Tensions and ambidexterity: a case study of an agile project at a government agency

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Recommended Citation

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Abstract:
Today's dynamic business environment must continuously adapt its software development methods to changing technologies and new requirements on the part of customers. Therefore, Agile methods are being used more and more used because they emphasize both flexibility and the ability to change. However, at the same time, the business-driven need for predictability and control remains. The purpose of this case study is to explore and theorize on paradoxical tensions and ambidexterity during an Agile software development project at a government agency. The study empirically examines how tensions and the ambidextrous responses to these tensions are related to Agile values. Data was collected by conducting interviews and studying internal project documents. Four categories of tensions (learning, organizing, performing, and belonging) were used for analytical purposes. The findings suggest that most of the tensions perceived were in the categories of learning and performing. There are, furthermore, several connections between the ambidextrous responses to these tensions and Agile principles. A deeper understanding of Agile values and principles is required in order to make projects successful. The contribution made by the study, therefore, is of great importance because Agile methods are for leading projects, not only in Agile software development, but also in other industries and sectors.

1. Introduction

There is an ever-increasing demand for organizational agility and flexibility in order to gain competitive advantage [1], [2]. At the same time, underlying business models and institutional and regulatory environments in the public sector are primarily designed for robustness and stability [3]. Organizations and teams need to follow standardized procedures to complete tasks effectively (i.e., exploitation). But at the same time, the development of new ideas for adapting to changing situations (i.e., exploration) is also being encouraged. It is then understandable that it can be experienced as tensions when: "the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms" and "the essence of exploration is experimentation with new alternatives" [4]. This indicates the importance of a comprehensive ability to deal with (i.e., ambidexterity) these paradoxical tensions [5].

Inherently conflicting goals are typical of the activities of all public organizations [6]. For example, the public sector has been associated with less flexibility but also greater public scrutiny, goals for social improvement, and a lack of profit as a measure of performance (ibid.). Choi and Chandler [7] point out the lack of competition, the impact of policies, and the diversity of stakeholders' interests as the main differences in terms of characteristics between public organizations and private organizations. In addition, software projects at government agencies are designed and built to last a long time. However, planning and implementation have often taken so long that software is frequently obsolete on finally being released [8].

The origins of the Agile concept lie in software development [9], where greater flexibility and changeability have traditionally been requested [10], being seen as a reaction to traditional or planned software methods [11]. Agile methods allow project teams to work in smaller steps, to review their work often, and to include feedback directly in order to prevent costly mistakes [8]. Weber & Tarba [12] state that: "Agile organizations have the ability to initiate continuous renewal that includes adapting existing competencies to an everchanging environment and simultaneously reconfiguring themselves in order to survive and thrive for the long term". However, Horlach and Drechsler [13] are of the opinion that embracing the Agile way of working can produce a number of paradoxical tensions at the team and organizational levels. The team members' experiences can come from traditional project environments with stable processes and predefined requirements based on detailed planning. In the Agile way of working, there is a radical change in the way of working because this attitude strives for flexibility. Preserved experiences can thus lead to inertia when it comes to these changes [13]. The ability of a project team to meet changes and overcome problems plays a critical role in the organization's reliability and success [14]. Managers must also be ready to give up their traditional sources of power, and new skills must be developed throughout the organization [15]. A successful transition to the Agile approach, therefore, requires a deeper understanding of the important Agile values, principles, and the specific way of thinking [16].

This study responds to the call by Werder and Heckmann [17] that future research should be about "investigating ambidexterity that thrives as a result of tension". The lens of paradoxical tensions has developed in organizational theory but has received too little attention in past research on software development [18] and project management [19]. A recent study by Iivari [19] introduces a framework of eleven paradoxical tensions concerning the priority, structure, and execution of projects, wishing to encourage future research on the paradoxical tensions of project management.

Ambidexterity has also been a hot topic in organizational research for a long time, but there is still a lack of understanding of "how" ambidexterity can be concretely supported by different types of organizations [20],[23]. For instance, relatively few empirical studies have studied ambidexterity in the public sector context [24]. In addition, Turner et al. [25] state that the project context is ideal for examining ambidexterity. The reason for this is that, in the project work form, frameworks and tools are already available (i.e., exploitation), but projects also require knowledge generation (i.e., exploration) (ibid.). Werder and Heckmann [17] argue, in turn, that more research on ambidexterity is needed for projects, teams, and individuals (i.e., contextual ambidexterity) because projects and their teams help organizations to solve complex problems and to handle complex tasks.

Based on the arguments made above and the growing use of Agile methods, this study examines how underlying paradoxical tensions are linked to Agile values. In addition, the study also examines what ambidextrous responses consist of. The question posed in this paper is: *How do the concepts of tensions and ambidexterity relate to Agile values?* To answer this question, data from a project (referred to as the Alpha Project) was used at a government agency conducting software development with a project setup (in-house and together with an external partner) that utilizes the Agile way of working. To the best of our knowledge, this was the first time that the four Agile values [9], the four categories of tensions highlighted by Smith and Lewis [26], and ambidextrous responses to these tensions, were combined in order to investigate Agile software development.

The paper is structured as follows: Section 2 provides the theoretical background. Section 3 describes the research methodology. Section 4 reports on the results of the study. Section 5 discusses these results, the limitations of the study, and future work. Finally, Section 6 concludes the paper.

2. Theoretical background

This section aims to provide the initial theoretical understanding necessary in order to understand the analytical lens used in this study. First, there is a brief introduction to the Agile way of working. Then, the focus is on the concepts of paradoxical tensions and ambidexterity.

2.1 The Agile way of working

Agile methods dominate, with their ability to respond and adapt quickly in a changing environment, software development [27]. Scrum [28] is currently the most widely used Agile method [27]. The Agile methods originate from a set of values and associated principles outlined in a declaration, the so-called Agile Manifesto, aimed at providing better ways of developing software [9], [29] using self-management and step-by-step development and delivery [30]. The four central values and the twelve principles formulated in the Agile Manifesto are listed in Table 1.

Table 1. The Agile values and principles from the Agile Manifesto [9]

Agile values	Agile principles		
1: Individuals and interactions over processes and tools.	1. Our highest priority is to **satisfy the customer** through early and continuous delivery of valuable software.	5. Build projects around **motivated individuals**. Give them the environment and support they need, and trust them to get the job done.	9. Continuous attention to **technical excellence** and **good design** enhances agility.
2: Working software over comprehensive documentation.	2. **Welcome changing** requirements, even late in development. Agile processes harness change for the customer's competitive advantage.	6. The most efficient and effective method of conveying information to and within a development team is **face-to-face conversation**.	10. **Simplicity** – the art of maximizing the amount of work not done – is essential.
3: Customer collaboration over contract negotiation.	3. **Deliver working software frequently**, from a couple of weeks to a couple of months, with a preference to the shorter timescale.	7. **Working software** is the primary measure of progress.	11. The best architectures, requirements, and designs emerge from **self-organizing teams**.
4: Responding to change over following a plan.	4. Business people and developers must **work together daily** throughout the project.	8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain **a constant pace** indefinitely.	12. At regular intervals, the team reflects on how to become more effective, **then tunes and adjusts** its behavior accordingly.

Given the growing interest in the Agile way of working, it is invaluable to understand the Agile values and the principles, as well as the factors that facilitate or hinder the acceptance and use of the Agile way of working at organizations [31]. The understanding is needed that embracing the Agile way of working can produce a number of

tensions at the organizational and team levels [13]. Agile is described as "people-oriented" [32] rather than "process-oriented" [33], and this can lead to tensions. For example, research conducted by the Scrum Alliance, an independent non-profit organization with 400,000 members, showed that more than 70% of Agile practitioners report tensions between their teams and the rest of their organizations due to a lack of knowledge about the Agile way of working [34]. Introducing Agile into an organization means changing the organizational culture, strategy, and structure, something which is not always easy [35]. Therefore, it is important that the Agile way of working is accepted and supported by the whole organization and all stakeholders at both the management and operational levels [36].

According to the Agile Manifesto [9], "the best architectures, requirements, and designs emerge from a self-organizing team". However, software developers working on the Agile team should not have specialized roles: Instead, decisions are made jointly about "how" development work should be conducted [37]. This can cause problems given the lack of basic domain knowledge of software developers. Conboy et al. [38] call this issue "masters of all and masters of none".

"Being Agile", according to Denning [16] and Prange [39], is about embracing the mindset, culture, values, and principles. In contrast, "Doing Agile" refers to the adoption of either Agile methodology or a limited set of Agile practices and tools (ibid.). Horlach and Drechsler [13] believe that in order to have a successful transition to the Agile way of working, a deeper understanding of the important Agile values and principles is required. That is, the particular mindset that characterizes "Being Agile" [16].

In the public sector, Agile studies are lacking because the adoption of Agile methods has been slower than in the private sector [40]. An example here, however, is the study by Nuottila et al. [40], which identifies and categorizes the challenges that may impede the effective use of Agile methods in public IT projects that embrace private software vendors. The identified challenges related to documentation, staff training, experience and commitment, stakeholder communication and involvement, Agile roles, the locations of Agile teams, legislation, and the complexity of software architecture and system integration.

This subsection touches on the tensions that can arise when working Agile. The next subsection digs deeper into the concept of paradoxical tensions.

2.2 Paradoxical tensions

The concept of the "paradox" provokes, confuses, and raises questions [41]. Perhaps we think of logical paradoxes that are thoughtful contrasts or contradictions, or any problematic situation [42] that can never be resolved [17]. Therefore, Poole and Van de Ven [43] suggest a difference between logical and social paradoxes. Socially constructed paradoxes are created by actors and can be handled through acceptance, confrontation, and transcendence [44]. In addition, in this study, the term paradoxical tensions is preferred to paradoxes. These paradoxical tensions are seen as two sides of the same coin (ibid.). Dealing with paradoxical tensions is not always about compromises between flexibility and control, but about an awareness of their contemporaneity [44]. In other words, managing paradoxes needs a creative both / and approach that utilizes the advantages of each side separately, while utilizing their synergistic potential [45].

In the rest of the paper, the concept of tensions is thus used to denote socially constructed paradoxical tensions defined as "conflicting but still interrelated elements that exist simultaneously and persist over time" [26]. The concepts of tensions and ambidexterity are closely linked and should be seen in combination [46]. In the growing body of literature on these concepts, different tensions are often described as exploitation versus exploration. This study follows the advice of Pertusa-Ortega et al. [47], who claim that other types of tensions must also be emphasized. Examples of other types of tensions are highlighted by Smith and Lewis [26], who propose an organizing framework in order to explore rising plurality in research into paradoxes and who categorize tensions into four categories (with potential combinations). Each category represents an organization's core activities; i.e. learning (knowledge-related), organizing (process-related), performing (goal-related), and belonging (identity/interpersonal relationship-related) (ibid.).

The most common category in the paradoxical tensions research field is **learning tensions**, which are tensions that arise when dynamic systems change and renew [48]. "Learning requires using, critiquing, and often destroying past understandings and practices to construct new and complicated frames of reference" [44]. A key source of learning

tensions is precisely the tensions between old and new. Lewis [44] calls it: "A struggle between the comfort of the past and the uncertainty of the future". Limited resources or time pressure can increase learning tensions if employees are required to learn new things (exploration) while maintaining a high level of performance (exploitation) [49]. A noteworthy challenge facing organizations is the balance between exploitation and exploration [4].

From a paradoxical perspective, **organizing** itself is filled with different **tensions**, such as tensions between control and flexibility [44] and routine and change [26]. The organizing tensions exists because organizations consist of several subsystems which must act independently and which are nevertheless part of a mutually dependent overall organizational system [50]. Organizing tensions often manifest themselves during periods of organizational restructuring or change [51]. It is mainly in processes, routines, and collaborations that such tensions are experienced (ibid.). For example, to compare contrasting forces that encourage commitment and trust, while at the same time providing productivity and discipline [44]. As mentioned before, organizations and teams typically need to develop new ideas in order to adapt to changing situations, but they also need to follow standardized procedures to complete tasks effectively [5].

Tensions that arise between different stakeholders' often conflicting demands, or conflicting expectations [52], can be categorized as **performing tensions** [26]. These tensions can result in conflicting strategies and goals [51], [53]. Tensions can manifest themselves at the individual level as actors struggle to respond to either the conflicting demands embodied in their roles or the conflicting demands that arise from the roles of others that they share everyday tasks with [44], [50]. These tensions can arise especially during a change development process, when new goals are being set, roles changed, and relations between actors redefined [50]. In the study by Lüscher and Lewis [54], it turned out to be the case that performing tensions arose when managers' roles became more blurred and multiplied in response to conflicting demands during major organizational changes. According to Iivari [18], the paradoxical lens has not been explicitly used to understand software development and therefore the references mentioned have been taken from the organizational research field. However, when implementing the Agile way of working as a replacement for a plan-driven way, roles and responsibilities will change, something that affects everyone. For instance, compared to plan-driven software development, the boundaries between the developer roles were less well defined in the Agile way of working [38]. If the developers are expected to have a broad knowledge of all aspects of software development, this can affect the balance between being "a generalist" and "a specialist" (ibid.).

Belonging tensions arise because people in organizations want to belong to a group but they also want to be independent [51]. It is mainly in the areas of organizational culture, values, roles, and membership that such tensions are experienced [26], [51]. Belonging tensions often arouse the emotions of the actors, and can also intensify conflicts and polarization. This kind of tensions can arise when actors try to express their differences while still remaining valued members of a group [44]. An example of a combination of belonging and performing tensions arises when role identification and the goals of different stakeholders conflict [53].

It is worth noting that tensions can overlap organizational levels because the experience creates new challenges on one level [53]. Tensions can also be combined (ibid.). A big change results if organizations that previously worked in a more traditional or plan-driven way switch to the Agile way of working [55]. Inherent and latent tensions can be made prominent through this process of change [26], [56]. Cooper and Sommer [57], Farjoun [58], and Pellegrinelli et al. [20] report that more and more organizations are struggling to address rapidly changing environments, and that change can result in "chaos" for the individual team members.

In the next subsection, the ability to handle these tensions is discussed.

2.3 Ambidexterity

An organization's diversity in terms of its ways of handling tensions by doing two different things simultaneously is captured in the concept of organizational ambidexterity [59], [60], [61]. The concepts of paradox, tensions, and ambidexterity are closely connected [19], [46], but the ambidexterity literature often focuses on a single tension between exploitation and exploration [18].

The ever-increasing interest in studying ambidexterity is because ambidexterity has long been considered an important driver of long-term results [7], [21], [62], leading not only to profitability but also to the survival of an organization [4]. Ambidexterity is also positively associated with performance when it comes to capacity utilization and employee motivation [63]. An ambidextrous perspective is especially favorable when it comes to providing insight into how organizations explore new opportunities while continuing to exploit their existing markets and resources [64]. Scholars and practitioners have tried to identify different ways or strategies for striking an appropriate balance between tensions [7]. In recent research, Luger et al. [65] reconceptualize the concept of ambidexterity as the ability to *dynamically* balance exploration and exploitation. Most previous ambidexterity studies focus on organizational and static mechanisms that enable organizations to build an ambidextrous capability (ibid.).

The most common forms of ambidexterity are structural (separation of units), sequential (time-based), and contextual (behavior-based) [66]. Ambidexterity can be examined at different levels of analysis; i.e. the organizational, group/team, and individual levels. Previous research on ambidexterity has mainly focused on the organizational level because it has been shown that successful organizations have had the unique ability to balance both their current business and market needs, and adapt to change [67]. A recent conceptual study in the context of Agile software development identified and categorized ambidextrous factors as time-related, team-related, task-related, and transition-related [68]. Another study, by Sailer [21], theorizes how project management methods affect ambidexterity on the project level. This study shows that planning activities are more exploratory and that project implementation activities are instead more exploitative in their nature (ibid.). But it is worth pointing out that ambidexterity is a "nested" concept; i.e. it takes place on several levels within the organization at the same time [61].

3. Research methodology

Using a case study approach allowed us to capture rich details of the Agile way of working, as well as the tensions, capabilities, and supporting factors associated with organizational ambidexterity in a "real-world" project setting. This kind of project was chosen as public sector projects in themselves have conflicting objectives typical of this type of organization [6]. In addition, there is also a lack of empirical studies of ambidexterity in the public sector context [24]. The interviews, together with the content analysis of the project documentation, functioned as a method of data triangulation [69] aimed at improving the internal validity of the study.

The project under study, referred to as the Alpha Project, was conducted by a major Swedish government agency that focuses on infrastructure. This government agency has thousands of employees and is split into several business divisions and key functions. Just over 45 billion SEK is financed by government subsidies, while certain activities are also financed using fees and income from commissioned work. The Alpha Project lasted from September 2015 to January 2018. The Alpha Project's main aim was to build and introduce a new IT system to replace three older IT systems, but also contribute towards clarifying the division of responsibilities between two government agencies in that particular field of activity. The project goal was broken down into ten sub-goals and nine impact goals. The project members came from three departments at two different organizations. Two of these departments were at the government agency, while the third was a partner, an IT company.

The Alpha Project was arranged into two teams, i.e. the lead and control team and the development team. People from both teams were interviewed, and all the interviews were audio-recorded and transcribed. Data generation and analysis took place in parallel. The respondents were anonymized. First, the main project manager was interviewed (alias PM in quotations). The PM also gave a guest lecture on a university course and had a meeting about the current project. From the PM, we received the names of potential respondents/team members from the lead and control team (i.e., snowball sampling), including the product owner (alias TM1, TM2, PO, in quotations). TM2 was hired from an IT company as a resource consultant. Finally, the sub-project manager from the development team (alias SPM in quotations), was contacted and interviewed. The project group containing the two groups was geographically spread across five Swedish cities. The overall planning of the project used the waterfall model, with an Agile approach during the actual implementation. During the project's realization phase, the Agile method Scrum [28] was used. Figure 1 shows the overall schedule for the Alpha Project.
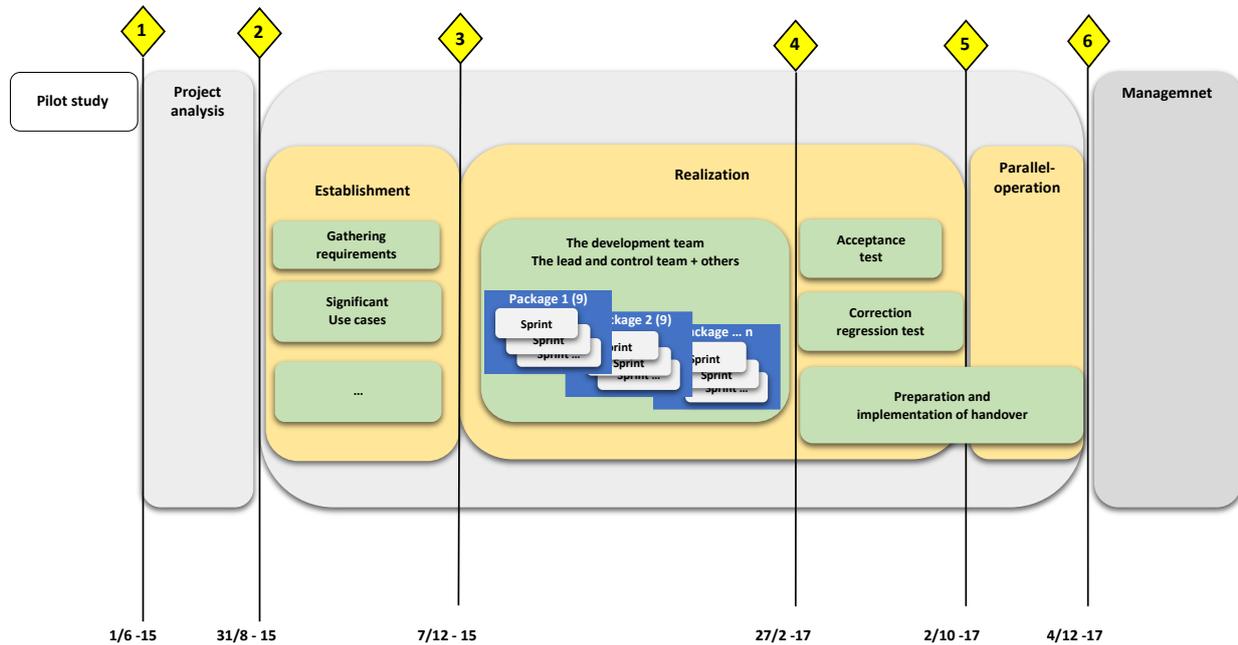
Fig. 1. The overall schedule for the Alpha Project (from a PowerPoint slide, translated into English)

Semi-structured interviews were conducted via Zoom due to the COVID-19 restrictions. In addition to predetermined questions, the interview was supplemented with follow-up questions, and the respondents were asked to express themselves openly and freely to define the world from their own perspectives [70]. An interview guide was designed, with these tensions and responses to them in mind, but it did not include the specific concept of "ambidexterity". The reason for this was that the concept of ambidexterity is an academic construct [61] and could create confusion among the participants. The interview consisted of questions about the respondents' Agile experience and their perceptions of the Agile mindset, culture, values, principles, and practices. The guide by Hancock and Algozzine [70] was followed in order to break down the research question into interview topics. For instance, the following questions were asked: What do Agile values mean to you? Are there any contradictions, tensions, or difficulties in following these values? How were these tensions handled by the team/project? Also asked were questions about how the respondents remembered the Alpha Project and how a typical working day during the project looked. The interviews took place between November 2020 and January 2021, lasting between 50 and 60 minutes. The interviews were conducted in Swedish, and thus the quotes and texts presented in the paper have been translated. The secondary data consisted of internal project documents of different kinds, see Table 2.

Table 2. Overview of dataset

Data Source	Description	Number
In-depth interviews	Semi-structured	5
Additional meetings	Web-meeting, guest lecture	2
Documents	Project documents; project presentations, stakeholder analysis, project financing, project planning, handover, review report, architecture report, final report, requirements modeling report, annual reports, test strategy, quality plan, follow-up, weekly diary, description of development work, description of working methods, PowerPoint slides	22

The coding activity was based on the research question: *How do the concepts of tensions and ambidexterity relate to the Agile values?* Furthermore, coding was arranged into three steps: First, the tensions emerging from the interviews and secondary data were identified, interpreted, and linked to the Agile values. Then, the Smith and Lewis framework [26] was used to categorize the identified tensions into four tension codes (learning, organizing, performing, and belonging). Each interview transcript and piece of project documentation was examined sentence by sentence and linked both to the different Agile value codes and to the different types of tension codes. Last, the ambidextrous responses to the different tensions were interpreted, coded, and linked to the Agile values. The qualitative research tool NVivo was used for the data extraction process, as well as for the linking and coding. Figure 2 shows two examples from steps one and two.
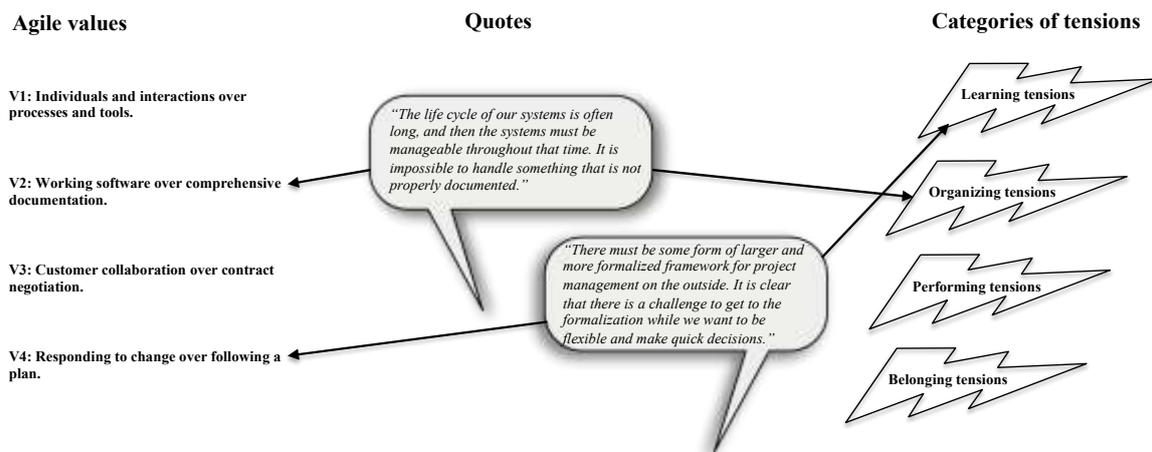

Fig. 2. Examples from steps one and two of the data analysis.

4. Results and analysis

This section provides an overview of the results with the aim of answering the stated research question: *How do the concepts of tensions and ambidexterity relate to the Agile values.* Under each subheading (which is an Agile value), both the tensions and the contextual (behavior-based) ambidextrous responses to them are present together with quotations from the Alpha Project. The section ends with a summary and analysis of the results explaining the differences and similarities between theory and practice.

4.1 Agile value 1 - Individuals and interactions over processes and tools

The focus in this value is on the individual's talents, skills, processes, and tools that should suit the people [38]. However, working in self-organized teams can also lead to developers experiencing fear caused by a lack of competence (ibid.). Tensions are categorized as **belonging tensions** because they relate to the complex relationships between the self and others' demands, concerning priorities, values and beliefs [26]. The PM of the Alpha Project explains:

"Working Agile means an opportunity to be effective and make things happen, but it can also mean a "scary" feeling for the team members who may not be so active. On an Agile team, there's nowhere you can hide or "flatten the curves", because everything will be visible."

Although all the respondents had experience of working Agile, there was still an underlying **learning tension** between old and new ways of working. The PO says: *"We as human beings might not be the most likely ones to want to change; traditionally, we always want to keep track of the next step."*

Another quote illustrates this (PO): *"I usually say that there's no system that's as good as the previous one. Because, in the old system, you know your way around, and when there's something new, you have to change, and then you think it's a bit scary."*

During the Alpha Project, **organizing tensions** were both predicted and aroused. This type of project organization, with several departments and a geographical spread, can make interactions more difficult to handle. In one of the project documents (the architecture report), the following can be seen: *"The fact that construction took place entirely using an external partner who is also a fairly large geographical distance away from the rest of the project, has entailed certain challenges of course."*

Ambidextrous responses to Agile value 1

In response to the tensions relating to this value, several respondents emphasized the importance of Agile experiences, commitment, and a common understanding of the different goals and needs. They allocated their time and resources to finding motivated and committed team members. Creating a "project culture" was something that the PM emphasized: *"With the different cultures of the companies, it's important to be able to build a common culture and framework within the project regarding how we should work Agile."*

It was essential for the PM to negotiate extra time to create or build this "project culture". The PM said: *"From the beginning, we had a preparation phase that was two months long, but I negotiated for another month."*

The importance of team building can be gleaned from the final document: *"At the beginning of the project, a workshop was held with the project participants to set a game plan regarding how we want ourselves to relate to each other, and how we contribute to a good working climate and results. All the project participants had a positive attitude toward contributing and were committed to the project work, to fulfill their own roles and areas of responsibility, and to help the project forward. A solid investment in creating two teams, where the project members have been given clear roles and frameworks for their areas of responsibility, has given all the project participants challenging and interesting tasks. Staff turnover has been low, based on resource planning for the project."*

The development team consisted of a team from the external IT company, who were also on a quest to find the right resource composition. The SPM, acting in the role of sub-project manager, said: *"We're dependent on the result, both as a customer and a supplier, because if we as a supplier are unable to achieve the result the customer has requested, then we won't get the references allowing us to sell more consultancy services to other agencies and companies. We always want to provide good craftsmanship because it's extremely important for us as a supplier to have satisfied customers because the whole industry relies on trust. As a team member, you must be both technically and professionally proficient. We also try to reuse the teams that we've seen to be working well."*

Despite the geographical spread of the project participants, interactions and continuous meetings were maintained in order to provide constant interaction. In one of the project documents (final report), the following can be seen: *"Physical meetings with the entire project group have been conducted twice a year — meetings in a smaller part of the project every quarter. Weekly web conference meetings have worked when it comes to keeping the project together."*

Another response to managing tensions, according to the document (test strategy), was testing as an activity occurring early on in the project: *"This led to a good opportunity to set up a common test strategy where clear roles and communication paths were described. This test strategy enabled good bridging between the two organizations. Early involvement in the project also enabled the test practice to both influence and be included in the project requirements process."*

4.2 Agile value 2 - Working software over comprehensive documentation

This value is interpreted thus: Choosing to spend less time documenting tasks and functions should make deliveries faster. During the Alpha Project, the TM1 described the value thus: *"You can say that it's a trade-off; you do less paperwork and administration and then you'll be able experiment more."*

Less documentation means that communication and decision-making can be more difficult to achieve satisfactorily [37], potentially leading to **organizing tensions**. One member of the lead and control team said: *"The lifecycle of our systems is often long, and then they must be manageable throughout that period. It's impossible to handle something that hasn't been properly documented."*

The project document (working method) also said: *"One challenge was being able to predict the scope of the new system without any clear system specifications, and also welcoming changes, improvements, and innovations within the scope of the project's financial framework."*

This value is also linked to a **performing tension** between the different stakeholders' goals and requirements. The PO said: *"We're also a government agency bound by laws and regulations, and if there's a change in the law, or in an ordinance, or a change, then we always have to look at it."*

For stakeholders unaccustomed to the Agile approach, this value also leads to **learning tensions**. TM1 explained: *"Many of our stakeholders have an expectation regarding, so to speak, classic reporting of time, cost, and content and they aren't used to the content not being fixed."*

Another team member (TM2) added: *"They knew how much the system would cost but not what they'd get in the end."*

Ambidextrous responses to Agile value 2

A shared understanding between the two organizations and three departments is needed to deal with the tensions relating to this value. A shared understanding can be created, for example, via continuous meetings. The SPM stated that: *"Understanding the business and relating to the customer's major IT guidelines puts great demands on the team. At the same time, it's also important to have technical learning. In this project, we brought in senior developers with great knowledge who would simultaneously be able to understand the similarities between industry-wide and other solutions."*

An understanding is needed of what it really means to work Agile (i.e., to adopt a new way of thinking) in order to balance the tension between an old way of working and a new one. Agile practices can also be used for a structure that is necessary. Using sprints can, for instance, help to create a structure. TM2 described the purpose of the sprints: *"Something useful will come from the sprints; we build the functionality the whole time."*

4.3 Agile value 3 - Customer collaboration over contract negotiation

This value also emphasizes people in the successful adoption of Agile methodologies, being characterized by communication and collaboration between people who trust each other [71]. During the Alpha Project, one respondent experienced **performing tensions** that had arisen between the various stakeholders' often conflicting goals and strategies due to the project being conducted at a major government agency with an array of stakeholders. For government organizations, all system development must comply with laws and regulations. TM2 described it thus: *"The project was conducted at a Swedish government agency, and when you build something at this type of organization, it becomes part of something much larger, and there must be a more formalized project management framework outside of the project itself."*

The context also implies that: "traditional contracting processes are oriented toward waterfall, which focuses on the delivery of specified products in a stepwise fashion" [8]. In contrast, the Agile way of working requires a contract management approach that is flexible and stretches beyond a fixed-price, one-time project (ibid.). Since the context of this study is a government agency, that is largely funded by government subsidies, TM1 points out: *"Those who distribute the money for the project must be aware that the Agile method is quite expensive because many of the alternatives that aren't used are discarded."*

The Agile way of working assumes failure, with public sector managers being forced to abandon a zero-error culture so that employees are allowed to make mistakes [8]. This changed approach to mistakes is described thus by the PO: *"We as a government agency are afraid of making mistakes, but if we dared to experiment a little bit more within the framework we have, then we'd move forward. Our mission is to produce a system that brings the greatest benefit to*

both the customer and the business. In addition, the system must also be legally secure. My role as a product owner is to make this system work, and to follow both the business process and technological development."

<u>Ambidextrous responses to Agile value 3</u>

At the beginning of the Alpha Project, the PM negotiated for extra time to build trust and what was called a special "project culture". Despite, or thanks to, this extra time, the PM emphasized the fact that: *"The project came in under budget and definitely managed to keep to schedule, delivering significantly more than was originally intended."* During the project, the framework was set as regards how the teams wanted the work environment to be for this project. The teams worked with documents and PowerPoint presentations that clarified communication so they could read what was expected of each role. This documentation was addressed both externally to the stakeholders and internally to the project, and had dialogs about the teams. Furthermore, the project culture was developed to create trust and facilitate collaboration. This is especially important because the two organizations have different goals and strategies. The SPM, acting in the role of sub-project manager during *development*, said: *"In the IT industry, you have to win a procurement and, to be able to do that, you have to have a low price. So, we must always be aware of what we have promised the customer."*

Another way to respond to tensions between different goals and strategies is by clarifying roles. McHugh et al. [72] emphasize that the product owner must trust the developers to do what they say they will do, and that the developers must trust the product owner not to burden them with work. Drury-Grogan et al. [37] argue that the project manager's role, as a decision-maker, is greatly reduced and resembles that of a facilitator or coordinator. The SPM of the development team claimed that one of the success factors of the project is an ever-present, knowledgeable and active PO. The PO him-/herself also saw the importance of participating in all the meetings so that the developers would be able to ask questions and discuss problems. The PO said: *"In the role of product owner, you have to dare to relinquish power and control to the organization, where the experts sit. Rather, you have to spend a lot of time continuously following up."*

Continuous meetings in response to perceived tensions were described by several respondents. The SPM from the development team had daily stand-up meetings with his/her team where they tried to capture both the big picture but also what was important on the day, identifying the different roles and their different dialogues. The SPM continued: *"You have to have a motivated group that thinks this is fun. They have to want to build something together and to make the customer feel like a hero. It's no longer possible to just put together a project consisting of random people, you need to create a team with the right players, players who want to become an innovative and welcome change, and who want to deliver a bit extra and shine a bit for their own sake, but also for the customer's. We also have to ask the customer the corresponding question, that is, are you prepared for this? Do you understand this? Do you understand the power, and do you understand the risks attached to everything we do in the event of this happening? It's very important that we agree on that. A success factor of this project was the development team being hired as an entire development team; not as individual consultants paid on an hourly basis."*

4.4 Agile value 4 - Responding to change over following a plan

The fourth value of adapting to change entails the action's iterative and incremental nature, with frequent product releases, allowing teams to adapt and respond quickly. It was identified, however, that there are **learning tensions** when changing working methods and mindsets. For instance, the document (working methods) emphasizes that: *"a challenge facing the project was being Agile while maintaining full control."*

In order to deal with the uncertainty of not being able to predict the scope of the new system (from working methods), one respondent's (TM2) wish is as follows: *"There must be some form of larger and more formalized framework for project management on the outside. It's clear that there's a challenge in getting to the formalization while wanting to be flexible and to make quick decisions."*

An example of a combined (**belonging-performing) tension** from TM2 is: *"On the development team, there were some rather young system developers who could get a bit frustrated and impatient when it took time to decide that things had to be dealt with formally."*

Ambidextrous responses to Agile value 4

To manage and balance the learning tensions identified in this assessment, the PO constantly asked him-/herself questions such as: *"Where are we today? Are there any new technologies we can use? Are there any new requirements on the part of the customers or the business?"*

The fact that the Agile way of working is a mindset was testified to by the PM thus: *"Change is our main focus because we know that we don't know everything right from the start. We put a lot of time into goals and goal breakdowns to gain an understanding of the project, but also to gain a shared understanding within the project team."*

All three departments involved were documented in a weekly diary throughout the project. The document (follow-up) describes the purpose: *"Writing a weekly diary enables reflection, and it also provides a very good brief summary of the project's progress on a weekly basis. Deviations from the plan are captured proactively. We see staffing of the project on a weekly basis. This weekly diary facilitates the work of going back and seeing the reasons for deviations and actions in a simple and clear way. Each resource responsible for a specific area writes briefly about its work for the week."*

Since the project used Scrum, the retrospective practice is also included, whereby, after each sprint, the team members asked themselves the following questions: What went well? What went less well? What can we do differently next time? TM2 described the benefits as follows: *"It's an extremely important part of working Agile practicing that reflection so that you don't repeat the same mistakes during the next sprint. The idea is for the team to be more efficient during the project. If you neglect to do follow-up, there's a risk that you'll continue working in the same way during the next sprint."*

4.5 Analysis of the results

To help analyze the results, and explain the differences and similarities between theory and practice, Table 3 shows a summary of the results.

Table 3. Summary of the results

Agile values	Identified tensions	Ambidextrous responses
V1: Individuals and interactions over processes and tools.	Belonging tension; relationships between the self and others' demands. Learning tension between old and new ways of working. Organizing tension caused by several geographically-spread departments.	Creating a "project culture". Team building. Interaction and continuous meetings. Test occurring early on in the project.
V2: Working software over comprehensive documentation.	Organizing tension caused by less documentation. Performing tension between the different stakeholders' goals and requirements. Learning tension between old and new ways of working.	Continuous meetings. A common understanding of the different organizations. Adopting the Agile way of thinking/working.
V3: Customer collaboration over contract negotiation.	Performing tensions between the different stakeholders' goals and requirements. All development must comply with laws and regulations. Furthermore, the government agency is largely funded by government subsidies.	Creating a "project culture". Team building. Clarifying roles and responsibilities. Continuous meetings.
V4: Responding to change over following a plan.	Learning tension when changing working methods and mindsets. A combined belonging-performing tension when individuals experience frustration due to different goals and strategies.	An active and ever-present PO. Understanding the Agile way of working as a mindset. Using the retrospective practice.

The aim of the first part of the results is to answer how the concept of tensions relates to the Agile values (the second column in Table 3). The results from the project show that there are perceived tensions in the various Agile values. This may be because the Agile values have been written on an overarching level and can thus be interpreted in different ways. Wang et al. [73] also point out that tensions exist because the existing Agile literature mainly adopts an "either / or" perspective on these values. For example, in the Agile manifesto, Beck et al. [9] state: "While there is value in the items on the right, we value the items on the left more". Wang et al. [73] are also of the opinion that those tensions exist in particular in values 1 and 4, i.e. people vs. processes, as well as in responding to change vs. following a plan. The current study shows that tensions are experienced within each Agile value, and not just between numbers 1 and 4.

Tensions are hard to define and observe directly, and thus they can be difficult to recognize empirically [74]. This study has gone a step further in explaining the different types of tensions that are perceived. This has been done with the help of the theoretical lens highlighted by organizational researchers Smith and Lewis [26]. The current study confirms that Agile is described as "people-oriented" rather than "process-oriented" [32], because most of the tensions are experienced due to people changing their way of working and / or having different goals and strategies.

The aim of the second part of the results is to answer how the concept of ambidexterity relates to the Agile values (the third column in Table 3). The study contributes by identifying ambidextrous responses to the identified tensions: It is equally important here to both identify and make the ambidextrous responses visible. In contrast to previous ambidextrous research, focusing on "what" ambidexterity is [68], this study has instead focused on "how" ambidextrous responses can be expressed concretely. From this study, it may be concluded that ambidexterity is not realized through behavior alone, but through a combination of creating both common goals and an understanding of the Agile approach, together with the department's prerequisites and the need for continuous meetings.

5. Discussion

This study aims to explore and theorize paradoxical tensions and ambidexterity during an Agile software development project at a government agency. To fulfill this aim; a case study was conducted as a research strategy. The study clearly shows that tensions exist which are related to the Agile values: An initial step towards being able to handle or balance tensions is identifying and investigating them.

5.1 Tensions identified during the Alpha Project

One empirical observation made was that most of the tensions perceived were in the categories of learning and performing. Even though all the project members had experience of working Agile, it was not always so easy to completely switch to a new way of working. An Agile approach permeates not only the project team itself, but also all the project's stakeholders and the entire organization. Performing tensions arose because this major government agency, with its multiplicity of stakeholders, is used to working on the basis of processes, laws, and regulations. Resetting the course of a "large ship" takes time, and requires understanding and patience.

Given these tensions, we can ask ourselves the big question: Does the Agile way of working suit such a major government agency? According to a recent study of Swedish government agencies, 87.8% (65 of the 73 government agencies that responded) of these reported that their software development is more Agile than plan-driven [75]. The results of the current study are in line with the fact that the Agile approach also suits government agencies because both the interviews and the documentation testified to the project being successful, and not just on the basis of the three sides of the project triangle; i.e. cost, quality, time [76]. Most of the identified success factors of the project can be categorized as "people-focused". This is in line with the study by Tam et al. [77], which states that personal characteristics and societal culture are, directly or indirectly, the reason for Agile software development projects being successful. Perhaps it is because of this "people-focus" that a number of tensions *were also identified during the Alpha Project.*

To further follow the call by Werder and Heckmann [17] to investigate the ambidexterity thriving as a result of tensions, the ambidextrous responses found during the Alpha Project are discussed below.

5.2 Ambidextrous responses identified during the Alpha Project

As a further explanation of the values of the Agile Manifesto, it was also accompanied by twelve principles (see Table 1). An interesting pattern found during the Alpha Project was that there are several connections between the ambidextrous responses and the Agile principles. For example, the first principle is: "Our highest priority is to satisfy the customer through the early and continuous delivery of valuable software" [9]. During the Alpha Project, the SPM, in his/her role as a developer who came from a supplier, described the importance of having satisfied customers thus: "Because the whole industry is about trust". Another example is the fifth principle: "Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done" (ibid.). During the Alpha Project, a lot of time and resources went into creating the special "project culture". The third example is the twelfth principle: "At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly" (ibid.). This principle is about reflection, and it was found that the project members of the Alpha Project wrote down their reflections in a weekly diary throughout the project. Even when it comes to the ambidextrous responses in the study, there is a clear link that they are "people-focused".

5.3 Limitations and future research

In case study research, the validity of the design concerns how well the narrative of the case represents reality. In the current study, the team members actively involved in a completed project were interviewed. There are always risks attached to what the respondents remember, as well as to personal opinions or social pressures. The empirical material could have involved all the team members and the steering group in generating richer data. The validity of the design of the study can be increased by triangulating data sources [69]. In the study, interviews and the project documentation were both used as a method of data triangulation.

Although any generalizations based on this study should be made with caution, given its limitations, case studies are particularly good when it comes to gaining a rich picture and an analytical understanding of the object of study [78]. However, in addition to the fact that use case studies can contribute rich insights, there is also a kind of generalization whereby empirical statements can be generalized to concepts and / or to theory [79],[80]. Lee and Baskerville explain that case studies are lacking *in "particularizability" rather than in generalizability [79].*

Four categories of tensions (learning, organizing, performing, and belonging) were used for analytical purposes. We should be aware that there is a risk of using these four categories as a typology, or as a full-scale roadmap for the paradoxical landscape [41]. It is worth noting that tensions are multifaceted and go beyond organizational levels, and/or are made up of one or more of the four categories in unique ways (ibid.).

Looking at future research, there is a lack of empirical studies of ambidexterity in the public sector [24]. For future research, further Agile case studies at government agencies are also proposed, given that research in this type of organization is limited. Studying the Agile way of working seems to be very relevant to the major government agencies that are "in the starting blocks" as regards changing their way of working to Agile. Achieving a successful transition to the Agile way of working requires a deeper understanding of Agile values and principles [13]. In other words, the special mindset that characterizes "Being Agile" is needed [16]. Our study also links success with "Being Agile" i.e., embracing its mindset, culture, values, and principles.

6. Conclusion

As more and more organizations have begun adopting Agile methods, this study examines how underlying paradoxical tensions are linked to Agile values. In addition, the study also concretely examines what ambidextrous responses consist of. The question posed in this paper is: *How do the concepts of tensions and ambidexterity relate to the Agile values?* The use case featured in this study was a project conducted by a major Swedish government agency, lasting from September 2015 to January 2018. Data was collected by conducting interviews and analyzing internal project documents. Four categories of tensions (learning, organizing, performing, and belonging), using the Smith and Lewis framework [26], were used for analytical purposes. One empirical observation was that most of the perceived tensions were in the categories of learning and performing. Even if all the project members had experience of working Agile, it

was not always so easy to switch completely to a new way of working. It was also found, during the Alpha Project, that there are several connections between *ambidextrous responses and Agile principles.*

The theoretical contribution made by this paper lies in how the analytical lens, consisting of four categories of tensions, can be used for identifying, analyzing, and categorizing several of the tensions occurring during an Agile software development project. In addition, the study also brings concepts together: From academic domains of knowledge (organizational theory of paradoxical tensions and ambidexterity), and ambidextrous responses from practitioners' domains of knowledge, to fresh insight into the complexity of system development. Thus, it can further develop knowledge of which types of tensions exist and how ambidexterity can be related to the Agile values. Due to the fact that the Agile values have been written on an overarching level, and can therefore easily be misunderstood, the practical contribution made lies in identifying the different types of tensions that may exist within each value. This knowledge can help organizations to deal with the competing demands that arise when Agile values are applied. The study also helps in identifying ambidextrous responses to the identified tensions. In contrast to previous research into organizational ambidexterity, which focuses on "what" ambidexterity is, this study has instead focused on "how" ambidextrous responses can be expressed concretely. Studying the Agile way of working seems to be very relevant to major government agencies that are "in the starting blocks" as regards changing their way of working to Agile. Achieving a successful transition to the Agile way of working requires a deeper understanding of the Agile values and principles. The contribution made will be of great importance to practice since Agile methods are a popular method of managing projects, not only in Agile software development, but also in other industries and sectors.

References

[1]   S. Clegg, C. P. Killen, C. Biesenthal, and S. Sankaran, "Practices, projects and portfolios: Current research trends and new directions," *International Journal of Project Management,* vol. 36, no. 5, pp. 762-772, 2018.

[2]   B. Ramesh, K. Mohan, and L. Cao, "Ambidexterity in agile distributed development: An empirical investigation," *Information Systems Research,* Article vol. 23, no. 2, pp. 323-339, 2012.

[3]   J. Magnusson, J. Khisro, M. Björses, and A. Ivarsson, "Closeness and distance: configurational practices for digital ambidexterity in the public sector," *Transforming Government: People, Process and Policy,* Ahead of print, 2020.

[4]   J. G. March, "Exploration and exploitation in organizational learning," *Organization science,* vol. 2, no. 1, pp. 71-87, 1991.

[5]   K. Zhao, B. Zong, and L. Zhang, "Explorative and Exploitative Learning in Teams: Unpacking the Antecedents and Consequences," *Frontiers in Psychology,* vol. 11, Article 2041, 2020.

[6]   M. Parikh and D. Bhatnagar, "A system of contradictory goals and realization of ambidexterity: a case study of a municipal corporation," *International Journal of Public Administration,* vol. 41, no. 2, pp. 95-109, 2018.

[7]   T. Choi and S. M. Chandler, "Exploration, exploitation, and public sector innovation: An organizational learning perspective for the public sector," *Human Service Organizations: Management, Leadership & Governance,* vol. 39, no. 2, pp. 139-151, 2015.

[8]   I. Mergel, S. Ganapati, and A. B. Whitford, "Agile: A new way of governing," *Public Administration Review,* vol. 81, no. 1, pp. 161-165, 2020.

[9]   K. Beck *et al.* "Manifesto for agile software development." https://agilemanifesto.org/ (accessed 09/29/2021).

[10] N. Abbas, A. M. Gravell, and G. B. Wills, "Historical roots of agile methods: Where did "Agile thinking" come from?," in *International Conference on Agile Processes and Extreme Programming in Software Engineering*, 2008, pp. 94-103.

[11] T. Dybå and T. Dingsøyr, "Empirical studies of agile software development: A systematic review," *Information and software technology,* vol. 50, no. 9, pp. 833-859, 2008.

[12] Y. Weber and S. Y. Tarba, "Strategic agility: A state of the art introduction to the special section on strategic agility," *California Management Review,* vol. 56, no. 3, pp. 5-12, 2014.

[13] B. Horlach and A. Drechsler, "It's Not Easy Being Agile: Unpacking Paradoxes in Agile Environments," in *International Conference on Agile Software Development*, 2020, pp. 182-189.

[14] J. Varajao, G. Fernandes, A. Amaral, and A. M. Gonçalves, "Team Resilience Model: An Empirical Examination of Information Systems Projects," *Reliability Engineering & System Safety,* vol. 206, Article 107303, 2021.

[15] J. Birkinshaw and J. Ridderstråle, *Fast/Forward: Make Your Company Fit for the Future,* Redwood City: Stanford University Press, 2017.

[16] S. Denning, "How to make the whole organization "Agile"," *Strategy & Leadership,* vol. 43, no. 6, pp. 10-17, 2015.

[17] K. Werder and C. S. Heckmann, "Ambidexterity in Information Systems Research: Overview of Conceptualizations, Antecedents, and Outcomes," *Journal of Information Technology Theory and Application,* vol. 20, no. 1, 2019.

[18] J. Iivari, "A Paradox lens to Systems Development projects: The Case of the Agile Software Development," *Communications of the Association for Information Systems* vol. 49, Article 4, 2021.

[19] J. Iivari, "A framework for paradoxical tensions of project management," *International Journal of Information Systems and Project Management,* vol. 9, no. 1, Article 2, 2021.

[20] S. Pellegrinelli, R. Murray-Webster, and N. Turner, "Facilitating organizational ambidexterity through the complementary use of projects and programs," *International Journal of Project Management,* vol. 33, no. 1, pp. 153-164, 2015.

[21] P. Sailer, "Project management methods as a way to ambidexterity," *International Journal of Managing Projects in Business,* Article vol. 12, no. 4, pp. 1061-1078, 2019.

[22] N. Turner and L. Lee-Kelley, "Unpacking the theory on ambidexterity: An illustrative case on the managerial architectures, mechanisms and dynamics," *Management Learning,* vol. 44, no. 2, pp. 179-196, 2013.

[23] C. A. O'Reilly and M. L. Tushman, "Organizational ambidexterity in action: How managers explore and exploit," *California Management Review,* vol. 53, no. 4, pp. 5-22, 2011.

[24] J. Magnusson, D. Koutsikouri, and T. Päivärinta, "Efficiency creep and shadow innovation: enacting ambidextrous IT Governance in the public sector," *European Journal of Information Systems,* vol. 29, no. 4, pp. 329-349, 2020.

[25] N. Turner, H. Maylor, and J. Swart, "Ambidexterity in projects: an intellectual capital perspective," *International Journal of Project Management,* vol. 33, no. 1, pp. 177-188, 2015.

[26] W. K. Smith and M. W. Lewis, "Toward a theory of paradox: A dynamic equilibrium model of organizing," *Academy of management Review,* vol. 36, no. 2, pp. 381-403, 2011.

[27] C. VersionOne. "14th State of Agile survey." https://stateofagile.com/?_ga=2.132299718.935942205.1605613380-506223216.1605613380#ufh-i-615706098-14th-annual-state-of-agile-report/7027494 (accessed 09/22/2021).

[28] K. Schwaber and M. Beedle, *Agile software development with Scrum.* Prentice Hall Upper Saddle River, 2002.

[29] A. Zaitsev, U. Gal, and B. Tan, "Reviewing the Role of the Agile Manifesto and Agile Methods in Literature," in *Americas Conference on Information Systems (AMCIS)*, New Orleans, LA, 2018, pp. 2613-2622.

[30] C. Prange and L. Heracleous, *Agility. X: How organizations thrive in unpredictable times*. Cambridge: Cambridge, UK: University Press, 2018.

[31] G. Mangalaraj, R. Mahapatra, and S. Nerur, "Acceptance of software process innovations–the case of extreme programming," *European Journal of Information Systems,* vol. 18, no. 4, pp. 344-354, 2009.

[32] A. Cockburn and J. Highsmith, "Agile software development, the people factor," *Computer,* vol. 34, no. 11, pp. 131-133, 2001.

[33] S. Syed-Abdullah, M. Holcombe, and M. Gheorge, "The impact of an agile methodology on the well being of development teams," *Empirical Software Engineering,* vol. 11, no. 1, pp. 143-167, 2006.

[34] D. K. Rigby, J. Sutherland, and H. Takeuchi, "The secret history of agile innovation," *Harvard Business Review*, pp. 2-5, April, 2016.

[35] T. J. Gandomani, H. Zulzalil, A. A. Ghani, A. B. M. Sultan, and K. Y. Sharif, "How human aspects impress Agile software development transition and adoption," *International Journal of Software Engineering and its Applications,* vol. 8, no. 1, pp. 129-148, 2014.

[36] N. B. Moe, A. Aurum, and T. Dybå, "Challenges of shared decision-making: a multiple case study of agile software development," *Information and Software Technology,* vol. 54, no. 8, pp. 853-865, 2012.

[37] M. L. Drury-Grogan, K. Conboy, and T. Acton, "Examining decision characteristics & challenges for agile software development," *Journal of Systems and Software,* vol. 131, pp. 248-265, 2017.

[38] K. Conboy, S. Coyle, X. Wang, and M. Pikkarainen, "People over process: key people challenges in agile development," *IEEE Software,* vol. 28, no. 4, pp. 48-57, 2011.

[39] C. Prange, "Agility as the Discovery of Slowness," *California Management Review*, vol. 63. no. 4, pp. pp. 27-51, 2021.

[40] J. Nuottila, K. Aaltonen, and J. Kujala, "Challenges of adopting agile methods in a public organization," *International Journal of Information Systems and Project Management,* vol. 4, no. 3, pp. 65-85, 2016.

[41] M. P. e. Cunha and L. L. Putnam, "Paradox theory and the paradox of success," *Strategic organization,* vol. 17, no. 1, pp. 95-106, 2019.

[42] E. J. Carlson, M. S. Poole, N. J. Lambert, and J. C. Lammers, "A study of organizational reponses to dilemmas in interorganizational emergency management," *Communication Research,* vol. 44, no. 2, pp. 287-315, 2017.

[43] M. S. Poole and A. H. Van de Ven, "Using paradox to build management and organization theories," *Academy of management review,* vol. 14, no. 4, pp. 562-578, 1989.

[44] M. W. Lewis, "Exploring paradox: Toward a more comprehensive guide," *Academy of Management review,* vol. 25, no. 4, pp. 760-776, 2000.

[45] M. W. Lewis, C. Andriopoulos, and W. K. Smith, "Paradoxical leadership to enable strategic agility," *California management review,* vol. 56, no. 3, pp. 58-77, 2014.

[46] R. W. Gregory, M. Keil, J. Muntermann, and M. Mähring, "Paradoxes and the nature of ambidexterity in IT transformation programs," *Information Systems Research,* vol. 26, no. 1, pp. 57-80, 2015.

[47] E. M. Pertusa-Ortega, J. F. Molina-Azorín, J. J. Tarí, J. Pereira-Moliner, and M. D. López-Gamero, "The microfoundations of organizational ambidexterity: A systematic review of individual ambidexterity through a multilevel framework," *BRQ Business Research Quarterly,* p. 2340944420929711, 2020.

[48] J. Schad, M. W. Lewis, S. Raisch, and W. K. Smith, "Paradox research in management science: Looking back to move forward," *The Academy of Management Annals,* vol. 10, no. 1, pp. 5-64, 2016.

[49] E. Miron-Spektor, A. Ingram, J. Keller, W. K. Smith, and M. W. Lewis, "Microfoundations of organizational paradox: The problem is how we think about the problem," *Academy of Management Journal,* vol. 61, no. 1, pp. 26-45, 2018.

[50] P. Jarzabkowski, J. K. Lê, and A. H. Van de Ven, "Responding to competing strategic demands: how organizing, belonging, and performing paradoxes coevolve," *Strategic Organization,* vol. 11, no. 3, pp. 245-280, 2013.

[51] W. K. Smith, M. Gonin, and M. L. Besharov, "Managing social-business tensions: A review and research agenda for social enterprise," *Business Ethics Quarterly,* vol. 23, no. 3, pp. 407-442, 2013.

[52] F. Maon, J. Vanhamme, K. De Roeck, A. Lindgreen, and V. Swaen, "The dark side of stakeholder reactions to corporate social responsibility: tensions and micro-level undesirable outcomes," *International Journal of Management Reviews,* vol. 21, no. 2, pp. 209-230, 2019.

[53] D. C. Smith, M. Bruyns, and S. Evans, "A project manager's optimism and stress management and IT project success," *International Journal of Managing Projects in Business,* Article vol. 4, no. 1, pp. 10-27, 2011.

[54] L. S. Lüscher and M. W. Lewis, "Organizational change and managerial sensemaking: Working through paradox," *Academy of Management Journal,* vol. 51, no. 2, pp. 221-240, 2008.

[55] S. Thangasamy, "Lessons learned in transforming from traditional to agile development," *Journal of Computer Science,* vol. 8, no. 3, pp. 389-392, 2012.

[56] G. T. Fairhurst, W. K. Smith, S. G. Banghart, M. W. Lewis, L. L. Putnam, S. Raisch, and J. Schad, "Diverging and converging: integrative insights on a paradox meta-perspective," *Academy of Management Annals,* vol. 10, no. 1, pp. 173-182, 2016.

[57] R. G. Cooper and A. F. Sommer, "The Agile–Stage-Gate hybrid model: a promising new approach and a new research opportunity," *Journal of Product Innovation Management,* vol. 33, no. 5, pp. 513-526, 2016.

[58] M. Farjoun, "Contradictions, Dialectics, and paradoxes," in *The Sage handbook of process organization studies*, A. T. Langley, H. Ed. Londo, UK: Sage, 2016, pp. 87-109.

[59] C. Andriopoulos and M. W. Lewis, "Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation," *Organization science,* vol. 20, no. 4, pp. 696-717, 2009.

[60] R. B. Duncan, "The ambidextrous organization: Designing dual structures for innovation," *The management of organization,* vol. 1, no. 1, pp. 167-188, 1976.

[61] J. Birkinshaw and K. Gupta, "Clarifying the distinctive contribution of ambidexterity to the field of organization studies," *Academy of Management Perspectives,* vol. 27, no. 4, pp. 287-298, 2013.

[62] S. Raisch and J. Birkinshaw, "Organizational ambidexterity: antecedents, outcomes, and moderators," *Journal of management,* vol. 34, no. 3, pp. 375-409, 2008.

[63] D. Lavie, U. Stettner, and M. L. Tushman, "Exploration and exploitation within and across organizations," *The Academy of Management Annals,* vol. 4, no. 1, pp. 109-155, 2010.

[64] J. Birkinshaw, A. Zimmermann, and S. Raisch, "How do firms adapt to discontinuous change? Bridging the dynamic capabilities and ambidexterity perspectives," *California Management Review,* vol. 58, no. 4, pp. 36-58, 2016.

[65] J. Luger, S. Raisch, and M. Schimmer, "Dynamic balancing of exploration and exploitation: The contingent benefits of ambidexterity," *Organization Science,* vol. 29, no. 3, pp. 449-470, 2018.

[66] M. Hughes, "Organisational ambidexterity and firm performance: burning research questions for marketing scholars," *Journal of Marketing Management,* vol. 34, no. 1-2, pp. 178-229, 2018.

[67] C. B. Gibson and J. Birkinshaw, "The antecedents, consequences, and mediating role of organizational ambidexterity," *Academy of management Journal,* vol. 47, no. 2, pp. 209-226, 2004.

[68] C. Lindskog and M. Magnusson, "Ambidexterity in Agile software development: a conceptual paper," *Journal of Organizational Effectiveness: People and Performance,* vol. 8, no. 1, pp. 16-43, 2021.

[69] R. K. Yin, *Case study research and applications: Design and methods*, 6th ed. Thousand Oaks, CA: Sage publications, 2017.

[70] D. R. Hancock and B. Algozzine, *Doing case study research: A practical guide for beginning researchers*. New York, NY: Teachers College Press, 2017.

[71] S. Nerur, R. Mahapatra, and G. Mangalaraj, "Challenges of migrating to agile methodologies," *Communications of the ACM,* vol. 48, no. 5, pp. 72-78, 2005.

[72] O. McHugh, K. Conboy, and M. Lang, "Agile practices: the impact on trust in software project teams," *IEEE Software,* vol. 29, no. 3, pp. 71-76, 2011.

[73] X. Wang, E. Ó Conchúir, and R. Vidgen, "A paradoxical perspective on contradictions in agile software development," in *16th European Conference on Information Systems (ECIS)*,Galway, Ireland, 2008, pp. 1-13.

[74] V. Michaud, "Words fly away, writings remain–paradoxes in and around documents," *Qualitative Research in Organizations and Management: An International Journal*, vol. 12, no. 1, pp. 33-52, 2017.

[75] M. Borg, T. Olsson, U. Franke, and S. Assar, "Digitalization of Swedish government agencies-a perspective through the lens of a software development census," in *2018 IEEE/ACM 40th International Conference on Software Engineering: Software Engineering in Society (ICSE-SEIS)*, pp. 37-46.

[76] R. Atkinson, "Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria," *International Journal of Project Management,* vol. 17, no. 6, pp. 337-342, 1999.

[77] C. Tam, E. J. da Costa Moura, T. Oliveira, and J. Varajão, "The factors influencing the success of on-going agile software development projects," *International Journal of Project Management,* vol. 38, no. 3, pp. 165-176, 2020.

[78] G. Thomas and K. Myers, *The anatomy of the case study*. Thousand Oaks, CA: Sage, 2015.

[79] A. S. Lee and R. L. Baskerville, "Generalizing generalizability in information systems research," *Information systems research*, vol. 14, no. 3, pp. 221-243, 2003.

[80] H. Wimelius, L. Mathiassen, J. Holmström, and M. Keil, "A paradoxical perspective on technology renewal in digital transformation," *Information Systems Journal*, vol. 31, no. 1, pp. 198-225, 2021.

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