"Agile Meets Non-Agile": Implications of Adopting Agile Practices at Enterprises

Completed Research

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Abstract

The question of how to increase speed and flexibility in times of digital disruption is essential to virtually any company. While previous research focuses on agility as software development practice or as form for organizing start-ups, little knowledge exists about agility at enterprises and its implications. Agile practices are currently adopted at enterprises in large-scale. While first steps towards agility are made quickly, we observed that specific challenges emerge when enterprises adopt agile practices. Drawing on results of an explorative study with ten global companies and on socio-technical systems theory, we reveal that adopting agile practices has far-reaching implications on products, processes, technology, people, and structure. This study contributes to agility research with specific insights on enterprise agility and its implications. While enterprises need to increase speed and flexibility to master digital transformation, an early incorporation of the implications of adopting agile practices fosters its sustainable implementation.

Keywords

Agility, agile practices, digital transformation, enterprise agility, IT-agility.

Introduction

Digital transformation is ubiquitous and requires companies to "rethink how they interact with customers, define value propositions, leverage data, and organize internal operations" (Joehnk et al. 2017, p. 1). Business model innovation takes place as new competitors create new products or services with the help of digital technologies (Weill and Woerner 2015). Thus, digital transformation imposes the need to react to rapidly changing market demands (Highsmith 2009). The question of how to increase agility plays a crucial role as companies compete on new combinations of digital and physical components for product innovation (Yoo et al. 2010). The pervasive adoption of agile practices (Kurapati et al. 2012) provides evidence for the need of speed and flexibility (Fitzgerald and Stol 2017).

While first steps towards agility are made quickly, we have observed that enterprises soon realize that adopting agile practices differs significantly from a start-up or greenfield context. Contrary to startups, enterprises are exposed to massive, highly customized legacy infrastructure, high volumes of historic data, well-established, highly efficient and optimized business processes that are difficult to change, and require an orchestration with multiple stakeholders (Kulak and Li 2017). As "agile breaks everything" (Kulak and Li 2017, p. 15), adopting agile practices has far-reaching implications on a company's work system (i.e., actors, structures, technologies, and tasks) (Bostrom and Heinen 1977).

Current research focuses on agility as a method of software development (Fitzgerald and Stol 2017) or perceives agility as only suitable to small units with co-located software developers in non-safety critical context (Ambler 2001). Consequently, we have observed a lack of understanding regarding agility as a

phenomenon and specifically regarding agility in the enterprise context with respect to: (1) Clarity of the term and observed kinds of agility (Conboy 2009), (2) specifics of agility in the enterprise context and its scaling (Kettunen and Laanti 2008; Leffingwell 2007; Reifer et al. 2003), (3) implications of adopting agile practices at enterprises (Kulak and Li 2017), (4) the applicability of the theoretical agility concept (Conboy 2009), and (5) empirical studies on how agile practices work in reality (Abrahamsson et al. 2009).

Furthermore, agile practices are often introduced "mechanically" with frameworks like SAFe (Scaled Agile Framework) or LeSS (Large Scale Enterprise Scrum), best practices, or following recommendations from agile coaches neglecting the company specifics (Kulak and Li 2017). As a result, enterprises frequently run into challenges when agile units need to collaborate with existing, non-agile units since mechanical approaches lose their sustainability as the environment around them changes (Kulak and Li 2017).

Against this backdrop we aim at doing justice to the increasing significance of agile practices for enterprises with the following research questions:

RQ 1: What are the specific challenges of adopting agile practices at enterprises?

RQ 2: What are the implications of adopting agile practices at enterprises?

This study is part of a larger research endeavor on enterprise agility. We have conducted a multiple-case study with ten global companies to learn about the implications of adopting agile practices at enterprises. We found that agile practices are currently adopted large-scale at well-established, traditional businesses. The cases revealed that, surprisingly, agile practices are usually adopted without an upfront profound impact analysis. Consequently, we observed specific challenges when enterprises adopt agile practices.

We contribute to research by shedding light on agility at enterprises identifying and clustering observed implications of adopting agile practices by making use of the socio-technical systems theory (STS theory) (Bostrom and Heinen 1977). Practitioners benefit from insights on the specifics of agility at enterprises, implications of the adoption of agile practices and how leading global companies tackle these challenges.

Theoretical Background

This section provides an overview of the theoretical background relevant for this study. We refer to related research on IT and enterprise agility and the socio-technical systems theory.

Roots of Agility

Agility is a response to challenges with the traditional way IT is organized following "Plan-Build-Run" and especially the resulting separation between build and run (Fowler and Highsmith 2001). Agile practices root in systems thinking and lean practices (Kulak and Li 2017). Systems thinking is about changing our perspective to solve problems in new and unexpected ways (Deming 2000). A key assumption of systems thinking is that success is the relation between people and practices and that trust is a prerequisite for speed and success (Kulak and Li 2017).

The Agile Manifesto is seen as the basis for agile practices and aims at designing "better ways of developing software by doing it and helping others do it" (Fowler and Highsmith 2001, p. 2). The Agile Manifesto is related to systems thinking and adopts its principles to software development: Individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan (Fowler and Highsmith 2001).

IT Agility

Due to its roots in software development, agility is closely related to IT. IT-agility can be defined as "the conceptual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value" (Conboy 2009, p. 340). Consequently, a tighter connection between development and execution is required to ensure that errors are detected and fixed as soon as possible (Fitzgerald and Stol 2017). IT agility is characterized by the following practices: Formulation of value stories, removing complexity, shortening release cycles to incorporate immediate customer feedback, and the estimation with story points to reduce effort estimation complexity (Kim et al. 2016). Agile practices aim at clean code, pair programming and immediate feedback,

test-driven development, continuous integration, and automated testing (Kulak and Li 2017). However, introducing agility in the IT function alone is not sufficient and requires "a more holistic approach [...] than one which is merely focused on continuous integration of software" (Fitzgerald and Stol 2017, p. 176). The benefits of agile software development will be sub-optimal if not complemented by an agile approach in related organizational functions such as finance or procurement (Overby et al. 2005).

Enterprise Agility

As organizations scale, so do development and operations in the IT function. While they may initially be co-located with close communication links, increased team size and more strict separation of responsibilities can weaken such links (Swartout 2014). Practitioners made attempts to scale agile practices for enterprises: LeSS (Large Scale Scrum) is a lightweight agile framework for scaling Scrum to more than one team (Larman and Vodde 2017) and SAFe (Scaled Agile Framework) is another approach for lean agile thinking and more visibly incorporating of scalable DevOps (ScaledAgile 2017). It is based on "experiences of organizations that have adopted agile at enterprise scale and describes practices and activities, roles, and artefacts" (Fitzgerald and Stol 2017, p. 177). We therefore define agility in the enterprise context as "an organization's ability not only to sense, but to respond swiftly and flexibly to technical changes, new business opportunities and unexpected environmental changes" (Hekkala et al. 2017, p. 5870).

Socio-Technical Systems Theory

The socio-technical perspective has its roots in the sociotechnical model of Leavitt (2013) and was formulated by Bostrom and Heinen (1977) to elaborate the best way to design information systems in line with the organizational work system (Bostrom and Heinen 1977). They distinguish the technical system and the social system as constituent parts of the work system as outlined in Figure 1.
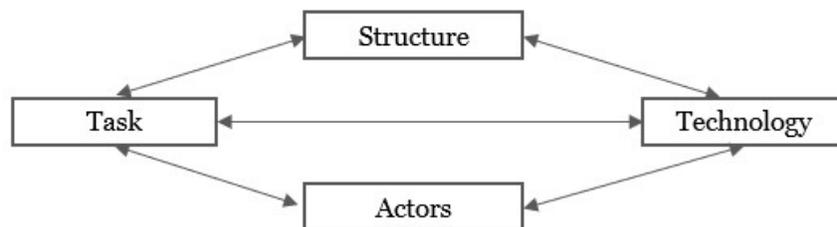
Figure 1. Socio-technical perspective on organizational work systems (Bostrom and Heinen 1977; Leavitt 2013)

The social system consists of structures and actors (Bostrom and Heinen 1977; Leavitt 2013). Actors include people with their culture and abilities and structures consist of "systems of communication, systems of authority (or other roles), and systems of work flow" (Leavitt 2013, p. 2978). Accordingly, actors include, besides others, organizational culture, capabilities, and knowledge whereas structures encompass organizational structures, ways of communication, and project organizations. The technical system consists of technology and tasks (Bostrom and Heinen 1977; Leavitt 2013). Tasks relate to "raison d'être [of the firm]: The production of goods and services, including the large [...] number of meaningful subtasks that may exist in complex organizations" (Leavitt 2013, p. 2977) and technology relates to "direct problem-solving inventions like work-measurement techniques or computers" including programs and machines (Leavitt 2013, p. 2977). Thus, technology constitutes of the tools and technological platforms and task represents the required organizational processes to fulfill work (Bostrom et al. 2009; Lyytinen and Newman 2008).

The socio-technical systems theory serves as a helpful lens for analyzing IS-induced changes in the organizational context and, particularly, its effects on the social and technical system (Lyytinen and Newman 2008). To successfully achieve the desired system performance the successful adoption, diffusion, and use of IS systems and its practices requires to consider this interrelationship and dependency (Bostrom and Heinen 1977). In consequence, knowledge about the alignment of socio-technical components is crucial for a profound understanding of the interdependencies at an organization (Lyytinen and Newman 2008).

Research Methodology

This study analyzes the challenges and implications of introducing agile practices at well-established, existing companies with an explorative multiple-case study. We adopt a multiple-case study research design to investigate "a contemporary phenomenon in depth and within its real-life context" (Yin 2009, p. 18) for three reasons: First, IS research lacks in keeping up the pace with practitioner literature regarding enterprise agility (Conboy 2009). Second, there is often a substantial difference between the textbook "vanilla" version of a method and how it actually enacted in practice (Wang et al. 2012). Third, a multiple-case study design allows for cross-case analysis, which helps us to shed light on the organizational configurations that lead to and affect enterprise agility (Yin 2009).

To avoid a potential industry bias, we selected cases from diverse industries (see Table 1). We aimed at identifying companies in an early adoption stage of agile practices to allow for deep insights into the challenges and implications of adopting agile practices at enterprises. An overview of the case study companies and conducted interviews is presented in Table 1.

Industry and code name of case study company	Head-quarter location	Company size [employees]	Company age [years]	No. of inter-views	Position of interview candidates
Car manufacturer: IT department ("CarCo")	Germany	100,000+	100+	7	Project manager agile transformation; team lead DevOps; DevOps sourcing; DevOps consultant
Chemicals company ("ChemCo")	Germany	100,000+	100+	5	CIO; Head of agile transformation and team members
Global bank ("FinCo")	UK	300,000+	100+	2	Transf. manager; DevOps consultant
Global energy company ("EnergyCo")	Germany	40,000	100+	2	Agile transformation manager; DevOps consultant
Global IT-Technology company ("TechCo")	Japan	150,000+	80+	3	CIO, agile project manager, agile team member & senior IT architect
Global tools manufacturing company "ToolsCo")	Liechten-stein	25,000	70+	2	Regional IT Manager Asia
Insurance company ("InsureCo")	Switzerland	4,000	100+	3	Lead agile transformation; Head of IT Strategy; Head corp. dev.
Online e-commerce company ("RetailCo")	Germany	50,000	50+	4	CIO; head of agile transformation; project team member; culture change manager
Services company ("ServicesCo")	USA	16,000	90+	2	Transformation manager; DevOps consultant
Telecommunications company ("TelCo")	Switzerland	17,000	20+	4	Process Innovation & Digitation; Head of Architecture Mgmt.; Prod. Manager and tribe chief S2O

Table 1. Overview and specifics of case study companies and conducted interviews.

Case study insights have been derived in personal interviews in a larger research endeavor on enterprise agility. While aspects related to agile organizations have been covered in a different study, we focus here on the implications of adopting agile practices on the four dimensions of the socio-technical systems theory, actors, structures, tasks, and technology. Consequently, we address in this study in the dimension structure only questions related to governance and not to organization.

A case study design is recommended in explorative research to allow comprehensive discussions (Langley and Abdallah 2011). In each company, a minimum of one senior manager (e.g. department/unit head) and at least one employee from the operative level has been identified to gain a diverse view on the implications of adopting agile practices. Additionally, executives and consultants facilitating agile transformation have

been interviewed to further triangulate our findings. In total 34 interviews have been conducted between November 2016 and February 2018 in either English or German. Questions were mainly open-end to allow the interviewee the possibility to explore their experience and views in detail (Yin 2009). Follow-up questions have been formulated for further clarification purposes. Each interview had a duration of 60-120 minutes and was carried out primarily personally in face-to-face meetings. If further details on the cases were needed, additional interviews have been conducted by telephone/Skype to achieve saturation. The interview results have been documented in detail in form of interview notes and, if permitted, in form of recorded interviews. Subsequently, these interviews have been coded, and reviewed for consistency and completeness by another researcher that has not participated at the interviews.

Results

Implications of Adopting Agile Practices at Enterprises

Figure 2 provides an overview of the identified areas impacted by adopting agile practices at enterprises and matched with STS theory categories. Topics shaded in dark grey could be identified at more than five cases. Topics shaded in light grey could be identified at 3-4 cases while topics identified at 1-2 cases are shown without shading. For reasons of focus we limit ourselves to topics identified at three or more cases.
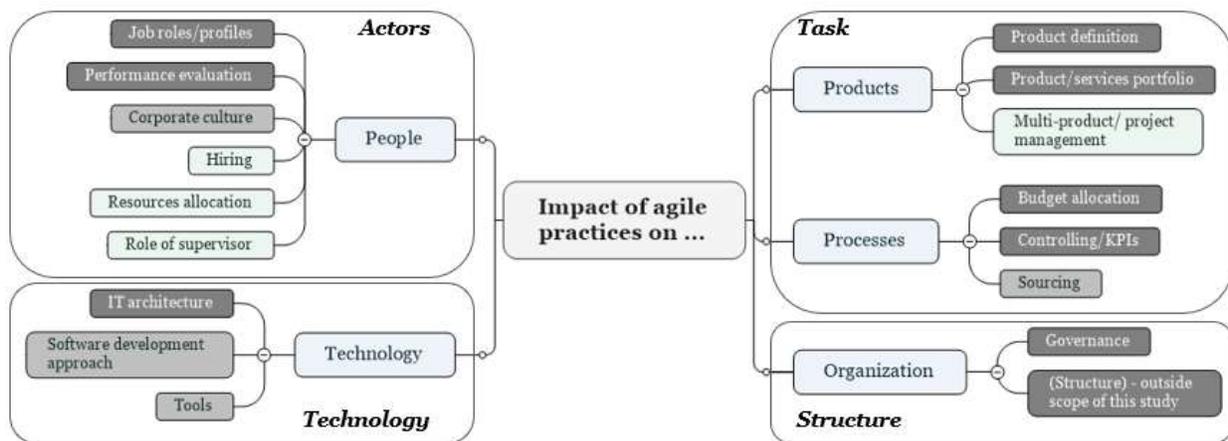

Figure 2: Overview of areas impacted by introducing agile practices at enterprises.

Impact of Agile Practices on Products (STS theory dimension "task")

Products play a key role at agile practices as teams are usually organized according to product features, a product itself, or a product area consisting of several products. While projects are input-oriented, products focus on outcomes and business capabilities and are directly associated to business value (Kim et al. 2016).

Regarding products, our multiple-case study revealed two key aspects affected by adopting agile practices:

(1) *Product definition* (ChemCo, CarCo, FinCo, InsureCo, RetailCo, ServicesCo, TelCo): This aspect addresses the question of how to design products in an agile setting: Agile practices focus on business capabilities and ensure an end-to-end responsibility for business outcomes. As a result, attention shifts from projects and input-orientation to products and outcome-orientation. While companies traditionally focus on activities and inputs with funding based on projects, agile practices increase the importance of products and outcomes that are centered around long-term business capabilities.

A product can be either a product or service offered to clients or an internal product or service. Most case study companies struggled with the question on how to define products. While product definition is more straightforward in IT where products follow technologies or applications, product definition becomes more challenging when business units adopt agile practices. We observed that an unfortunate product definition increases organizational complexity or interfaces with other units at CarCo and ChemCo since not all required resources were allocated to related products. We observed at RetailCo that some of these situations resolve themselves as monolithic products break up over time into combinable business microservices.

Examples for how to shape products are closely related to the organizational set-up. Observed dimensions included business processes (ChemCo, InsureCo, TelCo), systems or services behind business processes (FinCo, RetailCo), technology/shared services offering (partly FinCo, ChemCo, and CarCo), or combinations of all three dimensions (CarCo, FinCo). As an example, CarCo introduced agile practices in its car engineering department for autonomous driving where products were defined around business capabilities following the autonomous driving value chain. A successful product definition is meaningful regarding services offered to customers and can be clearly separated from other products, e.g. by technology, platform, or different capabilities allowing for a clear resources allocation.

(2) *Product portfolio* (CarCo, InsureCo, RetailCo, ServicesCo, TechCo, ToolsCo): This aspect is related to the impact of agile practices on the product portfolio. Agile practices shift attention towards business value and customer journeys. Product portfolios tune themselves fluidly to adapt and cater to customer journeys with the result that a product could cater to more than one journey. This gives rise to a new responsibility for end-to-end quality of service assurance for critical customer journeys which usually happens at the level of the portfolio. As the delivery mode shifts to a product focus, common components can be captured in a delivery platform. The more verticalized products are, the more horizontal a delivery platform will need to be. The more emerging technologies like API mediation or cloud brokerage are used by the delivery platform, the more "components as a service" can be offered. We observed the following examples for "components as a service" at FinCo, RetailCo, and ServicesCo: Security as a service, identity and access management as a service, platform as a service, and database as a service.

Impact of Agile Practices on Processes (STS theory dimension "task")

As enterprises differ from startups or small companies by well-designed, established and optimized processes, the implications of agile practices on processes need to be considered. We identified three key aspects affected when enterprises adopt agile practices:

(1) *Sourcing* (CarCo, ChemCo, FinCo, ServicesCo): Adopting agile practices significantly impacts almost the entire sourcing value chain and supplier strategy as vendors become strategic partners managing products over their complete lifecycle. Agile sourcing changes the customer-supplier relationship since it allows for outcome-based partnerships and new ways to collaborate in strategic partnerships. Consequently, adopting agile practices shifts attention from purchasing and contracting to managing of a network of strategic suppliers. We observed a shift from the "right to own an asset" to the "right to use an asset" especially at CarCo which heavily relied on strategic partnerships for building up the autonomous driving ecosystem. Partners worked on new, innovative ways to make resources available with ripple effects on balance sheet related topics like drop in upfront payments and introduction of recurring payments. Novel approaches such as open-sourcing and crowdsourcing are emerging within the software engineering domain, which have consequences for aspects such as innovation and time-to-market (Ågerfalk et al. 2015). CarCo and ChemCo excelled at completely redesigning the sourcing process moving to contracting value stories. Comprehensive requirements descriptions and long lists of contracted Service Level Agreements have been replaced by just one KPI – the duration where the user could not work productively with the system.

(2) *Budgeting* (CarCo, ChemCo, EnergyCo, InsureCo, ServicesCo): Agile practices focus on early time to market and optimize products in iterations based on timely customer feedback. Consequently, planning takes place only short-term for sprint cycles. This heavily interferes with long-term budget planning – exercised at most of the case study companies – as this approach contradicts with short-term sprint planning and allocation of story points for rough effort estimation. We observed that most case study companies have already adopted a product-oriented budget allocation. EnergyCo for example further developed this approach by establishing a so called "investment board" acting like an internal venture capitalist approving budgets only for sprint cycles based on progress with product features. At CarCo, this venture-capitalist-like budget allocation approach was at the time of research in discussion to be introduced for the development of a new customer-ecosystem.

(3) *Controlling* (CarCo, ChemCo, FinCo, RetailCo, ServicesCo): Agile practices rely on self-organization of teams and individuals. Consequently, the question of how to control and measure success of agile teams arises. ServicesCo and FinCo completely redesigned metrics to define product success. Designed key metrics include the percentage of builds automated and time to deploy, the number of automated test cycles per day, the percentage of automated testing, the percentage of reduced baseline defects, the number of

releases per quarter and the number of days from idea to production. Furthermore, quality of service is no longer measured in incidents resolved, but rather in mean time to recover or mean time between failures.

Impact of Agile Practices on Governance (STS theory dimension "structure")

We observed the impact of agile practices on governance widely. Addressed aspects were twofold:

(1) *Coexistence of agile and non-agile units* (CarCo, ChemCo, FinCo, InsureCo, RetailCo, ServicesCo, ToolsCo): At enterprises, agile units usually coexist with non-agile like business units. Agile units in need of cooperation with non-agile units are predestined for conflicts due to different objectives, steering, and incentives. ChemCo, InsureCo, ServicesCo, RetailCo, and TechCo addressed this topic by allocating resources with required skills in the product teams to reduce interfaces with other, usually non-agile units. ChemCo installed a dedicated resource for handling interfaces with other departments.

(2) *Resolving resources conflicts between products* (CarCo, ChemCo, FinCo, RetailCo, ServicesCo): As products should be staffed with resources to manage the product completely, the question arises on how to provide access to specialists required only occasionally. These specialists usually cannot be fully utilized by just one product. Furthermore, a lack of e.g. cyber-security specialists prevents to fully dedicate specialists to just one product. While ChemCo preferred to allocate specialists to related products, FinCo and ServicesCo established cross-product "shared service pods" around special expertise matters. These shared services pods provide access to expert knowledge on a needs basis for several products. In case of conflicting priorities, we saw decision making either based on topics criticality or first-come-first serve.

Impact of Agile Practices on Information Technology (STS theory dimension "technology")

Having its roots in software engineering to provide ways for software development (Fowler and Highsmith 2001), agile practices, particularly, affect IT processes, architecture, and tools. We perceived three aspects in our multiple-case study where we observed an impact of agile practices on information technology.

(1) *Software development* (CarCo, ChemCo, FinCo, InsureCo, RetailCo, ServicesCo, TelCo): Mentioned aspects were threefold: First, product-orientation focuses on early provision of features with highest business value. To achieve this, software development takes places in short iterations aiming at product improvements based on customer feedback. Second, the initial requirements definition phase is shortened significantly as requirements are defined "on the fly" based on learnings and customer feedback. Third, IT-delivery takes place at multiple speeds as required by the business. It is a common misconception that speed in agility is an end in itself: As we learned from FinCo, RetailCo, and ServicesCo, adopting agile practices does not necessarily imply that delivery always must be as fast as possible. Exemplary for early provision of features with highest business value, TelCo designed a process for rapid product development and delivery to customers where features are composed based on standard service components and are put together on lot-size one according to customer specifications. This approach avoids comprehensive requirements and product design phases detached from the customer. Exemplarily, CarCo prioritized its applications portfolio for delivery at multiple speeds according to business priorities and IT delivers at just the minimum speed required by the business. This approach ensures efficient resources allocation and avoids wasting resources for applications or features not valued accordingly by the business.

The question of how to develop according to the "waterfall" in an agile context is closely related to software development. We observed discussions at ChemCo and CarCo related to the question of whether IT should follow a fully agile approach. Especially ChemCo was convinced that even in a fully agile setting development according to "waterfall" would sometimes be beneficial. This is the case when the scope is clear – e.g. pre-defined by tax, legal or regulatory bodies and a predefined feature set needs to be delivered. For instance, this is the case with an ERP core or for systems managing a shop floor or supply chain. ChemCo addressed this question by defining a template for an agile, non-Scrum, waterfall team which can be flexibly integrated into a fully agile setting. ChemCo currently uses this approach in their biggest IT project ever, the migration from SAP R/3 to SAP S/4 HANA where predominately "waterfall teams" focus on the SAP S/4 HANA core while agile teams develop services around the ERP core.

(2) *IT-Architecture* (CarCo, ChemCo, FinCo, InsureCo, RetailCo, ServicesCo): Companies excelling at delivery of "right-speed" spend significant efforts on the classification of the applications like ChemCo, CarCo, FinCo and ServicesCo. These companies applied a "pace-layering approach" (Gaughan et al. 2010;

Rayner and Van Decker 2011) where applications are clustered according to strategic priorities: (1) Applications for innovation and new products, (2) business differentiating applications to exploit existing products, and (3) business sustaining applications that are subject to retire. Pace-layering of applications allows to assign different priorities to applications and to redirect resources according to business priorities.

(3) *Software tools* (CarCo, FinCo, ServicesCo): This aspect addresses implications of agile practices related to software development. Though initially not in focus of our interviews, this aspect was mentioned in interviews at CarCo, FinCo, and ServicesCo. Interviewees stressed the importance of standardized tools for agile software development. Exemplary products mentioned by more than one company were Jira for product definition, Eclipse for coding, GitLab for source control, Jenkins for build, Parasoft for testing and Ansible for deployment. As CarCo is establishing a system for autonomous driving in strategic partnerships with other car manufacturers and suppliers, an early alignment across all partners on which specific tools to use has been mentioned as critical.

Impact of Agile Practices on People (STS theory dimension "actors")

According to the Agile Manifesto, individuals and interactions should be valued over processes and tools (Fowler and Highsmith 2001). Consequently, people play a crucial role when agile practices are adopted.

(1) *Job-profiles and roles* (ChemCo, InsureCo, ServicesCo, TelCo, ToolsCo): The adoption of agile practices impacts roles and job profiles: In a fully agile setting, there is no disciplinary supervisor as it is still the case at most enterprises. Rather, the employee needs to take on own initiative and actively contribute to self-organization of the product team. Taking on initiative is neither easy nor necessarily desired by all team members: As observed at ToolsCo, the offshore unit, which develops mobile apps and is in Malaysia, had applied Scrum and reorganized according to a fully-agile setting. Product owners reported that some team members were lacking the initiative to engage in sprint planning and estimating feature development effort with story points and, surprisingly, claimed to rather focus on coding instead.

Consequently, adopting agile practices impacts job profiles as not only different skills are required but also new jobs are created. We observed the following new positions being created at ChemCo, InsureCo, and ServicesCo: Data scientist, team builder and coach, business process analyst, UX/UI designer, technical broker and a product owner in the role of "broker and communicator" between business and IT.

(2) *Performance appraisal and compensation mechanisms* (CarCo, ChemCo, FinCo, InsureCo, ServicesCo, TelCo, ToolsCo): A second impact of agile practices on people addresses the question of how to conduct performance assessments and to decide about promotions, bonuses or salary increases: In a non-agile setting, supervisors are taking care. Contrary, a fully agile setting relies on self-organized teams where the product owner takes on responsibility exclusively for business outcomes of the related product.

We observed intensive discussions regarding performance assessments at InsureCo, TelCo and ServicesCo. Team members were assigned full freedom to organize their work independently and to get rid of management by objectives or performance appraisals. This confirms the findings of a study describing the systematic side effects of "overprescribing goal setting" (Ordóñez et al. 2009). InsureCo and ServicesCo started to introduce a team-based performance appraisal mechanism where team members assess each other 360 degrees regarding performance and perceived business value contribution of each team member.

(3) *Corporate culture* (InsureCo, RetailCo, ServicesCo, TelCo, ToolsCo): The question of how agile practices influence culture was intensively discussed at InsureCo, RetailCo, and TelCo. The inherent corporate culture has been mentioned as critical for a successful adoption of agile practices. Numerous studies confirm this finding by identifying culture as the most critical hurdle for agile transformation (Buvat et al. 2017). InsureCo, an industry leader regarding adoption of agile practices, revealed that change management related to corporate culture is key priority for 2018. Consequently, changing corporate culture according to agile practices is at InsureCo not driven by the IT department or agile teams but governed by the CEO to emphasize commitment and importance.

Discussion and Conclusion

As agility changes everything (Kulak and Li 2017), we have observed far reaching challenges and implications when enterprises adopt agile practices. While first steps towards agility are often made quickly, the challenge starts when agile units need to collaborate with non-agile units. When "agile meets non-agile",

self-sufficient teams are exposed to non-agile processes finetuned for efficiency, reliability, and security. The question on how to balance between "keeping the lights on" with existing non-agile units and concurrently engaging in exploration and innovation (Dixon et al. 2017) is currently omnipresent.

Agility as a phenomenon has already been addressed extensively (Conboy 2009). While previous research primarily focused on agility as software development method (Fitzgerald and Stol 2017; Fowler and Highsmith 2001), as form to organize start-ups or strategically insignificant units dealing with innovation (Ambler 2001), our research is motivated by the lack of empirical evidence on the implications of adopting agile practices at enterprises. Accordingly, an exploratory study with ten cases has been conducted to get a deeper understanding of the specifics of enterprise agility and the resulting implications of adopting it.

Derived insights are threefold: First, well-established, traditional businesses are currently adopting agile practices at large scale. Second, contrary to start-ups or digital-native companies, enterprises are exposed to specific challenges preventing a seamless adoption of agile practices (Highsmith 2013; Kim et al. 2016). Frequently observed barriers are the existence of huge amounts of historic data, well-established and highly optimized processes, and a high amount of historically grown and company-specific legacy systems. Third, the adoption of agile practices impacts not only the affected agile unit itself, but also almost the entire company. By applying STS theory, we found that all four dimensions of a works system (i.e., actors, structures, tasks and technologies) are impacted when agile practices are adopted by enterprises.

To our best knowledge, this is one of the very first explorative multiple-case studies dealing with the implications of adopting agile practices at enterprises. Our study has several practical contributions: Well-established, existing companies get a better understanding of the specific challenges they are confronted with when adopting agile practices. Furthermore, our multiple-case study reveals insights into areas affected by agility and exemplary shows how leading, global companies address some of these challenges.

This study does not come without its limitations: We have identified ten cases to be as representative as possible for enterprises turning into agility. Selected case study companies might not be fully representative for all industries. Furthermore, except for FinCo and InsureCo, most case study companies are at an early innovation assimilation stage. Consequently, companies at later adoption stages might be faced with different challenges by adopting agile practices and come up with different solutions.

Accordingly, future work should stress importance on the following aspects: First, to understand more about the challenges of adopting agile practices at different maturity stages of the agile transformation. Because most enterprises started their agile transformation just recently, accessible cases in a more mature adoption stage are limited. Second, we perceive a significant research gap related to what differs start-up agility from enterprise agility and to the related hurdles for enterprises to adopt agile practices. Third, insights into how enterprises mastered the challenge when agile units need to collaborate with non-agile units in a longitudinal perspective might provide important insights for practitioners.

Despite of disruptive challenges resulting when enterprises adopt agile practices, the journey to enterprise agility seems to be more than a one-time, transitory trend and will be a cornerstone to increase speed and flexibility. Successfully mastering the challenges resulting from the adoption of agile practices will be crucial for a sustainable and successful journey to enterprise agility.

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