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Institutional challenges in agile adoption: Evidence from a public sector IT project

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ABSTRACT

Agile is emerging as a promising approach in governments, with the potential to significantly enhance project management when implemented effectively. Despite its potential merits, it has not yet become a mainstream approach in government IT projects, primarily due to the incongruence between Agile practices and conventional methods of project funding, governance, and management. In order to contribute to our understanding of Agile in public sector practice, this study examines an extensive IT program in the UK defense sector which adopted Agile. We applied institutional logics as a theoretical lens to understand the complex dynamics within this environment, investigating the change mechanisms and the enduring tensions and conflicts. Our analysis of interview data revealed the key change mechanisms "mission collaborator" and "one team culture". Unresolved tensions in our case setting encompass public value versus cost, project approval, policy, governance, and culture.

1. Introduction

Improving public sector IT projects is extremely important, especially given the history of high-profile failures; for example in the UK only "30% of technology-based projects and programs" are successful, according to Serrador and Pinto (2015, p. 1040). One of the most significant UK government digital project failures was reported to have spent £7bn against an initial budget of £2.3bn.[1] The US has a similar record with 94% of federal government IT projects exceeding their budgets and schedules, and 40% failing to complete (Mergel, 2016). Public sector IT projects are often initiated to improve efficiency by introducing new technologies to address current system limitations (Erridge, Fee, & McIlroy, 1998; Peled, 2001). The high failure rates can in part be attributed to the level of complexity in introducing new technology into established processes supported by legacy systems (Bjorvatn & Wald, 2018; Crawford & Helm, 2009; Rosacker & Rosacker, 2010). Since large government projects often involve a range of partners, the inter-organizational coordination challenges can further compound the rate of acute failure in public sector IT projects (Rajala & Aaltonen, 2021; Zhang & Tariq, 2020).

The high failure rate of government IT projects is also attributed to outdated and unsuitable management methods that do not account for these drivers of complexity. Since traditional governance focuses on stability, repeatability and accountability (Janssen & van der Voort, 2016), it is unsuitable for the new challenges of organizational innovation brought about by the digital era (Dunleavy, 2005). Agile has the potential to improve the management of large complex projects in the public sector, particularly those with an IT focus (Lappi, Karvonen, Lwakatare, Aaltonen, & Kuvaja, 2018), and it is recommended for public sector IT projects by scholars (e.g. Mergel, Gong, & Bertot, 2018).

The rate of transformation towards Agile has been varied, especially in government projects (Dikert, Paasivaara, & Lassenius, 2016). Because Agile is a best practice and sometimes a requirement, it might be adopted ceremonially, or as a mindless trend (Cram & Newell, 2016). Whilst Agile has a great deal of potential to improve IT project delivery in the private sector, management methods must be customized for public sector application (Soe & Drechsler, 2018), and there are also known limitations of Agile in large-scale projects (Michaelson, 2013). Agile requires flexibility in system design, and autonomy in team decision-making, and these features also require substantial changes in policy and management (Mergel, 2016). The appetite to make these changes might be limited, in particular due to the claims that there is a

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[1] See https://www.softwareadvisoryservice.com/en/blog/biggest-uk-government-project-failures/ for details.

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fundamental conflict between the orientation of public servants and that of Agile (Altukhova, Vasileva, & Slavin, 2016), which questions whether Agile can be successfully adopted within the existing government culture (Mergel et al., 2018), which is often highly bureaucratic and compliance-driven (Crawford & Helm, 2009).

Improving government IT delivery is they key driver, but we have also identified several significant challenges to the adoption of Agile in large public sector IT projects. Since these challenges are under-studied in the academic literature (Mergel, Ganapati, & Whitford, 2021), further research is needed if academia is to offer any insight into whether and how Agile should be applied. The adoption of new management approaches requires a deep understanding of the particular needs and character of the public sector setting (Soe & Drechsler, 2018). We therefore select institutional logics (Friedland & Alford, 1991) as a suitable theoretical perspective to develop a deep understanding of the complex inter-organizational relationships and change dynamics within our selected institutional settings. This study examines the application of Agile in a large multi-organizational UK public sector project, using a case study methodology. From an empirical perspective, the selected case is a very large IT program to build a digital ecosystem across defense medical services. From a theoretical perspective, we investigate why and how Agile maintains or upends the pre-existing institutional orders in a large-scale public sector IT project.

2. Literature review

In a public sector environment there is expected to be a great deal of complexity introducing Agile due to tensions between Agile values and government policy, procedures, and documentation (Lappi & Aaltonen, 2017). A rather extreme view is that Agile is incompatible with the "hierarchical and bureaucratic structures typical of government" (Vacari & Prikladnicki, 2015, p. 709). The counter-claim, that Agile has the potential to "reshape government, public management, and governance in general" (Mergel et al., 2021, p. 161), therefore requires further investigation, particularly into how this may happen, by what mechanisms, and the effects.

This literature review first defines Agile, then discusses the application of Agile in the public sector. It then introduces institutional logics as a theory to help understand how the approach to project management is influenced by the institutional settings. Against this background the research questions are presented.

2.1. Defining agile

Agile is the central theme of our research but it is an elusive and contested concept. One problem is the word itself, and as one example, agility, as the speed of responding to change, is discussed in the public sector literature (e.g. Gong & Janssen, 2012). In the operations and supply chain literature the "agile" concept also has a rich research history (e.g., Altay, Gunasekaran, Dubey, & Childe, 2018; Christopher, 2000; Dubey et al., 2018) that is also largely separate from recent Agile research (Lechler & Yang, 2017). Capital-A Agile (Baxter & Turner, 2021), the approach popularized by the Manifesto for Agile Software Development, started as a way of developing software (Beck et al., 2001) but was later also proposed as a suitable approach to tackling very different challenges such as new product development (Cooper & Sommer, 2016a; Smith, 2008). In broad terms, Agile supports complex projects by enabling flexible requirements: "The iterative nature of Agile allows for frequent stakeholder interaction, adjustments made on the fly, and re-scoping project requirements in light of new information or customer requests" (Serrador & Pinto, 2015a, p. 1042).

Going beyond the project level, McKinsey have described Agile as a shift in what an organization is and how it operates (Esbensen, Hjartar, Pralong, & Salo, 2019). They also suggest that a lack of understanding about Agile does not prevent its use as a trendy set of tools used by a few teams in the IT department, but it does stop Agile from becoming the foundation of a novel organizational design. Their radical conceptualization of the Agile organization is not widespread, but instead Agile is still commonly presented as a suite of methods, collectively called "agile methods" (e.g., Edin Grimheden, 2013; Hobbs & Petit, 2017; Karlstrom & Runeson, 2005; Lechler & Yang, 2017; Qumer & Henderson-Sellers, 2008). Positioning Agile as a method is problematic, since it changes over time (Bianchi, Marzi, & Guerini, 2020) and is adapted to specific organizational settings (Cram & Newell, 2016). Agile is not a particular practice, but the principles guiding those practices. The Agile Manifesto presents a flexible values-based approach rather than a set of methods, and accordingly Agile is described as a holistic way of thinking (Mergel et al., 2018) and as a mindset (Dikert et al., 2016; Lappi & Aaltonen, 2017; van Waardenburg & van Vliet, 2013), and also as something requiring a significant change in mindset if it is to be successfully adopted (Chen, Ravichandar, & Proctor, 2016; Cooper & Sommer, 2016b).

2.2. Agile in public sector projects

Agile became more widely used in private sector IT than traditional development methods as early as 2009 (Schwaber, 2010) and now represents a best practice approach to software development (Cañete-Valdeón, 2013; Smith, 2008). Its adoption has been much slower in the public sector (Azanha, Argoud, de Camargo Junior, & Antoniolli, 2017), and research remains limited (Mergel et al., 2021). A number of systematic reviews on public sector Agile have been published recently, and they illustrate the paucity of research. Extensive searches found, for example, no papers presenting a method for evaluating Agile software projects in the public sector (Carvalho Fernandes, Juarez Alencar, Assis Schmitz, Ferreira da Silva, & Sotirios Stefaneas, 2016), just 17 articles discussing its adoption in the public sector (Vacari & Prikladnicki, 2015), and a total of 33 articles (including 25 conference papers) on the broader topic of Agile approaches in government (Mergel et al., 2018). This lack of research is especially surprising given that Agile is recommended by the US government (U.S. Government Accountability Office, 2020) and mandated by the UK government (Agile delivery community, 2016).

There is widespread consensus that the adoption of Agile presents serious challenges to the public sector (Lappi et al., 2018; Mergel et al., 2021; Wang, Medaglia, & Zheng, 2018). Proposed causes include governance tensions (Lappi & Aaltonen, 2017), unfamiliarity (Azanha et al., 2017), and the "significantly reduced motivation" (Altukhova et al., 2016, p. 60) of public sector managers to participate in informal leadership or self-management practices. The effective implementation of Agile in the public sector also requires wider changes in government policy and procedures (Mergel, 2016; Mergel et al., 2018; Scupola & Mergel, 2022).

Digital government has significant potential to transform public service delivery, and Agile is seen as a central element of digital government (Fishenden & Thompson, 2013) and of the broader concept of adaptive governance (Janssen & van der Voort, 2016; Soe & Drechsler, 2018). In the public sector literature there is often a very close alignment between digital transformation and Agile: "ICT adds public value via agile methods" (Soe & Drechsler, 2018). However, there is limited empirical research investigating the impact or implications of Agile adoption in the public sector, and much of what does exist is in the form of experience reports presented at conferences. One such example, an experience report from 2008, describes the adoption of Agile in Calgary's municipal government, and the authors describe a process of adoption that started with widespread doubt, moved through team development and finally Agile was an accepted and valued practice that was thought to improve project performance even in a command-and-control setting that was counter to the Agile way of working (Scott, Johnson, & McCullough, 2008). Empirical research has also been conducted to understand the emergence of digital service teams that apply Agile principles in a number of countries including Canada, Denmark, Estonia,

Finland, Italy, UK, and the US, where these relatively small and separate units have been created in part due to the lack of guidance about how to develop digital government at scale (Mergel, 2019).

The adoption of Agile as a rhetorical device did not solve the UK's Universal Credit project, and there remained doubts about the scalability of Agile in such a large project, the lack of Agile skills, and the failure to make the required changes to organizational structures (Michaelson, 2013). An analysis of three cases in the Finnish public sector showed how governance relationships can support or detract from Agile projects, and it is noted that "applying flexible agile methods requires radical changes in the way projects are negotiated, contracted, procured, organized and, in particular, governed" (Lappi & Aaltonen, 2017, p. 264). The different practices, roles, organizing methods and reporting requirements in the project team and the steering group caused problems (Lappi & Aaltonen, 2017). Agile was also seen as a central part of the digital transformation of public service provision in Denmark, and as an important mechanism of becoming more customer focused (Scupola & Mergel, 2022). Again, the existing regulatory environment was not conducive to the digital transformation. It is widely reported that governance structures are an important feature of the alignment with both digital projects and Agile, and an empirical analysis of digital government projects in China showed that governance arrangements are evolving to become more agile alongside the transition towards digital government (Wang et al., 2018).

In general, the academic literature on Agile has been dominated by practice-oriented publications (Lechler & Yang, 2017) and it has been noted that theoretical analysis is lacking (Niederman, Lechler, & Petit, 2018). We respond to this gap and contribute to the theoretical understanding of Agile by applying an institutional logics lens, to understand how Agile in the public sector changes the relationships between the institutional orders. Institutional logics theory is introduced in the next section.

2.3. Institutional logics

The institutional logics perspective allows us to understand organizations by considering the relationships among individuals, organizations, and society within an institutional setting, according to Friedland and Alford (1991), who view institutions as "supraorganizational patterns of human activity by which individuals and organizations reproduce their material subsistence and organize time and space" (ibid, p. 232). They are the symbolic systems that give meaning to experience and frame foundational concepts such as value. A number of institutional orders together constitute society in reinforcing, competing, conflicting and contextual ways. The current institutional logics literature recognizes seven institutional orders: family, community, religion, state, market, profession, and corporation (Thornton, Ocasio, & Lounsbury, 2012). These orders have associated logics, "material practices and symbolic constructions" (Friedland & Alford, 1991) available to the individuals and organizations in their institutional work. These logics range from widely applied field-level norms to specific local practices (Johansen & Boch, 2017). A variety of logics apply to any given setting (Greenwood, Díaz, Li, & Lorente, 2010; Vickers, Lyon, Sepulveda, & McMullin, 2017) and these can be merged to achieve organizational goals (Kurtmollaiev, Fjuk, Pedersen, Clatworthy, & Kvale, 2018). Logics both describe unity, through the "connections that create a sense of common purpose and unity within an organizational field", and at the same time division, since "competing logics can co-exist" (Reay & Hinings, 2009, p. 629). A small set of examples from the variety of logics that have been studied, elaborated, and compared include: banking logic, care logic (Johansen & Boch, 2017), digital logic (Ertuna, Karatas-Ozkan, & Yamak, 2019), business-like health care logic (Reay & Hinings, 2009), design logic, governance logic, enculturation logic (Cornford, 2019), entrepreneurship logic, consulting logic, and managerial logic (Berente, Hansen, & Rosenkranz, 2015).

2.4. Institutional logics in the public sector

The nature of governments and the "state" institutional order has evolved, and in recent decades European governments have moved away from a traditional Weberian bureaucracy (Meyer, Egger-Peitler, Höllerer, & Hammerschmid, 2014). Historical reform initiatives and management models include: New Public Management (NPM) as described by Hood (1991); New Public Governance (NPG) as an attempt to apply private sector management models to improve efficiency, as explained by Osborne (2006); and, in turn, Digital Era Governance (DEG), which places a greater emphasis on inter-organizational models and service outcomes alongside the advantages offered by digitization, according to Dunleavy (2005).

A few studies have related institutional logics to these governance models. NPM presented a major system change within which "the whole logic of service production is often challenged" (Aalto & Kallio, 2019, p. 487). These changes naturally create tensions; as one example, NPG is said to conflict with the traditional bureaucratic and managerial logics (Nederhand, Van Der Steen, & Van Twist, 2019). We also expect to see an evolving public sector influenced by a market logic, with values encompassing efficiency, performance orientation, competition, and receptiveness to external demands (Meyer et al., 2014). Our case study is in the defense sector, which is certainly not solely market-oriented. In the UK's 2021 Defence Review, market orientation is not a core theme, but it does include *effectiveness* as a key objective: "Most importantly our armed forces will be integrated across all domains, joining up our people, equipment and information to increase their outputs and effectiveness" (Secretary of State for Defence, 2021).

In this research, we investigate the application of Agile in a large, multi-organizational public sector project. The institutional logics perspective has been previously applied in the public sector to understand a number of complex and related topics, including innovation (e.g., Vickers et al., 2017), systemic change (e.g., Nederhand et al., 2019) and the management of alliances and networks (e.g., Saz-Carranza & Longo, 2012). It has also been suggested that there is misalignment between Agile and typical public sector structures (Mergel et al., 2018), so the implementation of Agile at any significant scale is expected to expose some fundamental tensions. As with all institutional settings, the public sector is shaped by multiple institutional logics (Vickers et al., 2017), and the institutional logics perspective allows us to identify and evaluate a variety of dynamics, tensions and conflicts.

2.5. Focusing on the institutional orders - market, corporation, state, and professions

Institutional orders represent the "cultural symbols and material practices particular to that order" (Thornton et al., 2012, p. 54), and are presented as "ideal types". In order to study a multi-organizational private and public sector project, three relevant institutional orders are the market, corporation, and state (Saz-Carranza & Longo, 2012). The market institutional order concerns an orientation towards market competition, growth orientation, and performance (Thornton et al., 2012). The state institutional order refers to the bureaucratic state. Its source of legitimacy includes nation-building, state formation, legal mandates, and political power (Thornton et al., 2012). The corporation institutional order refers to the corporation as a legal institution. Usually associated with commerce, in our case the corporation is a source of rationalization, with a root metaphor of "corporation as hierarchy". We note that the corporation is an evolving form: "The Weberian theory of bureaucracy is not the same as that of the modern corporation" (Thornton et al., 2012, p. 27). In addition to these three institutional orders, we also study the professions, as key carriers of institutional logics who regulate professional practice (Ngoye, Sierra, & Ysa, 2019). The professions institutional order has a root metaphor: "profession as relational network". It is concerned with expertise, professional association or guild memberships, quality of craft, and personal reputation.

Table 1
Interviewee roles.

Role & Responsibility	Type	Interview
2* Director	Contractor	45 min
1* Head Application	Military	72 min
Cortisone Program Manager	Military	50 min
Senior Application Services	Civil Servant	67 min
Cortisone Delivery Manager	Military	70 min
Chief Architect	Contractor	55 min
Release Train Engineer	Contractor	50 min
Scrum Master	Contractor	50 min
Product Owner	Military	64 min
Agile Delivery Team Leader	Civil Servant	43 min
Change Release / Service Support	Civil Servant	48 min
Approvals	Contractor	59 min
SAFe Coordinator / Induction	Civil Servant	33 min
Commercial Officer	Civil Servant	58 min
Lead Scrutiny	Civil Servant	59 min
MoD Stakeholder	Civil Servant	64 min
MoD Stakeholder	Civil Servant	57 min

We evaluate the relationships and effects of Agile on these four institutional orders.

2.6. Research question

One fundamental question which the institutional logics perspective allows scholars to address is "Why and how do individual and organizational actors maintain or upend pre-existing orders?" (Durand & Thornton, 2018, pp. 631–632). This study focuses on the specific challenges, changes and tensions presented by Agile. Our research question is:

> Why and how does Agile maintain or upend the institutional orders of market, corporation, state, and professions in large scale public-sector projects?

3. Research methods

3.1. Case study sample

In order to examine the effects of Agile within large public sector projects, a single case study approach was adopted (Barratt, Choi, & Li, 2011; Dyer & Wilkins, 1991; Gerring, 2004; McCutcheon & Meredith, 1993). This approach is particularly well suited to exploring and investigating complex phenomena within a rich and detailed context (Yin, 1994). The research team undertook a broad search of appropriate organizations that would fulfil the research criteria and address the overarching questions (Barratt et al., 2011; Gammelgaard, 2017). The identification and selection process enabled the shortlisting of organizations with extensive prior practice of developing and managing complex projects and of substantial size and complexity. The case selection was refined across multiple phases (Gibbert & Ruigrok, 2010; Poulis, Poulis, & Plakoyiannaki, 2013). The initial stage required discussion around shortlisting potential organizations, some of which were based on prior research projects the team had undertaken and subsequently built key relationships with that might enable access to the internal workings of a case study (Dyer & Wilkins, 1991; Yin, 1994). Presenting both the merits and challenges or limitations of engaging with each organization, around access to specific elements of public sector projects (Barratt et al., 2011; Gibbert & Ruigrok, 2010), served as screening exercises. Finally, a single case study was identified as the most relevant and appropriate for the research, which would afford access to a wide range of functional and departmental positions across the project team (Dyer & Wilkins, 1991; Yin, 1994). Organizational buy-in and access was a vital component of the selection criteria to ensure a representative view would underpin the subsequent data analysis.

The selected case study is a large inter-organizational project within the UK Ministry of Defence (MoD), one of the largest and most prominent organizations in the UK public sector, with an extensive history of managing critical and complex projects with competing priorities (Allen, 2017; Taylor & Neal, 2004; Warren, 2014). Prior research suggests large public sector projects are often open to public scrutiny and follow strict bureaucratic processes (Aritua, Smith, & Bower, 2011; Crawford & Helm, 2009; Hall & Holt, 2002, 2003). Therefore, exploring and examining Agile whilst also considering the highly complex institutional setting would allow us to understand the challenges and tensions.

3.2. Case study description: "Programme cortisone"

Programme Cortisone[2] aims to create and deliver an IT ecosystem for medical services to UK Defense and military operations at an international scale, in order to "improve patient outcomes while maximizing resource efficiency and the number of service personnel fit for role".[3] It has had a multi-hundred-million-pound budget and hundreds of team members, including both in-house professionals and contractors. The nature and the scope of this case project requires involvement and coordination of various key inputs from across IT engineers and data management, MoD officials, military clinics, and the NHS. Initially, the program started in 2006 with a traditional waterfall structure, but it did not progress as expected. After almost 10 years of halting, the program was considered a failure,[4] having exceeded the budget but with almost no key milestones achieved.

A revised project proposal of Cortisone was approved in 2015 that featured the Scaled Agile Framework (SAFe) to coordinate the program. Several internal and external organizations were involved in the delivery, including the project owner, recipients of the proposed service, in addition to internal and external program governance, finance, and scrutiny, but the adoption of and transition to Agile initially experienced challenges. Since 2017–18, Programme Cortisone has successfully developed a set of mechanisms, including flexible contracting and supportive induction training for staff, and is now delivering project objectives effectively. At the time of our research, 9 out of 10 project deliverables set in the most recent 18-month program increment had been achieved, meeting the quality requirement within budget, despite the dramatic effects of the Covid-19 pandemic. The 10th deliverable was also only slightly delayed, by a matter of weeks. This performance is considered a remarkable achievement, and one which would not have been possible without Agile due to the levels of complexity and uncertainty in the program that were apparent in the previous failure.

3.3. Data collection

Detailed and in-depth semi-structured interviews underpinned the qualitative data collection process (Barratt et al., 2011; Schmidt, 2004). This approach facilitated the development and iterative review of initial insights, allowing further review and refining of specific questions and topics of analysis as new knowledge emerged throughout this process (Miles & Huberman, 1994). Interviews were undertaken with a cross-section of members at different organizational levels (Silverman, 2020), ranging from army personnel to civil servants (see Table 1). Each interview involved one or more members of the research team and individual members of the project. The interview protocol can be found in the appendix.

Prior to data collection, the study underwent review and approval by

[2] More details can be found at the UK Government's official project vision at: https://www.gov.uk/government/publications/programme-cortisone
[3] See "client story" via https://atos.net/en/client-stories/cortisone
[4] See https://techmonitor.ai/government-computing/mods-failure-to-award-cortisone-contracts-signals-procurement-rethink

the ethics and research governance board to ensure appropriate guidance was followed, in ensuring the scope and reach of the research remained within the proposed boundaries of the study (Kvale, 1994). Ethical guidelines were further implemented at each stage of the interview process, with approval on an individual basis through informed consent. Interviewees were also advised that either party could terminate the process. Bridging the gap between the interviewer and interviewee during a focused semi-structured interview can often be challenging in order to be able to examine and investigate specific questions, and respondents may feel reticent to provide a transparent, honest or unbiased response (Leech, 2002; Randall & Phoenix, 2009). However, these ethical measures catalyzed a salient degree of trust between the interviewers and interviewees, therein revealing unexpected and nuanced insights through candid discussions on the complexities of this large inter-organizational public project.

This study was conducted through a combination of 26 interviews, exploratory meetings (Table 2 lists the informal meetings), and supplementary secondary data. The interviews took place over a six-month period, spanning from January to June 2021. To adhere to Covid-19 social distancing rules at the time of the study (Shen & Sun, 2021), the 17 interviews, and the 9 informal meetings with 12 program stakeholders, were undertaken using online tools, such as Microsoft Teams and Zoom (Singh & Awasthi, 2020) over a period of eleven months. During the interviews, researchers raised probing questions based on a set of pre-existing themes, with follow-up questions to address emerging topics. Interviews lasted between 45 and 72 min, with the total time equating to 947 min of audio. Data capture was a combination of detailed notetaking and audio recording. All audio recordings were transcribed, and the notes provided contextual reference and representative comments to enrich the audio recordings' transcription (Silverman, 2020). Whilst the data from the informal meetings and project documents were not captured or formally included, they provided the research team with background knowledge that helped a great deal in understanding the study context and focusing the interview topics. Interviewees were assigned into one of three groups: military, civil servant (or crown servant), and contractor. This enabled the research team to ensure that meaningful data was captured in order to investigate and examine possible conflicts that may exist or emerge across inter-organizational coordination mechanisms in a public sector project. Data collection also captured the main responsibilities and roles associated with individual participants, which helped develop a mind-map-based relationship network, to cast light on the relationships across the institutional dimensions.

3.4. Data analysis

The data analysis process relied on established approaches and the combined experience and expertise of the research team, applying an iterative process of coding and thematic analysis across three main phases (Gioia, Corley, & Hamilton, 2013; Miles & Huberman, 1994). In the initial coding phase (Fig. 1), we sought relevant data related to the four institutional orders identified in our research question, namely market, state, corporation, and professions (Thornton et al., 2012). We carefully analyzed the interview transcripts, focusing on participants' narratives and experiences (Riessman, 2008), and identified relevant quotes and assertions that afforded insights into their perspectives on these institutional orders.

In the second-order coding phase, we sought analytical themes across the content (Boyatzis, 1998; Miles & Huberman, 1994), which resulted in the identification of the following themes: "Agile / market alignment", "State / market transition", "Agile / corporation conflicts", "State / corporation conflicts", "Agile as a driver of culture change", and "The Agile Profession". This involved comparing and contrasting the narratives and assertions from the interviews, and looking for patterns and connections within and across the institutional orders. Therefore, we specifically focused attention to how individual assertions could be aligned with an institutional logic (Thornton et al., 2012), by examining the underlying beliefs, values, and assumptions participants expressed or implied in their responses.

Further analysis and refinement enabled the development of aggregate dimensions (Gioia et al., 2013), which offer theoretical insight into the interrelationships between institutional orders and Agile. In this phase, following the strategies for theorizing from process data (Langley, 1999), we synthesized the findings from the first two stages of analysis, connecting the identified themes and assertions to the broader institutional logics perspective, resulting in two aggregate dimensions: "From commodity supplier to mission collaborator" and "One team culture". Through this process, we constructed a more comprehensive understanding of the complex interplay between the institutional orders and their influence on Agile practices within the organizations.

Throughout the data analysis process, we maintained a rigorous and reflexive approach (Lincoln & Guba, 1985), engaging in regular discussions within the research team to ensure the validity and accuracy of our findings. We also maintained a record of our coding decisions and analytical insights (Miles & Huberman, 1994), which enabled us to track the development of our understanding and ensure a clear and systematic approach to our analysis.

Table 2
Informal meetings with program stakeholders.

Date of Meeting	No of participants	Approx. Duration
18 Jan 2021	1	30 min
01 Feb 2021	1	45 min
09 Feb 2021	2	90 min
01 Apr 2021	1	30 min
28 Apr 2021	1	110 min
05 May 2021	3	60 min
14 Jul 2021	1	50 min
08 Sep 2021	1	60 min
16 Nov 2021	1	45 min

4. Results

Our study examined the question: Why and how does Agile maintain or upend the institutional orders of market, corporation, state, and professions in large scale public-sector projects? The coding approach embedded the institutional orders as an initial template, and ultimately led to the aggregate dimensions shown in Fig. 1. The aggregate dimensions illustrate how Agile influences the institutional orders, and particularly the corporation order. Section 4.1 describes the emerging position of Agile as a profession. Section 4.2 elaborates on the influences and tensions caused by Agile on the institutional setting, including (1) Agile / market alignment, (2) state / market transition, (3) Agile / corporation conflict, (4) state / corporation conflicts. Section 4.3 describes the aggregate dimensions, which help to understand how Agile leads to deep changes in the culture and orientation of the institutional setting within and around the project.

Note that in this results section we do not present respondent codes against interview quotes, as would usually be expected. The reason for this is that since Programme Cortisone has been named, some of the roles specified in Table 1 might relate to identifiable individuals. As such, in order to protect respondent anonymity, we are not linking any quotes to respondents.

4.1. The professions order as a carrier of agile

We suggest that Agile is carried by the professions order. Specifically, the understanding, promotion, and practice of Agile methodologies is part of an emerging professional discipline that includes several professional associations and formal qualifications. A deep understanding of Agile methodologies was felt to be a critical success factor that was lacking:

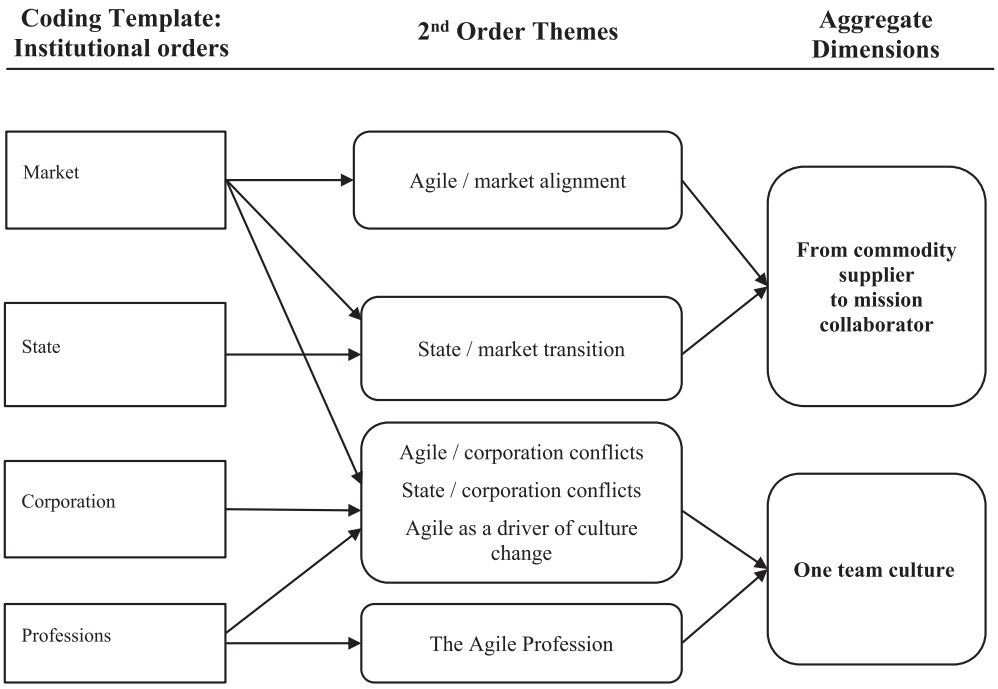

Fig. 1. Summary of the data structure.

"…only a few people would understand the subtleties… the Agile methodology that you know as a professional has a certain conduct, a certain way of doing things which is different from the past."

A lack of understanding in a sufficient number of people was also considered an important barrier to the wider adoption of Agile:

"I think we don't have enough critical mass of people who understand Agile to make it useful and to roll it out…".

One relevant topic in improving Agile knowledge and understanding as a professional discipline is training. Some individuals reported training to be lacking:

"There is no structured thing. It's pretty much learning on the job."

However, other people described a great deal of training provided across large teams:

"…we've spent quite a lot of money providing Agile training, or specifically SAFe training, to large parts of the organization."

Some suppliers also helped in the adoption of Agile as embedded team members, bringing their professional experience and expertise in Agile approaches:

"…we are fortunate enough as well, we've got some third-party suppliers, contractors, who are very much adept in Agile delivery themselves… they work in an Agile way and again completely buy into our methodology and assist and kind of work hand-in-hand and side-by-side with us to deliver what we need to do."

4.2. *Influences and tensions between agile and the institutional setting*

4.2.1. *Agile – market alignment*

The Agile profession and the market order are clearly in alignment. When asked about justifying the use of an Agile approach, which might enable improved value delivery, one respondent emphasized the primacy of project cost:

"You'd have to make a cost argument… Very little do we get a benefits argument win it… We'd have to put it back into cost terms somehow because the whole of government runs on pound notes."

The appetite to adopt Agile principles has increased, alongside a developing maturity that supports effective project delivery:

"And for an organization that most projects are late, and most projects are vastly over-budget, to have a technique to keep you on time and on budget I think is probably one of the biggest reasons why you see the change from old to new."

4.2.2. *State – market transition*

We observed changes in the state order that are taking place alongside the emergence of the Agile profession, reflecting the government shift towards a market orientation. The state is now a supporter of Agile:

"…it's probably quite rare to find an IT project now in Government that doesn't have some kind of Agile elements to it. I think the days of running everything in a purely Waterfall fashion are probably dead…".

In fact, the program reviewed in our case study was required to demonstrate the application of Agile principles in their initial project proposal in order to get government sign-off.

The market order (and market logics) is typically defined in terms of growth orientation, performance, and competitive advantage (Thornton et al., 2012). Growth and competitive advantage are not public sector values. Instead, the market order in this case is embodied in performance; the drive to provide service excellence:

"They really genuinely are invested in delivering the best possible thing."

The Agile profession embodies a values-driven mindset that embraces change, flexibility, and collaboration. These elements align very closely with the market order. Change and flexibility allow managers to focus on value delivery, and an important element of this is the ability to evolve the project requirements as they learn more about the users:

"…the way we are delivering it allows us to really nail down the emerging requirements as well as the set [originally defined] requirements and provide what is actually of use to the customer now rather than what was of use to the customer five years ago."

4.2.3. Agile – corporation conflict

The anticipated role of the state order as an anti-Agile bureaucratic authority (Mergel et al., 2021) was not observed in our case study. Rather, we observed that (central) government is now an active promoter of Agile working, within an evolving market orientation that is also significantly influenced by Agile. The Agile profession conflicts not with the state, but with the corporation order, as reflected in its bureaucratic roles, processes and governance, and culture. The project definition and approval stage is an important feature of the governance landscape, where we identified a major source of conflict between the corporation order and the agile profession. This conflict caused the program team significant difficulty:

"Getting that first business case through was really, really hard, because I had to make it sound waterfall to defense, and then make it sound Agile because I had to go to the cabinet office for GDS cabinet office approval, because they knew it was digital."

The existing corporation order within the MoD, including its bureaucratic roles, organizational culture, and hierarchical status, is a major barrier to Agile:

"…the culture within the MoD would be, for most occasions most of the time, be hostile to agile."

The root metaphor of the corporation order is *corporation as hierarchy* (Thornton et al., 2012). The MoD has five government ministers at the top of the organization chart, including one member of the Cabinet.[5] The strong hierarchical culture in the MoD is a very significant driver of behavior. In contrast, market logics and Agile are both rather anti-hierarchical. Herein, we observe a clash of logics. We observed a rather complicated relationship between Agile and hierarchy. Agile projects can transform the traditional culture of a process-driven, bureaucratic agency adhering to policy, to one which directly serves senior leadership in a clear, transparent, direct, and rapid way:

"…for the very first time in my career was I able to see right from the top down to where all of the priorities were being set at the highest level in defense… and it was very clear then precisely what you should be working on and what fitted within those higher priorities that were being set and clearly those activities that weren't. And therefore, your focus was very much on the activity that you needed to support the high-level intent."

At the same time, hierarchy is not a design feature for Agile team structures and a flat team structure can improve problem-solving:

"…in the Waterfall teams that I've worked in, that hierarchy is very omni-present and in Agile it's kind of removed and you feel empowered to be able to talk to the person that can solve your issue."

The initial adoption of Agile was also driven by senior management:

"…the main driving force behind that was we had a couple of senior people at kind of one star level, so that's a senior civil service level, who were real kind of Agile champions… they were the driving force behind us moving to an Agile approach."

Even with top-down adoption (and so hierarchical alignment), tensions remained between the Agile operating model and the existing governance structures because internal policy was not aligned. The Agile profession, with a values-driven mindset that embraces change, flexibility, and collaboration, conflicts with the governance model, where boards meet to approve specific project objectives. Agile encourages a customer focused model that is open to change, and autonomous teams create work that customers value (Denning, 2013) rather than governance boards defining and tracking project outcomes.

Our interview participants included some military personnel who had been through officer training and they reflected on the similarities between Agile and Mission Command (Storr, 2003). Mission Command is a military doctrine of centralized intent but decentralized execution – a military model of workplace empowerment. Mission command would include directives on what to achieve, but not how, and this was thought to share many similarities with Agile:

"I think an Army officer running an Agile team is perfect because you've got that 'servant leadership' because the Sandhurst motto is 'Serve to Lead'… And then you've got this complete tenet about Mission Command, which is 'I trust my people, I have great people so why would I tell them what to do?'"

Agile is not therefore removing hierarchy, but does change the nature of the corporation order. The primary character of the corporation order, and of the MoD culture, is bureaucracy:

"…it's so much governance and red tape everywhere… it's just one hurdle after another. You kind of lose sense of the sum of the parts sometimes. You're just fighting the system and just trying to comply."

Indeed the root metaphor of the MoD as a corporate entity, rather than the existing *corporation as hierarchy* (Friedland & Alford, 1991), might be better reflected by *department as bureaucracy*. Another example of the tension between the Agile profession and the corporation order is embodied in commercial policy and procedures:

"…people like me, in a commercial function, all about policy, are aimed at defining requirements upfront and contracting for them and doing everything Agile says is wrong. So, all of my policy, you know, in my department, is saying, don't do this!"

The development of new commercial policy that accounts for Agile projects is recognized as an important gap:

"…if I wanted to, you know, award a big prime contract to build an aircraft carrier, then there's pages and pages and pages and pages of policy on that… If you're talking about doing some Agile development, there's nothing out there, there's no guidance on what good looks like… There's no internal policy, you know, and that's a bit of a failing on our part, I think. And that, in a way, would help change the culture in itself, because it would give it a bit more legitimacy and make it a bit more formal, rather than some kind of crazy, lunatic idea some random person has on how to run a project."

Internal governance processes are also not aligned with Agile, and this remains a major challenge for ongoing projects:

"…the project governance or control process couldn't tolerate an agile process."

Even given the high level of awareness about these issues, there remains a clear tension between the central government mandate to operate with an Agile approach and the existing MoD internal governance structures. This supports our theoretical change to change the rot metaphor of the corporation order to *department as bureaucracy*. Pragmatically, this tension is articulated as a change process that is underway, but as one which remains difficult:

[5] Refer to https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920219/20200922-How_Defence_Works_V6.0_Sep_2020.pdf for details.

"…hopefully defense have had an epiphany and get rid of the processes in the middle and allow us to do what the Cabinet Office want us to do in the first place. But it's always a journey."

4.2.4. State – corporation conflicts in the face of agile: the accountability paradox

Policy and accountability structures are in place to identify and report on whether public money is being spent with prudence. This requirement underlies the tension between the evolving market orientation of government and the rigidity of the corporation order. The corporation order is heavily influenced by a strong accountability culture that exists in the public sector and in defense in particular (Baxter, Colledge, & Turner, 2017). This accountability logic stems from state ownership and control:

"We have to be very careful. We're spending the taxpayer's money. It has to be right."

The existing project management environment represents a governance paradox: Public money must be responsibly managed, but the existing management methods have a low success rate according to their own internal metrics:

"…we have a business case approval and [it] has a very defined requirement matrix… performance, time, and cost is very largely fixed in our acquisition process. The fact that about three-quarters, probably more than that, fail to meet those is not an issue."

In other words, while the existing structures frequently fail to deliver, they must still be applied. The accountability paradox that erodes responsible judgement in favor of the blind application of policy (Jos & Tompkins, 2004; Roberts, 2002) is a known problem, and illustrates that the transition to Agile is not a simple, rational problem.

This section has presented a number of influences and tensions between Agile and the institutional setting, showing how Agile aligns with the market and state orders but conflicts with the corporation order. The next section describes how Agile has led to changes in the corporation order.

4.3. How agile affects change in the corporation order

Our thematic analysis of the interview data identified two aggregate dimensions that describe how the changes in the culture and orientation of the corporation order occur: *mission collaborator* and *one team culture*. The existing MoD systems and structures are optimized for purchasing commodities, and are less suitable for the co-development of customized, complex systems that cannot be fully defined up-front. The new orientation of the Cortisone project team as a *mission collaborator* reflects the changing relationships between the MoD and its internal and external suppliers, as an active participant in the project as well as being the project owner and customer. The second dimension, *one team culture*, is also a divergence from the root metaphor of the corporation order "corporation as hierarchy". These emerging dimensions and their effects are described in the following sections.

4.3.1. From commodity supplier to mission collaborator

The Agile profession seeks to serve customers through change, flexibility, and collaboration. One of the changes observed in our case study was the move away from large and detailed contracts, and a corresponding shift in project ownership from suppliers back to the MoD. In the new model, contractors are brought in for much smaller packages of work, and the contracts include a much lower level of detail on the work required. This transition back to the MoD for the roles of design authority, risk holder, and system architect might imply a corresponding reduction in supplier engagement, influence, and autonomy, but we observed the opposite effect. Rather than serving as a supplier of a known and fixed system, the external organizations were able to engage more deeply in the design, optimization, and evaluation of the emerging system during the project.

Procurement typically begins with a detailed requirement, and this is very well suited to commodity items that can be clearly defined in advance. It is possible to meet the procurement regulations with rather open problems, but historically it has been more common to specify requirements in detail:

"…traditionally what government departments do when they are building a capability, they let a prime contract with a supplier and say, 'This is our requirement', and then they build it and provide it to us as a service."

This contracting model comes with certain difficulties, including a lack of flexibility in the requirements:

"…the problems there is these kinds of arrangement are really unwieldy and they're really inflexible and they're really big and they're hard to manage."

The organizational model for managing and delivering Programme Cortisone was very different, and in several ways. One major change is in the "design authority" role, which changes the nature of ownership and risk. Rather than allowing a single large project with defined requirements, Programme Cortisone manages a series of short duration contracts:

"…rather than do it that traditional commercial way where we appoint one supplier, we – MoD – are going to be the design authority, or the prime contractor. We're going to be at the heart of this, and rather than placing one large contract, we're going to disaggregate that and place lots of smaller contracts, and we're going to manage those."

Another major change was the nature of the contracts, which were fundamentally different and based on an Agile management methodology. This led to changes in the system design and program management:

"So not only was it a smaller contract, it wasn't a big prime, but it was small contracts that were aligned to the SAFe methodology, so it was aligned to the sprints and to the product backlogs and the minimum viable products and all that sort of stuff."

This new model allows the suppliers to take an active role in the ongoing design and development of the system. The nature of the contract, as one buying time rather than offering a defined capability, has also changed the nature of the relationship from a guarded and closed system of buyer-and-supplier to an open and transparent system of professional collaborators.

"It's a really open and transparent relationship, and we work jointly together, and you know, they've pretty much given us a lot of visibility and, you know, they've lifted the bonnet on their contract so we can see under the hood and see what it is they're doing, warts and all… there's a real shift in the way we work together."

Agile also changes the nature of risk in contracts:

"…we ended up contracting on a time and materials basis, where we pay for their people, but we make the decisions and we direct them… given that you're not taking any risk, we want the ability to walk away from this unilaterally if we think this relationship isn't working, without any consequence. So that was the trade-off."

Changes in the nature of supplier relationships similarly took place internally across departments and with other government organizations. These relationships also moved away from a contractual "hold them to

account" approach towards a more collaborative approach centered on co-design. As one reflection explains:

> "It was very much previously seen as a supplier and therefore needed to be held to account… and we came down hard on them if they failed to achieve what it was that they were supposed to do. That's now changed with the Agile approach to a more one team culture… there is greater involvement, awareness, empathy and understanding of everybody that was never there before."

The move to Agile then supported a closer alignment among departments than the previous customer-supplier relationships allowed:

> "The way that we are more closely aligned with the business as we go through, I think the delivery organization probably is more productive as a consequence of that."

Organizational relationships both externally with suppliers and internally across departments and organizations are changing because of Agile. In this case study, inter-organizational relationships have changed from a model of "commodity supplier to he held to account" to one of "mission collaborator with essential professional capability and an equal drive to deliver a good result". The contractual model also bears some similarity to Mission Command (Storr, 2003), albeit at a higher level. The changing nature of these organizational relationships is also closely related to the creation of a strong Agile team culture, which we present in the next section.

4.3.2. One team culture

Agile was also thought to improve team morale and motivation, which was expected given military leadership knowledge. The scrum framework (Schwaber & Sutherland, 2013), the most commonly used Agile approach (Digital.ai, 2020), was applied within Programme Cortisone. The Scrum team, as with the military team (or squad, crew, detail), is thought to provide the basis for camaraderie and trust:

> "Do you know what motivates soldiers? It's not fighting for Queen and country, it's fighting for their team. So, when they're in a fight they're there with their muckers and they're helping their friends and the people that they're really closely bonded with to succeed. And that's what happens in Scrum teams as well."

Agile was critical in creating a one team culture, which was not the typical state:

> "…normally in a situation where you have multiple contractors, they almost want each other's work or they, you know, they want to do better than the other contractor or there's competitiveness. But you don't really have that here. Everyone kind of, it's very much a one team culture."

Part of the team identity is reflected in the shared values of the Agile profession and the market order, to serve the end users. Internally this is recognized as a shared purpose, to deliver the project mission.

> "…what we've achieved on Cortisone is… The word that I use is mission alignment, which is, even though we're from different companies, different suppliers, we all know what we're trying to do is really important."

In summary, Agile is both supported by and is an enabler of the one team culture. Leadership behaviors, including clear support for Agile methods, transparency in communication, and some overhead protection from the governance regime, serve to enable the adoption of Agile working practices. Agile working practices then serve to support an aligned, collaborative, and supportive environment that enhances inter-organizational coordination.

5. Discussion

This paper responds to the call for further research on Agile in the public sector (Mergel et al., 2021). Whilst Agile might change the nature of organizations, this does not occur in isolation, but within a complex institutional setting (Royston Greenwood, Díaz, Li, & Lorente, 2010; Vickers et al., 2017) that has the potential to maintain conflicting logics over extended periods (Reay & Hinings, 2009). By applying an institutional logics lens (Friedland & Alford, 1991; Thornton et al., 2012), we examined this complexity by investigating the tensions and conflicts within the institutional setting (Cornford, 2019; Reay & Hinings, 2009; Saz-Carranza & Longo, 2012). Specifically, our research examined how Agile interacts with the key public sector institutional orders of market, corporation, state and professions (Saz-Carranza & Longo, 2012).

In the results section we presented some specific tensions including Agile / corporation and state / corporation conflicts. We also observed that changes in the institutional setting were enabled by the transition towards Mission Collaborator and One Team Culture. These tensions and changes prompt some further analysis of how our case study relates to and informs institutional theory, and our discussion addresses the nature of the institutional orders in our case setting and the challenges brought about by Agile.

5.1. Revised model of the institutional orders

We observed a number of challenges and tensions within and between the institutional orders brought about by Agile. As such, we present two revised models of the institutional orders. Table 3 presents the observed institutional environment within our UK public sector case study, and Table 4 illustrates the alignment and ongoing conflicts observed in the institutional setting that were brought about by Agile.

5.2. Changes in the state order

Table 3 presents a change in the root metaphor of the state order, from "state as redistribution mechanism" to "citizen service provider". The Government Digital Service is the leading UK agency in this realm, aiming to provide "a simple, joined-up and personalized experience of government for everyone".[6] Other government agencies are also presenting a service orientation, such as the NHS "helping you take control of your health and wellbeing".[7] Our case study showed a clear orientation towards service. The underlying service metaphor applies to a wider range of public sector settings and implies a change in the root metaphor of the state that is taking place alongside digitization.

5.3. Changes in the market order

We positioned the market order as one which is transforming the nature of the public sector, due to its focus on efficiency, performance-orientation, competition, and receptiveness to external demands (Meyer et al., 2014). However, the majority of the market order descriptions highlighted in Table 3 are not directly influential in the public sector. The root metaphor of the market order, "transaction", clashes with the public sector setting, where *public value* (e.g., Mergel, 2019) would offer a closer reflection of the emerging institutional characteristics. Share price is clearly not influential in the public sector, and we propose *procedure and performance* as relevant sources of legitimacy (Gustavsen, Røiseland, & Pierre, 2014; Jongen & Scholte, 2022). We also suggest that the source of authority is not shareholder activism but rather the strong *legal framework* that the UK public sector operates within.

[6] See https://www.gov.uk/government/organisations/government-digital-service for more detail.

[7] See https://www.nhs.uk/

Table 3
Analysis of the Institutional Orders in our case setting.

	X-axis categories			
Y-axis categories	State order	Market order	Corporation order	Professions order
Root metaphor	(State as redistribution mechanism) Citizen service provider §	(Transaction) Public value §	(Corporation as hierarchy) Department as bureaucracy §	Profession as relational network
Sources of legitimacy	Democratic participation	(Share price) Procedure and performance §	(Market Position) Public mandate §	Personal expertise
Sources of authority	Bureaucratic domination	(Shareholder activism) Legal framework §	Board, top management	Professional association
Sources of identity	Social and economic class	Faceless	Bureaucratic roles	Association with quality of craft, Personal reputation
Basis of norms	Citizenship in nation	Self-interest	Employment in firm	Membership in guild and association
Basis of attention	Status of interest group	Democratic performance	Status in hierarchy	Status in profession
Basis of strategy	Increase community good	Increase efficiency and profit	(Increase size and diversification of firm)	Increase personal reputation
Informal control mechanisms	Backroom politics	Industry analysts	Organization culture	Celebrity professionals
Economic system	Welfare capitalism	Market capitalism	Managerial capitalism	Personal capitalism

Key: Original term (Edited term) Edits and additions §.

5.4. Changes in the corporation order

Agile emerged within the IT sector as a way of developing software (Beck et al., 2001), though it has also been applied in other settings (Cooper & Sommer, 2016a; Smith, 2008). It has the potential to change the nature of organizations (Esbensen et al., 2019). In our study of inter-organizational coordination mechanisms, the corporation order emerged as a central barrier. The mandate issued by the state to adopt Agile is not immediately reflected in the corporation order, which exists at the department level (i.e., the MoD). Within the department we identified an ongoing tension between the agile profession and the root metaphor of the corporation order, which is not characterized in this setting by the existing "Corporation as hierarchy" but instead by the metaphor *department as bureaucracy*. In a public sector setting, the "source of legitimacy" is not market position but *public mandate*.

5.5. The professions order as a carrier of Agile

The increasingly visible and conscious professionalization of Agile led us to position Agile as a conveyor of institutional logics (Ngoye et al., 2019). Agile is embodied within and carried by the personal experience of being an *Agile Professional*. Across the profession, Agile is demonstrated and asserted through professional accreditations and associations. Both accreditations and external consultants legitimize the application of Agile (Mol & Birkinshaw, 2009), although some complexities and conflicts remain within this knowledge space, including the controversy around presenting Agile as a method (Bianchi et al., 2020).

Having described the institutional setting of our public sector case study at a high level in Table 3, Table 4 describes the details of the alignments and conflicts between Agile and the institutional setting.

Because Agile requires organic, flexible, and participative structures (Lappi & Aaltonen, 2017) that encourage cooperative social actions and decision-making (Serrador & Pinto, 2015), Agile creates conflict and tension in the existing institutional orders. Competing and conflicting logics are a feature in the public sector (Cornford, 2019). Some of these will be resolved through the change process, but some will remain unresolved; competing logics can co-exist for many years (Reay & Hinings, 2009). We identified a number of unresolved tensions in our case setting, illustrated in Table 4. They include cost-value, project approval, policy, governance, and culture. All of these conflicts require additional ongoing effort from the project team in managing the project-organization interface, and some of them (particularly policy and approvals) threaten the future viability of Agile.

We also identified a number of areas of alignment: mission delivery, value delivery, Agile procedures, and Agile professionals. The change mechanisms that we identified, *mission collaborator* and *one team culture*, rely on and interact with the institutional setting. Fig. 2 illustrates how the institutional orders serve together to promote the use of Agile, which then leads to these change mechanisms which serve to enact change in the corporation order. The remaining governance tensions may be worked through in part with the introduction of new policy, but it is likely that the accountability paradox will continue to enable the blind application of existing policy (Jos & Tompkins, 2004; Roberts, 2002).

Agile is presented as a *mindset* (Dikert et al., 2016; Lappi & Aaltonen, 2017; van Waardenburg & van Vliet, 2013) that embraces change and collaboration (Beck et al., 2001), and which changes the nature of organizations (Esbensen et al., 2019). Our analysis of a large IT project in UK defense shows that the Manifesto for Agile Software Development (Beck et al., 2001) has triggered a collective identity that was socially constructed from institutionalized practices and behavior (Thornton et al., 2012; Thornton & Ocasio, 2008) and which influences decision-making (Lounsbury, 2007); the *Agile profession*. The adoption of Agile in our case study facilitated the emergence of new values, behaviors and coordination mechanisms. We identified two key change mechanisms: *Mission Collaborator* and *One Team Culture*. Fig. 2 illustrates how they interact with the institutional orders to effect change.

5.6. Contributions

The primary contribution of this study lies in its empirical nature, addressing the numerous calls for further studies of practice, including the broad analysis of Agile in the public sector (Mergel, 2016; Vacari & Prikladnicki, 2015), the required adaptations within governmental bureaucracy (Dikert et al., 2016; Mergel et al., 2018), the empirical investigation of Agile project governance (Lappi et al., 2018) and detailed examinations of the evolving relationships between Agile and public administration values (Mergel et al., 2021). Earlier we discussed the widespread consensus that the adoption of Agile presents serious challenges to the public sector (Lappi et al., 2018; Mergel et al., 2021; Wang et al., 2018), and our research offers additional insights into the foundations of such challenges and tensions, as well as their dynamic nature.

Table 4
Alignment and conflict in the institutional orders brought about by Agile.

	X-axis categories			
Y-axis categories	State order	Market order	Corporation order	Professions order
Root metaphor	Citizen service provider	Public value	Department as bureaucracy	Profession as relational network
Agile influences	*Agile visibly supports mission delivery* "…I able to see right from the top down to where all of the priorities were being set at the highest level in defense… your focus was very much on the activity that you needed to support the high-level intent."	*Agile emphasizes the cost-value conflict in project approvals* "Very little do we get a benefits argument win it… We'd have to put it back into cost terms somehow because the whole of government runs on pound notes"	*The project adopts the new role 'Mission Collaborator', though 'department as bureaucracy' holds* "It's a really open and transparent relationship… there's a real shift in the way we work together"	*Agile has professional recognition and networks* "…critical mass of people who understand Agile"
Sources of legitimacy	Democratic participation	Procedure and performance	Public mandate	Personal expertise
Agile influences	*Accountability culture influences project practices* "We have to be very careful. We're spending the taxpayer's money. It has to be right."	*Agile procedures are novel, and challenge existing practices* "…rather than do it that traditional commercial way where we appoint one supplier, we – MoD – are going to be the design authority… rather than placing one large contract, we're going to disaggregate that and place lots of smaller contracts, and we're going to manage those"	*Value delivery is improved with Agile, which meets the public mandate* "…provide what is actually of use to the customer now rather than what was of use to the customer five years ago"	*Agile as a profession provides legitimacy* "Agile… has a certain conduct, a certain way of doing things which is different from the past" "I trust my people; I have great people so why would I tell them what to do?"
Sources of authority	Bureaucratic domination	Legal framework	Board, top management	Professional association
Agile influences	*(Project approval and governance frameworks conflict with Agile)* "I had to make it sound waterfall to defense, and then make it sound Agile because I had to go to the cabinet office for GDS cabinet office approval, because they knew it was digital"	*(Internal commercial policy conflicts with Agile)* "If you're talking about doing some Agile development, there's nothing out there, there's no guidance on what good looks like… There's no internal policy"	*There was strong top-down support for Agile* "…we had a couple of senior people… who were real kind of Agile champions… they were the driving force behind us moving to an Agile approach"	*Agile professional accreditations and associations provide an external source of authority and legitimacy*
Sources of identity	Social and economic class	Faceless	Bureaucratic roles	Association with quality of craft, Personal reputation
Agile influences	–	–	*Agile practice removes hierarchical barriers* "…in the Waterfall teams that I've worked in, that hierarchy is very omni-present and in Agile it's kind of removed and you feel empowered to be able to talk to the person that can solve your issue"	*Agile professionals identify with delivering value, as defined by their customers* "They really genuinely are invested in delivering the best possible thing"

Note that we excluded several y-axis categories where our data did not provide meaningful insight.

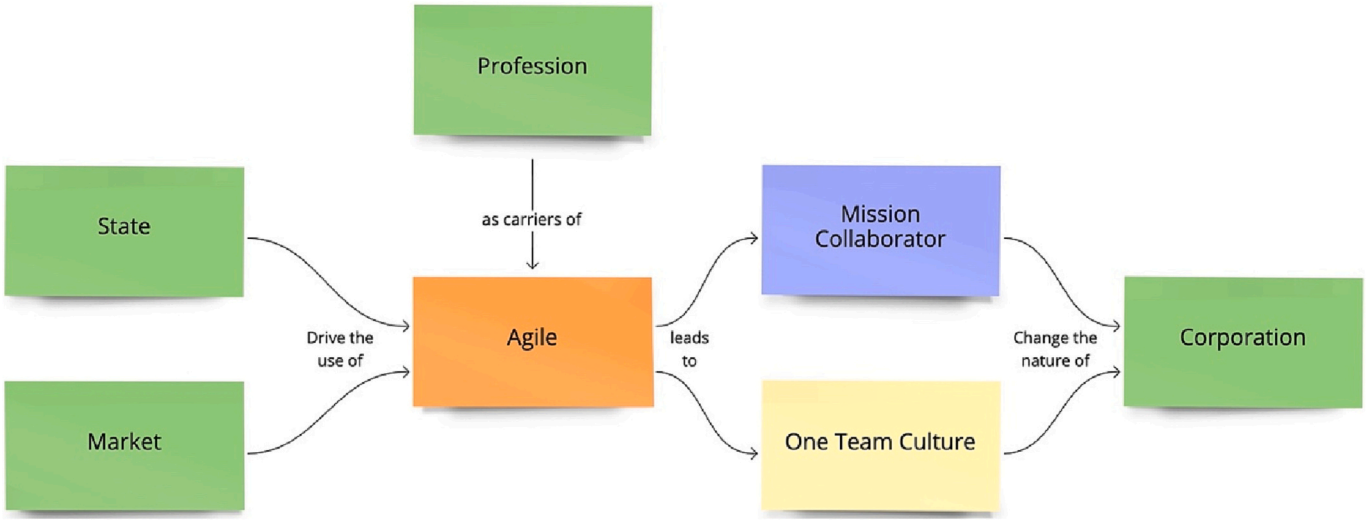

Fig. 2. Interactions between Agile and the institutional orders.

In the wider Agile literature, theoretical analysis is also lacking (Niederman et al., 2018) and we make a theoretical contribution to the understanding of Agile in the public sector by applying an institutional logics lens. In particular we elaborate on how Agile interacts with the key public sector institutional orders of market, corporation, state and professions (Saz-Carranza & Longo, 2012). Table 3 provides a detailed analysis of the changes in these Institutional Orders that are co-evolving with Agile, which include changes in the root metaphor of the state from "redistribution mechanism" to "citizen service provider". Agile is not the exclusive driving force behind such changes, but rather the wider prospects of digital era governance (e.g. Dunleavy, 2005) and the modifications to public sector IT practices that the digital era enables (e.g. Fishenden & Thompson, 2013) are coevolving with Agile to have dramatic effects on the nature of government in the digital age. As previously discussed, the transition process is expected to be extremely challenging and this study presents a detailed theory-driven analysis of the specific tensions arising in our institutional setting that are brought about by Agile, summarized in Table 4. Within this context, various relationships are elaborated including Agile / corporation and state / corporation conflicts. Our theoretical analysis also discerned two pivotal change mechanisms that were crucial to the functioning of Agile in our case study, and which reflect transitions in both governance and public sector values: *Mission Collaborator* and *One Team Culture*.

5.7. Limitations

This research project used a single case study to explore a complex and emerging phenomenon in depth. The case study approach allows a deep exploration of complex phenomena in a particular context (Yin, 1994). Therefore, the generalizability of the case is limited by design, both by the extent of the sample (one organizational setting) and by the context (the UK Defense sector). There is a need for further research to investigate the effects of the specific institutional setting.

5.8. Future research opportunities

Our case study provides some evidence that both the state order and corporation order are evolving towards a *service orientation*. Services rely on customer input (Sampson & Froehle, 2009), relationships, and co-creation (Vargo & Lusch, 2004). In broad terms, this could be considered as a move towards a *service-dominant logic* (Vargo & Lusch, 2004), an approach which aligns closely with the existing mechanisms of the MoD to procure "through-life" capability rather than products. Defense procurement has been the subject of intense government scrutiny and research into, for example, procurement culture (O'Callaghan, 2001) and the ongoing challenges arising from rapid technology change (Russell, 2009). Agile is enabling an improved alignment within procurement towards a service orientation, which includes major changes to contracts, project ownership, governance mechanisms, and team structures. Applying a services lens, including service-dominant logic, could provide new salient insights.

5.9. Implications for practice

In the UK public sector there is a mandatory requirement to use Agile for government IT projects (Agile delivery community, 2016). As such, the implications for practice in the UK are not related to the question of whether to use Agile, but how to anticipate and address the challenges that may arise as a result of the misalignment between Agile and traditional methods of project funding, governance, and management. Project funding mechanisms, including the use of a single prime contractor for a fully specified system, will need to be changed. Cortisone took on the critical roles of system architect and contract manager internally, and whilst this offers a great deal of flexibility it does also require substantial expertise. Project governance mechanisms that were typically applied within the MoD were also not adapted to Agile, and so, in the longer term, a significant review of project governance and oversight will be required. In the short term, project managers will need to produce multiple sets of reporting documents, one to track the performance of the Agile project and another different set to satisfy the internal governance review procedures. Changing the approach to project contracts and governance is a major undertaking. Management methods will also need to adapt to Agile, and training is one route towards this.

6. Conclusion

This paper investigated the challenges faced following the adoption of Agile in a large IT program in the UK defense sector. Institutional logics was applied as a theoretical lens to understand the complex dynamics. Unresolved tensions in our case setting include cost-value, project approval, policy, governance, and culture. We also identified a number of areas of alignment: mission delivery, value delivery, Agile procedures, and Agile professionals. The change mechanisms that we identified, *mission collaborator* and *one team culture*, rely on and interact with the institutional setting, and serve to orient the project team and enable them to embody the Agile methods and values. The Agile transformation in government has come a long way, and our case study

describes a well-functioning project that is on track to deliver its goals. It also has a long way to go, and a great deal of organizational design effort is still needed.

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CRediT authorship contribution statement

David Baxter: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Nicholas Dacre:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition. **Hao Dong:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing. **Serkan Ceylan:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Interview protocol

Our semi-structured interview questions have three main topics, as outlined below. The intention is to capture both individual experiences and to understand the wider project context through detailed experiences and insights.

1. Personal Agile expertise

(1) Please briefly describe your background and work history.
(2) How experienced are you with Agile?
(3) Have you had any formal training on Agile? If so, which/when/where?
(4) Do you have any Agile qualifications or certificates?
(5) Is any training provided by the organization?

2. Organization's Agile practice

(1) Where/when/how is Agile applied?
(2) Which Agile methods or practices are used in your organization, and which ones are you directly involved with?
(3) Is there a reason why certain Agile methods were adopted?
(4) What support is available (e.g., training, induction sessions, sponsorship, professional coach, culture building, etc)?

3. Experiencing Agile implementation (from the current stage of Cortisone and beyond)

(1) Does Agile make a difference? Good or Bad?
(2) How would you comment on the efficacy and effectiveness of Agile in your project?
(3) From your understanding and experience, what are the success factors in Agile projects and project teams?
(4) Can you talk about the governance of this Agile project? Is it different from the previous approach or other projects in your organization?
(5) Is the project team culture different from other projects in your organization?
(6) What is required to nurture/promote such culture? Any resistance/difficulties?
(7) What are the main challenges when implementing Agile?
(8) From your understanding/experience, what are the success factors in implementing Agile?
(9) What is your vision for the future of Agile projects?

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