1		Suggestssolution	0
	Providesassistance	2		Providesassistance	1
	Showsinitiative	1		Showsinitiative	0
	Autonomous	1		Autonomous	0

APPENDIX F

Co-occurrences of leadership behaviours

Table 26: Co-occurrence - Transformational & non-MLQ related leadership behaviours

Code System	Non MLQ-related behaviors	Planning	Monitoring	Clarifying	Informing	Facilitating	Supporting	Advising	Empowering	Reflecting	Analyzing
Transformational leadership											
Idealized Influence (behavior)											
IIB_collectivesense		6		5	2		6				
IIB_senseofpurpose		6	2	8	2	1	3		1		
IIB_valuesandbeliefs		1		3			1				
IIB_ethicalmindset											
Idealized influence (attributed)											
IIA_buildsrespect		4	5	4	1		2		3	1	
IIA_prideencouraging		2	2		1	5			10		
IIA_displayssenseofpower		5		5	2	1	2	1			
IIA_goesbeyondselfinterest		1					4				
Individualized Consideration											
IC_empathic		4	4	8		1	7	1			
IC_treatspeopleasindividuals			3	3			3				
IC_personaldevelopment				2					2		
IC_coaching				1						1	
Inspirational Motivation											
IM_talksenthusiasticallyaboutgoals		10	3	7	4	1			1		
IM_optimisticaboutthefuture			1	5					1		
IM_confidentaboutgoalachievement		1	3		1		1			1	
IM_visionary		3			1	1					
Intellectual stimulation											
IS_perspectiveseeking		15	16	4	3	8	1	1	1	1	
IS_creativitystimulating		3	1	4	1	2	1		1		
IS_criticalquestionning			2	1	2		2	1		1	1
IS_innovativeworking		4	1	3				1	1		

Table 27: Co-occurrence - Transformational & shared leadership behaviours

Code System	Shared leadership	Delegatesdecisionmaking	Shareddecisionmaking
Transformational leadership			
Idealized Influence (behavior)			
IIB_collectivesense		2	1
IIB_senseofpurpose		2	4
IIB_valuesandbeliefs			
IIB_ethicalmindset			
Idealized influence (attributed)			
IIA_buildsrespect		2	4
IIA_prideencouraging		4	3
IIA_displayssenseofpower			2
IIA_goesbeyondselfinterest		1	
Individualized Consideration			
IC_empathic			2
IC_treatspeopleasindividuals		2	
IC_personaldevelopment			
IC_coaching			
Inspirational Motivation			
IM_talksenthusiasticallyaboutgoals		5	1
IM_optimisticaboutthefuture		1	
IM_confidentaboutgoalachievement		1	
IM_visionary		1	
Intellectual stimulation			
IS_perspectiveseeking		16	3
IS_creativitystimulating		2	
IS_criticalquestionning		1	
IS_innovativeworking			

Table 28: Co-occurrence - Transformational & transactional leadership behaviours

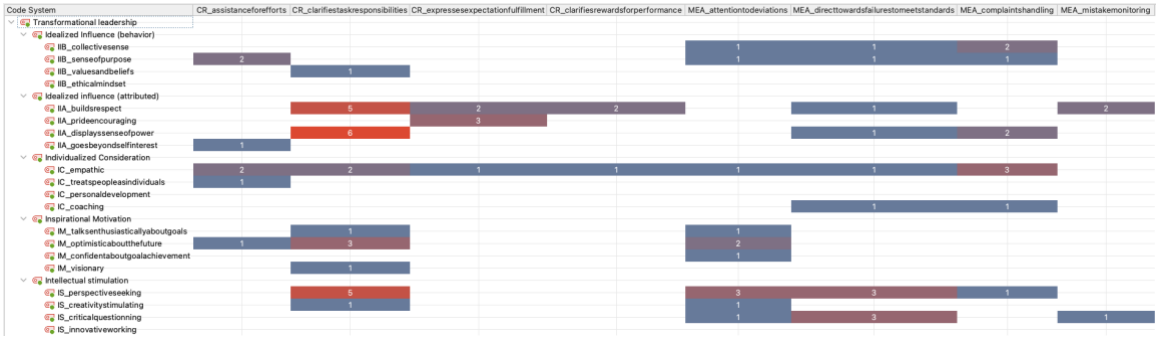


Table 29: Co-occurrence - Transformational & passive-avoidant leadership behaviours

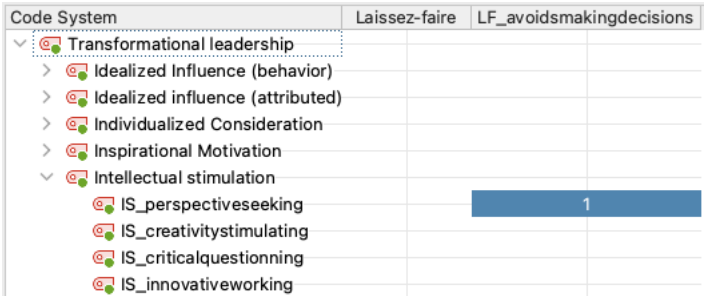


Table 30: Co-occurrence - Transactional & non-MLQ related leadership behaviours

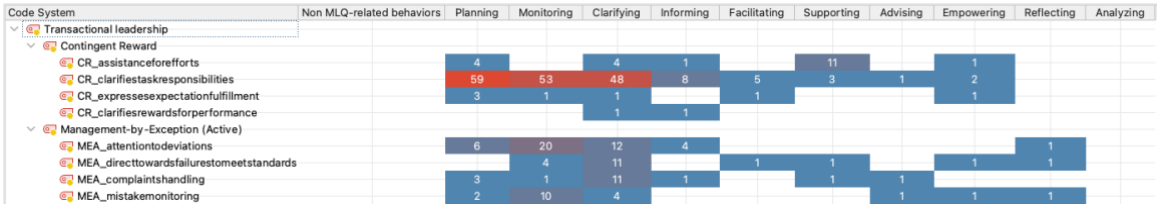


Table 31: Co-occurrence - Transactional & passive-avoidant leadership behaviours

Table 32: Co-occurrence - Transactional & shared leadership behaviours

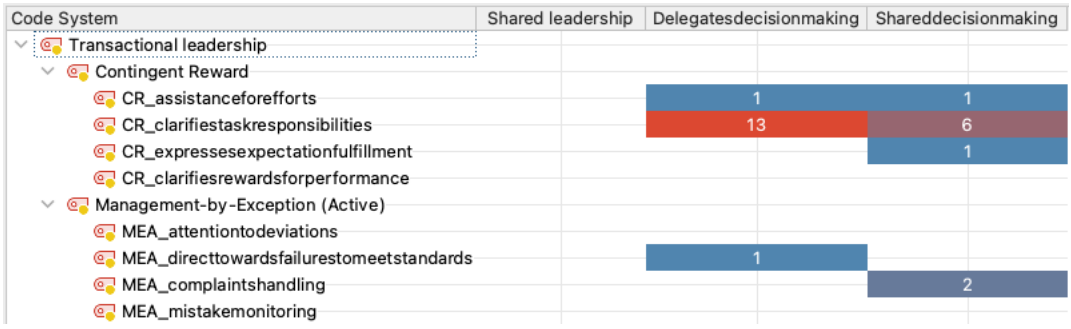
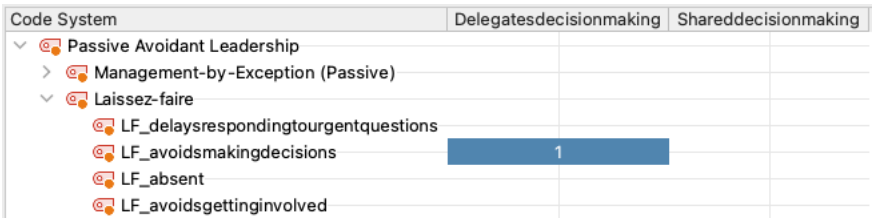


Table 33: Co-occurrence - Passive-avoidant & non-MLQ related leadership behaviours

Table 34: Co-occurrence - Passive-avoidant & shared leadership behaviours



APPENDIX G

Leadership behaviour and leadership outcomes per ART

Figure 20: Perceived leadership & leadership outcomes in ART 1

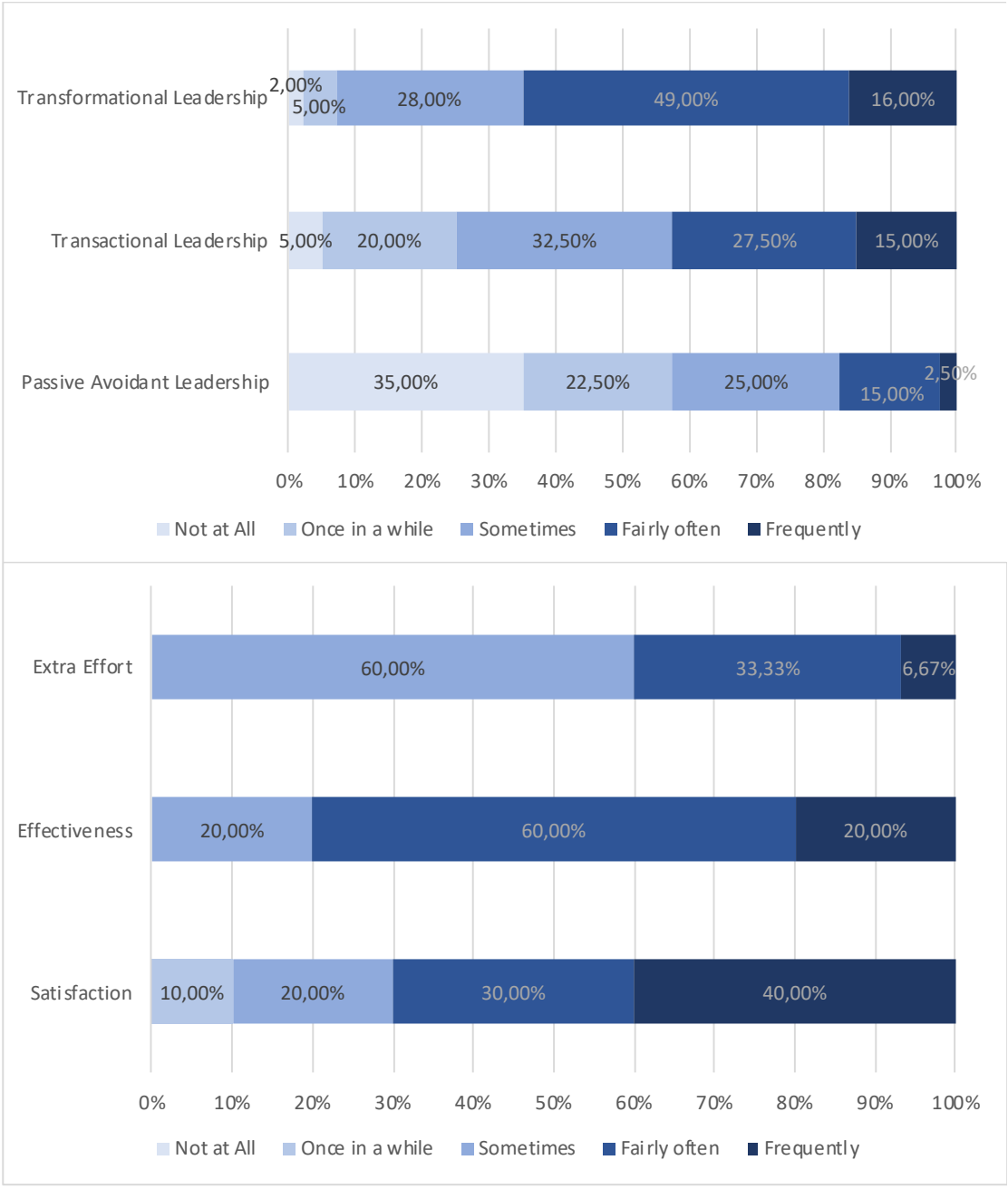
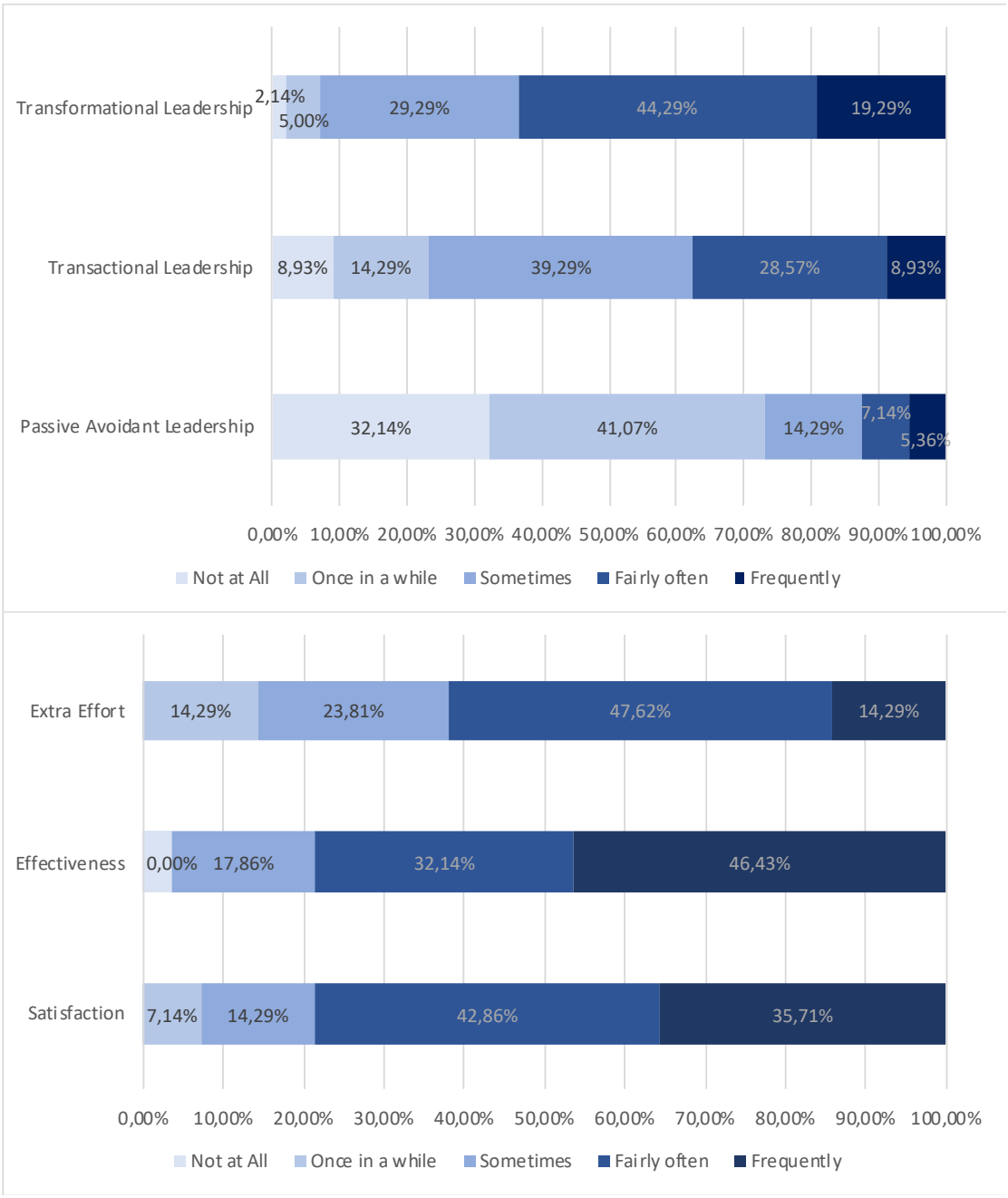


Figure 21: Perceived leadership and leadership outcomes in ART 2



APPENDIX H

Leadership behaviour per meeting type

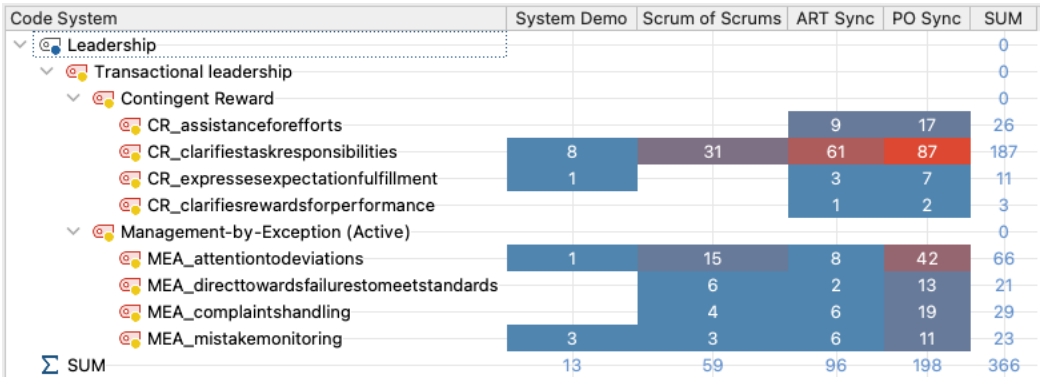
Table 35: Non-MLQ related leadership behaviours per meeting type

Code System	System Demo	Scrum of Scrums	ART Sync	PO Sync	SUM
Leadership					0
Non MLQ-related behaviors					0
Planning	17	25	53	102	197
Monitoring	14	27	81	66	188
Clarifying	2	33	42	89	166
Informing	6	10	38	52	106
Facilitating	13	9	13	31	66
Supporting	3	15	22	23	63
Advising		11	11	30	52
Empowering	6	5	14	11	36
Reflecting		11	1	1	13
Analyzing	1		4	3	8
Shared leadership					0
Delegatesdecisionmaking	3	11	36	49	99
Shareddecisionmaking	2	5	44	32	83
SUM	67	162	359	489	1077

Table 36: Transformational leadership behaviours per meeting type

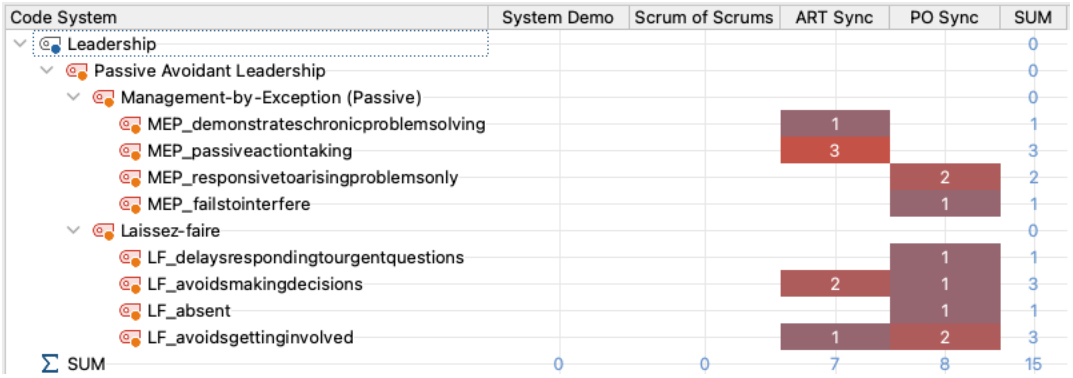
Code System	System Demo	Scrum of Scrums	ART Sync	PO Sync	SUM
Leadership					0
Transformational leadership					0
Idealized Influence (behavior)					0
IIB_collectivesense	4	1	10	8	23
IIB_senseofpurpose		4	9	14	27
IIB_valuesandbeliefs		3	1	4	8
IIB_ethicalmindset	2				2
Idealized influence (attributed)					0
IIA_buildsrespect	7	5	15	9	36
IIA_prideencouraging	12	4	11	5	32
IIA_displayssenseofpower	1	3	3	9	16
IIA_goesbeyondselfinterest		2	2	2	6
Individualized Consideration					0
IC_empathic	1	6	10	27	44
IC_treatspeopleasindividuals		3	9	12	24
IC_personaldevelopment		3	1		4
IC_coaching		1		2	3
Inspirational Motivation					0
IM_talksenthusiasticallyaboutgoals	4	3	10	5	22
IM_optimisticaboutthefuture	1	5	3	2	11
IM_confidentaboutgoalachievement	1	2	2	2	7
IM_visionary	2	1	1	1	5
Intellectual stimulation					0
IS_perspectiveseeking	3	10	29	30	72
IS_creativitystimulating	2	4	2	6	14
IS_criticalquestionning	1	5	2	9	17
IS_innovativeworking	3	5	2	2	12
SUM	44	70	122	149	385

Table 37: Transactional leadership behaviours per meeting type



Code System	System Demo	Scrum of Scrums	ART Sync	PO Sync	SUM
Leadership					0
Transactional leadership					0
Contingent Reward					0
CR_assistanceforefforts			9	17	26
CR_clarifiestaskresponsibilities	8	31	61	87	187
CR_expressesexpectationfulfillment	1		3	7	11
CR_clarifiesrewardsforperformance			1	2	3
Management-by-Exception (Active)					0
MEA_attentiontodeviations	1	15	8	42	66
MEA_directtowardsfailurestomeetstandards		6	2	13	21
MEA_complaintshandling		4	6	19	29
MEA_mistakemonitoring	3	3	6	11	23
SUM	13	59	96	198	366

Table 38: Passive-avoidant leadership behaviours per meeting type



Code System	System Demo	Scrum of Scrums	ART Sync	PO Sync	SUM
Leadership					0
Passive Avoidant Leadership					0
Management-by-Exception (Passive)					0
MEP_demonstrateschronicproblemsolving			1		1
MEP_passiveactiontaking			3		3
MEP_responsivetoarisingproblemsonly				2	2
MEP_failstointerfere				1	1
Laissez-faire					0
LF_delaysrespondingtourgentquestions				1	1
LF_avoidsmakingdecisions			2	1	3
LF_absent				1	1
LF_avoidsgettinginvolved			1	2	3
SUM	0	0	7	8	15

BIBLIOGRAPHY

Abrahamsson, P., Salo, O., Ronkainen, J., & Warsta, J. (2017). *Agile software development methods: Review and analysis.* arXiv preprint arXiv:1709.08439.

Afsar, B., Badir, Y., Saeed, B., & Hafeez, S. (2017). Transformational and transactional leadership and employee's entrepreneurial behavior in knowledge–intensive industries. *The International Journal of Human Resource Management*, 307-332.

Alt, R., Beck, R., & Smits, M. (2018). FinTech and the transformation of the financial industry.

Anderson, R., & Adams, W. (2015). *Mastering leadership: An integrated framework for breakthrough performance and extraordinary business results.* John Wiley & Sons.

Antonakis, J., Ashkanasy, N. M., & Dasborough, M. T. (2009). Does leadership need emotional intelligence? *The leadership quarterly, 20(2)*, 247-261.

Antonakis, J., Avolio, B., & Sivasubramaniam, N. (2003). Context and leadership: An examination of the nine-factor full-range leadership theory using the Multifactor Leadership Questionnaire. *The leadership quarterly, 14(3)*, 261-295.

Antonakis, J., & Day, D. (2018). Leadership: Past, present, and future. In J. Antonakis, & D. Day, *The nature of leadership* (pp. 3-26). Thousand Oaks,CA: Sage.

Antonakis, J., Schriesheim, C., Donovan, J., Gopalakrishna-Pillai, K., Pelligrini, E., & Rossomme, J. (2004). Methods of studying leadership. In J. Antonakis, A. Cianciolo, & R. Sternberg, *The nature of leadership* (pp. 48-70). Thousand Oaks,CA: Sage.

Aryee, S., Walumbwa, F., Zhou, Q., & Hartnell, C. (2012). Transformational leadership, innovative behavior, and task performance: Test of mediation and moderation processes. *Human Performance, 25(1)*, 1-25.

Avolio, B. (2007). Promoting more integrative strategies for leadership theory-building. *American psychologist, 62(1)*.

Avolio, B., & Bass, B. (1991). *The full range leadership development programs: basic and advanced manuals.* Binghamton, New York: Bass, Avolio & Associates.

Aydogdu, S., & Asikgil, B. (2011). The effect of transformational leadership behavior on organizational culture: An application in pharmaceutical industry. *International Review of Management and Marketing, 1(4)*.

Bass, B. (1985). *Leadership and performance beyond expectations.* New York: The Free Press.

Bass, B., & Avolio, B. (1996). Multifactor leadership questionnaire. *European Journal of Psychological Assessment.*

Bass, B., & Avolio, B. (2004). *Multifactor Leadership Questionnaire Manual (3).* Menlo
Park: Mind Garden, Inc.

Bass, B., & Bass, R. (2009). *The Bass handbook of leadership: Theory, research, and managerial applications.* Simon and Schuster.

Bass, B., & Riggio, R. (2006). *Transformational leadership, 2nd ed.* Mahwah: Lawrence Erlbaum Associates.

Bass, B., & Yammarino, F. (1991). Congruence of self and others' leadership ratings of naval officers for understanding successful performance. *Applied Psychology , 40(4)*, 437-454.

Beck, K. (2000). *Extreme programming explained: embrace change.* addison-wesley professional.

Behrendt, P., Matz, S., & Göritz, A. (2017). An integrative model of leadership behavior. . *The leadership quarterly, 28(1)*, 229-244.

Bernard, H. (2006). *Research methods in anthropology: Qualitative and quantitative approaches.* Walnut Creek,CA: AltaMira Press.
Bhavnani, S., Narula, J., & Sengupta, P. (2016). Mobile technology and the digitization of healthcare. *European heart journal, 37(18)*, 1428-1438.
Boehm, B. (2002). Get ready for agile methods, with care. *Computer, 35(1)*, 64-69.
Bryman, A. (1992). *Charisma and leadership in organizations.* London: Sage Publications.
Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative research, 6 (1)*, 97-113.
Bulmer, M., Sturgis, P., & Allum, N. (2009). *Secondary Analysis of Survey Data.* Los Angeles: Sage.
Burns, J. (1978). *Leadership.* New York: Harper & Row,3.
Campanelli, A., & Parreiras, F. (2015). Agile methods tailoring - A systematic literature review. . *Journal of Systems and Software, 110*, 85-100.
Ceschi, M., Sillitti, A., Succi, G., & De Panfilis, S. (2005). Project management in plan-based and agile companies. *IEEE Software, 22(3)*, 21-27.
Chorney, J., McMurtry, C., Chambers, C., & Bakeman, R. (2015). Developing and modifying behavioral coding schemes in pediatric psychology: a practical guide. *Journal of pediatric psychology, 40(1)*, 154-164.
Cockburn, A., & Highsmith, J. (2001). Agile software development, the people factor. *Computer, 34(11)*, 131-133.
Collis, J., & Hussey, R. (2003). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students.* Basingstoke: Pearson.
Dang, D., Waldman, D., & Zhang, Z. (2014). A meta-analysis of shared leadership and team effectiveness. *Journal of applied psychology, 99(2)*.
Dansereau, F., Graen, G., & Haga, W. (1975). A vertical dyad approach to leadership within formal organizations. *Organizational Behavior and Human Performance, 13*, 46-78.
Dewettinck, K., & Van Ameijde, M. (2011). Linking leadership empowerment behaviour to employee attitudes and behavioural intentions. *Personnel Review.*
Dingsøyr, T., & Moe, N. B. (2013). Research challenges in large-scale agile software development. *ACM SIGSOFT Software Engineering Notes, 38(5)*, 38-39.
Dingsøyr, T., Nerur, S., Balijepally, V., & Moe, N. B. (2012). A decade of agile methodologies: Towards explaining agile software development. *The Journal of Systems and Software*, 1213-1221.
Drury, M., Conboy, K., & Power, K. (2012). Obstacles to decision making in Agile software development teams. *Journal of Systems and Software, 85(6)*, 1239-1254.
Dumdum, U., Lowe, K., & Avolio, B. (2013). A meta-analysis of transformational and transactional leadership correlates of effectiveness and satisfaction: An update and extension. *Transformational and charismatic leadership: The road ahead 10th anniversary edition.*
Eagly, A., Johannesen-Schmidt, M., & Van Egen, M. (2003). Transformational, transactional, and laissez-faire leadership styles: a meta-analysis comparing women and men. *Psychological bulletin, 129(4)*.
Eisenhardt, K., & Graebner, M. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal, 50 (1)*, 25-32.
Fisher College of Business. (2021). *Leader Behavior Description Questionnaire (LBDQ)*. Retrieved 02 2021, from fisher.osu.edu: https://fisher.osu.edu/centers-partnerships/leadership/leader-behavior-description-questionnaire-lbdq#:~:text=%22The%20Leader%20Behavior%20Description%20Questionnaire,which%20a%20leader%20may%20behave.

Ford, J., & Ford, L. (2012). The leadership of organization change: A view from recent empirical evidence. In A. Shani, W. Pasmore, & R. Woodman, *Research in Organizational Change and Development* (pp. 1-36). Emerald Group Publishing Limited.

Full Circle Group. (2021, 04 01). *The Leadership Circle Profile*. Retrieved from fcg-global.com: https://www.fcg-global.com/assessments/2016/4/15/the-leadership-circle-profile

Gibb, C. (1958). An interactional view of the emergence of leadership. *Australian Journal of Psychology, 10*, 101-110.

Glesne, C. (2006). *Becoming qualitative researchers: An introduction.* Boston: Allyn and Bacon.

Gockel, C., & Werth, L. (2011). Measuring and modeling shared leadership. *Journal of Personnel Psychology*.

Gordon, T. (1955). *Group-centered leadership: a way of releasing the creative power of groups.*

Grbich, C. (2007). *Qualitative data analysis: An introduction.* Thousand Oaks, CA: Sage.

Guzzo, R., & Dickson, M. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual review of psychology, 47(1)*, 307-338.

Halphin, A. (1957). *Manual for the Leader Behavior Description Questionnaire.* Columbus: The Ohio State University.

Henriette, E., Feki, M., & Boughzala, I. (2015). The shape of digital transformation: a systematic literature review. *MCIS 2015 proceedings, 10*, (pp. 431-443).

Hoegl, M., & Gemuenden, H. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization science, 12(4)*, 435-449.

Hoegl, M., Parboteeah, K. P., & Gemuenden, H. G. (2003). When teamwork really matters: task innovativeness as a moderator of the teamwork–performance relationship in software development projects. *Journal of Engineering and Technology Management, 20 (4)*, 281-302.

Hogan Assessments. (2021, 04 21). *Hogan Development Survey*. Retrieved from hoganassessments.com: https://www.hoganassessments.com/assessment/hogan-development-survey/

Hogan, R., & Hogan, J. (2001). Assessing leadership: A view from the dark side. . *International Journal of Selection and assessment, 9(1-2)*, 40-51.

Homans, G. (1950). *The human group.* New York: Harcourt Brace Jovanovich.

House, R., Hanges, P., Javidan, M., Dorfman, P., & Gupta, V. (2004). *Culture, leadership and organizations: The GLOBE study of 62 societies*. Sage Publications.

Kaiser, R., Hogan, R., & Craig, S. (2008). Leadership and the fate of organizations. *American Psychologist, 63*, 96-110.

Katz, D., & Kahn, R. (1978). *The social psychology of organizations.* New York: John Wiley.

Knaster, R., & Leffingwell, D. (2018). *SAFe 4.5 Distilled: Applying the Scaled Agile Framework for Lean Enterprises.* Addison-Wesley Professional.

Laanti, M. (2014). Characteristics and principles of scaled agile. *International Conference on Agile Software Development* (pp. 9-20). Cham: Springer.

Laanti, M. (2017). Agile transformation model for large software development organizations. *Proceedings of the XP2017 Scientific Workshops* (pp. 1-5). Cologne: ACM.

Langfred, C. (2000). The paradox of self-management: Individual and group autonomy in work groups. *Journal of Organizational Behavior, 21(5)*, 563-585.

Larsson, J., & Vinberg, S. (2010). Leadership behaviour in successful organisations: Universal or situation-dependent?. *Total quality management, 21(3)*, 317-334.

LeCompte, M. D., & Goetz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of educational research, 52(1)*, 31-60.
Leffingwell, D. (2010). *Agile software requirements: lean requirements practices for teams, programs, and the enterprise.* Addison-Wesley Professional.
Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *The leadership quarterly, 7(3)*, 385-425.
Marion, R., & Uhl-Bien, M. (2001). Leadership in complex organizations. *The Leadership Quarterly, 12(4)*, 414.
MAXQDA. (2021, 03 24). *https://www.maxqda.com/products/maxqda-plus.* Retrieved from maxqda.com.
McFarland, L., Senn, L., & Childress, J. (1993). *Twenty-first century leadership: Dialogues with 100 top leaders.* Long Beach: Leadership Press.
Medinilla, Á. (2012). *Agile management: Leadership in an agile environment.* Springer Science & Business Media. .
Melo, C., Cruzes, D., Kon, F., & Conradi, R. (2013). Interpretative case studies on agile team productivity and management. *Information and Software Technology, 55(2)*, 412-427.
Miller, G. (2001). The Characteristics of Agile Software Processes. *The 39th International Conference of Object-Oriented Languages and Systems (TOOLS 39).* Santa Barbara: IEEE Computer Society.
Mind Garden, Inc. (2019). *Multifactor Leadership Questionnaire™.* Retrieved 02 2021, from mindgarden.com: https://www.mindgarden.com/16-multifactor-leadership-questionnaire
Moe, N., Aurum, A., & Dybå, T. (2012). Challenges of shared decision-making: A multiple case study of agile software development. *Information and Software Technology, 54(8)*, 853-865.
Moe, N., Dingsøyr, T., & Dybå, T. (2010). A teamwork model for understanding an agile team: A case study of a Scrum project. *Information and Software Technology, 52(5)*, 480-491.
Moe, N., Dingsyr, T., & Kvangardsnes, O. (2009). Understanding shared leadership in agile development: A case study. *42nd Hawaii International Conference on System Sciences* (pp. 1-10). IEEE.
Molina-Azorin, J. (2011). The use and added value of mixed methods in management research. *Journal of Mixed Methods Research, 5 (1)*, 7-24.
Monahan, T., & Fisher, J. A. (2010). Benefits of 'observer effects': lessons from the field. . *Qualitative research, 10(3)*, 357-376.
Moşteanu, N. R. (2020). Challenges for Organizational Structure and design as a result of digitalization and cybersecurity. *The Business & Management Review, 11(1)*, 278-286.
Muenjohn, N., & Armstrong, A. (2008). Evaluating the structural validity of the multifactor leadership questionnaire (MLQ), capturing the leadership factors of transformational-transactional leadership. *Contemporary management research, 4(1)*.
Nerur, S., & Mahapatra, R. (2005). Challenges of migrating to agile methodologies. *Communications of the ACM*, 72-78.
Nold, H., & Michel, L. (2016). The performance triangle: a model for corporate agility. *Leadership & Organization Development Journal, 3*, 341-356.
Ospina, S., & Foldy.E.G. (2010). Building bridges from the margins: The work of leadership in social change organizations. *The Leadership Quarterly, 21*, 292-307.

Pearce, C., & Sims Jr, H. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group dynamics: Theory, research, and practice, 6(2)*.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology, 88(5)*, 881.

Rauch, C., & Behling, O. (1984). Leaders and managers: International perspectives on managerial behavior and leadership. In J. Hunt, D. Hosking, C. Schriesheim, & R. Stewart, *Leaders and managers: International perspectives on managerial behavior and leadership* (pp. 45-62). Elmsford,NY: Pergamon Press.

Richards, D., & Engle, S. (1986). After the vision: Suggestions to corporate visionaries and vision champions. In J. Adams, *Transforming leadership* (pp. 199-214). Alexandria, VA: Miles River Press.

Rothmann, S., & Coetzer, E. (2003). The big five personality dimensions and job performance. . *SA Journal of industrial psychology, 29(1)*, 68-74.

Rubin, K. (2012). *Essential Scrum: A practical guide to the most popular Agile process.* Addison-Wesley.

Sabbagh, K., Friedrich, R., El-Darwiche, B., Singh, M., Ganediwalla, S., & Katz, R. (2012). *Maximizing the impact of digitization.* The global information technology report.

Saldaña, J. (2009). *The coding manual for qualitative researchers.* Thousand Oaks: Sage Publications .

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students.* Pearson education.

Scaled Agile, Inc. (2021). *SAFe 5 for Lean Enterprises*. Retrieved 02 2021, from scaledagileframework.com: https://www.scaledagileframework.com/#

Schein, E. (1992). *Organizational culture and leadership.* San Francisco: Jossey-Bass.

Schwaber, K. (1997). Scrum development process. In K. Schwaber, *Business object design and implementation* (pp. 117-134). London: Springer.

Schwaber, K., & Beedle, M. (2002). *Agile software development with Scrum (Vol. 1).* Uper Saddle River, New Jersey: Prentice Hall.

Schwaber, K., & Sutherland, J. (2011). *The scrum guide. .* Scrum Alliance, 21, 19.

Scott, W., & Davis, G. (2015). *Organizations and organizing: Rational, natural and open systems perspectives.* Routledge.

Sendjaya, S., & Sarros, J. C. (2002). Servant leadership: Its origin, development, and application in organizations. *Journal of Leadership & Organizational Studies, 9(2)*, 57-64.

Sjöström, O., & Holst, D. (2002). Validity of a questionnaire survey: response patterns in different subgroups and the effect of social desirability. *Acta Odontologica Scandinavica, 60(3)*, 136-140.

Skogstad, A., Einarsen, S., Torsheim, T., Aasland, M., & Hetland, H. (2007). The destructiveness of laissez-faire leadership behavior. *Journal of occupational health psychology, 12(1), 80*.

Spano, R. (2005). Potential sources of observer bias in police observational data. *Social science research, 34(3)*, 591-617.

Spiegler, S., Heinecke, C., & Wagner, S. (2021). An empirical study on changing leadership in agile teams. . *Empirical Software Engineering, 26(3)*, 1-35.

Srivastava, P., & Jain, S. (2017). A leadership framework for distributed self-organized scrum teams. *Team performance management: An international journal*.

Stettina, C., & Heijstek, W. (2011). Five agile factors: helping self-management to self-reflect. *European Conference on Software Process Improvement* (pp. 84-96). Berlin, Heidelberg: Springer.

Stettina, C., van Els, V., Croonenberg, J., & Visser, J. (2021). The Impact of Agile Transformations on Organizational Performance: A Survey of Teams, Programs and Portfolios. *International Conference on Agile Software Development* (pp. 86-102). Cham: Springer .

Theobald, S., Prenner, N., Krieg, A., & Schneider, K. (2020). Agile Leadership and Agile Management on Organizational Level - A Systematic Literature Review. *International Conference on Product-Focused Software Process Improvement* (pp. 20-36). Cham: Springer.

Uhl-Bien, M., & Arena, M. (2018). Leadership for organizational adaptability: A theoretical synthesis and integrative framework. *The Leadership Quarterly, 29(1)*, 89-104.

Van der Voet, J., Kuipers, B., & Groeneveld, S. (2016). Implementing change in public organizations: The relationship between leadership and affective commitment to change in a public sector context. *Public Management Review, 18(6)*, 842-865.

Van Dierendonck, D. (2011). Servant leadership: A review and synthesis. *Journal of management, 37(4)*, 1228-1261.

van Kelle, E., Visser, J., Plaat, A., & van der Wijst, P. (2015). An Empirical Study into Social Success Factors for Agile Software Development. *8th International Workshop on Cooperative and Human Aspects of Software Engineering* (pp. 77-80). IEEE.

Van Knippenberg, B., Van Knippenberg, D., De Cremer, D., & Hogg, M. (2005). Research in leadership, self, and identity: A sample of the present and a glimpse of the future. *The Leadership Quarterly, 16(4)*, 495-499.

Van Knippenberg, D., & Sitkin, S. (2013). A critical assessment of charismatic—transformational leadership research: Back to the drawing board?. *Academy of Management Annals, 7(1)*, 1-60.

Vermeeren, B., Kuipers, B., & Steijn, B. (2014). Does leadership style make a difference? Linking HRM, job satisfaction, and organizational performance. *Review of Public Personnel Administration, 34(2)*, 174-195.

Walumbwa, F., Lawler, J., Avolio, B., Wang, P., & Shi, K. (2005). Transformational leadership and work-related attitudes: The moderating effects of collective and self-efficacy across cultures. *Journal of Leadership & Organizational Studies, 11(3)*, 2-16.

Whetstone, J. T. (2002). Personalism and moral leadership: The servant leader with a transforming vision. *Business Ethics: A European Review, 11(4)*, 385-392.

Yang, C., Wang, Y. S., Chang, S., Guo, S. E., & Huang, M. (2009). A study on the leadership behavior, safety culture, and safety performance of the healthcare industry. *World Academy of Science, Engineering and Technology, 53(1)*.

Yin, R. (2009). *Case Study Research: Design and Methods.* Los Angeles: Sage .

Yukl, G. (2008). How leaders influence organizational effectiveness. *The leadership quarterly, 19(6)*, 708-722.

Yukl, G. (2012). Effective leadership behavior: What we know and what questions need more attention. *Academy of Management Perspectives, 26(4)*, 66-85.

Yukl, G., & Gardner, W. (2020). *Leadership in Organizations.* New York: Pearson.

Yukl, G., Gordon, A., & Taber, T. (2002). A hierarchical taxonomy of leadership behavior: Integrating a half century of behavior research. *Journal of leadership & organizational studies, 9(1)*, 15-32.