

The governance of collaboration in complex projects

Governance of
collaboration

Mehmet Chakkol

Warwick Business School, University of Warwick, Coventry, UK

Kostas Selviaridis

*Department of Management Science, Lancaster University Management School,
Lancaster University, Lancaster, UK, and*

Max Finne

Warwick Business School, University of Warwick, Coventry, UK

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Abstract

Purpose – Inter-organisational collaboration is becoming increasingly important in complex projects; some project customers even formally require evidence of collaborative competence from potential providers. The purpose of this paper is to explore the governance of collaboration and the ways in which it is enacted in practice for complex projects.

Design/methodology/approach – The study is based on a qualitative analysis of 29 semi-structured interviews, primary data from meetings and events supported by secondary data, including standards and industry-specific contract templates.

Findings – The paper identifies how collaboration can be effectively governed in complex projects through the emerging role of the collaboration standard and its impact on contractual and relational governance mechanisms. The standard sets higher-level institutional guidelines that affect the way in which collaboration is governed in complex projects. It helps formalise informal relational practices whilst also providing guidelines for building flexibility in contracts by including coordination- and adaptation-oriented provisions conducive to collaboration.

Originality/value – The paper demonstrates the emerging role of the collaboration standard and its influence on contractual and relational mechanisms deployed in complex projects. It shows how the standard can formalise and codify informal collaborative practices and help transfer related learning across projects, thereby contributing towards the dual requirement for standardisation and flexibility in project settings.

Keywords Project management, Standardization, Governance, Inter-organizational collaboration, Complex projects

Paper type Research paper

1. Introduction

Collaboration is increasingly seen as a preferred way of delivering complex projects involving multiple partners, suppliers and customers (Acha *et al.*, 2004; Davies and Hobday, 2005). Collaborative competence amongst partnering firms is a necessity to successfully manage large-scale, multi-organisation projects (Davies, 2004). Collaboration is defined in this paper as “the commitment to working together with two or more parties to create value by striving to achieve shared competitive goals and operational benefits through a spirit of mutual trust and openness” (Institute for Collaborative Working, 2016). Collaboration can be challenging in temporary, project-based settings, especially when the involved organisations lack prior experience of working together: “one of the biggest risks to large-scale infrastructure projects is conflict emerging between consortium partners who have not co-operated before” (*The Financial Times*, 2016). Collaborative culture, norms and practices take time to develop; this implies challenges in the context of time-limited projects (DeFillippi and Sydow, 2016; Jones *et al.*, 1997). Accordingly, collaboration in complex projects is often considered particularly challenging, and needs to be governed effectively.

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As an example of the emerging need to govern collaboration in complex projects, consider the ongoing UK High Speed 2 (HS2) project for building a fast railway initially linking London with Birmingham, and later with Leeds and Manchester. To this date, the HS2 project organisation has spent close to £1 billion to formally test the collaborative behaviour and abilities of bidding alliances (*The Financial Times*, 2016). More broadly, project alliances and their members aim for competitive advantage on the basis of their abilities to collaborate, which can in turn enable improved governance in specific projects (Vangen *et al.*, 2015). Project governance refers to the governance of individual projects. It comprises a consistent method of controlling the project and enacting sets of practices that are reliable and repeatable across projects (Müller *et al.*, 2014), one of which is collaborative practices. This suggests that whilst successful delivery of complex projects requires flexibility to respond to unique customer requirements (Davies and Hobday, 2005), the governance structures of complex projects can be replicated across multiple projects yielding possibilities for efficiency in subsequent ventures (Brady and Davies, 2004; Müller *et al.*, 2014).

Prior research has stressed the benefits of formalising experience-based know-how on inter-organisational collaboration to be used in subsequent endeavours (e.g. Davies *et al.*, 2016; Löwendahl *et al.*, 2001). This process should allow project organisations to benefit simultaneously from the flexibility required to customise output and from the standardisation of processes driving operational efficiency (Davies and Brady, 2000). Huxham *et al.* (2000) have suggested that inter-firm relationships in projects, “[...] if left to [their] own devices, [are] more likely to have a negative effect than to lead to a collaborative advantage” (p. 352). Nevertheless, there is still a limited understanding of how to govern inter-firm collaboration and use experiential learning across different projects to gain competitive advantage (Maylor *et al.*, 2015). This paper aims to empirically explore the governance of collaboration in project-based operations. In line with Vangen *et al.* (2015, p. 1246), the paper uses this term to refer to “the structure, processes, actions and decisions that enable collaboration both within and across projects”. Unlike the literature on exchange governance, which tends to treat collaborative norms as an integral part of relational governance mechanisms (e.g. Poppo and Zenger, 2002), this paper stresses that in time-finite, project-based operations collaboration itself needs to be governed.

The paper focuses on complex projects (Davies and Brady, 2000), which entail networks of both vertical and horizontal relationships. This is complementary to settings of more permanent operations that typically involve long-term, mostly vertical inter-organisational relationships (IORs) (Cao and Lumineau, 2015). Complex projects exhibit high complexity, as a result of their time span, the bundling of capital equipment and services and the coordination of multiple organisations (Brady *et al.*, 2005; Lewis and Roehrich, 2009). The governance of collaboration is often problematic in complex projects and requires robust mechanisms of different types (Caldwell and Howard, 2014; Roehrich and Lewis, 2014). The paper poses the following research question:

RQ. How do project firms govern inter-organisational collaboration in complex projects?

The remainder of the paper is structured as follows. The next section reviews the literature on inter-organisational collaboration in complex projects, exchange governance mechanisms and institutional-level influences in complex projects. The qualitative research design is discussed in Section 3, followed by presentation of the findings in Section 4. The paper concludes in Section 5 by discussing the findings and elucidating research and managerial contributions as well as avenues for further research.

2. Literature review

In the first subsection of the literature review, collaboration is discussed in the context of complex projects. The second subsection reviews the literature on exchange governance mechanisms, whilst the third focuses on institutional influences in the governance of collaboration in complex projects.

2.1 *Inter-organisational collaboration for effective delivery of complex projects*

Complex projects deliver products, services and technologies that are tailored to the needs of industrial customers (Acha *et al.*, 2004; Davies and Brady, 2000; Davies and Hobday, 2005). Some examples include air traffic control systems, infrastructure projects, advanced manufacturing equipment or mass transportation systems. Such projects entail long time frames and the coordination of multiple interdependent project stakeholders (Brady *et al.*, 2005; Davies, 2004; Lewis and Roehrich, 2009). They often require forming a project organisation in which multiple partners, suppliers, customers and even competitors work together in consortia, alliances or joint ventures (Acha *et al.*, 2004; Davies and Brady, 2000). For example, consider the British Petroleum (BP) Andrew Alliance. This is an offshore oil and gas field, where initially BP was not able to conduct any work due to high operational risks (Broome, 2002). Revisiting the project led BP to conclude that the £450 million extraction costs were not feasible using its conventional project management practices. Instead, BP decided to form a strategic alliance with seven contractors, using a pain/gain share open-book contract (Mendelson and Ziegler, 1999). The Alliance adopted a structured approach to collaboration by working as an integrated team sharing common systems, risks and incentives. This approach allowed the completion of the project six months ahead of schedule, at a cost of £290 million. The UK National Audit Office identifies the BP Andrew Alliance as an example of successful governance of collaborative relationships (National Audit Office, 2006).

Complex projects have three major contingent characteristics. First, the temporary nature of project-based partnerships (Davies and Hobday, 2005) renders collaboration more challenging mainly due to the limited time available to build cooperative norms and mutual trust amongst project partners. Second, complex projects are highly complicated and unique in terms of the capital resources and coordination required for multiple organisations, resulting in uncertainty in planning and forecasting (Brady *et al.*, 2005; Lewis and Roehrich, 2009). Third, organisational structures and hierarchies can be ambiguous for complex projects since a multitude of firms, teams and individuals are involved. Accordingly, the governance of collaboration in complex projects can refer to both vertical (e.g. contractor-subcontractors) and horizontal (e.g. bidding consortium partners) relationships comprising different levels of teams, projects, firms, joint ventures/consortia and alliances.

Governance of collaboration is instrumental for achieving both project-specific and cross-project performance goals that differ in nature (DeFillippi and Sydow, 2016; Vangen *et al.*, 2015). Accordingly, governance of collaboration aims to simultaneously achieve a balance between the flexibility required for bespoke project needs and the standardisation needed for organisational efficiency. An excessive focus on flexibility can undermine managerial predictability and operational efficiency, whilst too much standardisation can inhibit autonomous decision making and innovative problem solving. Complex project providers seek efficiency through cross-project repeatability in terms of partners, processes, routines and practices (Manning and Sydow, 2011). In this vein, providers aim to achieve economies of repetition, as noted by DeFillippi and Sydow (2016):

Project networks experience tensions between standard operating procedures (routines) and customized crafted solutions to the challenges of unexpected or innovative project work tasks and challenges. Standardizing policies provide economies of repetition and repeatable solutions (Davies and Brady, 2000). However, these standardizing policies can become dysfunctional when a project or a series of projects contains unique (innovative) requirements (p. 8).

2.2 *Inter-organisational exchange governance*

IORs are governed through contractual and relational mechanisms (Cao and Lumineau, 2015; Wacker *et al.*, 2016), both of which are relevant to inter-organisational collaboration in projects. Contractual governance concerns formal, explicit and legally enforceable

inter-organisational agreements that define the roles, rights and responsibilities of exchange parties and establish safeguards against potential opportunism (Poppo and Zenger, 2002). On the other hand, relational governance refers to informal, socially derived norms in managing exchange risks and uncertainty and coordinating inter-organisational collaboration (Zhou and Xu, 2012). The notion of relational governance is multi-dimensional and includes several socially derived mechanisms, such as trust, commitment, flexibility norms and information and knowledge sharing (Wacker *et al.*, 2016). For example, trust, commitment and shared understanding are perceived as the prime factors influencing the success of collaborative project initiatives (Ansell and Gash, 2008). Relational governance includes encouraging personal means of interaction through informal project meetings, job rotations and top management support along with shared events, workshops, conferences and technological platforms (Müller *et al.*, 2014).

Contracts are usually agreed upon between two (or more) organisations and can perform different functions in exchange relationships. The traditional view focuses on safeguarding against potential opportunism, where detailed legal clauses protect the asset-specific investments of parties and hedge against transaction uncertainty (Schepker *et al.*, 2014). Examples of safeguarding provisions include termination rights, assignment of property rights and penalties for non-performance (Roehrich and Lewis, 2014). However, more recent literature has argued that in addition to safeguarding, formal contracts can signal commitment and serve as tools for coordination and adaptation (Cao and Lumineau, 2015; Schepker *et al.*, 2014). For example, clauses may require establishing inter-organisational information-sharing routines, joint performance reviews and problem solving, renegotiations and variations in prices and resources (Selviaridis, 2016). Furthermore, the different functions of contracts can interact with collaboration (and relational norms more broadly) in a variable manner (Cao and Lumineau, 2015). Indeed, whilst contractual provisions stressing safeguarding and control tend to inhibit the development of collaborative norms, coordination and adaptation provisions serve as flexible frameworks for relationship management and reinforce the collaborative atmosphere in IORs (Lumineau and Henderson, 2012).

Formal contracts and relational norms can be viewed either as substitutes for each other, or as complements, or both (Poppo and Zenger, 2002; Woolthuis *et al.*, 2005). For example, contracts with gain/pain share provisions are regarded as devices for goal and incentive alignment, because they tie compensation to specified performance targets (Caldwell and Howard, 2014; Selviaridis and Wynstra, 2015). In longer lasting relationships in which the parties have accumulated knowledge of each other, formal contracts and trust tend to be complementary, impacting performance positively (Mayer and Argyres, 2004). However, formal governance mechanisms may actually be detrimental insofar as they preclude intrinsic sources of motivation and trust, undermine the development of relational norms and collaboration routines and elicit opportunistic behaviour (Ghoshal and Moran, 1996). On the other hand, contracts can reinforce collaboration in cases where formal provisions stress increased transparency, expectations of collaborative behaviour and flexibility to adjust to changing circumstances (Schepker *et al.*, 2014).

2.3 Institutional influences on the governance of collaboration in complex projects

The governance of IORs and inter-organisational collaboration is embedded in the social and cultural context. Accordingly, key stakeholders can influence the governance of collaboration through shaping the institutional environment (DiMaggio and Powell, 1983) within which collaboration takes place. Such influence affects the governance of exchange relationships and thereby project collaborations, through setting social and cultural expectations. In the UK, government departments commission reports to shape institutional environments in order to address industry-wide issues and failures. For example, the policy documents of the

Egan (1998) Report and National Audit Office (NAO) (2011) identified the construction industry as underperforming and ineffective, with adversarial and fragmented relationships underpinned by inconsistent procurement practices. The Egan (1998) report was amongst the first influential institutional drivers for collaborative projects in the construction industry, proposing partnering in complex projects with integrated project processes and long-term relationships replacing competitive tendering. This drive has been amplified over the years as the official strategic plan of the UK Government is to use its position to drive collaboration to deliver better value for the taxpayer (Government Construction Strategy, 2016).

Institutional influences can affect the performance and behaviour of firms because companies are dependent on the resources derived from the institutional environment (DiMaggio and Powell, 1983). The delivery of complex projects often requires a simultaneous use of adaptation, coordination and safeguarding within a project network (Jones *et al.*, 1997). Coordination and safeguarding necessitate focal firms to build and maintain longer-term relationships within networks (Manning and Sydow, 2011), while adaptation builds on flexible use of inter-organisational networks. A cluster of structurally embedded companies that interact relatively frequently (Manning and Sydow, 2011) can create a common macro-culture that is a key element for the governance of a network (Jones *et al.*, 1997). Such institutional influences go beyond the level of individual projects and relationships to sustain and exploit a number of relationships in a series of interlinked projects taking place over a longer period of time (Brady and Davies, 2004; Manning and Sydow, 2011).

A means to achieve such institutional influences is through certified management standards such as ISO 9001 and ISO 14001. These standards provide crucial guidelines for the companies that implement them, thus reducing information asymmetries between buyers and potential suppliers (King *et al.*, 2005; Terlaak and King, 2006). This may enable better supplier selection through information that otherwise would have been difficult to acquire (Christmann and Taylor, 2006). Using standards to provide the relevant information is particularly useful when parties are physically, socially, culturally or institutionally distant because they may have fewer options through which to acquire the information directly (King *et al.*, 2005). Of course, there is a risk that companies may choose to implement the standards only symbolically to attain positive legitimacy or brand impact rather than amending their organisation and operations according to the requirements set by the standard (Christmann and Taylor, 2006). Regarding the governance of collaboration in complex projects, standards may have a role despite the fact that collaboration has traditionally been perceived as emergent and not easily standardisable. The next section describes the methods applied to studying the governance of inter-organisational collaboration in complex projects.

3. Research methods

The governance of collaboration in complex projects is an understudied and emerging topic, hence it necessitates an approach that can elicit rich empirical insights into the actual practices used (Meredith, 1998). It was therefore decided to study in a qualitative fashion the real-life practices applied by organisations that deliver project-based combinations of products, services and technologies in collaboration with their partners (Miles *et al.*, 2013). This exploratory qualitative approach entailed 29 qualitative interviews (Denzin and Lincoln, 2000; Strauss and Corbin, 1998) with key informants employed by the studied companies or acting as advisors/facilitators of collaboration on behalf of these organisations. The interview data were complemented by analyses of secondary data, including the international standard for collaboration, ISO 44001, and the industry-level contracts that facilitate inter-firm collaboration, as well as primary data obtained from participation in events and meetings. Regarding the collaboration standard, the British Standard for Collaboration BS 11000 was introduced in 2010 and was recently ratified as international standard ISO 44001.

3.1 Sampling logic

The unit of analysis is the governance of collaboration in complex projects. The empirical enquiry is focused on understanding the way in which firms govern their collaborations with partners through formal and informal means. As part of this exploratory study, the data are collected from primary contractors who are part of a joint venture or alliance and are contractually responsible for delivering the complex project. The focus has been on these primary project partners, as these are the key entities that decide and implement the appropriate mechanisms to govern collaboration in a project.

To develop in-depth understanding of the governance of collaboration, experienced individuals operating in complex project environments were selected as the interviewees. The study's participants were sampled from two main types. The first type comprised respondents from companies directly involved in the delivery of complex projects. The second type involved respondents who advised the organisations of the first type or focused on the facilitation of inter-organisational collaboration. The second type was included in the study because such organisations were identified as playing a central role in driving the governance mechanisms applied in different industries. Their insights also enabled some triangulation (Diefenbach, 2009) of the perspectives of the companies of the first type. Furthermore, the data from the first type of organisation enabled observations on the more detailed governance mechanisms and related processes. The interviews with the representatives of the second type of companies helped elicit depth and breadth of information on contractual governance across different industries.

The selection of organisations in the first group was based on theoretical sampling (Strauss and Corbin, 1998) in the sense that the authors defined fourfold specific qualifying criteria for inclusion in the study. First, each organisation's main business had to be directly linked to the delivery of complex projects where a number of providers collaborated on delivery and provision, as this was the study's focus. The authors targeted industries where highly complex and networked operations were dominant because this would maximise the chances of learning from the numerous existing collaborations in these contexts. Second, each firm's business had to be based on a series of project deliveries instead of continuous manufacturing or service provision. This criterion was essential since the governance of collaboration in a context in which business relationships were inherently discontinuous would be expected to differ from more permanent operational settings. Third, each company had to emphasise developing effective practices to drive inter-firm collaboration that ought to be central for the success of its business. This criterion was crucial as the study aimed to investigate practices adopted by best-of-breed organisations investing resources in the area. Fourth, due to the nature of the complex projects, data collection focused on companies operating in business-to-business (B2B) or business-to-government contexts to deliver large-scale projects.

The first type of sampled organisation included construction and civil engineering industries, the provision of technology and B2B services and the delivery of highly complex technological systems (see Table I). The second type of organisation comprised independent consultants and institutions facilitating the adoption of best practices for inter-organisational collaboration.

3.2 Data collection and analysis

The main source of primary data comprised the 29 semi-structured interviews conducted by the authors, as outlined in Table I. In addition, a wide range of secondary data sources were obtained including reports, guidelines, descriptions of standards and contract templates, some of which were confidential project contracts shared with the research team. These are presented in Table II, together with additional primary data, such as observations of meetings, events, workshops and site visits organised to discuss collaboration in project contexts. The data collection began in 2015 and was conducted over an 18-month period.

Industry group	Company pseudonym	Interviewee job title	Interview number	Interview length
Construction/Civil engineering	Constructor A	Head of Supply Chain	1	00:39:41
	Constructor B	Collaboration Co-ordinator	2	00:29:40
	Constructor C	Head of Corporate Responsibility	3	01:16:31
	Constructor D	Quality Manager	4	00:38:53
	Constructor E	Business Improvement Manager	5 and 6	01:13:00 and 00:41:22
	Constructor E	Business Improvement Director	7	00:54:01
	Constructor E	Construction Manager	8	01:13:37
	Civil engineering	Framework Director	9	01:11:02
	Engineering A	Project Support Manager	10	01:32:08
	Engineering B	Senior Quality and Collaborative Work Consultant	11	00:40:03
	Engineering C	Construction Manager	12	00:38:58
Technology and B2B services	Tech A	Enterprise Strategy Consultant	13	01:21:36
	Tech B	Regional Manager	14	01:03:57
	Tech C	UK Technology Sales Director	15	00:38:43
	Tech D	Sales and Marketing Director	16	01:04:49
Highly complex critical systems	Aerospace	Director of Government Relations	17	01:10:30
	Air traffic	Senior Purchasing Manager	18	01:23:16
	Rail	Collaborative Work Manager	19	01:33:55
Organisations outside the UK	Constructor	Partnering Manager	20	01:18:43
	Sweden		21	03:46:08
	Buildings Sweden	Managing Director	22	00:29:25
	Defender USA	Deputy Assistant Secretary of Defence for Maintenance	23	00:53:29
Independent advisors	Consultant A	Consultant	24	00:55:51
	Consultant B	Consultant	25	01:27:59
	Coach A	Executive Coach	26	01:06:18
Collaboration facilitators		Senior Associate	27	01:07:35
	Collaborator	Associate Director	28	00:49:55
	Standards Adjudicator	Compliance and Risk Director	29	01:40:55

Table I.
Details of interviews across different industries

The initial interviews were held to understand the contexts, inter-organisational dynamics and particular focus areas of each studied industry and company. Interviews gradually became more focused to delve into governance mechanisms and beyond the easily accessible insights of the informants by comparing and contrasting different collaborations based on the interviewees' work histories (see Appendix 1 for the interview protocol). The data collection was continued until theoretical saturation was reached (Denzin and Lincoln, 2000) and no significant new insights were obtained in relation to governance mechanisms. The interviews ranged from 29 minutes to 1 hour and 40 minutes, with an average duration of 1 hour and 13 minutes. The interviews were recorded and transcribed verbatim to allow systematic data analysis and ensure that the analysis maintained the focus on the central themes, thereby yielding the richest and most valuable insights. Secondary data were collected to gain a more detailed understanding of the role of contracts and standards in the governance of inter-firm collaboration, which included the BS 11000/ISO 44001 collaboration standard and industry-level contract templates such as NEC3, SPC2000 and FAC1 (see Table II).

To analyse the data set, the principles of template analysis were adopted (King, 2012). The initial coding template only included two higher-level aggregate themes (i.e. contractual and relational governance) in order to allow for flexible and open coding to enable themes emerge from data (Strauss and Corbin, 1998). The coding process included identifying and storing quotes, events, objects, interpretations and observations, which are referred to as

Table II.
Secondary data and
additional primary
data collected

<i>Secondary data</i>		
Document number	Type	Document title
D1	Report	Competency frameworks for collaboration in B2B services
D2	Report	Project Collaboration Toolkit for the oil and gas sector: enhancing project performance through collaboration
D3	Guidelines	National Alliance contracting guidelines
D4	Description of standard	BS 11000: Collaborative Business Relationships Part 1
D5	Description of standard	BS 11000: Collaborative Business Relationships Part 2
D6	Description of standard	ISO 44001: Collaborative Business Relationships Management Systems
D7	Contract template	PPC2000: standard form of project partnering contract
D8	Contract template	SPC2000: specialist project partnering contract
D9	Contract template	NEC3: national engineering and construction contract
D10	Contract template	FAC1: Framework Alliance Contract
D11	Code of practice	HM Treasury Alliance code of practice for infrastructure projects
<i>Additional primary data</i>		
Event number	Date	Event description
E1	October 2015	Collaboration Professionals Membership Committee Meeting
E2	December 2015	ICW Annual Collaboration Awards event
E3	May 2016	Project site visit and tour with Constructor E
E4	June 2016	Understanding the Capabilities of Collaboration and Behavioural Consultants Event
E5	June 2016	Future of Collaboration Workshop
E6	June 2016	Project site visit with Constructor Sweden
E7	September 2016	Collaborative Working Executive Network Meeting
E8	October 2016	Collaboration Professionals Membership Committee Meeting
E9	October 2016	Effective Collaboration in Digital Sector Event
E10	November 2016	British Standards Institute: Collaboration Event
E11	December 2016	ICW Annual Collaboration Awards event
E12	January 2017	Collaborative Working Executive Network Meeting
E13	March 2017	Insight Into ISO44001 – The Next Evolution of Collaborative Working
E14	March 2017	British Standards Institute: Collaboration Event

data items (or codes). These were then collectively collapsed into a smaller number of categories called first-order themes (King, 2012) and were labelled with a descriptive term. New themes were added when the analysis identified findings that did not fit the existing structure (Miles *et al.*, 2013). The first-order themes led to an initial understanding of inter-organisational collaboration and its governance, which allowed for further classification through collapsing these under second-order themes.

The data set was initially coded by one researcher and later cross-checked and ratified by each of the other two researchers. Hence, investigator triangulation was used to ensure the findings' validity (Denzin and Lincoln, 2000). The relationships amongst the various categories were interpreted using abductive reasoning towards the "most likely" explanation (Mantere and Ketokivi, 2013). As the analysis unfolded, the coding structure was extended, refined and empirically substantiated to form the findings. The initial coding structure with contractual and relational mechanisms as the aggregate dimensions was extended through the abductive process of iteration between the data and the literature, where the emerging role of standards became strongly evident. Accordingly, the literature on the role of management standards was considered and the standards were labelled as the third aggregate theme in the coding template. The results are presented in Section 4 and are structured according to the three aggregate categories of mechanisms governing inter-firm collaboration: collaboration standards, contractual mechanisms and relational mechanisms. Figure A1 presents the coding structure.

4. Findings: governance of inter-firm collaboration in complex projects

Inter-firm collaboration in complex projects is managed by contractual and relational governance mechanisms whose design and implementation is influenced by the standard. The emergence of the standard for the governance of collaboration has been an understudied area compared to the use of contracts and relational mechanisms. All three mechanisms are interlinked and concurrently enacted within the studied complex projects in order to proactively govern inter-firm collaboration amongst project partners. These findings are elaborated in the following subsections.

4.1 Standards to govern collaboration

4.1.1 The emergence of standards. The empirical research reveals an overarching demand across industries for systematic ways of demonstrating collaborative competence in complex projects. Major clients in various industries, such as construction, transportation and managed services, increasingly demand systematic evidence of effective collaboration in their tender documents. Certain interviewees pointed out that UK Network Rail, HS2 and Highways England now include collaborative behaviour assessments that can account for up to 20 per cent of their overall evaluation of an alliance bid for complex project contracts (see also *The Financial Times*, 2016). Importantly, UK government departments have also adopted these requirements:

The MoD [Ministry of Defence] and other government departments almost always now talk about collaborative working in their tender documentation for bids for contracts (Quality Manager, Constructor D).

A respondent provided examples of how clients test collaborative competence of suppliers:

We now do collaboration assessment workshops with potential partners and suppliers. This allowed us to identify early on that for some suppliers, motivation to collaborate was purely to profit or to be part of intellectual property. Hence we are getting better at screening those out early on (Regional Manager, Tech B).

The data show that the standard operates at the institutional level and affects the governance of IORs in complex projects. In particular, the standard plays an important role in shaping the governance agenda for inter-firm collaboration by informing the design and use of both contractual and relational mechanisms. This was echoed by various interviewees, who pointed out the wider acceptance of the collaboration standard across different industries. In particular, some companies have started to require their potential suppliers to adopt the collaboration standard:

Some industry players have adopted collaboration wholeheartedly and, some have actually said you can't do business with us as a supplier unless you're certified with the standard. For example, Network Rail do that (Framework Director, Civil engineering).

A respondent from a large engineering firm indicated how adherence to the collaboration standard has spread across industries and has gradually become a norm for working together with project partners:

So taking that success model from a pilot project for the Highways and a pilot framework in Water, we then took it to all the other Water frameworks. And then with the Highways job, more and more jobs gradually, more and more went that way and then it started becoming the norm (Senior Quality and Collaborative Work Consultant, Engineering B).

It is believed the role of the collaboration standard will garner further practical attention in the future, due to its recent ratification as an international standard. This is extremely relevant for project firms operating in complex settings as major

clients are more likely to mandate the collaboration standard even as a prerequisite to compete for projects:

As the standard progressed towards an ISO standard, it is now going to make even more difference because an ISO standard is more likely to be mandated by the customers than a British standard (Head of Supply Chain, Constructor A).

However, the use of the standard as a framework to collaborate with project partners constituted a change from traditional ways of working. As a result, this has posed various challenges for firms implementing the standard in complex projects. These are detailed next.

4.1.2 Implementation challenges. The collaboration standard is seen as a tool to boost collaborative performance in project environments. The respondents pointed out that the BS 11000/ISO 44001 standard requires firms to provide tangible evidence of collaborative behaviours and culture embedded within the projects to achieve certification. Because culture is intangible, it can be difficult to demonstrate a collaborative culture in a concrete manner. A recurrent challenge mentioned in the interviews was related to the issue of socialising the standard within the project organisations. This referred to building culture and behaviours conducive to collaboration as well as designing the appropriate managerial and governance mechanisms to support them:

So [we need to be] doing more than ticking the boxes, and actually embedding the culture in the organisation, and keeping that momentum up so that teams have an awareness and understanding (Senior Quality and Collaborative Work Consultant, Engineering B).

Furthermore, many interviewees pointed out that whilst leadership and executive support is essential, a collaborative culture requires more. Managerial support must therefore be introduced through training, development and annual reappraisals, in order to build a collaborative culture:

It's impossible to just have one or two people responsible for collaboration and it has to be embedded in our entire relationship management function. So there's an on-going training and development challenge and awareness challenge (Business Improvement Director, Constructor E).

The implementation of support mechanisms was often facilitated by external behavioural consultants who specialise in collaboration in large projects; however, this gave rise to further challenges and risks. In particular, there were challenges regarding the extent to which external experts could create or help in building a collaboration culture that adhered to the standard's guidelines. Several respondents pointed to the creation of an army of collaboration consultants that see collaborative projects as "cash cows". In addition, seeing the standard as a "box ticking exercise" was considered to be amongst the key challenges. This was also discussed in the events organised by the Institute of Collaborative Working, where the chief proponents of the standard even voiced concerns indicating "the standard can be its own biggest enemy" (E10, Table II) through demonstrating instances in which the certification process was carried out purely to satisfy client requirements rather than adopting principles of collaboration effectively.

4.1.3 Formalization of collaboration. The BS 11000/ISO 44001 standard is formed from sets of overarching guidelines for facilitating inter-firm collaboration; it does not explicitly specify how contractual and relational mechanisms should be enacted in practice. In other words, the role of the standard is to describe what collaboration entails but not how it is actually enacted in different contexts. This then leaves space for the much-needed flexibility to accommodate the unpredictability of the complex project environments.

The collaboration standard aims to systematically formalise structures for inter-firm collaboration with clients, partners and suppliers. This approach can contribute to the benefits a partnering firm receives from established collaboration practices in subsequent

complex projects, thereby achieving economies of repetition. The standard's guidelines include terms and conditions that govern inter-firm interactions and outline roles, responsibilities, accountabilities and authorities in collaborative inter-firm relationships. The guidelines include the entire lifecycle of collaboration, from initial engagement and leadership involvement to the exit strategy that details contract termination.

The standard's governance guidelines clearly indicate the need to manage the trade-offs between operational efficiency and the flexibility required in collaborative environments. Whilst the governance framework set by the standard allows formalising key practices of collaboration, it also provides flexibility for partnering firms to define these key practices in their contexts. Accordingly, the collaboration standard aims to provide a balance between standardisation and flexibility. Particularly, it suggests that partnering firms should ensure:

- that the governance processes are sufficiently robust to demonstrate effective assurance and accountability within a collaborative arrangement, and
- that the governance processes are sufficiently agile and adaptable to ensure that the potential value could be realized from collaboration (International Organization for Standardization, 2016, p. 8).

The collaboration standard offers several suggestions on how to achieve flexibility in contracts and standardisation in relationship management. For instance, the standard requires contract terms to be reviewed to determine clarity of purpose, encourage appropriate behaviour and identify the potential impacts on conflicts. Additionally, all performance requirements and measurement methods are to be mutually agreed on to ensure clarity. Risk and reward models, issue management, exit strategy, knowledge transfer and sustainability should be considered during the development of a formal contract. At the same time, the standard provides a structure for governing relationships in an attempt to formalise relational mechanisms, as follows:

A Joint Relationship Management Plan may be established and annexed to agreements or contractual arrangements to formalize the overall management of the collaborative business relationship and encompass the principles of collaborative behaviour (International Organization for Standardization, 2016, p. 30).

The data show that the standard's operational implications for collaboration are embedded in industry-specific contracting frameworks, such as NEC3, SPC2000 and FAC1. Moreover, the standard formalises the requirement for relational mechanisms to build mutual trust and confidence for collaboration. These mechanisms include the formation of integrated project teams, dispute resolution mechanisms, collaborative training initiatives for skills development and early contractor involvement. By requiring the use of relational mechanisms, the standard enables kick-starting the relationship-building process, which is especially valuable for collaboration in complex projects:

It [the standard] gives us a better framework to work with our customers, and it moves from a supply customer relationship effectively to a partnership between the clients and us (Business Improvement Manager, Constructor E).

The standard allows you to look at the supply chain and have a collaborative framework with your supply chain. [...] Suppliers are more successful; they have a positive working relationship with us as a prime contractor. Therefore, they're more likely to want to work with us in the future rather than our competitors (Enterprise Strategy Consultant, Tech A).

The formalisation of collaboration also contributes to learning across projects. This is sometimes achieved through designing exit strategies. The standard recommends explicit agreement on an exit strategy that helps codify lessons learned from the project by the partners.

This topic had rarely been discussed at the onset of collaborative projects before the introduction of the collaboration standard:

Exit strategy wasn't an area where we've done as much work as needed that also came out of the BS 11000 and getting ready for certification (Construction Manager, Constructor E).

The cross-project learning that is facilitated by the formalisation of collaboration was seen as contributing to operational improvements not only for the specific project, but also for future projects and the organisation as a whole:

You are learning and you're building it into your system. You're not creating this massive beast just for collaboration that is standalone cottage industry. You each try to tweak your existing systems to improve for the next time around (Quality Manager, Constructor D).

4.2 The role of formal contracts in the governance of collaboration

4.2.1 Contracts for collaboration. The data show that the type and nature of a contract has a significant impact on whether collaboration is effective. Traditional transactional contracts are considered inappropriate for collaboration in the context of complex projects. This is because such contracts bind partnering firms by strict rules with little space for flexibility and agility; hence, employees are prevented from exercising collaborative behaviour. Therefore, a number of contracts have been developed that are especially designed to enable collaboration and are tailored to particular industry needs. The interviewees refer to these contracts simply as collaborative contracts:

So we do a lot of our work under something called NEC. It's a form of engineering contract, a New Engineering Contract, and there are options within that. So this is where our cost-plus approach comes, and a lot of our work is based on that. That in itself is a collaborative contract (Senior Purchasing Manager, Air traffic).

Designing an appropriate contract from the outset is perceived as a key enabler for collaboration. Contracts that foster collaboration allow for the legitimisation of a collaborative environment within a project:

You have to have the vision from the outset to draft a contract that will support what you want to achieve as part of your joint vision for the programme (Head of Corporate Responsibility, Constructor C).

What we want is a clean contract; just allow for people who want to work collaboratively, to do that without the noise (Regional Manager, Tech B).

Furthermore, the respondents largely acknowledge the need to account for the dynamic and flexible nature of complex projects by periodically reviewing and changing the contractual specifications (e.g. detailed project activities and resources) where needed, as part of the ongoing contracting process:

We leave such a lot of flexibility in the main contract. So recognising that the [client] is transforming, it wasn't in their best interest or ours to try and lock down everything that would be accomplished over a three-year period. So what we did was to identify in the contract, at a higher level, the types of resources that would be available and could be provided, and then the details of what's actually used get written down in the tasking notes (Partnering Manager, Constructor Sweden).

A contract is required to be flexible so that the project's steering committee has the mandate to manage the project as needed, to further the best interests of the key stakeholders. Such autonomy is considered imperative since day-to-day activities are impossible to detail formally. The following quotes show how the respondents perceived the governing power of contracts:

What we work [on] is contracted – not how we work (Executive Coach, Coach A).

The contract is one thing, and how you behave is different. And there is a fine line, but if the contract's written correctly, you can actually flex with it (Construction Manager, Engineering C).

KPIs or a strategic requirement is being defined by a measurement in a contract, but actually, the method of making that measurement isn't being defined. So there's an output that says you'll save this amount of money over this amount of time. [...] But actually, the parts that make up that saving are not defined (Collaborative Work Manager, Rail).

4.2.2 Contractual functions. The findings show that the contracts fostering collaboration still perform their traditional safeguarding function to ensure the quality of the project outcome. The safeguarding-oriented clauses include costs, payment methods, conditions for subcontracting, tests and inspections, compensation conditions, the dispute resolution adjudication process, the limitation of liability and low performance damages, amongst others. For instance, these safeguarding functions are detailed in clause 8 in the NEC3 contract template (D9 in Table II, pp. 21-23).

The collaborative contracts also include several coordination- and adaptation-oriented clauses that differentiate them from traditional transactional contracts (which are based on strict deadlines and costing arrangements). These clauses include the creation and empowerment of a core governance team for the project, providing this core group with the authority for decision making, assurances of working together in a spirit of mutual trust and cooperation, the requirement to give an early warning for any issues affecting work and the establishment of common operational systems to enhance collaboration. For example, in NEC3, Options X12 and X13 clearly detail coordination- and adaptation-oriented clauses (D9, pp. 50-52). To encourage collaboration amongst project partners, these clauses include incentives for completion of tasks, bonuses for early deliveries and acceleration. These contractual clauses have implications for how collaboration is governed through relational mechanisms during the actual delivery, as follows:

- creation of governance steering teams, including joint venture boards and steering committees;
- securing leadership buy-in from the executive management of partnering firms;
- legitimisation of a collaborative work environment;
- creation of shared operational systems and infrastructures;
- development of a framework agreement on costs, incentives and key performance indicators;
- definition of commercial and strategic risk management; and
- ensuring stakeholder engagement.

These contracts were identified to set up the enabling governance structures and relational mechanisms for projects as crucial for project success. Collaboration is not achieved solely by inter-firm contracting; rather, governance mechanisms are also required to drive personal motivation and engagement with the partners. Many of the collaborative contracts include clauses on incentives and bonuses to motivate the individuals to shift their mindsets and ways of working from a focus on the organisation's interests, to a focus on collaboration and the interests of the project. These incentives are discussed in detail in the following subsection.

4.2.3 Contractual incentives. Many of the studied contracts have built-in incentive models, both financial and non-financial. A common arrangement in the UK is a mutually agreed client-supplier pain/gain share contract that rewards high performance and

penalises less-than-satisfactory performance. These incentive-based clauses may also contribute to the flexibility needed for collaboration:

They [incentives] give a degree of flexibility. They give you the ability to be flexible on spending. Save some and then agree perhaps to spend it on something innovative or different that you weren't originally going to do but has come up since you started, and it can create buckets of money that give you those opportunities to improve things (Project Support Manager, Engineering A).

Some respondents strongly criticised financial incentives, claiming such incentives discourage collaboration by causing people to focus on specific outcomes, which might not always align with what is the best for the project:

There's a place potentially for incentives, but they have to be incentives in line with the collaborative outcomes. And they shouldn't be purely financial, and they shouldn't be purely focused on monetary outcomes. They should be focused on a broader range of outcomes (Quality Manager, Constructor D).

Overall, the respondents note that many collaborative contracts have an apparent disconnect between motivators for individuals and motivators for companies:

The thing is that a contract is with a company, it isn't with an individual. So we've got to motivate the individual. If the individual doesn't gain anything from a contract, then it doesn't matter to them whether they implement it or not (Business Improvement Manager, Constructor E).

Some companies have dedicated teams to design "smart incentives" based on adaptations of the collaborative contracts, in order to bridge the gap between inter-firm incentives and individual/team-based incentives. Furthermore, some firms have moved away from financial incentives towards including behavioural incentives:

They call it the shadow of the future. Saying that, if you do this project very well, then we will give you, we will want to work with you on the next project, and that type of incentive is really efficient, because that will also motivate the people outside of the project to promote the right behaviour (Enterprise Strategy Consultant, Tech A).

Overall, partnering firms within complex projects include incentives at the firm, team and individual levels. These are usually grouped as financial or behavioural incentives that facilitate inter-firm collaboration in complex projects.

4.3 Relational mechanisms to govern collaboration

4.3.1 Flexible work environment. It was clear from the data set that relational mechanisms play a critical role during the delivery of complex projects. Many respondents argued that the dynamic day-to-day operations should rely mostly on relational governance mechanisms, whilst the formal contract should set out the overarching governance terms and conditions. A common theme across the interviews was related to the role of relational mechanisms in creating a flexible work environment, which was required for promoting collaboration in complex projects:

The contracts just set out the framework, the legalese, the rules of engagement, [...] and then how you work together afterwards can be set out in relationship management plans and in other documents to give you the flexibility. And then you put the contract in the drawer, and then you only ever get it out if you're really falling out (Collaborative Work Manager, Rail).

Many interviews considered the ways in which relational governance in complex projects has changed as a result of the introduction of the collaboration standard. One interviewee noted that the standard has enabled the company to combine different relational mechanisms to form a relationship governance framework:

This platform is the first one that was done that combines everything that we do all in one service [...] and it's a nice high-profile, well-thought of [structure]. We've got a great relationship through the

[collaboration] framework with this client. They should be and remain our best reference customer to help us with other business (Consultant, Consultant A).

Another interviewee pointed out that all the existing guidance on relational mechanisms was too abstract prior to the introduction of the collaboration standard:

So all the guidance on collaborative working talks about the theory instead of things like, you need a joint relationship management plan or a joint risk register or exit strategy. But nobody ever told us about these before (Regional Manager, Tech B).

4.3.2 Relational practices. The findings showed that mutual trust, openness, commitment and confidence are built as a result of emerging relational practices triggered by the use of the standard and collaborative contracts. Many relational practices have been introduced such as open-book accounting and risk registers:

We make sure that we get a long-term acceptable profit because we've got open book accounting. That's one way to build trust and just have everyone commit to everyone having decent and fair earning[s] in the project (Business Improvement Director, Constructor E).

We put a giant risk register together. And you manage the whole register, so you'll see my risks, and you're working on my risks as though they're your own risks, but you own that register. [...] It's a great environment for people to work in because they feel part of something (UK Technology Sales Director, Tech C).

The interviews identified a long list of relational practices that have been operationalised to foster inter-firm collaboration during the actual delivery of complex projects. One common theme is that these practices are not dictated by the contract; rather, they are enabled by a collaborative environment within which project partners interact and work. Table III provides a list of these relational practices for collaboration, including those related to the project, the customer engagement, the supply chain management and stakeholder involvement. These practices demonstrate how a strategic intention to collaborate through standardised contractual processes translates into a flexible work environment that allows for the emergence of relational practices for collaboration. Overall, these practices emerge in a collective and flexible manner to cater to the emergent needs of the project.

5. Discussion and conclusions

This section discusses the main findings by means of three working propositions that stress the emerging role of collaboration standards and their impact on contractual and relational governance mechanisms in complex projects. It also elucidates research and managerial contributions as well as limitations and avenues for further research.

5.1 Discussion

This study provides new insights regarding the governance of collaboration in complex projects, especially about the emerging role of standards. The extant literature stresses the ability to collaborate effectively and develop related norms in project settings (e.g. Davies *et al.*, 2016). Developing shared collaboration norms amongst project partners requires significant time, which poses challenges in the context of time-limited projects (DeFillippi and Sydow, 2016; Jones *et al.*, 1997). The findings highlight the importance of the collaboration standard ISO 44001, the adoption of which may even constitute a prerequisite for tendering for complex projects. The study shows that the adoption of the collaboration standard and the pre-contract evaluation of project partners' collaborative competence have emerged as specific responses to prior performance failures associated with competitive bidding and the resulting fragmented, adversarial relationships (e.g. Egan Report, 1998; Government Construction Strategy, 2016). The standard helps

Identified relational practices for collaboration within complex projects

<i>Project-related practices</i>	<i>Customer engagement</i>
Strategic co-location of partners	Customer becoming part of provider's interview panel for recruitment
Integrated programme generation	Customers attending provider's supplier meetings
Joint OPEX forecasting	Individual training and mentoring on client focus and collaborative behaviour
Joint CAPEX scenario planning	On-site user support
Collaborative skills development	Customer becoming part of alliance
Early contractor involvement to build trust and confidence	Back-to-back contracts
Training for multicultural and younger workforce	Customers' and suppliers' joint induction programme
Measuring collaboration's impact on other suppliers and wider industry	Two-way partner selection
Industry-wide commercial director forum, which produces guidance notes, example contracts and young talent forums	BIM 360° and customer access
Weekly JV conference classes	<i>Supply chain management</i>
War room for crisis management	Supply chain council
Fortnightly design review	360° workshops with partners and suppliers
Commercial and risk review meetings –commercial trackers	Multi-part joined-up supply chain
Health and safety forums	Establishing supply chain community
Hazard workshops	Joint process forecasting and reporting
Contract awareness workshops	Tiers 2 and 3 conferences
Lessons learned workshops	Back-to-back terms and conditions for supply chain
360° workshops for the project teams	Synchronised contract training (with provider and supplier teams)
Meeting training and time management workshops	Relationship segmentation
Business collaborator software	<i>Stakeholder/community involvement</i>
Project acceleration coaching and teamwork (PACT) workshop	Creating a magazine to inform multiple stakeholders of the project and the community
JV value register	Public liaison officers
JV lessons learned register	Voluntary community clarity workshops
Regular social parties	Door-to-door resident meet-ups
Behaviour and process correlation models	Steering group to manage local disputes
	Creating social and community contribution projects, such as Guinness World Record for charity – most people dressed as penguins
	Look-ahead Monday meetings

Table III.
Identified relational practices for collaboration

reduce information asymmetries insofar as they are considered by customers (King *et al.*, 2005; Christmann and Taylor, 2006) during the evaluation and selection of project consortia. The standard operates at an institutional level in that it reflects the institutional context and the related macro-culture and norms developed within networks of organisations involved in complex projects (Jones *et al.*, 1997; Manning and Sydow, 2011). As such, it enables project firms to take a shortcut in the development of collaborative norms and know-how by fostering the adoption of tried-and-tested contractual and relational practices. This is particularly valuable in the context of time-limited projects that may lack the time needed to develop shared collaborative norms (DeFillippi and Sydow, 2016; Jones *et al.*, 1997). Accordingly, the standard influences the design of formal contracts and relational mechanisms, which are subsequently used to govern exchange relationships in complex projects. In light of these findings, we propose the following:

- P1.* The adoption of the collaboration standard in complex projects reduces the cost and duration of developing collaborative norms by promoting the use of attested contractual and relational practices.

The empirical research reveals the specific ways in which the collaboration standard, formal contracts and relational governance mechanisms interrelate. The standard helps formalise collaboration practices for managing inter-firm relations, which can be captured in contracts and industry-level contract templates. ISO 44001 also provides guidelines for building flexibility in contracts by including coordination and adaptation-oriented provisions that are conducive to collaboration. This contractual flexibility (Poppo and Zenger, 2002) is demonstrated by the use of “tasking note” contracts, which include open-ended specifications of actual project tasks. In addition, the standard explicitly refers to the adaptation of contracts over time, thus allowing flexible formal/contractual governance to create responsiveness to evolving requirements in complex projects (Roehrich and Lewis, 2014). This conclusion leads us to the second proposition:

- P2.* The adoption of the collaboration standard in complex projects enables building flexibility into contractual governance mechanisms by requiring the use of coordination- and adaptation-oriented provisions in formal contracts.

Although the adoption of the collaboration standard is required by some customers in particular industries as part of the tendering process, there is no conclusive evidence to suggest that the standard has been institutionalised and reflected in regulations in the same way as other management standards such as ISO 9001 or ISO 14001 (see e.g. King *et al.*, 2005). In addition, the implementation of the collaboration standard is currently met with challenges, notably the difficulty facing project partner firms to go beyond symbolic implementation of the standard (Christmann and Taylor, 2006) and truly internalise a collaborative culture. Hence, the role of relational mechanisms during the project delivery phase is paramount for project partners to develop practices that operationalise collaboration (see Table III) in their daily working relationships. Formal contracts emphasising coordination- and adaptation-oriented provisions facilitate the development of such relational practices; hence, they foster the use of relational governance (Roehrich and Lewis, 2014). In particular, relational practices that have been identified to work well in a number of collaborative settings are captured and codified in the collaboration standard. In this way, the standard enables formalization of relational practices, thus allowing companies to benefit from lessons learned across similar complex projects. Based on this conclusion, we formulate the third proposition as follows:

- P3.* The adoption of the collaboration standard in complex projects enables formalisation of relational mechanisms for governing inter-firm relations by codifying lessons learned regarding relational practices.

5.2 Research contributions

This paper makes a threefold contribution to research. First, the study contributes to the literature regarding the tensions between flexibility and standardisation in project environments (e.g. Davies and Hobday, 2005; Brax and Jonsson, 2009; Müller *et al.*, 2014; DeFillippi and Sydow, 2016) by demonstrating how this dual requirement may be addressed in the context of governance of collaboration. In particular, the study shows the emerging role of the collaboration standard and its influence on contractual and relational governance mechanisms. The standard’s guidelines contribute to codifying the informal practices of managing inter-firm relations and transferring related learning (e.g. on the use of exit strategies) across projects. In this sense, the standard may contribute to economies of repetition and efficiencies (Davies and Brady, 2000), specifically in terms of the ability to collaborate to co-produce project outcomes. At the same time, the standard allows for flexibility regarding the enactment of formal contracts, depending on the scope and aims of specific projects.

Second, the study contributes to research on the governance of complex projects (e.g. Davies and Brady, 2000; Brady *et al.*, 2005; Müller *et al.*, 2014) by demonstrating how the role of the standard is beginning to emerge in the governance of collaboration. The study adds

to the insights of the extant literature regarding the role of contractual and relational governance mechanisms and their interplay (Roehrich and Lewis, 2014; Wacker *et al.*, 2016), by discussing the influence of the collaboration standard on these mechanisms. The need for the collaboration standard has partly emerged as a result of failures in prior project collaborations (Egan Report, 1998; NAO, 2011). In particular, the standard informs the design of contractual provisions that facilitate collaboration, and helps formalise collaborative practices.

Third, the research extends the literature on the importance of collaboration in project settings (Davies, 2004; DeFillippi and Sydow, 2016; Davies *et al.*, 2016) as it demonstrates that the increasing adoption of such standards has been driven by explicit customer requirements. The study shows that the ability to collaborate is increasingly required by customers of complex projects. It indicates that providers of complex projects may rely on the standard as a source of codified know-how to structure and enact collaboration with customers, consortia partners and supply chain counterparts across projects. The formalisation of collaboration through the standard may act as a source of vicarious learning (Lumineau *et al.*, 2011) by codifying lessons learned regarding collaboration practices across multiple projects and industries. As such, the collaboration standard may allow firms to take a shortcut in the development of shared cooperative norms; hence, the standard would embody collective, experience-based knowledge that is shared amongst organisations (Løwendahl *et al.*, 2001).

5.3 Managerial implications

The study provides twofold implications for managers of companies involved in the delivery of complex projects. First, demanding customers are beginning to require evidence of collaboration competence as part of their tendering process. Accordingly, suppliers must seriously consider building and strengthening these capabilities in order to respond to these market changes. Adopting the ISO 44001 collaboration standard can be a structured way to facilitate the development of collaborative competence and build legitimacy among potential customers and partners (King *et al.*, 2005). However, this should only be part of an overall process. It should also be complemented by employee training and by fostering the development of a collaborative culture.

Second, the effective delivery of complex projects requires that organisations use relational governance mechanisms in a manner that is conducive to inter-organisational collaboration. Organisations must also design their contractual relationships so that mutual trust and a flexible working environment can be created. Here, the collaboration standard can offer valuable guidance into the complementary use of contractual and relational governance mechanisms. Even so, implementation will naturally give rise to new challenges. For instance, building the momentum for getting the entire organisation on board for the required changes may take a considerable amount of time and effort. Employees may struggle to see the benefits, which may mean the standard's implementation might be perceived as being about ticking the boxes or nominating a few individuals to be responsible for collaboration. Through increasing the awareness of possible issues, this study aids companies in finding ways to solve related problems and improve performance.

5.4 Limitations and future research

This paper presents some limitations, which can be addressed in further research. First, the empirical study did not explicitly focus on how organisations involved in the delivery of complex projects develop collaborative competence over time (Davies *et al.*, 2016), and what types of project-specific learning might be required to build such competence. Due to the study's exploratory nature, the empirical enquiry concentrated on a cross-industry investigation to acquire a broad overview of the phenomenon under scrutiny. Future research should take a

processual perspective (Pettigrew, 1990) and employ longitudinal case-based research designs to examine in-depth the ways in which project partners develop their competencies and how they learn to collaborate in complex project settings.

This exploratory study has drawbacks in terms of the generalisability of the findings. Although the study has covered a broad range of organisations and industries and has offered rich insights into the governance of inter-firm collaboration in complex projects, it cannot quantify phenomena related to the collaboration standard. Neither can the study argue for explicit differences across industries. Here, a large-scale survey could help map the adoption of the collaboration standard across project-based industries and uncover its impacts on performance at the project and organisational levels. In addition, our data consider primary project firm relationships, while future research may look into wider collaboration in supply chains including subcontractors, designers, and second- and third-tier suppliers in relation to governance. The study also focusses mainly on the UK-based operations of international companies and it does not provide enough data to draw inferences on possible national and cultural differences regarding the governance of collaboration in complex projects. Future studies could implement qualitative comparative methods to examine how relational norms, for example, differ in this sense and what implications this may have on the interdependencies among the collaboration standard, contracts and relational governance mechanisms.

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Appendix 1. Interview protocol

- Personal background and history.
- Job role and responsibilities.
- Describe the complex project context and operating environment.
- Explain your involvement and responsibility in the governance of collaboration.
- How has the complex project market evolved over recent years in terms of collaborative relationships?
- How important is the governance of collaboration in complex projects?
Probe: Have you experienced demands from your clients and other stakeholders to demonstrate collaborative capability?
- Explain how you plan or design the governance of collaboration in projects.

Probe: How do you account for flexibility and uncertainty in collaborations?

- How does the nature of complex projects affect collaboration?
- How did you come to use the standard for collaboration (BS 11000/ISO 44001)?
- What were the factors that enabled formalisation through the standard?

Probe: What were the benefits and what has changed in terms of governance?

- Have you experienced any differences in the complex projects that used the standard?
- What were the challenges associated with implementation of the standard in complex projects?

Probe: How was certification achieved for the collaboration standard?

- What are the contractual arrangements between you and your project partners in complex projects?

Probe: How influential are these contracts in your decisions and activities?

- How did the standard impact contractual agreements?
Probe: What were the industry-specific collaborative contracts?
- What do these collaborative contracts entail in terms of their content?
- How do the contracts account for flexibility required in projects?

Probe: What are the specific clauses or incentives?

- How were day-to-day collaborative operations governed in complex projects?
- What specific relational practices were used?

Probe: How were these practices operationalized? Detail any relational collaborative practices concerning project partners, customers, supply chain and other key stakeholders.

- How do the project partners manage these relational practices?

Probe: How were these practices introduced? Were they dictated by the contract? What was the role of the standard?

- Explain how you acquire and accumulate useful knowledge, resources and capital from collaborative projects.
- How do you capture and transfer the knowledge learned from one collaboration to another?
- How did the standard contribute to learning?
- What was the content of your exit strategy?

Probe: Was an exit strategy formally discussed before the introduction of the standard?

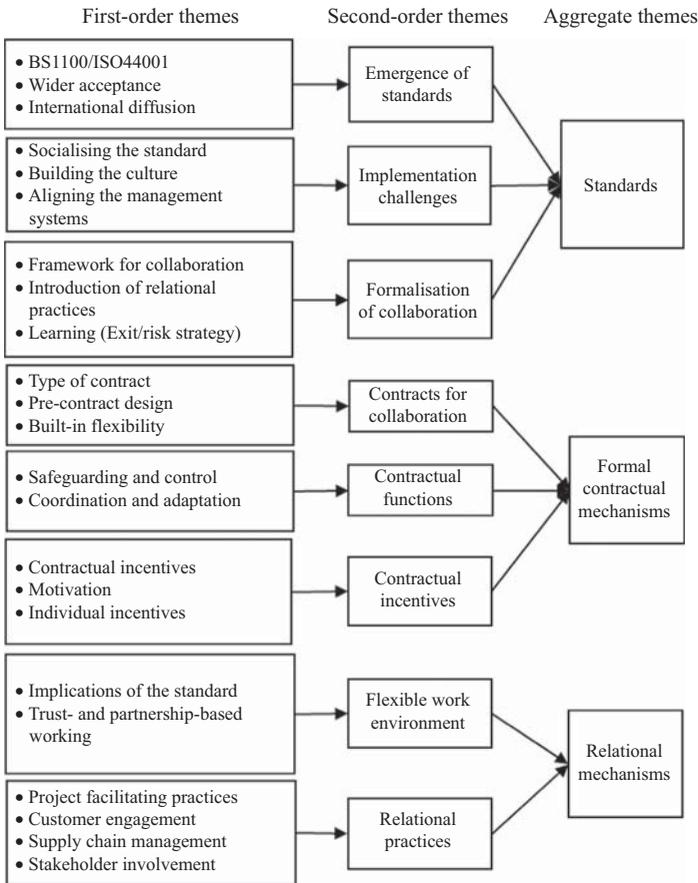


Figure A1. The coding structure

Corresponding author

Mehmet Chakkol can be contacted at: Mehmet.Chakkol@wbs.ac.uk

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