BECOMING COLLABORATIVE: ENHANCING THE UNDERSTANDING OF INTRA-ORGANISATIONAL RELATIONAL DYNAMICS

by
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Thanks to my supervisors at Loughborough University for their words of wisdom and encouragement. I've been connected to the School of Architecture, Building and Civil Engineering on and off since 2008. Whilst I've never been permanently based there I have always felt like I belong. I therefore extend this thanks to the wider team at ACBE – you make it a special place to learn.

Thank you to all my industrial supervisors (there have been many) for their guidance, with special thanks to Lisa for, in her words, being the best industrial supervisor in the history of industrial supervisors. She's kind of a big deal.

For the hours upon hours of proof reading, not only throughout the years of this study but for all the homework, assignments, applications and papers that have got me to this stage in my life. Mum, you are wonderful.

I could not have completed this project without the unfaltering support and love of my husband. He has packed his bags, moved cities and taken time out of his own career to raise our babies so that I could pursue my doctoral ambitions.

For Steve – I think you'd be proud.

ABSTRACT

Managing the delivery of highway maintenance and management is complex. A multi-faceted and highly reactive service provision requires the coordination of an interconnected web of intra-organisational inputs. Collaborative approaches for the management of such complexity has attracted a great deal of research attention over the years but there remains a lack of research examining collaboration "in flight". In Construction Management Research (CMR) studies orientate toward antecedents and processes for the application of a collaborative approach. Practically, contracts are used to govern these works, to coordinate expectations, and to structure relationships, with most of the work procured under transactional, non-collaborative and financially punitive forms of contract, which makes the enactment of collaborative working practices even more challenging. To investigate how collaborative approaches to service delivery might improve performance, this study examines the conditions that render collaboration operable when deployed within non-collaborative delivery frameworks. To aid this understanding the theoretical lens of institutionalisation, a theory underutilised in CMR, is used to unravel the multiplicity of factors acting to both support and erode collaborative working practice as observed at the micro level. Typically, institutional theorists examine micro and macro elements separately. Through a longitudinal case study consisting of four and a half years of participant observation, this study adopts an approach to examine micro-practices of collaborative behaviour to reveal how collaboration plays out in practice, leading to an understanding of how collaboration is shaped by macro-institutional logics. Through the lens of institutionalisation this study supports a reconceptualisation of collaboration, not as an exceptional event, but as an ongoing journey of accomplishment. This work follows the observations of three improvement initiatives designed to enhance collaborative working for the purposes of service improvement.

Early findings revealed formalised collaborative efforts improved performance but benefits realised remained localised. Bringing people together to collectively work through an isolated issue did not automatically lead to more or better collaboration. Pockets of collaborative efforts were found to be unsupported by wider governance mechanisms leading to short term interventions, unsustainable over time. Using institutionalisation to make sense of the observations revealed tensions between regulatory and cognitive/normative institutional logics; tensions that were observed to impact negatively on service delivery, particularly

given the non-relational contractual arrangements employed to procure and govern service provision. For example, cognitive logics to engage in collaborative solutions were overshadowed by logics that put commercial needs front and centre.

Contrary to the dominant discourse in CMR that describes how collaborative interventions can be applied to positively impact project performance, this research reveals the need for sustained collaborative effort. Whilst other work in the field deterministically positions relationships (collaborative or otherwise) as a product of contractual arrangements, findings here suggest collaborative behaviours can thrive in unfavourable contract mechanisms. As such, this work proposes a framework for an alternative approach to supporting collaboration that addresses the failure to recognise conflicting logics, understand why conflict arises and effectively manage the consequences, particularly in adversarial environments.

KEYWORDS: Collaboration, contractual arrangements, institutional theory, micro-practices, process improvement, relationship management

PREFACE

The research presented in this thesis was conducted to fulfil the requirements of an Engineering Doctorate (EngD) at the Centre of Innovative Construction Engineering (CICE), Loughborough University. The research programme was supervised by CICE and funded by the Engineering Physical Sciences Research Council (EPSRC), supplemented by an Industrial Sponsor who shall, by their request, remain anonymous.

The EngD is a well-recognised post-graduate qualification satisfying a different research need to that of a traditional PhD with the core aim of the EngD being to solve one or more significant and challenging problems within an applied engineering industrial context. The EngD is examined on the basis of a thesis supported by academic publications in the form of peer reviewed conference and journal papers. This thesis is supported by one journal and four conference papers which have been numbered 1 to 5 for ease of reference and are included as Appendices A to E of this thesis. These papers support specific work items within the overall programme and are provided as a reference for further reading and in support of the EngD research presented.

In addition to this thesis, the taught element of the EngD has been satisfied through the attainment of 180 credits gained through the completion of six modules, including a 90 credit research project, plus a 40 credit exemption for MSc post graduate courses already completed.

As well as setting out the structural background to the thesis in this preface, I feel it is of importance and relevance to explain to the reader the journey this research has taken.

Having previously expressed an interest in the EngD programme, I began my EngD journey early in 2011 when I was invited by the CICE to apply for a specific EngD position that had been developed jointly by the CICE and the Sponsor organisation. After a successful application process, I relocated in October 2011 to take up the placement within the Sponsoring organisation. Daily guidance was provided to me by an industrial supervisor (an employee of the Sponsoring organisation) with academic support provided by regular contact with academic research supervisors based at Loughborough University. This arrangement was to ensure the EngD research was industrially focused yet maintained a high level of

academic rigour. There are three important points here that hold significant implications for the development of this research and I would like to emphasise them further.

Firstly, this research project started almost seven years ago. In that time I have taken two periods of maternity leave. The journey this project has taken over time has been determined to varying degrees by the changing needs of all the project stakeholders, but most notably the Sponsor organisation. The economic and political climate has changed, there is a new CEO at the helm, mergers and acquisitions have shaped the company and contracts and projects have begun and ended, all of which have affected the strategies of the sponsor organisation. This has had knock on effects for my research which seeks to understand how macro factors affect collaboration at the micro-level and I have had to make conscious decisions to account for these changes.

Secondly, the original EngD brief was developed prior to my appointment as the researcher, the implication being that I spent the first few months developing a research strategy to satisfy a predetermined approach. As this thesis will go on to explain, this created challenges in the early stages as it became necessary to alter the focus of the study to balance the tension between providing a valuable output for the Sponsor whilst at the same time contributing novelty to academia.

Thirdly, and as might be expected, over the course of the seven years, employees within the Sponsor organisation have changed. People have been and gone (and come back!) but most significantly for this study, none of the industrial supervisors involved at the outset were involved at the end. Each time my supervision changed, the focus of the study necessarily changed to adapt to the specific needs and attitudes of the industrial sponsor. Some of the supervisors involved have been active in shaping the direction of the research and others have taken a much more “hands-off” approach. As such this research does not follow a linear pathway. Instead, I have had to pragmatically adapt the scope of my study to balance the inherent tensions of this longitudinal research within a live industrial setting.

I feel it is important that the reader bear in mind these points whilst reading this thesis because an appreciation of the journey taken to get here will explain why there are some ambiguities as I have reacted to a fluid organisation. Upon reflection, it is fitting that the approach I have taken to proactively adapt to the changing landscape of my study environment resembles the ongoing journey of accomplishment that I, through this thesis,

advocate is adopted in order to see collaboration as an emergent phenomenon and, as such, better support it to thrive.

USED ACRONYMS/ABBREVIATIONS

BI	Business Improvement
BIT	Business Improvement Team
BMR	Business Management Research
CICE	Centre for Innovative and Collaborative Construction Engineering
CMR	Construction Management Research
EngD	Engineering Doctorate
EPSRC	Engineering and Physical Sciences Research Council
FAQ	Frequently Asked Question
IT	Information Technology
KPI	Key Performance Indicators
OCR	Operational Control Room
PFI	Private Finance Initiative
PM	Project Manager
RE	Research Engineer
SIP	Service Improvement Plan
TUPE	Transfer of Undertakings (Protection of Employment) Regulations 2006
UK	United Kingdom

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LIST OF PAPERS

The following papers, included in the appendices, have been produced in partial fulfilment of the award requirements of the Engineering Doctorate during the course of the research.

PAPER 1 (APPENDIX A)

Boyce, E., Dainty, A. and Thorpe, A. 2012. A novel collaborative planning methodology for complex infrastructure design projects, N. Thurairajah, ed. In: *CIB Joint Symposium, "Management of Construction: Research to Practice"*, Montreal, Canada, June 26-29 2012.

PAPER 2 (APPENDIX B)

Grove, E., Dainty, A.R.J., Thomson, D.S. and Thorpe, A. 2016. Contracts, Collaboration and Conflict Resolution: Forging Relationships in the Face of Adversity, *Working Paper Series, Proceedings of the Engineering Project Organization Conference*, Cle Elum, WA, June 28-30.

PAPER 3 (APPENDIX C)

Grove, E., Dainty, A.R.J., Thomson, D.S. and Thorpe, A. 2018. "Becoming collaborative": A study of intra-organisational relational dynamics. *Journal of Financial Management of Property and Construction*, 23(1). pp. 6-23 (Published).

PAPER 4 (APPENDIX D)

Grove, E., Dainty, A.R.J., Thomson, D.S. and Thorpe, A. 2017. The collaborative journey: Riding the bumps of the institutional landscape. In P. W. Chan & C. J. Neilson, eds. *Proceedings of the 33rd Annual ARCOM Conference*. September 4-6 pp. 4–6.

PAPER 5 (APPENDIX E)

Grove, E., Dainty, A.R.J., Thomson, D.S. and Thorpe, A. 2018. Becoming collaborative: enhancing the understanding of intra-organisational relational dynamics. In P. W. Chan & C. J. Neilson, eds. *Proceedings of the 34th Annual ARCOM Conference.* September 3-5 (Accepted).

1 BACKGROUND TO THE RESEARCH

1.1 INTRODUCTION

This chapter introduces a thesis on the subject of collaborative working practices in the context of highway maintenance. It sets out the key issues and topics relevant to the subject domain, provides an outline of the research context and summarises the industrial setting both for the sector and the Industrial Sponsor. The discussion then provides justification for the research before outlining the aims and objectives of the study. The chapter concludes with a description of the structure of the thesis. A diagram is provided to illustrate how these elements interlink.

1.2 CONTEXT OF THE RESEARCH

1.2.1 THE COLLABORATION PROBLEM

The construction industry as a whole is characterised by litigation and adversary with a raft of reports such as Constructing the Team (Latham 1994), Rethinking Construction (Egan 1998), Accelerating Change (Egan 2002) and more recently Modernise or Die (Farmer 2016) which talk of the industry's collaboration problem. A common recommendation across these papers is for more integrated working. More and better collaboration is reported to be the mechanism with which to deal with the complexity faced (Walker et al. 2017) and has been linked to better performance in a construction context (Greenwood & Wu 2012). The benefits of a collaborative approach are widely accepted with a significant volume of research commenting on how to encourage and improve it (Yin et al. 2011; Austin et al. 2007; Jorgensen & Emmitt 2009; Marshall 2014; Cox & Thompson 1997; Powell 1998; Bresnen & Marshall 2000).

There is a willingness within the construction industry to implement collaborative approaches to working relationships but so far, applications have not been profound. Collaborative approaches to solutions to major problems are often ad hoc 'bolt-on' elements (Anvuur & Kumaraswamy 2008). Firms often show willing to experiment with a suite of tools and techniques but are either unwilling or unable to instil a culture of collaboration with the potential impact of team building hindered by the 'formalisation' of collaborative practices (Suprapto, Bakker & Mooi 2015).

In response, the industry has looked to other sectors for inspiration for improvement and the industry is littered with examples of initiatives taken from elsewhere, a good examples of which is Lean initiatives from the manufacturing industry. At the commencement of this study the Sponsor organisation was experimenting with Lean approaches and included it within the original EngD brief. There are many in the research community committed to the Lean approach and within industry, consultants have commodified these approaches. The drive for organisations to procure the services of Lean consultants is often spurred on by clients who encourage this approach, for instance, BS11000 (ISO44001) is, for some clients, an invitation to tender prequalification requirement. Well intentioned, off-the-shelf proposals to encourage collaborative working and team integration are frequently transplanted into project environments where adversarial behaviours already exist. In summary, the problem this thesis seeks to address is how can organisations take a collaborative approach when many factors appear to be acting against the desire to be collaborative.

1.2.2 COLLABORATION: THE SOLUTION

In construction management research (CMR) there is much rhetoric around the benefits of collaborative approaches for the delivery of complex programmes with a significant volume of research commenting on factors that encourage and inhibit it (Bresnen & Marshall 2000), how to measure it (Yin et al. 2011), control it (Ballard 1994), how to employ fit-for-purpose contracts to foster it (Cox & Thompson 1997), and the best tools to support it (Bolstad & Endsley 2003). More and better collaboration is championed as the method with which to allow us to deal with the complexity faced (Walker et al. 2017), not least because it enables the seamless flow of knowledge between project participants (Ruan et al. 2012). Not only is collaboration put forward as a solution to the complexity of construction projects, research indicates that the problem of fragmentation and low productivity can also be overcome through collaborative approaches to delivery (Ballard & Tommelein 2012). Working collaboratively leads to better performance in a construction context (Greenwood & Wu 2012) where the creation of a no blame culture encourages parties come together for the good of the project (Lloyd-walker et al. 2014).

A collaborative approach to project delivery is an attractive solution to the problems faced by the sector and features repeatedly in strategy documentation as a core value, see Table 1.1. Furthermore collaboration is supported and encouraged through British and international standards (The British Standards Institute 2016) and is celebrated by industry awards (New

Civil Engineer 2016). Off the shelf collaborative tools such as The Last Planner System appeal to industry practitioners because they can be combined with existing practices with relative ease, making no grand requests for alterations to the status quo. Despite the pervasiveness of collaboration as an indicator of project success, we know very little about how it unfolds practice.

1.2.3 THE INDUSTRIAL SETTING

The Industrial Sponsor for this study is a Public Listed Company (PLC), a provider of services to the public sector, and one of the most diverse companies in the UK public and regulated sectors directly employing over 20,000 people across a range of divisions. The Sponsor organisation is owned by a large multinational parent company, one of the world's leading infrastructure management and investment companies. Figure 1.1 depicts the services the Sponsor organisation designs and maintains across the UK.

This research began in 2011 when the economy was reeling from the effects of the economic downturn. As a profit-motivated private organisation the Sponsor organisation has an obligation to satisfy its shareholders. As a provider of services to the public-sector, the Industrial Sponsor's clients are demanding "more for less" in a bid to demonstrate efficiency savings, often manifested as budget cuts. Here we have two main parties with different commercial and/or social objectives (Ball et al. 2014), which creates additional challenges for services provision; challenges that must be managed by the coming together of multidisciplinary teams within the service provider.

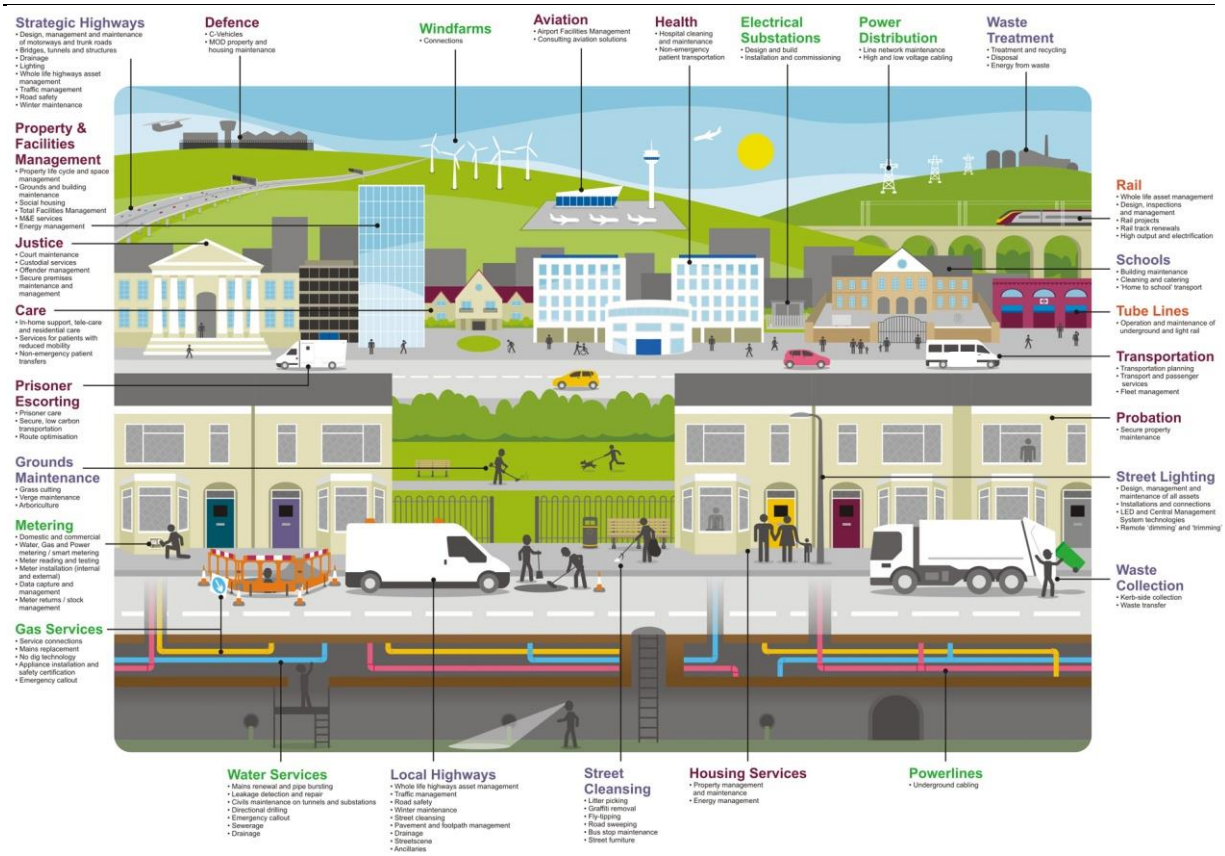


Figure 1.1: The services provided by the Sponsor organisation

The decision was made to locate this research project within the highways division of the Industrial Sponsor where project teams manage contracts on behalf of an almost exclusively public sector client base, providing both strategic (motorways and major A roads) and local highway maintenance and management services. Focusing the research here created a suitable opportunity to investigate further the problems facing collaborative working in a multidisciplinary setting in the presence of adversarial relationships.

1.2.4 THE NATIONAL PICTURE

The UK has an aging transport infrastructure asset with many areas suffering from historic under-investment (HM Treasury 2014) compounded by a long-term trend of growing road traffic. Vehicle miles travelled per year increased by 274.8 billion from 1949 to 2013 (HM Treasury 2014). The UK government's Roads Investment Strategy set out a commitment to spend £15 billion between 2015-16 and 2020-21 on the transformation of the Strategic Road Network; the biggest programme of road investment since the 1970s, with investment tripling from current levels by the end of the decade (HM Treasury 2014). Cash strapped local authorities unable to meet the financial demands for the development and maintenance of its infrastructure assets (Odoemena & Horita 2017) has seen the rise of partnerships between the

public and private sector (PPPs and PFIs) as alternate ways are sought to finance the work needed to keep the UK's roads operational. This investment creates considerable opportunities for providers of highway maintenance services but also creates challenges. Long-term partnerships to provide these routine maintenance and renewal services is one option. Lengthy contract terms of up to 20 years (or more in some cases) bring with them the inevitability of uncertainty and highlight many of the limitations of such contracts (Garvin 2009). PFI contracts have received much media attention; disputes over performance are common and this does little to address the adversarial reputation of the industry. Other contractual arrangements of around 5 years in length (typical of strategic network maintenance contracts) bring alternative challenges such as the frequent changing of service provider and the Transfer of Undertakings (Protection of Employment), or "TUPE" of contract staff. Nationally (with very few exceptions) these works are procured under contracts that do not make provisions for collaborative working practices. However, the desire for collaborative approaches to delivering services is widespread with collaboration frequently cited as a value throughout the sector. See Table 1.1.

Table 1.1 Collaboration as a core value

Source	Stated Vision / Value
AECOM (2016)	Collaborate (core value)
Amey (2017)	We are collaborative (core value)
Arup (2015)	Sustaining a collaborative culture (annual report)
Bam Nuttall (2016)	Founding members of the Institution of Collaborative Working (who we are)
Chartered Institute of Highways and Transportation (2016)	Collaborative (core value)
Galliford Try (2016)	Collaboration (core value)
Highways England (2014)	Drive collaboration through improved company-wide ways of working (strategic plan)
Kier (2016)	Collaborative (core value)
Network Rail (2016)	To fulfil our vision, we need to collaborate effectively with our industry partners (vision)
WSP (2016)	Our strength is in the power of our collaboration and teamwork (core values)

Misalignment of public sector incentives that are often short term, political and social in nature with the longer term profit making incentives of the private sector (Delhi et al. 2010) creates tensions as the public sector seeks auditable value for money whilst continuing to procure services under traditional transactional based contracts. It is within this national picture that the Industrial Sponsor for this project is situated.

1.2.5 THE INTERNATIONAL PICTURE

The problems associated with clients preoccupied with costs and services providers challenged to do more with less are experienced away from the UK as well. Pressures, particularly those of a commercial nature, resulting in conflict and dispute affect the construction industries of many counties with construction around the world attracting criticism for inefficiency and customer dissatisfaction (Eriksson & Westerberg 2011). A lack of cooperation is cited in studies in the Far East as a cause of inefficiency (Cheung et al. 2003). Studies emanating from northern Europe provide theoretical and empirical support for partnering procurement approaches with a reduced focus on price and authority and greater emphasis on facilitated relationships based on trust and cooperation (Eriksson & Nilsson 2008), with others more explicitly calling for improved collaboration (Grosse & Gustavsson 2017). A recognition of the need for better collaboration continues in Australia with studies there investigating when the barriers to collaborative working practices are best addressed (Ey et al. 2014). In line with the critique of UK empirical research into collaborative working presented in this thesis, research in Australia has a tendency to focus on the positive aspects of collaboration without a proper consideration of the constraints affecting application (Ey et al. 2014).

Much like the contracting practices in the UK that make little or no provision for collaborative working, the delivery of road projects in India have been studies to understand the issues caused by project governance (Delhi et al. 2010). Australian researchers have also attempted to understand why some forms of contracting practices are selected over others (Doloi 2013). The literature review that follows in Chapter 2 is not constrained to studies from the UK, demonstrating how the effects of project complexity on project governance are not UK specific. Researchers internationally are working towards a better understanding of contractual governance in projects for the purposes of managing the uncertainty and opportunistic behavior (You et al. 2018)

1.3 JUSTIFICATION FOR THE RESEARCH

The need for this research arose from the Industrial Sponsor’s desire to understand how it delivers its highways maintenance and management, how it enacts its strategic vision to be collaborative and how it reacts to industry recommendations to work collaboratively.

1.3.1 FOR INDUSTRY

Research literature concerned with collaboration and the practices adopted by industry have been found to be focused on the implementable forms of collaborative working (often applied by external consultants). Within the Sponsor organisation, pockets of initiatives to instil a collaborative approach were underway as this study commenced but little was known about the impact these were having on service provision. It was felt that the initiatives were carried out as a reaction to immediate communication challenges and more could be done to strategise the approach. Furthermore, off the shelf solutions were being applied without first investigating the collaboration problem that needed solving. In addition, the implementable approaches adopted were failing to consider the human and behavioural effects of collaboration (surprisingly, given collaboration is essentially people working together) and focussed heavily of the processes involved. Given the Industrial Sponsor's strategic value to deliver world class, profitable services to its clients and given the complex interdisciplinary nature of the service provision under investigation, further work in this area was required to establish how better collaborative working could be achieved.

1.3.2 FOR RESEARCH

This research arises from an interest in collaboration within a highways maintenance setting for the following reasons: (1) fragmentation of the multifaceted service arrangement and the siloed approach to delivery, (2) adversarial client/service provider relationships and the effects on internal project teams, (3) hypothetical value attributed to collaboration as a key strategy element, (4) a lack of empirical research into the detailed practices through which collaboration is mobilised by organisational members and (5) failure of Construction Management Research (CMR) to effectively consider connections between macro institutional factors and micro-practices of collaboration. This study attempts to move beyond an assertion that through institutional theory values *are* instilled, to an understanding of *how* this occurs (Scott 1987).

1.4 CONTRIBUTION

This study makes three key contributions as depicted in Figure 1.2. Firstly, the work undertaken here addresses a lack of insight into micro-practices within institutional theory, particularly institutional work theory. Secondly, this research attends to the paucity of work concerning institutional theory in construction management literature. The third is largely a

practical contribution to industry as the research seeks to understand how collaborative working unfolds within these complex highway maintenance projects. In doing so a contribution is made to practice in the form of actionable recommendations for enhanced collaborative working.

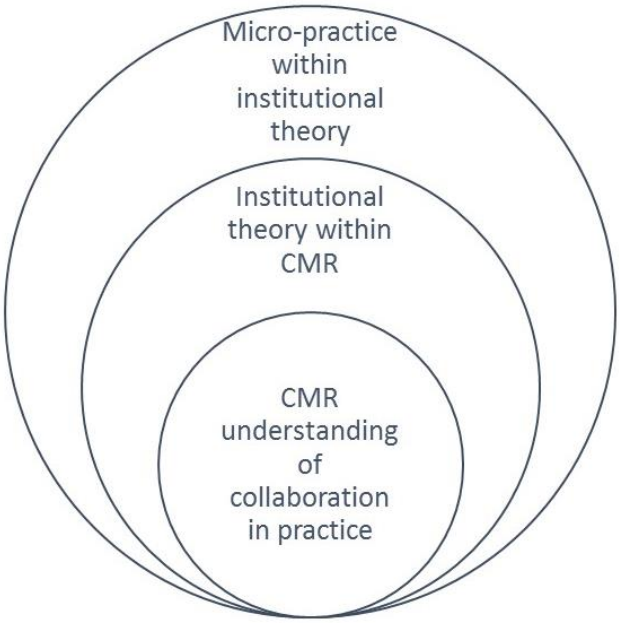


Figure 1.2 Contributions of the study

1.5 AIM

The aim of this research project was to establish how collaboration can support the delivery of highway maintenance and management services through a consideration of the contractual arrangements, the management of relationships and the application of tools and techniques.

1.6 OBJECTIVES

The aim stated above was achieved via the following objectives which have been developed to attend to the practical, applied focus of the EngD:

Objective 1: Explore the processes for delivering highway maintenance and management services

Objective 2: Identify the contractual arrangements for highway maintenance and management

Objective 3: Understand how relationships are managed for the maintenance and management of highways

Objective 4: Synthesise learning from objectives 1, 2 and 3 to design practices to improve project execution

Objective 5: Evaluate the impact of the practices

1.6.1 JUSTIFICATION OF OBJECTIVES

The objectives listed above were designed to meet both the research aim and the needs of the Industrial Sponsor. Although separated into discrete undertakings, objectives 1, 2 and 3 were interconnected, as shown in Figure 1.3.

The first objective – to explore the processes for delivering highway maintenance and management services – was necessary to understand how services were provided. An appreciation of the state of play within the case study organisation and how this related to extant research provided an important step in the theoretical underpinning of this research.

The second objective – to identify the contractual arrangements for highway maintenance and management – sought to describe the structural constraints of the governance arrangements and comprehend how these constraints impacted and shaped the processes through which highway maintenance services were provided.

The third objective – to understand how relationships were managed – complements and supports objectives 1 and 2 and built on the learning thus far to begin to interpret the relationships at play both inter- and intra-organisationally. The completion of objective 3 provided social context to the processes for delivering services and to the enactment of contractual arrangements.

The fourth objective required synthesise and analysis of the learning from objectives 1, 2 and 3 to develop practices to enhance collaborative working for the benefit of project execution. The outcome of this objective was tangible, providing both a contribution to knowledge and recommendations for informing relationship management and the support of collaborative working practices.

The fifth objective was to provide an evaluation of the impact of the research on the case study organisation, ensuring the Industrial Sponsor benefits from the insights offered by the work undertaken. The completion of this objective facilitated an articulation of the contribution to knowledge and areas for further research.

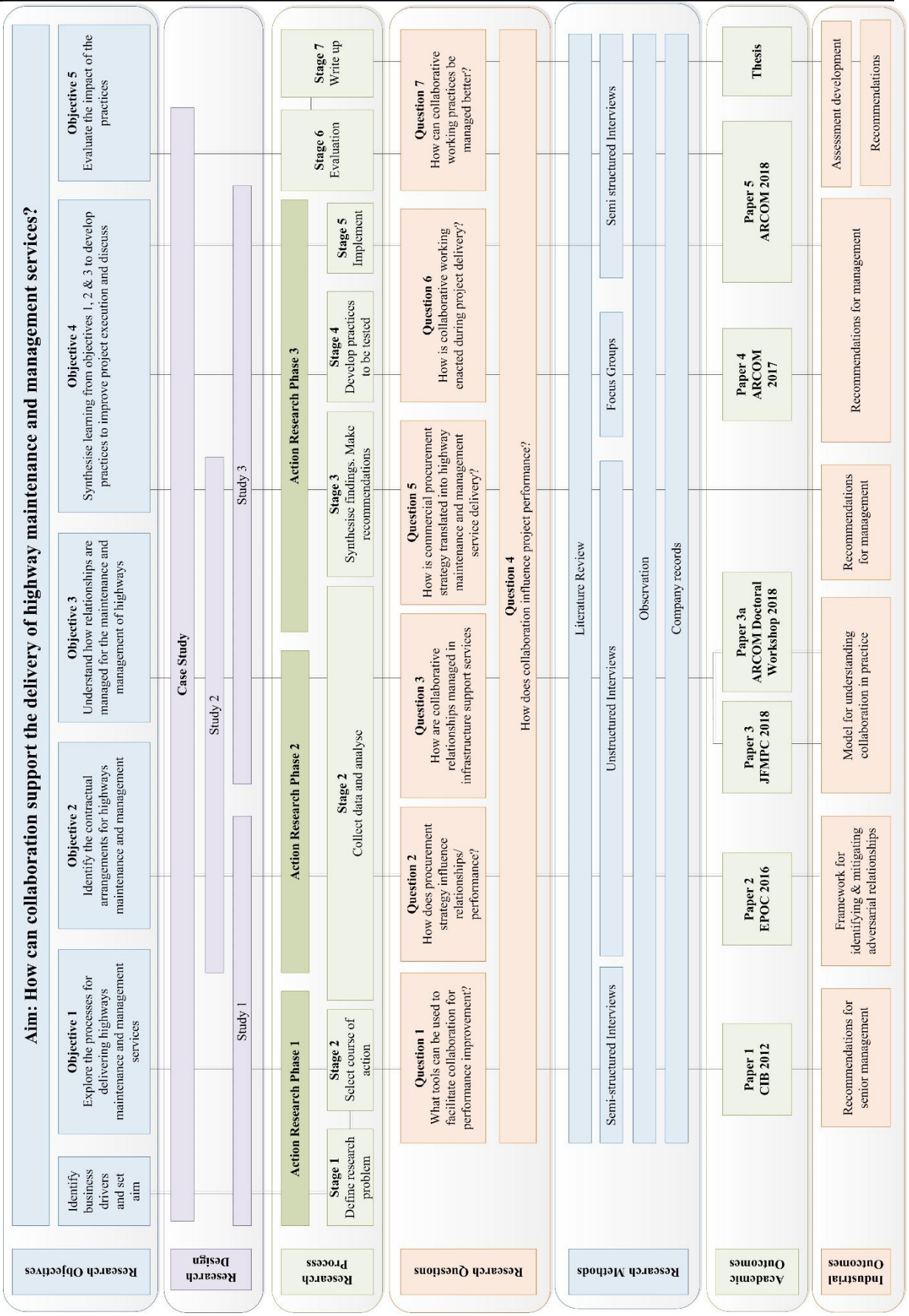


Figure 1.3 Research Map

1.7 RESEARCH APPROACH

Initially the intention was to focus on the methods employed by the sector to work more collaboratively and to understand what these meant in the context of highway maintenance and management. Collaboration is seen here as the process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible (Gray 1989). It was the expected that this understanding would permit the development of a context specific practice for the enhancement of collaborative working. In a sense, a "solution" had been identified (collaborative working methodologies) and the Industrial Sponsor was motivated to apply this solution within in their industrial field and the research would guide them to do so with best effect. Therefore, the early stages of the research were approached with a conceptualisation of collaboration as a noun; as a tool to be applied, see Figure 1.4. As the study progressed the ontology shifted as the research findings began to reveal the appropriateness to conceptualise collaboration as a dynamic state of becoming.

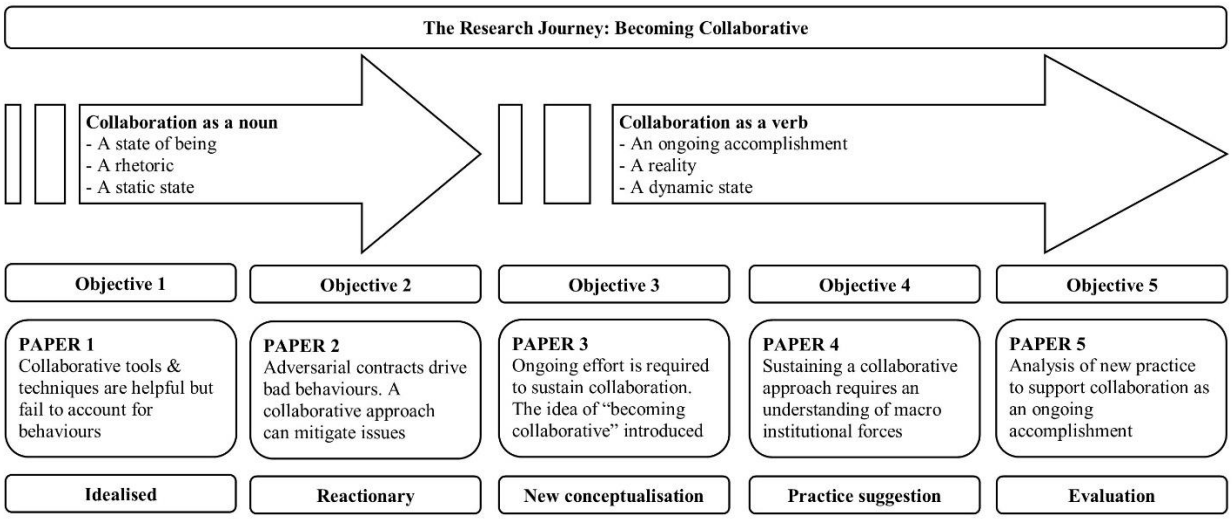


Figure 1.4 The research approach: becoming collaborative

1.8 STRUCTURE OF THE THESIS

This thesis is organised into six chapters and a series of supporting appendices which are structured as follows:

Chapter 1: Introduction - introduces this EngD project and sets out the aim, objectives and scope of the research. The structure of the thesis and a synopsis of each of the published

papers are also presented and it provides an overview of the research context and gives background information regarding highways maintenance and management.

Chapter 2: Literature Review - provides the findings of a literature review and acknowledges previous research undertaken in the field. The literature covered is broadly divided in two: that which covers collaboration as applicable and that which considers collaboration as ongoing. This chapter concludes with a presentation of the research questions informed by the literature reviewed.

Chapter 3: Research Methodology - reviews the range of research methodologies available and outlines and justifies the adopted methodological approach and its appropriateness for this study.

Chapter 4: Research Undertaken - presents a detailed description of the research undertaken to address the research objectives and includes the key findings of the research whilst making links to the appended papers.

Chapter 5: Discussion - recaps the key findings of the research and discusses them within the context of the literature and the implications for research.

Chapter 6: Conclusion - highlights the originality and contribution to existing theory and practice, identifies the impact on the Sponsor and the wider industry. It critically evaluates the research and makes recommendations for areas of further research. A final overall summary is included.

The five papers presented and published during this research are included in the appendices. These papers were the key outputs of the EngD during the four-year research project and are summarised in Figure 1.3. These papers are also an integral part of the thesis output and intended to be read in their entirety to support Chapter 4.

2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides a literature review that explores why collaboration is important and how collaboration is explained in existing Construction Management Research (CMR). The purpose of this review is to aid the identification of theoretical viewpoints in support of the research aim and objectives and to generate research questions. Figure 2.1 below provides an illustrative example a construction context of how the themes of this literature (and those within the papers in the appendices) come together to define the scope of the literature covered. The key topics covered are: collaborative approaches to project delivery, mostly within a construction context; project governance and the impact on delivery; the delivery of micro-practice and what this level of analysis can offer to this study; and institutionalisation, particularly institutional work theory. The coverage of these topics is not exhaustive, mainly due to practicalities of time and the scope of the research study. Instead the literature covered throughout the study period and presented here is predominantly where these key topics overlap (see Figure 2.1). For example, partnering in a contractual and procurement sense was not investigated to its fullest extent but was draw upon from time to time to illustrate points of interest, such as trust and institutional logic tension.

This review is largely a rejection of how collaboration tends to be treated in literature as a measurable entity. To present this critique, a selection of such studies is highlighted as this review considers the benefits of extant conceptualisations and draws attention to potential theoretical and practical limitations of studies concerned with collaborative working. The remainder of this review then turns to consider the premise, introduced in Section 1.7 of this thesis, that there are benefits of shifting from a view of collaboration as an exceptional event (dealt with as a noun) to seeing it as an ongoing accomplishment (treated as a verb). From here, this chapter continues to unpack how two theories, micro-practices and institutional theory, can be used to better explain collaboration as an emergent phenomenon. This literature review draws on research from other fields away from construction and explores institutionalism as a theoretical lens and mechanism with which to connect macro and micro viewpoints within the context of collaborative behaviour.

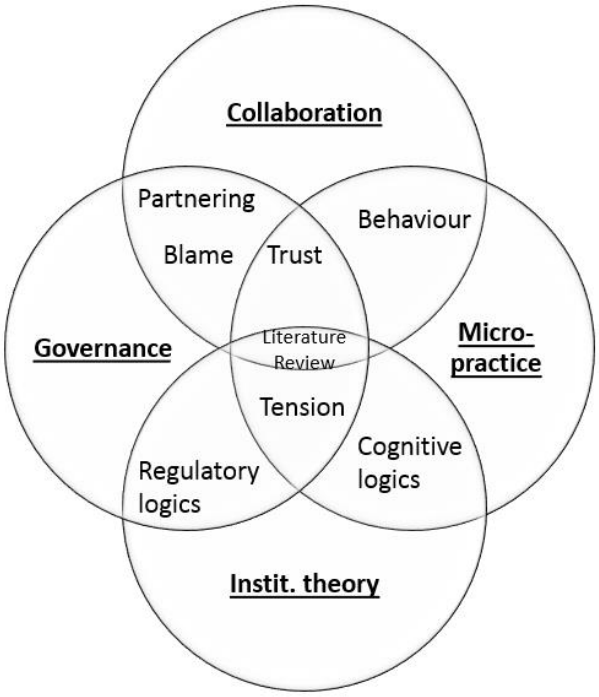


Figure 2.1 Scope of the literature review

2.2 THE IDEAL COLLABORTIVE SYSTEM

As this review will go on to explore, the existing literature concerned with collaborative working practice treats collaboration as an achievable state of being. Whilst this review and this study at large criticises such approaches for their unhelpfulness in understanding collaboration as it emerges in practice, they do provide a useful synthesis of what researchers and practitioners consider to be the ideal conditions for collaboration. When describing such environments, the focus is often upon collaboration across organisational boundaries, whereby effective owner–contractor relationship geared toward solution seeking, not blame (Suprapto, Bakker, Mooi, et al. 2015). The encouragement of a no blame culture (Lloyd-walker et al. 2014) and the creation of trust (Grosse & Gustavsson 2017) feature strongly in the rhetoric of what it is to be collaborative. Furthermore, Grosse & Gustavsson put it in practical terms; learning from one another to appreciate the perspective of others is required for collaboration to occur. Zhang et al. (2018) succinctly summarise the key characteristics of the ideal collaborative environment to include: the alignment of objectives, incentivisation, measuring at a strategic level, accountability, and emotional intelligence. The ideal components discussed here are dominated by behavioural factors. From a project governance perspective, coordination is more effective than contractual control when mitigating opportunistic behaviours (You et al. 2018). Beyond the behaviours associated with idealised collaborative systems is the consideration of the role of physical artefacts to support

collaboration (Nicolini et al. 2012), such as the power of boundary objects to convey a shared sense of meaning even when professional knowledge differs (Star & Griesemer 1989). Cooperation in this way leads to better collaboration (Anvuur & Kumaraswamy 2008).

2.3 COLLABORATION AS A NOUN

Collaboration is the coming together of resources to jointly develop solutions. As this review lays out, the concept of collaborative working has been adopted by the construction industry as a technique for the efficient delivery of goods and services to its clients. As such it can be argued that collaboration is commonly conceptualised as an applicable method of working. In this sense, collaboration is dealt with as a noun, as a tangible entity, and as a state of being. As introduced in Chapter 1, the construction industry has traditionally been regarded as inefficient, fragmented and troubled by adversarial relationships. These challenges have prompted studies that support the premise that more collaborative practices can lead to improvements in the efficiency and delivery of highways projects (Rooney & Allan 2015). It is widely recognised that knowledge is highly important to organisations and the transfer of knowledge is crucial for a reduction in rework and for quick response to customers (Javernick-will 2012). If the parties concerned can share their knowledge and develop collaborative working relationships and in doing so align their interests, it is understood that potential conflicts can be dealt with before becoming adversarial (Suprapto, Bakker, Mooi, et al. 2015). This first half of the literature review explores how the notion of collaboration to deal with the challenges of adversary and fragmentation facing the industry has been tackled in the past and the benefits and limitations of such a conceptualisation.

2.3.1 APPLICABILITY OF COLLABORATION

A review of the research that deals with collaboration revealed a commonality; prescriptive recommendations based largely on the experience of isolated success stories are dominated by accounts of the application of tools and techniques (Green 2006). An example of such an approach to support collaborative working is Lean construction. Since the 1990s CMR has been applying Lean principles to construction. in a bid to reduce waste and provide greater value through the more efficient delivery of goods and services. The Last Planner System™ (Ballard 1994) is an example of such a tool for the facilitation of a collaborative approach to production control and was, for this reason, included for examination in this study (Objective 1 in Chapter 4 discusses this work). The literature review contained within Paper 1 explores this approach towards implementing collaborative working further. Whilst many will say that

Lean construction is not a set of tools but a lifelong strategy (e.g. Liker (2004)) literature in the field tends to conceptualise collaboration as implementable with success factors dominated by quantifiable measures that tend not consider the softer issues.

The application of collaboration as a fix for inherently uncollaborative and adversarial behaviour treats collaboration as an exogenously created phenomenon. In this sense, collaboration is conceptualised narrowly as something that can be created away from the context in which it is to be used and applied to situations under specific conditions by certain people, for example business improvement consultants, or collaboration conveners (London & Pablo 2017). Such views of collaboration are unhelpful for dealing with contingent circumstances. Far from being externally created and applied, it is argued that collaborative working is a phenomenon socially constructed from within organisations by the actors involved. This reversal of ontological priority has resonance with Tsoukas and Chia's (2002) call to treat change as a normal condition of organisational life.

Existing work in the field is fixated on formalised and implementable styles of collaborative working and consequently, fails to include the collaborations arising from everyday routines and mundane interactions. There is a case to be made for moving beyond the idea that a correct collaborative approach can be selected and applied. Instead, an improvement in the collaborative environment requires a reconceptualization of collaboration as an endogenously created phenomenon, not an implementable solution to poorly defined problems. Indeed, 'the conventional, routine activities that produce most organisational change require ordinary people to do ordinary things in a competent way' (March 1981, p.575). But attempting to alter the collaborative environment requires participants to alter their performance of routines in an intended manner (Feldman 2003).

Practically, companies often show willing to experiment with a suite of tools and techniques but are either unwilling or unable to build a sense of joint belonging or to instil a culture of collaboration (Hietajarvi & Aaltonen 2017) with the potential impact of team building hindered by the 'formalisation' of collaborative practices (Suprapto, Bakker & Mooi 2015). The links between collaboration and organisational processes tends only to be discussed in terms of the extent to which the processes render it operable. Collaborative planning methodologies, such as The Last Planner, and BS11000 (Hawkins & Little 2011) (soon to be replaced by ISO44001) are prime examples of this. The people in this literature are mere users of the systems and occupants of space whose activities were never described (Ahrens &

Chapman 2007). The connection between people and processes cannot be mechanical, reliant on repeated activity; the practice depends on the 'intended, meaningful relatedness between activities with respect to outcomes, clients, practitioners, techniques, resources, strategies, institutions, etc.' (Ahrens & Chapman 2007, p.23). Through their study of accounting systems, Ahrens and Chapman (2007) describe the rhetoric of collaboration (collaboration as a noun) and the practice of collaborative behaviour (collaboration as a verb) and conclude that doing and saying are fundamentally different, or put another way, formal narratives of organisational change are different to the lived reality (Löwstedt & Räisänen 2012). To understand collaboration on its own terms, efforts need to be made to determine what is formal narrative and what is lived reality. The EngD programme, through an embedded researcher is the ideal vehicle to achieve this micro-level insight. Collaborative strategy cannot be used as the means by which to pursue collaborative practice ends because means and ends are constructed simultaneously in practice (Lave 1988). Just as an application of technology cannot increase or decrease productivity or performance (Orlikowski 2000), collaboration will not simply occur by physically bringing people together (Kokkonen 2017).

The prescriptive and applicable nature of the collaborative working techniques covered in extant literature makes the transfer of knowledge problematic. The unique characteristics of the case receiving the transplant are not considered. To consider it in this new way requires more attention to be paid to all the other factors that impact on a collaborative approach being achieved. Feldman's (2003) study of 'the change that would not occur' found that difficulties in realising change were not because the new routine being asked to be performed is difficult but because it required action inconsistent with the latent understanding of how the organisation operates. By stating an intention to create change (for instance the implementation of a new collaborative initiative) the attention of managers is drawn to whether the routine as a whole changed and not to the performances that need to be different in order for the change to be realised. The scope of Feldman's study does not extend to include suggestions of how the prevailing performances might be changed but recognises change is unlikely when inconsistent with broader organisational understanding. Institutional theory is explored here as a mechanism to understand what broader organisational and industry level forces may be acting to influence collaboration at the micro-level.

2.3.2 COLLABORATION AS A STATIC CONCEPT

Routines and conversations are elementary forms of daily life and, despite their mundane nature, they appropriately link the micro and the macro; a richer picture is presented when routines are not separated from the people applying them (Feldman 2000). Just as using a microscope aids an understanding of the whole through its tiny parts, routines and conversations offer an interesting insight to examine strategic change (Rouleau 2005). To the extent it reflects the macro, the micro is never trivial (Seidl & Whittington 2014). Treating collaboration as applicable and taking a prescriptive approach assumes that collaboration can be applied to a situation whilst all other factors remain constant. To describe the adjustment in the level of analysis and how this refocusing on the micro reveals otherwise hidden knowledge, Tsoukas and Chia's (2002) analogy of a tightrope walker is used in the context of a car travelling along a motorway. If the focus of analysis is upon the car, it may be viewed as stable as it travels within the lane markings at a constant speed. But if we reduce the level of analysis to the driver it becomes possible to observe the constant adjustments made to the steering wheel, the rise and fall of the foot on the accelerator pedal and the eyes that make regular glances to the mirrors to check for other road users. At certain levels of analysis stability can be seen and yet at another levels high degrees of dynamism are apparent. Both the macro and micro view are important. Failure to appreciate both the micro and the macro factors surrounding the collaborative application may lead to an assumption that stability has been achieved. The behaviours of those enacting the off the shelf solution are a case in point. As we have discussed, the actors are often excluded from any analysis of the collaborative application.

It is unrealistic to describe an organisation as it is now because the environment changes so rapidly the description will not align with the way it will be later (Weick 1969). Snapshots in time only provide a series of snapshots; they do not tell the journey between the snapshots. As such, the documentation of observational data can illuminate activity, but the activity cannot be reduced to description (Ahrens & Chapman 2007). This is problematic when attempting to provide a true assessment of collaboration. The behaviours and enactments of collaborative behaviour in a once a week collaborative planning setting will inevitably fail to reveal anything about what goes on between meetings or with the wider project team. For instance, the way in which people communicate with one another both inside and outside of formalised settings has much to do with patterns of trust. Whilst collaborative planning

sessions may be valuable forums for the creation of mutual understanding and shared goals, an important facet of trust (Khalfan et al. 2007), isolating any enquiry of collaborative working to a set of meetings renders a prescription for how to achieve a state of collaborative excellence inadequate.

2.4 COLLABORATION AS A VERB

Having considered the conceptualisation of collaboration as a noun and as a tangible tool that can be prescriptively applied, this review now moves forward to explore an alternative viewpoint. The following discussion attempts to deal with collaboration as a verb and the assertion that a conceptualisation of collaboration as an ongoing journey of accomplishment is more helpful for practice and theory. This review now considers how two theories, micro-practice theory and institutional theory, can support this conceptualisation.

2.4.1 DEFINING COLLABORATION

The variety of organisational and individual agendas present in collaborative situations makes it difficult to agree on a common definition of what it means to be collaborative (Huxham 2003). Attempts at differentiated definitions depending on perspectives have been made (Hughes et al. 2012) which while helpful in highlighting the array of associated aspects fails to provide succinct unifying definitions. While a universally accepted definition may not be available in the literature, a working definition is required here. A widely-cited definition by Gray (1989) makes explicit reference to problems and the quest for solutions in defining collaboration as the "process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible". This study adopts this definition and deems it appropriate when dealing with either two or more individuals within an organisation, between divisions within organisations as well as across organisational boundaries.

2.4.2 MICRO-PRACTICES OF COLLABORATION

Despite the pervasiveness of collaboration in literature we know very little about how it unfolds in practice. This thesis asserts a need to move beyond assumptions that the correct collaborative processes can be applied and result in collaborative working to instead attempt to think of collaboration on its own terms, therefore taking a more nuanced understanding. This approach requires more consideration of micro-level practices in action to emphasise people's detailed activities (Tello-Rozas et al. 2015). A micro-practices approach to

considering the ongoing nature of collaboration is appropriate for two reasons. Firstly, such an approach attends to the identified lack of grassroots analysis of collaborative behaviour. Failure to understand and address what happens at this level of analysis carries the potential for a distorted view of stability as discussed above. As such, methods designed to support collaborative working that do not account for the circumstances at the micro-level cannot be expected to be complete. Secondly, a micro-practice approach aids an understanding of how collaboration is accomplished. Actors within organisations form intricate networks that simultaneously collaborate around more complex issues and understanding how this happens is crucial for understanding how actors organise themselves and the consequences this has for the organisation centrally (Tello-Rozas et al. 2015).

2.4.3 AN INSTITUTIONAL PERSPECTIVE

The literature reviews within Papers 3 and 4 (see Appendix C and Appendix D) explore fully the notion that a micro-practice approach can help to overcome some of the limitations that a view of collaborative practice as an applicable state of being bring and explores how a micro-level of analysis can lead to a fuller understanding of collaboration in flight. An ongoing consideration for this study is the mismatch between the industry's apparent desire to act collaboratively (as evident in corporate values and company strategies (see Table 1.1 on page 5) and the persistent adversarial, siloed, uncollaborative approach to service delivery (as discussed in Section 1.2) and the implications this has for practice as well as for theoretical conceptualisations of collaborative working. This review has not yet paid consideration to the manner in which industry level rhetoric to be collaborative translates into practice or how micro-level analysis links to macro institutional factors which is important if empirical micro-isolationism is to be avoided (Seidl & Whittington 2014). Similar discussions regarding the ineffective linking of local activity (micro-practice) with larger social phenomena (institutions) can be found in Feldman (2000) and Tsoukas & Chia (2002). There is a need to study the effects of the institutional environment on governance in order to devise contingent strategies (Delhi et al. 2010). The prevalent neo-institutional, macro views of organisations are concerned with meta-analyses that document antecedents and provide normative explanations but without empirically reflecting the reality of how actors engage with their institutional environment (Suddaby et al. 2013).

Institutional factors determine how actors in different settings seek different aims, for example actors in firms pursue profits, actors in political parties pursue votes, actors in

research universities pursue publications (Scott 1987). Scott (2008) sets out three institutional pillars that he uses to rationalise human behaviour: regulatory, cognitive and normative. Regulatory institutions (such as the law) are formally governed and enforced via commercial and financial incentives/sanctions. Normative (social conventions) and cognitive (largely informal and cultural) institutions are concerned with the socially shared and accepted behaviours that, when violated, are sanctioned with ridicule, isolation and ostracism (Henisz et al. 2012).

The study of institutional processes and institutionalisation arose as researchers sought to explain and predict commonality across organised systems (Osborn & Hagedoorn 1997). In the context of this study it is used to explain why a common practice of adversary between client and supplier exists in spite of a common rhetoric to be collaborative. As discussed (see Papers 1 and 3 in Appendices A and C), extant studies on collaborative working tend to consider a single aspect, such as the application of a collaborative tool, or the antecedents of a collaborative relationship. What we know about project management and organisation is shaped by a huge variety of actors and institutions and informed by the diverse orientations and interests that they represent (Bresnen 2016). Rather than emphasising a single aspect of collaboration an institutional perspective encourages incorporation of economic, technical and strategic rationalities and how these rationalities play against each other in different settings (Osborn & Hagedoorn 1997). As depicted earlier in Figure 1.2, institutional analysis requires the organisation to be seen as a whole as it is 'the nesting of these processes into the whole that gives them meaning' (Scott 1987, p.494). The link between institutional elements and their consequences must be specified (Zucker 1987) and to achieve this requires in-depth knowledge of micro-level consequences.

Attempting to connect the micro- to the macro-practices offers something to a theory that typically neglects internal organisational processes. Institutional theorists alter levels of analysis to enquire how institutional features shape organisational structures and to examine the determinants of institutional systems themselves (Scott 1987). Criticism is levelled at neo-institutional theory for its tendency to divert attention away from the multi-level nature of how new activity emerges and focus on the actions of the few (Lounsbury & Crumley 2007). Focus on powerful actors, the 'heroes' as Lounsbury & Crumley (2007) calls them, results in attention around the latter stages of practice creation, such as that brought about by the implementation of a new collaborative working approach. Greater attention ought to be

paid to the micro-practices of a wide and diverse body of actors in understanding the conditions in the build up to new practice creation (Tello-Rozas et al. 2015). Much like the discussion of static collaboration above (Section 2.3.2), institutions have a history; they cannot be created instantaneously. It is impossible to understand an institution adequately without understanding the historical process in which it was produced (Scott 1987). As discussed above, actors within organisations form intricate networks to navigate complex issues and understanding how they organise and the impact this has for the organisation is crucial. The concept of micro-practice observation to understand how change can be realised at the macro-level has been employed in the field of social movement literature (Tello-Rozas et al. 2015). In other fields, there is a rich body of literature about why institutional forces are important in forming and shaping organisational structures which in turn affects the micro-practices by signalling what behaviours are acceptable or otherwise. It mostly resides in business management research but is largely absent in CMR (Bresnen 2017) (with few examples such as (Phua 2006)). In this thesis, linking the two together in a single study offers novelty whilst practically unravelling the mismatch between collaboration rhetoric and practice.

A facet of institutionalisation is the process of instilling value: 'to institutionalise is to infuse with value beyond the technical requirements of the task in hand' (Selznick 1957, p.17). As such, institutionalised organisations have become more than just the producers of things, they are the product of interactions, receptacles of group idealism (Scott 1987). Institutional features of organisational environments shape both the goals and means of actors (Scott 1987) therefore it is important to understand what these features are and how they shape what actors do and why they do it. The behaviour and institutions to be analysed are so constrained by ongoing social relations that to construe them as independent is a grievous misunderstanding (Granovetter 1985), a further justification for the approach that aims to link the macro and the micro.

2.4.4 THE REPRODUCTION OF INSTITUTIONS

There are two distinct theoretical approaches to institutionalisation; the environment as the institution and the organisation as the institution. The former approach sets the wider 'state-project' environment as the creator of the institution. This 'statist' view asserts that organisations merely reproduce the institutions created within the environment (Zucker 1987). As such, organisations conform to the collective normative order in a sector wide

reproduction of basic practices The statist view which asserts that only external elements can be institutional creates theoretical obstacles, not least because the creation of new social order is problematic (Zucker 1987). The opposing theoretical approach is that institutional elements arise from within the organisation or from imitation of other similar organisations but not from the state or elsewhere (Zucker 1987). This concept of institution reproduction can help to explain the disconnect between rhetoric to be collaborative and the actuality of adversary. Institutional forces acting across organisational boundaries leads to the creation of a Proto-institution (Phua 2006) whereby firms operating within the same space over time become homogenous, particularly if conforming to the collective normative order is in the interest of long term survival (Zucker 1987).

This concept of proto-institution offers an explanation of why an industry so well known for its adversary might struggle to enact collaborative working despite a recognition of the potential benefits: *'a ceremony may be celebrated by people who no longer know its origin and would repudiate its first meaning if they but knew it. A once technically useful means of achieving some known end persists as an accepted and even sacred practice after better technical devices have been invented'* Hughes 1939 in Scott (1987, p.499). Common structures and patterns, such as the adversarial approach discussed, are copied over time and become "legitimate" and generally accepted practice (Osborn & Hagedoorn 1997). Even if the practice is perceived to be unfair and not supported by the individual, the individual will still behave as if they supported them (Zucker 1987). Despite calls for more integrated project delivery, uncollaborative working practices persist. The power to conform is far greater than the power of rhetorical messages that "we are collaborative". The fact that what we say and what we do are totally different appears in the work of Feldman (2003) and the change that would not occur. A recognition of a multiplicity of institutional sources saw institutional debates move away from *the* institutional environment (statist) to one of multiple institutional environments (Scott 1987). Harmony between multiple institutions is not a given; and there may not be consensus of which practices are appropriate for which activities. *'Any given activity…can have multiple meanings and can be the focus of conflicting and contradictory institutional definitions and demands'* (Scott 1987, p.500). A consideration of the multiple institutions that may be acting simultaneously may help to explain this mismatch between what is said and what is done.

2.4.5 INSTITUTIONAL WORK THEORY

In defining institutional work, Lawrence et al. (2011) reason institutions are the enduring elements of social life, (non-conformity with which is associated with some kind of cost) and work is a connection between effort and a goal. Therefore, institutional work is the physical or mental effort aimed at affecting an institution or set of institutions. Institutional work theory raises several reservations to the application of an institutional perspective to the study of collaborative working practice. Whilst valuable for making sense of organisational transformations as discussed above, institutional focus tends to be on macro-sociological understanding at the expense of the lived experiences of actors and, in particular, the connection between their lived experience and institutional structures. An emerging focus in more recent institutional work research is the interplay between actors and institutional structures. Although institutions are often analysed as fixed structures that help to explain behaviour and outcomes, it is increasingly becoming clear that institutional change and institutional stability depend on sustained human endeavour and effort (Beunen & Patterson 2017). Institutional work theory departs from the traditional concerns of macro-dynamics to consider the efforts of individuals to cope with the institutional structures they inhabit. Research on institutional work contributes to the theory at large by bringing the individual back into institutional theory through an examination of the relationship between agency and institutions. In doing so, institutional work theory is a rejection of the notion that agency is only interested in successful institutional change as it concerns itself with the daily complexities and unintended consequences, both successful and otherwise (Lawrence et al. 2011). In this sense, institutionalisation is variable, with different degrees of institutionalisation altering the cultural persistence which can be expected (Zucker 1977).

A large part of institutional work implies communication (Beunen & Patterson 2017). Institutions reflect shared beliefs to create, maintain, and disrupt institutions. To do so requires communications. Yet there has been very little attention paid to the social dynamics of communication in studying institutional work (Beunen & Patterson 2017). The adoption of a micro-practices approach, to study collaborative behaviour informed by institutional work theory, attends to this gap in knowledge. Moreover, careful consideration of the social image of structure, actors, and agency and of how micro-practice activity is coordinated to achieve institutional change permits an extension of advice beyond the theory to professionals that are

involved in institutional change processes (Lieftink et al. 2018). This possibility is of significant value for this study which seeks to make a practical industrial impact.

In the conceptualisation of collaboration as ongoing, emergence is a neglected area of institutional theory which tends to position institutional processes as nonlinear and non-deterministic, making any analysis concerned with how and why problematic (Lawrence et al. 2011). Institutional work on the other hand highlights how and why actors work to interpret and edit institutions, and how those actions lead to other intended and unintended institutional consequences. Tracing that work as it emerges via a micro-practices approach could provide insight into the relationship between forms of institutional work and patterns of institutional change and stability (Lawrence et al. 2011), further supporting an emergent conceptualisation of collaborative practice.

Through their study of institutional work that looks at both the actions taken by actors, as well as the resulting effects, Beunen & Patterson (2017) identify a critical need for attention to be paid to the fundamentally political character of institutional work, the cumulative effects of action taken by multiple actors, and communicative and discursive dimensions (Beunen & Patterson 2017). Put another way, we must attend less to the organisational products of institutional pressures and more to the processes by which institutional pressures are understood (Suddaby 2010). To realise this aim, researchers are encouraged to shift their gaze away from the "organisational field" and large-scale social transformations, and attend more closely to the relationship between institutions and the actors who populate them (Lawrence et al. 2011). Such studies would complement the small but growing body of institutional work research by investigating institutional projects at different units of analysis, like the micro-level institutional work (Lieftink et al. 2018).

2.4.6 MULTIPLE INSTITUTIONAL FORCES

2.4.6.1 REGULATORY

Without explicit links to institutional theory, CMR has attended to the regulatory institutions that govern collaborative working arrangements, in particular through the examination of relational contracting strategies (Gil 2009; Rahman & Kumaraswamy 2005; Zou et al. 2014; Ling et al. 2014). For instance, the enhanced collaboration experienced under alliance contract forms are reported to be as a result of the supportive environment (collaborative, knowledge sharing, organisational learning) and it is this supportive environment that

"switches on" the supportive framework of the alliance (Lloyd-walker et al. 2014). The literature review within Paper 2 discusses these perspectives more fully (see Appendix B). Despite the problems of adversary and strong advocacy for collaborative working practices, contractual models that operationalise that way of working (e.g. partnering/alliance contracts) have been implemented across the industry in moderation, at best (Phua 2006). This contradicts the positive attitude the industry has towards partnering (Phua 2006) and towards collaboration (see the number of firms that include it as a core value in Table 1.1 on page 5).

Collaboration is often depicted as a set of specific behavioural and contractual actions and obligations, each of which can be codified and evidenced as outcomes achieved (Suprapto, Bakker, Mooi, et al. 2015; Kovacic & Filzmoser 2014). This reduction of collaboration to a set of actions and outcomes says little of how actions propagate, or what happens to collaboration when progress inevitably deviates from the original intentions. Whilst literature does report successes resulting from collaboratively delivered projects, these studies are mostly concerned with one-off, mega projects which create very different circumstances to those of ongoing highway maintenance and management contracts. Collaborative working successes are in many instances reported only in isolated cases (Gadde & Dubois 2010). Furthermore, successful collaborations in literature are frequently concerned with projects governed by relational forms of contract, please see Paper 2 for a fuller discussion of this concept. Particularly relevant for this study is the persistence of the public sector, (the primary procurer of highway maintenance services) to employ non-collaborative forms of contract with no inbuilt incentives to collaborate (or sanctions for failing to collaborate). Research tells us that governance issues are affected by the incentives that motivate stakeholders to cooperate (or otherwise) with regard to polices (Delhi et al. 2010). Empirical research exists showing that issues arise where there are no incentives for the client to act in alignment with the project goals (Delhi et al. 2010), in support of more conceptual governance models (Garvin 2009). Where incentives are well structured, projects are reported to run smoothly (Delhi et al. 2010). For example, alliance forms of contracts see the alliance members commit to work in collaborative arrangements characterised by joint members sharing the risks in no disputes and no blame environments with contractual incentives linked to contractual behaviours (Lloyd-walker et al. 2014). Loosemore and Lim (2015) also pointed to the inherent unfairness of traditional procurement systems which serve to discourage firms working equally in collaborative relationships with an array of unfair practices adopted by UK main contractors towards their subcontractors. Most of the research aimed at unfairness

in the construction industry has taken place at an interpersonal rather than an inter-organisational level (Loosemore & Lim 2015).

Whilst important, the contracts used to govern the works are only part of the story. Financial incentives and sanctions can enhance regulatory governance but they can never fully subsume the sociological perspectives (Henisz et al. 2012). The adoption of legitimated elements (or regulatory forces) direct attention away from task performance; as attention is directed to serving legitimating functions, the core technical tasks are not performed as well as they might and the basic organisational objectives are also often deflected (Zucker 1987). *'In this view, the social [or cognitive] becomes mythical and implicitly dysfunctional in strict task performance terms, while the technical remains real and rational'* (Zucker 1987, p.445). It is acknowledged that asking individuals to behave in a trusting way (cognitive) is difficult when procurement frameworks and organisation cultures mean individuals would be exposing themselves to personal risk (McDermott et al. 2005).

A common definition of institutionalisation is that it is the process by which individuals accept a shared definition of social reality (Scott 1987). For example, to act with adversary might be independent of actors' own views (who may prefer non-adversarial approaches) but is accepted as "the way things are". The same could be applied to the enactment of regulatory elements. The non-relational forms of contracts employed to govern this type of work are independent of the rhetoric to be collaborative. The persistent adoption of such regulatory elements has led to adversarial isomorphism within the institutional environment (Zucker 1987). It therefore follows that institutionalisation is rooted in conformity and everyday taken for granted life, not via sanctions and incentives (Scott 1987). Entering into a contractual relationship of any kind is not solely a result of motivations for financial or competitive advantage but is heavily influenced by rational decision making to conform to institutional norms and expectations associated with the practice (Phua 2006).

2.4.6.2 COGNITIVE AND NORMATIVE

Attention to the normative and cognitive dimensions of institutions is the major feature of institutionalism and to take a sociological perspective toward the understanding of governance is reported to have the strongest purchase in micro-level studies (Henisz et al. 2012). Theory tells us that institutions are created when people formally and informally organise their time and space into regular patterns that impact their activities (Jia et al. 2017). The statist view says individuals and organisations reproduce the institutions they inhabit and

this presents a tricky theoretical dilemma. How are routines altered and new ones created if the institution is so great individuals automatically conform to it? Seo and Creed (2002) suggest that this question is partially answered by incorporating theory of agency, but doing so contradicts the central assertion of institutional theory which is that actors themselves are institutionally constructed (Seo & Creed 2002). This paradox is interesting in the context of collaboration when we consider that an application of some collaborative action or working method, governed by cognitive and normative institutions, is intended to alter organisational routines that the regulatory institutions govern. The question arises: how can actors change the collaborative environment if their collaborative actions are conditioned by the institution they wish to change? This suggests multiple institutional forces exerting pressure simultaneously, allowing tensions to arise; something not considered in the extant literature regarding collaborative working within construction.

2.4.6.3 TENSIONS

'People draw on a variety of structures to inform how they perform a specific routine and the same performances can give meaning to a variety of routines or processes for accomplishing work' (Feldman 2003, p.747). Simultaneously drawing on the organisational level values to be collaborative (which align with personal values to do a good job - see paper D) whilst performing activities in accordance with a traditional, non-relational, transactional contractual environment (where your loss is my gain) creates tension at the micro-level of project delivery. But tension does not have to be unmanageable. In a specifically collaborative context, London & Pablo's (2017) review of meta-analyses suggests effective collaboration should lead participants toward coherence (rather than conformity) to exploit the potential for innovation as a result of contradictory ideas. One-sided responses that seek consistency in response to organisational tensions may spur vicious cycles whereby negative effects are reinforced. Conversely, an acceptance of tensions that embraces both sides may create virtuous cycles leading to sustainable development (Szentes 2017). In line with Phua's (2006) discussion of partnering, when firms rationalise that benefits are to be gained by following an industry norm, in this case to act collaboratively, the presence of such practice will likely increase. Demonstrated by the frequency of its appearance in company literature (revisit Table 1.1) it can be argued that companies do rationalise the benefits of collaborative behaviour, but while the industrial institution to be adversarial dominates, any institutional force to be collaborate, will continue to be overshadowed. 'Institutional elements are easily

transmitted to newcomers, are maintained over long periods of time without further justification or elaboration, and are highly resistant to change' (Zucker 1987, p.446). Here the approach ought to be about managing the tension between conflicting institutions rather than an attempt to overpower or eliminate the force perceived as problematic. To manage a dynamic relationship between the potential conflict first requires a recognition of the tension between institutions.

2.4.7 PROBLEMATISATION

Theory tells us that institutions are created when people formally and informally organise their time and space into regular patterns that impact their activities (Jia et al. 2017). Individuals are said to automatically reproduce the institutions they inhabit. Whilst the behaviours of individuals are a product of the practice (in this case profit motivated service delivery) it is their actions that help to compose the practice (Ahrens & Chapman 2007). Social order exists only as a product of human activity; the actions taken, the interpretations of the actions and the sharing of the interpretation with others (Scott 1987). Repeating this over time is institutionalisation. The fragmented nature of the industry is therefore a socially constructed reality produced by the people interacting within that space. Institutional change as an endogenous process gives rise to the idea of performativity whereby individuals' performance of practice alters and reproduces a given practice (Feldman 2003). From a performative perspective the mechanisms of change and stability are the same; performances of routines create and recreate understandings of the routine while the understanding constrains and enables the performance which explains why routines change and also why routines do not change (Feldman 2003). To lay blame with the contract (regulatory institutional forces) for the adversarial nature of the relationship between client and service provider ignores the fact that the contract and the adversary attached has been interpreted by people and that interpretation has been shared, accepted and enacted. For collaboration to flourish, an alternative interpretation must be provided and shared, but first the existing interpretation and its enactment must be recognised as problematic.

Lounsbury & Crumley (2007) set out a process model for new practice creation which identifies the point at which new fields of practice begin to be developed, see Figure 2.2. The trigger point is the social recognition that existing practice is problematic. The continuation of a '*sacred practice after better technical devices have been invented'* (Hughes 1939 in Scott (1987, p.499)) would, according to (Lounsbury & Crumley 2007) only persist until such

continued use is problematised. The model does not account for what happens when irregularities in practice are socially recognised and the boundaries of practice are redrawn but attempts made to alter practice are then resisted meaning existing practice is not substantively changed. This suggests multiple and conflicting institutional logics (Sewell 1992). Who decides which institutional forces should be altered and which attempts to change are resisted? Is this even possible given the exaggerated ability afforded to actors to create and transform institutions (Lounsbury & Crumley 2007)?

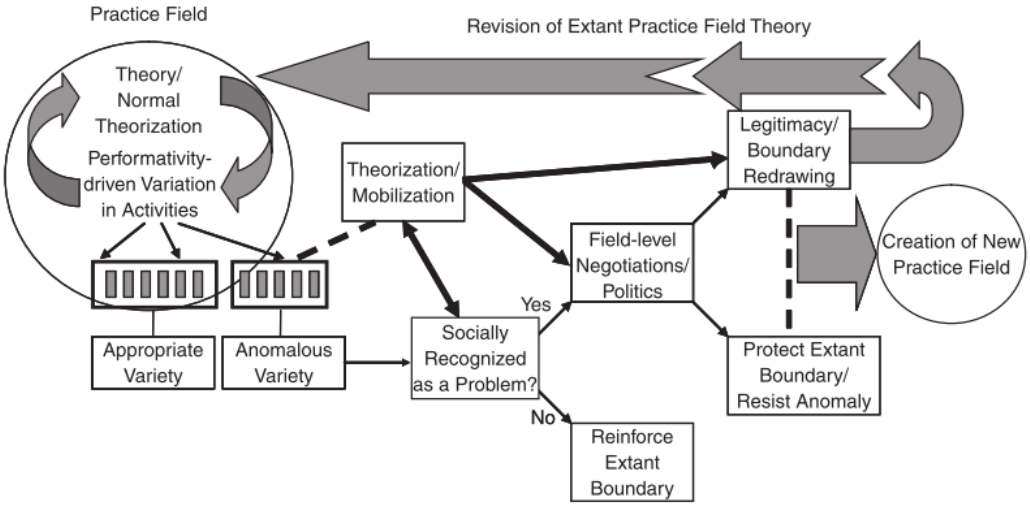


Figure 2.2 A process model of new practice creation (Lounsbury & Crumley 2007)

In the development of their processual model of change (please refer to Paper 3 for more discussion), Tello-Rozas et al. (2015) direct their attention towards peoples' detailed actions and interactions revealing where numerous collaborations coexist, informal authority usually prevails over formal and that such informal authority emerges dynamically from different meetings and events. Their model shows how low level collaborative behaviours transformed to a point where change could be affected at a grand scale; in their case, macro-economic policy. Their research reinforces Lounsbury & Crumley's (2007) notion that for change to occur the problem must be socially and collectively recognised by field level actors.

2.5 RESEARCH QUESTIONS

Informed from by the literature reviewed here, seven research questions were developed to guide the research activities and to satisfy the research objectives set out in Chapter 1.

1. How do tools and techniques support the facilitation of collaboration for performance improvement?

This question seeks to uncover what the Sponsor organisation does already, how do they do it and why? How effective are current practices?

2. How does contract governance influence collaboration?

   In an industry of adversary this question is intended to discover how contracts affect the tools and approaches adopted? What are the regulatory constraints affecting service delivery?

3. How are collaborative relationships managed to support service delivery?

   How does human interaction influence the enactment of tools and techniques designed to enhance collaboration? What are the relationships like within the Sponsor organisation and how are they managed?

4. How does collaboration influence project performance?

   Where a more collaborative approach to service delivery is adopted, is the performance of the team enhanced?

5. How is commercial strategy translated into highway maintenance service delivery?

   How is commercial strategy operationalised and what are the implication for collaborative working?

6. How is collaborative working enacted during project delivery?

   Can collaboration mitigate structural barriers to project delivery? In an environment of non-relational project governance arrangements, how can a more integrated delivery model mitigate adversary?

7. How can collaborative working practices be managed better?

   Can support for collaborative working be designed to better account for the unique circumstance in which it occurs?

2.6 SUMMARY

This chapter has provided an overview of the relevant research considered for this study. In addition, the literature review sections of the five papers appended to this thesis provide further theoretical positioning. Having drawn on institutionalism, and more specifically,

institutional work theory this review has outlined the benefits an exploration of collaboration as an emergent phenomenon through this theory can bring about. Going forward, this study will demonstrate why the notion that collaborative working practices can be applied exogenously to projects is flawed as it asserts the need to see collaboration as an ongoing journey of accomplishment, shaped by underlying institutional forces. If the notion that institutions are powerful instruments of cognition are to be believed, there must be effort spent to research how institutional logics are understood at the individual level (Suddaby 2010) and this literature review has set out the theoretical framework within which this study will unfold. The literature review ensures the research adds to the field of knowledge with novelty and the learning from this review provides the foundations upon which the research questions for this thesis were developed. The research map provided previously in Figure 1.3 shows how the research objectives are supported by these research questions. Research questions are central to the process of real world research and how you get the answers to these questions shapes the design of the research (Robson 2011). The following chapter will go on explain how these questions have informed the research design methodology.

3 RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter provides details of the research methodology employed and the influencing considerations. First, methodological considerations are discussed before the chapter moves on to outline the specific research methods used together with justifications for their selection and explanation of how the EngD is the ideal vehicle for a study that requires the researcher to be immersed in the case. Details are provided of how the methods employed align with the research objectives. Further details of the methodologies used for each research output can be found in Papers 1-5 in the appendices and Figure 1.3 (page 10) summarised how these papers fit within the structure of this thesis.

3.2 METHODOLOGICAL CONSIDERATIONS

Methods are not just tools; they are linked to the way the researcher envisions connections between society and how it should be investigated (Bryman & Bell 2011). As well as considering how such personal traits influence alignment with epistemological and ontological viewpoints, consideration must be paid to how such traits affect the selection of appropriate research methods to make best use of those traits. In this case the Research Engineer (RE) finds it easy and enjoyable to build rapport and working relationships amongst colleagues. As an embedded researcher within the Sponsor organisation the RE was able to regularly attend meetings, facilitate meetings, and interact with organisation personnel on a day to day basis. Coupled with a willingness and ability to be flexible and adaptable the RE was able to assimilate herself with different teams within the Sponsor organisation whilst moving around the business to cross reference findings in one area with observations in another. This ability supported the RE to seize data gathering opportunities when they presented themselves. Bryman and Bell (2011) agree the choice of methods may be influenced by the RE's enjoyment of face-to-face contact over, say, methods that confine them to a computer screen. The former may see a researcher opt for methods that rely more heavily on personal interaction. Whilst it may not be feasible to keep the RE's personal values totally in check (Bryman & Bell 2011) it is important to consider how they may affect the research because successful studies involving the collection of data from people depend primarily on the interpersonal skills and authenticity of the researcher (Marshall & Rossman

1999). In this case, the personal attributes described permitted the collection of data in the form of observations in return for her support with business actives such as workshop facilitation, process map review and report writing.

In forming the research design it was important to consider factors beyond the collection and analysis of data and give thought to what Harty & Leiringer (2017) call external pressures of industry, government, funders and other consumers of research outputs. This is particularly relevant for an EngD research located away from the academic institution and embedded within the industrial setting. These challenges are discussed further in a reflexive manner in Section 3.5.1. As such, there are several practical issues that influenced the application of the methods selected. Outputs of this study must satisfy the needs of the EngD programme whilst at the same time being relevant for industry. As such, validation by industrial practitioners was crucial.

3.2.1 ONTOLOGY

Consideration was paid to two opposing ontological positions: objectivism and constructionism. Researchers that agree social entities hold an external reality beyond our influence that should be studied in isolation identify with an objective ontology. An alternative position suggests instead that social entities be considered as constructed by perceptions and actions of others (Bryman & Bell 2011). Given the purpose of this study was to understand how processes, relationships and contracts influence the ways people collaborate to ultimately deliver a service through an examination of micro-practices, a constructivist stance was adopted. Constructionism asserts that social phenomena are continually shaped by social actors and categories of organisation and culture are not pre-given (Bryman and Bell, 2011). Much like the hospital environment described by Strauss et al. (1973) in Bryman & Bell (2011), the social order of the case study organisation is in a constant state of change because agreements (contracts and projects) are continually being terminated but also established, renewed and revised. Being preoccupied with the properties of organisation (rules, organisational charts, roles etc.) neglects the fact that order in organisations needs to be accomplished every day and are in a constant state of revision.

3.2.2 EPISTEMOLOGY

The design of an appropriate methodology requires consideration of the underlying epistemological assumptions. Furthermore, it is important to know the RE's own role in the

research process: how data will be collected and the theoretical perspective that will inform their interpretation of it (Bryman & Bell 2011). What the RE regards as acceptable knowledge, particularly with regard to whether or not the social world should be studied according to the same principles as the natural world (Bryman & Bell 2011) has implications for the research design. Bryman & Bell (2011) discuss three broad epistemological positions:

Positivism – the collection of data to produce laws and systematic generalisations. Social reality is objective and testable. Theories and hypotheses can be tested independently and law like relations can be applied to predict outcomes (Susman & Evered 1978).

Realism (critical/empirical) - critical research that aims to challenge the prevailing assumptions and social conditions. Real objects exist independently of our knowledge of their existence.

Interpretivism – the subjective meaning of social value. People and their institutions are fundamentally different to the natural sciences (Bryman & Bell 2011). This significantly contrasts with positivism.

In this study, the RE aligns with an interpretive epistemology and as such the aim, objectives and research questions of the study reflect this. Unlike positivist research that does not 'mean' anything to the research subject, the observations and meaning constructed should in this case have relevance for the people living within it (Bryman & Bell 2011), particularly as this study seeks to provide a positive outcome to the organisation in which the research is to be conducted. A positivist stance would be inappropriate for generating knowledge for use in solving problems that members of organisations face (Susman & Evered 1978).

3.3 RESEARCH STRATEGY

Whilst the analysis of research data can take one of two forms (quantitative or qualitative), it tends to be the case that an interpretivist and constructivist orientation leads to the formulation of a qualitative research design (Naoum 2007). Rather than deliberately confining the research design to one methodology and adhering to the rules and processes associated, in this study the RE took a pragmatic approach, informed by the external pressures discussed previously (most notably the frequent changes in industrial supervision and the evolution of organisational strategy), to handle the data, apply good analysis and present robust findings. That said, the considerations explained here consistently point

towards qualitative research design. Qualitative research is an appropriate choice when attempting to identify new theoretical propositions or managerial actions, where the researcher is not knowledgeable of the phenomena under study, and where efforts are to be directed toward understanding the participants, their operations and activities by spending considerable time in the field of study (Lee 1999). Furthermore, this study involves variables that do not lend themselves to experiments and the associated quantitative methods of research. Whilst a qualitative approach allowed the RE to get close to the people being studied, the adoption of this research design had deeper implications for the research beyond the collection of data. The objectives of this study call for organisational and human processes to be investigated over a lengthy period of time to understand how these entities are organised and constructed by the participants themselves in order to leave the reader with a sense of "truth" – a defining characteristic of qualitative research (Lee 1999). A qualitative strategy allowed the RE to design a study that employed a variety of data collection techniques to meet the research objectives. Studies of this type have value for research that (Marshall & Rossman 1999):

- delves into complexities and processes
- explore why policy and practice are at odds
- is concerned with informal and unstructured linkages
- investigates real, as opposed stated, organisational practices

3.3.1 ACTION RESEARCH

The term action research was introduced by Kurt Lewin in 1946 to denote a social research approach that linked theory with changing the social system through the researcher acting in or on the social system (Susman & Evered 1978), and playing an active role in designing and implementing change with the ultimate objective to improve practice in some way (Scanlon 2000). It is recognised that the RE's involvement in the collection of data influenced the interactions and behaviours of the participants, adding to the complexity of the research (McNiff & Whitehead 2002; Baldwin et al. 1999). Despite the challenges such an approach brings, it was considered appropriate for this study where a researcher from a professional background has identified a problem and wishes to investigate and propose changes for improvement (Naoum 2007). Furthermore, action research is usually a collaborative and co-creative learning process that promotes the idea that the researcher can move into relationships with others to foster innovation together and in doing so transcend the position

of an observer of change performed by others to be amongst the actors working for change (Thorkildsen & Ekman 2013).

To address the criticism levelled at past research for treating collaboration as an applicable technique that can be managed through a framework of formalised processes meetings, it was essential that this study go beyond the preconceived ideas of what collaboration is to investigate how collaborative working practice emerges within project settings. To be immersed in the organisation to observe collaboration as it plays out in practice and over time could only be achieved through action research. Further, the EngD programme which places the researcher within the industrial setting, is the perfect vehicle for enabling this type of study which could not be achieved from a distance.

Whilst action research is criticised by those who subscribe to more traditional scientific approaches as lacking in scientific rigour (Scanlon 2000), it is important here to note that factors that legitimise action research in science are based in philosophical traditions that are different from those that legitimise positivist science (Susman & Evered 1978). Alvesson (2003) in Bryman & Bell (2011) draw a distinction between a *planned-systematic* approach to data collection and an *emergent-spontaneous* one. The latter might appear to be unscientific but it has advantages. An action research framework permitted the RE to pursue a pragmatic and opportunistic approach to the research. As Chapter 4 will go on to explain, the three projects/studies selected for inclusion in the study (see Figure 3.3) evolved as the interventions revealed findings, leading to further interventions requiring testing. As such, there was no "screening" of case study nominations (Yin 2014). Rigour was derived from the cyclical and iterative nature of the practice developed, see Figure 3.1, made possible by the fluidity with which the RE was able to move around the Sponsor organisation whilst taking hold of opportunities to make an impact at each stage of the journey. The three studies included in this research emerged as the journey progressed. Because action research has qualities that contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework (Rapoport 1970) it was deemed a suitable choice for this study and acted as a driving force for the rest of the methodology.

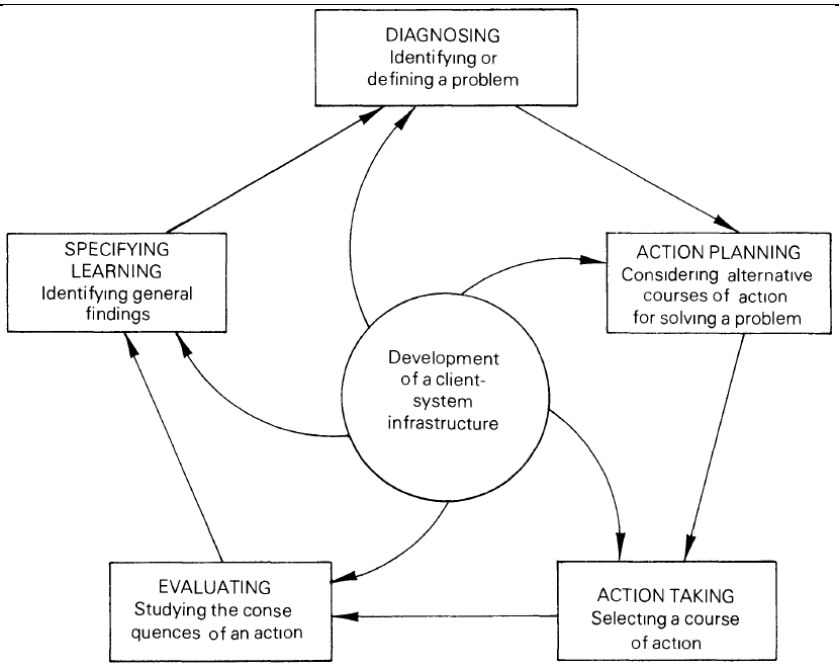


Figure 3.1 The cyclical process of action research (Susman & Evered 1978)

3.4 ADOPTED METHODS

The most suitable methods for this study were examined and the discussion that follows outlines the merits of these and the justification for their selection bearing in mind the considerations discussed above. For a study with the concept of collaboration at its centre it was considered appropriate to select methods that not only permitted the observation of collaboration in flight but that also (at appropriate times) facilitated a collaborative approach to data collection and analysis. The dynamism of the industrial context and the accessibility of research sample also affected which methods were employed at different times. 'Social research is by its very nature a messy process' (Scanlon 2000, p.9) and planning therefore was essential to provide a methodology rigid enough to mitigate the risk of scope creep detracting from the core aim of the study but fluid enough to allow the RE to adapt to research opportunities as and when they arose to make best use of the data available. A key part of this required careful consideration of the time available. The following sections explain further how the selected methods supported the research aim and objectives and provided answers to the research questions.

3.4.1 LITERATURE REVIEW

Any researcher wishing to advance knowledge in a field must begin with an investment in time and effort investigating the work of others to understand what has been achieved and what remains to be achieved (Birmingham 2000). The literature review undertaken at the

outset of this study informed the generation of the research questions and laid the foundations of knowledge for the subject field in general. Whilst the review of existing literature was the first and arguably most important step in the data collection process, it continues to inform as research progressed. A review of the literature provided the basis for an understanding of two key topics (micro-processes and institutional theory) which was used to satisfy the objectives. In addition, each of the papers that feature in the appendices required their own review of the literature. A strong and clearly defined research methodology ensured that this study builts upon the knowledge that exists and adds value to the field.

3.4.2 CASE STUDY RESEARCH

A case study was chosen as the most appropriate over all research method to meet the aim and objectives and address the research questions. When trying to harness local management efforts, a detailed case description is considered the best approach to study it (Ahrens & Chapman 2007). An additional benefit of case study research is the ability to collect data from multiple sources and use triangulation for purposes of corroboration and explanation and to confirm a result through two or more research methods. As such, any uncertainties in the results are greatly reduced (Bryman, 2010). This convergence of evidence is depicted in Figure 3.2. To further increase reliability of the research, a case study protocol was developed containing general procedures and rules to guide the collection of data (see Appendix F). Further details of the research design are provided on the following pages and in particular, Table 3.2 sets out the three studies included in this thesis and provides details of the specific methods employed for each. For a reflective discussion of validity and reliability, refer to Section 6.8 on page 117.

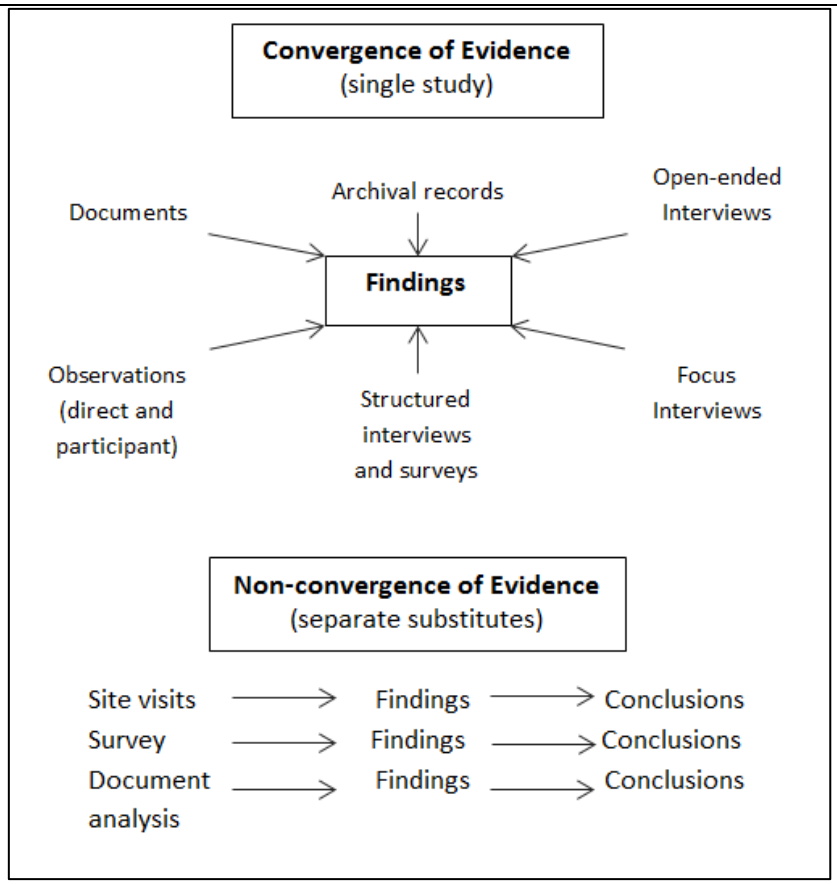


Figure 3.2 Convergence and non-convergence of multiple sources of evidence (Yin 2014)

Case studies often include organisations undergoing change or stress and the descriptions of this change provides a window into these explosive, sporadic and infrequent events. Such descriptions are said to be unhelpful for theory generation which is best founded on regularities; regularities that are missing from many case studies (Weick 1969). As with previous studies, such as Tsoukas & Chia (2002), in this case, frequent change was certainly a normal condition of organisational life.

Figure 3.3 depicts the location of the study within the Sponsor organisation. This single case study is located within a single division of a single company. The units of assessment are three separate projects (Study 1, 2 and 3), each governed by separate contracts, within the highways division. Each of the projects was led by an account director, supported by a senior leadership team which in turn directed the operational work streams below. Although the three studies belong to a common organisation, the Sponsor organisation at group level did not feature as a unit of assessment in the research because the research questions were concerned with developing an understanding of collaboration at the point of project execution. In addition, each of the three studies was geographically separated from the central group functions of the Sponsor organisation. As such, each of the three studies are considered

to have their own project identities, further reinforced as a large proportion of the project staff TUPE from service provider to service provider (see Paper 2, Appendix B) and they are therefore considered to work more for the project/study than the Sponsor organisation.

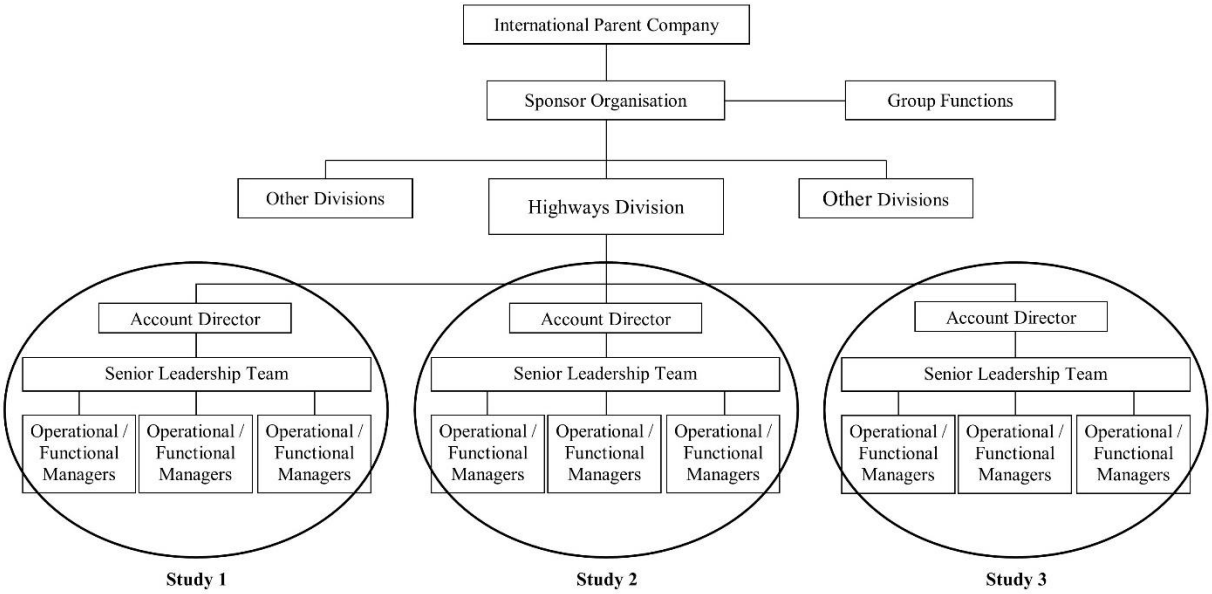


Figure 3.3 Location of studies with the Sponsor organisation

3.4.3 OBSERVATION

In line with the adopted strategy, participant observation, unstructured interviews and life histories are normally regarded as qualitative research methods (Scanlon 2000). To gather data within the Sponsor organisation required the selection of appropriate methods to gain the confidence of participants. For example, participants might be unlikely to honestly reveal how their behaviours intentionally deviate from the prescribed way working via a questionnaire survey. To illicit such sensitive information the RE chose to act as participant researcher to build rapport and trust with the study participants. Qualitative researchers commonly distinguish four types of participant observer (Lee 1999):

1. *Complete participant*: the researcher participates fully but covertly as a member of the organisation, being careful to disguise any research intention whilst making relationships with other members.
2. *Participant as observer*: the researcher participates fully as a member of the organisation and make relationships with other members with overt research intentions.

3. *Observer as participant*: the researcher participates as a member of the organisation with overt research intentions but makes no effort to build relationships or nurture ties with other members (although they may occur).
4. *Complete observer*: the researcher remains in the background and make observations with minimum intrusion. Relationships with other members is unlikely.

In this study the RE assumed the role of a participant as observer with the intention to observe existing practice and affect change. To achieve this, the RE assumed a variety of roles within a fieldwork situation and participated in the actions being studied (Yin, 2014). Benefits of this approach included access to groups and events that would otherwise have been inaccessible to study and ability to perceive reality as someone on the "inside" described as 'invaluable in producing an accurate portrayal of a case phenomenon' (Yin, 2014). In addition, observations made within an action research framework, gave participants a greater sense that positive change would occur and therefore their involvement in the study was of value to them, their team as well as to the study. The interpersonal skills and abilities of the RE (as discussed above) were important here.

The RE was a participant as observer in the organisation for four and a half years from October 2011 to June 2018 (excluding two breaks: one of 12 months and another of 15 months – see Figure 4.1). Throughout this period the RE had extensive and intensive contact with members of the contracts under investigation as well as considerable contact with others across the organisation. In general, the RE spent around 40 hours per week as an embedded RE within the organisation working regular office hours Monday to Friday and took annual leave in line with that of employees of the Sponsor organisation. The RE had a desk within the company, access to archival documents the same as any other employee and was granted an organisational email account and could communicate with other employees as one of them. The common assumption was that the RE was an employee of the firm but wherever possible the RE's position was disclosed. For instance, the RE's email signature states "Research Engineer" and the RE would be introduced at all meetings attended as a doctoral student attached to Loughborough University undertaking research within the company.

The major challenge with a participant role is potential for bias. Furthermore, such a role may require too much attention resulting in the participant-observer not having sufficient time to take notes or raise questions as a good observer might (Yin, 2014). A further challenge for participant observation is locating and gaining access to a setting to gather observations on

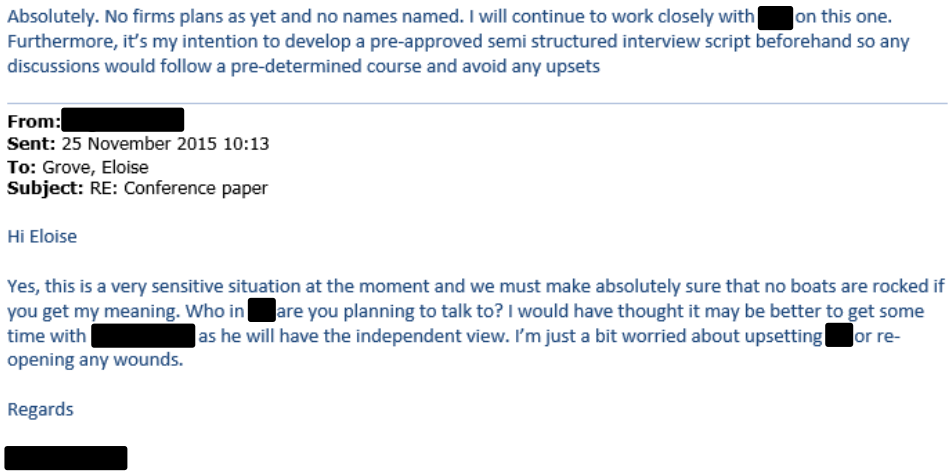
the chosen topic (Morgan 1997). This was overcome due to the Sponsor organisation arrangement of the EngD programme. Moreover, the senior positions held by the industrial supervisors enabled the RE to participate in countless meetings (formal and informal) with senior managers over the research period. As such the RE was privy to many discussions of a strategic and confidential nature. As well as formal discussions, the embedded nature of the research exposed the RE to many unsolicited conversations in the form of company gossip and "off the record" accounts of participants' observations and reactions to daily life told either directly to the RE or overheard. Much of the data informing this research is derived naturally and not through formal interviews and surveys. Participant observation of this type is the distinguishing feature of other ethnographic studies of micro intra-organisational processes (Dougherty 1992; Orlikowski et al. 1995; Ahrens & Chapman 2007; Lounsbury 2001). Many of the quotes used in this study are taken from field notes made during observations as well as from interviews that were audio recorded and transcribed.

3.4.4 INTERVIEWS

The literature review has provided a solid basis for the development of a clear research strategy and it was intended that the findings of the observations made during action research would lead to the formulation of topics for further and deeper investigation. As well as being one of the most important sources of case study evidence, (Yin 2014), interviews were the most effective way to unearth the more intricate research findings.

Relatively unstructured, conversational style interviews that gave a sense of openness were employed. Care was taken to include individuals from all hierarchical levels, a range of different functions and areas of the business. Some individuals were interviewed more than once. Sometimes interviews were exploratory and at other times, confirmatory. To support the continuous real time data collection retrospective interviews and expert verification was required. Interviews were transcribed verbatim by the RE to minimise the risk of the written language decontextualizing the meaning of the spoken (Lee 1999). When conducting and analysing interview data consideration was paid to the notion that actors' accounts of their own activities are categorically unlike the complex cognitive processes they go through to accomplish them; doing and saying are fundamentally different (Ahrens & Chapman 2007). Therefore, the use of multiple methods to triangulate the data is prudent (Lee 1999). The research made use of industrial superiors to validate interpretations and opinions of other people and events, gaining their insight related to certain events and used this information as

the basis for further inquiries. The more a participant assists in this manner the more their role might be considered an "informant" rather than an interviewee. Key informants are often critical to the success of a case study but the research must be cautious about becoming overly dependent on an informant and the potential for reflexive influence the informant may have over the researcher (Yin, 2014). Thematising (Lee 1999) was done in writing prior to interviews, not only in order to prepare for and support the interview technique but to gain approval from Industrial Sponsor to carry out the interviews with staff members (for example, see Figure 3.4) to provide assurance and confidence that the organisation would not be compromised, particularly when interviewing clients side staff. Quotes taken from interviews are inserted throughout this study to give credibility to the research.



Absolutely. No firms plans as yet and no names named. I will continue to work closely with [redacted] on this one. Furthermore, it's my intention to develop a pre-approved semi structured interview script beforehand so any discussions would follow a pre-determined course and avoid any upsets

From: [redacted]
Sent: 25 November 2015 10:13
To: Grove, Eloise
Subject: RE: Conference paper

Hi Eloise

Yes, this is a very sensitive situation at the moment and we must make absolutely sure that no boats are rocked if you get my meaning. Who in [redacted] are you planning to talk to? I would have thought it may be better to get some time with [redacted] as he will have the independent view. I'm just a bit worried about upsetting [redacted] or re-opening any wounds.

Regards

[redacted]

Figure 3.4 Example of sensitivity applied to interviews

3.4.5 FOCUS GROUPS

Participant observation and focus groups share an overlapping interest in group interaction (Morgan 1997). Observations (discussed above) provided data on the micro- social interaction amongst project participants whereas the focus groups provided data about the discussion of these observed practices to shed light on why such behaviours were present and what impact these had. Bryman and Bell (2011) distinguish between focus groups and group interviews. Unlike Frey & Fontana's (1991) exclusive view of focus groups as a specific form of group interview, focus groups were employed in this study in an inclusive manner which aligns with Morgan (1997, p.6) who says 'it is not possible to draw a line between formal and informal group interviews in a way that defines some as focus groups and the others as something else'. Focus groups were employed because the RE recognised participants may provide different accounts within a group setting than they would during a

one to one interview. It is important to note that one or the other is not right or wrong or accurate or inaccurate but products of those contexts (Smithson 2000). Given the focus of the research on collaborative activities, the focus group was an appropriate and valuable method for obtaining first-hand experience and knowledge of collaborative working in practice. Furthermore, the group setting was expected to facilitate the co-creation of knowledge (see Figure 3.5), help identify sub-topics, or new topics and generate data related to a theme imposed by the RE and enriched by the groups interactive discussion (Lee 1999). The interactions that take place within the focus group is their distinguishing feature (Smithson 2000). The focus groups conducted here provided the RE with exposure to the culture of the contract, the range of the participants views and the attitudes of the key members within the group (Lee 1999).

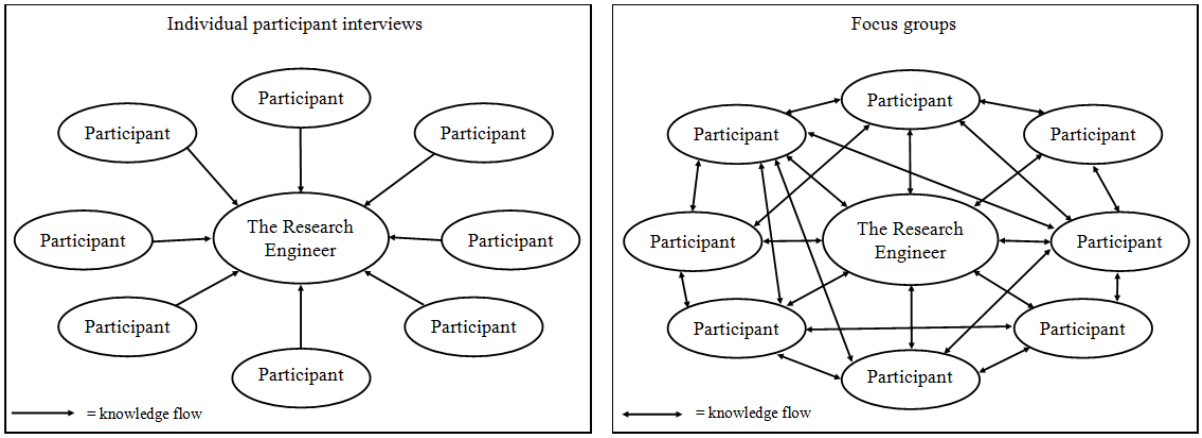


Figure 3.5 Knowledge flow in interviews vs focus groups

An attractive benefit of the focus group setting was a large amount of interaction in a short amount of time on a given subject. Whilst somewhat unnatural, the role of the moderator (in this case the RE) allowed the discussion to be controlled to keep to time and topic. Whilst controlled by the RE, the group setting allowed the diffusion of the interviewers influence on the interviewees (Frey & Fontana 1991). The structure to the group sessions renders them potentially reproducible and the theoretical generalisations are more likely to be feasible than empirical generalisations (Sim 1998). That said, measuring strength of opinion is problematic for data gathered via focus groups, particularly when comparing data across different focus groups. Interferences can be drawn regarding the presence of data but not on the strength (Sim 1998).

3.4.6 DOCUMENT ANALYSIS

Used in conjunction with other research methods, documentary analysis provides Information and insights; supplementary research data that can be valuable additions to a knowledge base and support data gathered through interview (Bowen 2009). Bowen sets out five purposes of documents in research, all of which support the use of this method in this study. Firstly, documents provide context to the study area. Second, documents can help to identify further research questions and topics of investigation. Thirdly document can provide additional data for studies. Fourthly, unlike observations and interviews, documents allow researchers to track and corroborate changes and developments over time. Fifthly, documents can be used to corroborate data gathered via other means, such as interviews and observations.

Documents belonging to the Sponsor organisation are to be reviewed in support of the study, in particular:

- Process maps and activity notes
- Procedure documents and guidance
- Contract documents, including obligations and specifications
- Company reports, strategy documents and annual reports

3.5 RESEARCH DESIGN

In determining which methods to use and when requires consideration of the form the research questions take. Table 3.1 summaries the most appropriate methods recommended for use when answering a variety of research question types. Table 3.2 shows how these methods were used in each of the three studies included in this research, whilst Table 3.3 sets out the methods chosen to meet the objective of this study. It is important to note that the design of this case study research does not follow the case study design as discussed by Yin (2014) which would typically see all units of analysis within a case study adopting the same research methods in order to permit comparison. Instead, this study adopts alternative configurations of methods, selected to best suit the study in question (see Table 3.2). The objective here was not to compare and contrast the findings of study 1 with studies 2 and 3, but to use the findings from study 1 to inform the action research of the subsequent study. For additional details regarding the context of the three studies, see Figure 4.2.

Table 3.1 Research methods and their relevance

Method	Form of question	Able to control behaviours	Suitable for current or past events	Investigation of human or non-human subjects
Literature review	How? Why? When? Where? How much? Who?	n/a	Past	Both
Case study	How? Why?	Yes	Both	Both
Participant as observer	Who? When? How?	No	Current	Human
Interviews	How? Why? When? Who?	Yes	Both	Human
Focus groups	How? Why? When? Who?	Yes	Both	Human
Document analysis	When? Where? Who? How?	No	Both	Both

As an embedded researcher, participant observation was consistently employed as a method for data gathering, but often other methods took precedence. The purpose of Objective 1 was to explore the processes for delivering highway maintenance and management services and understand how services are provided in order to appreciate the state of play within the case study organisation. This objective required a discovery of who does what, when they do it and how they go about it. For this objective, the RE was less concerned with controlling behaviours and therefore participant observation was chosen as the primary method, supported by interviews for further probing. Objective 2 sought to describe the structural constraints of the governance arrangements and comprehend how these constraints impacted and shaped the processes observed in Objective 1. To achieve this required questions that asked why people acted in certain ways and how behaviour compared to documented processes and therefore a case study was chosen as the most appropriate method. Objective 3 was concerned with understanding how relationships are managed to provide social context to the processes for delivering highway maintenance services and to the enactment of contractual arrangements. The work undertaken to achieve this required the implementation of an improvement initiative, designed by the RE with data gathered from focus group sessions. Therefore, action research was employed as the primary method, supported by focus groups. Objective 4 required the development of practices to enhance collaborative working for the benefit of project execution. A deep understanding of who does what

activities and why they perform activities differently in different scenarios was crucial to the practice development. For this reason, focus groups continued to be the most appropriate method. To enable an evaluation, the practice required testing in a live project environment and for this reason a case study was selected as the method with which to understand how strategy is translated for operational delivery. Objective 5 was to provide an evaluation of the impact of the research on the case study organisation. To appreciate how, when and why the practice developed in object 4 had an impact interviews were conducted, again supplemented with observations in a case study setting. Table 3.2 consolidates the methods discussed above across all five research objectives and shows how they was employed across the three studies and to what extent.

Table 3.2 Research methods used according to study

Methods	**Study 1**	**Study 2**	**Study 3**
Interviews	3	10	10
Focus groups: • Sessions • Participants	 - -	 - -	 31 80
Document analysis	Yes	Yes	Yes
Observation: • Duration • Meetings attended* • Actors observed*	 18 months 80 60	 12 months 15 20	 24 months 50^ 70
Literature review	Yes	Yes	Yes

*approximation

^excluding focus group sessions

Table 3.3 Research methods contained within the research design

Key:
P Primary method
S Supporting method

Objective		Research question	Research method						Output
			Literature review	Case study	Action research	Participant observation	Interviews	Focus groups	
1.	Explore the processes for delivering highway maintenance and management services	What tools and techniques are available for the facilitation of collaboration for performance improvement?	S	S	S	P	S		Paper 1 (Appendix A)
2.	Identify the contractual arrangements for highway maintenance and management	How does contract governance influence collaboration?	S	P	S	S	S		Paper 2 (Appendix B)
3.	Understand how relationships are managed for the maintenance and management of highways	How are collaborative relationships managed to support service delivery?	S	S	P	S	S	S	Paper 3 (Appendix C)
4.	Synthesise learning from objectives 1, 2 and 3 to design practices to improve project execution	How does collaboration influence project performance?	S	S	S	S	S	P	Paper 4 (Appendix D)
		How is commercial strategy translated into highway maintenance service delivery?	S	P	S	S	S	S	
		How is collaborative working enacted during project delivery?	S	S	S	S	S	P	
5.	Evaluate the impact of the practices	How can collaborative working practices be managed better?	S	S		S	P		Paper 5 (Appendix E) Thesis

3.5.1 REFLEXIVITY AND ETHICS

Table 3.3 set out a wide range of methods employed in this study, each of which offers different insights into the industrial research setting. Some might say the methods chosen to be used together in this study are fundamentally incompatible due to the alternative frames of reference drawn upon. For instance, participant observation draws on a frame of reference belonging to the researcher where as in an interview the frame of reference is that of the interviewee. As such the RE considered how the adopted research process might shape the data collected and the analysis of that data given the role and prior assumptions of the researcher. As a RE based in industry conducting academic research consideration was paid to whether or not the REs non-highway specific background would impact on participants' willingness to share their experiences or shape the interpretations of what was said, particularly during interviews. Being embedded within the sponsor organisation and being seen to undertake activities in support of the overall project objectives helped to remove some of the unease that a "outsider" researcher might create. Furthermore, the RE's professional

background in construction contracting provided her with a suitable vocabulary with which to converse with some confidence.

Furthermore, interviews and focus groups alike are performative (albeit in different ways) in the sense that participants release to the researcher what they choose and control and shape the data they impart. The challenge for the researcher is to be objective, particularly when alternative methods reveal contradictory findings. There are said to be three sides to every argument: yours, mine and the truth, and no one is lying (Evans 1994). But uncovering the truth involves a philosophical consideration of what is real. While it may not be possible to reconcile the dilemma of which data set takes primacy and it is important that the researcher acknowledge this dilemma and make allowances in the research design to mitigate the bias this entails. To this end, the embedded nature of the RE within this study provided endless opportunities for discussions with industrial supervisors, as well as other employees within the sponsoring organisation to unravel any contradictions. Oftentimes, it was the contradictions themselves that were of interest; choosing which version of events was the truth was not necessary. Section 6.8 on page 117 sets out the limitations of this study and discusses how the factors discussed here impacted on the final output.

Is it important to note here that despite the limitations of the data collection techniques employed, it was necessary for the RE to act with pragmatism to gather the material required for analysis. As an action framework implies, the RE was responsible for initiating the majority of the forums where many of the observations of this study took place (collaborative planning meetings, focus group workshops and so on that Chapter 4 will go on describe). Whilst the RE recognises the impact her presence had on the data collected, the interventions observed would not have happened otherwise.

An ethical checklist was completed for this study. All interviewees gave informed consent before taking part. Where informed consent was not appropriate, for instance project meetings attended by the RE for observational purposes, the RE's role as a researcher and links to Loughborough University was explicitly mentioned.

3.6 SUMMARY

This chapter has highlighted the methodologies available to the RE and provided details of the methods selected alongside justification for the methods given the context of this study.

Table 3.3 provides an overview of the methods chosen to meet the objectives of the research. The chapter that follows provides a review of the research undertaken.

4 RESEARCH UNDERTAKEN

4.1 INTRODUCTION

This chapter presents the activities undertaken to meet the objectives outlined in Chapter 1 and restated below. To recap, these objectives were formed to meet the aim 'to establish how collaboration can support the delivery of highway maintenance and management services through a consideration of the contractual arrangements, the management of relationships and the application of tools and techniques'.

Objective 1: Explore the processes for delivering highway maintenance and management services

Objective 2: Identify the contractual arrangements for highway maintenance and management

Objective 3: Understand how relationships are managed for the maintenance and management of highways

Objective 4: Synthesise learning from objectives 1, 2 and 3 to design practices to improve project execution

Objective 5: Evaluate the impact of the practices

To guide the research towards meetings these objectives, the literature review helped to identify seven research questions and these are recapped at the start of each of the sub-sections that follow.

This four-year research project was completed over a period of nearly seven years as shown in Figure 4.1. The diagram illustrates how the objectives align with the research approach. The discussion that follows deals with the research objectives one by one and describes the work undertaken at each stage. Figure 4.2 provides an overview of the three studies discussed and their alignment to the research objectives.

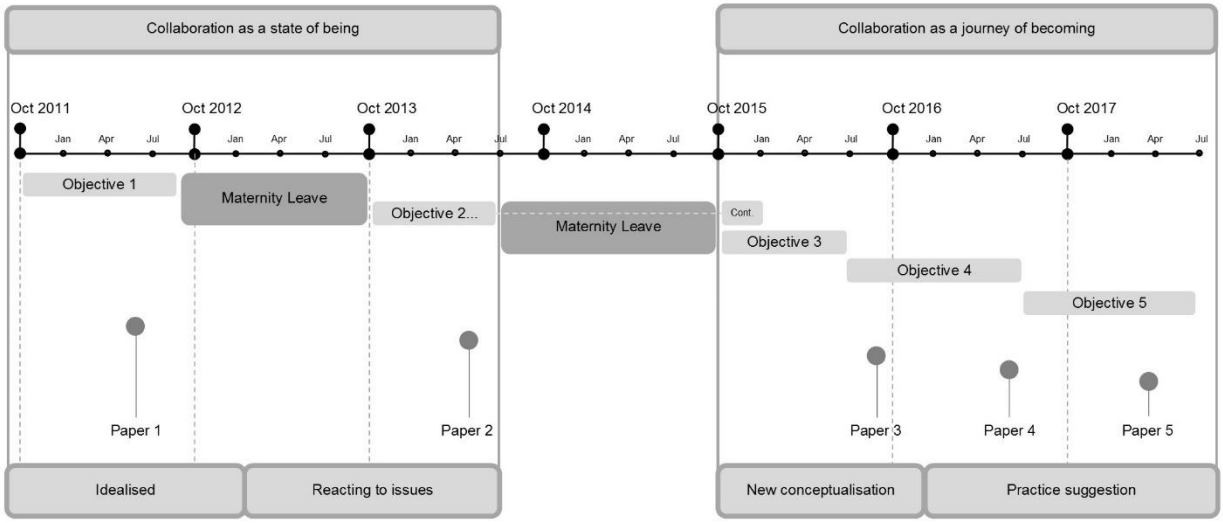


Figure 4.1 Research timeline

As set out in Section 1.7 (p.11), the ontology of the research shifted as the objectives of the study began to be met and the focus moved towards a reconceptualization of collaboration as an ongoing accomplishment. This chapter will go on to reveal how the completion of Objective 1 promoted the rejection of the common conceptualisation of collaboration as something that can be applied to any given scenario, with the work towards Objective 2 affirming this stance through an examination of regulatory forces. Early findings began to suggest macro factors were acting to influence the enactment of collaboration at the micro-level. Literature supported this view that macro-level and micro-level are inextricably intertwined, where each actor perceives and describes social reality by enacting it and in doing so transmits it to other actors in the social system (Zucker 1977). Figure 4.1 shows the point at which this reconceptualization was introduced. Informed by the literature, Objective 3 took a micro-practice approach to give order to the often mundane and everyday routines and conversations that were observed through the research whilst searching for commonalities in micro-level activities, signalling the presence of institutions acting to shape collaborative behaviour as it emerged.

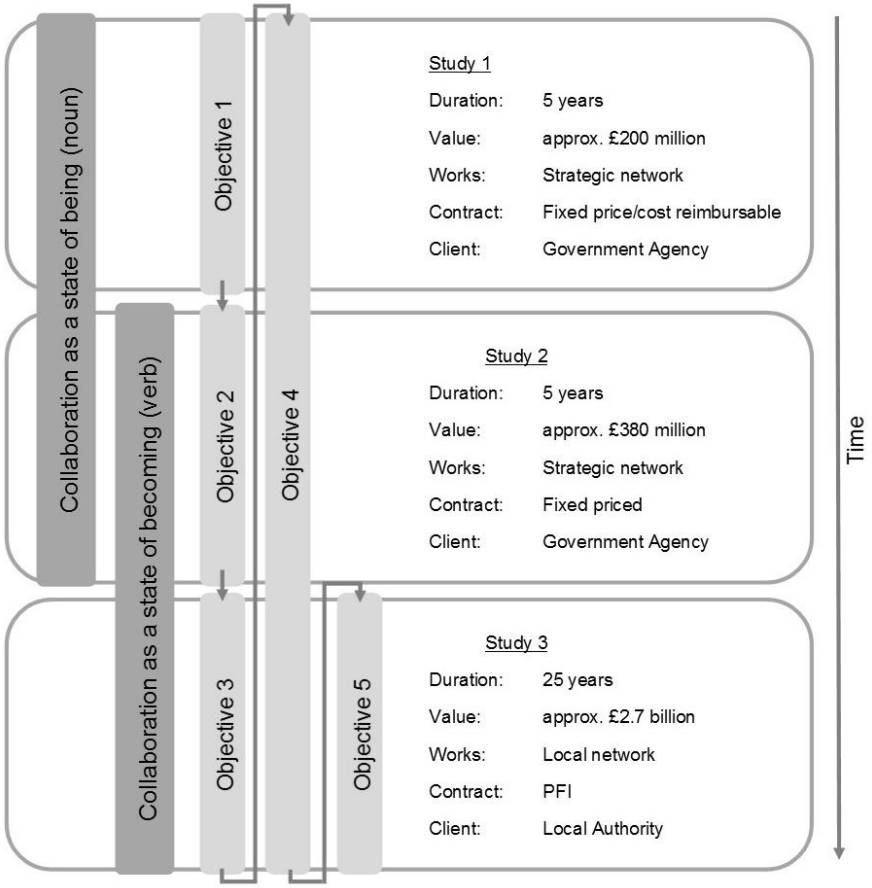


Figure 4.2 Overview of work undertaken

4.2 OBJECTIVE 1

Explore the processes for delivering highway maintenance and management services

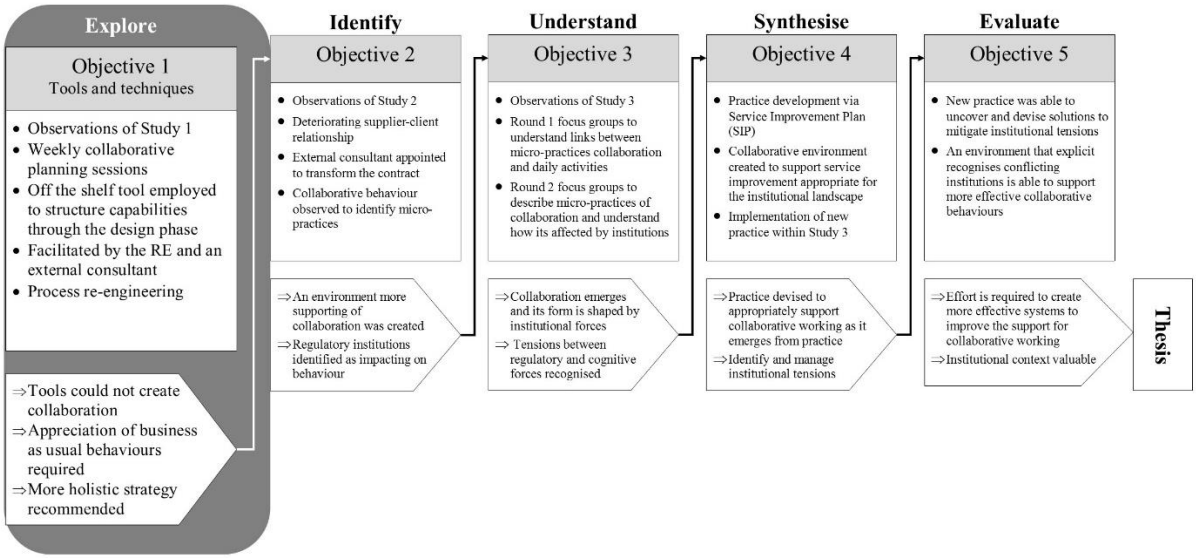


Figure 4.3 Objective 1 of 5

The process orientated nature of Objective 1 satisfied the desire of the Sponsor organisation to specifically investigate collaborative planning methodologies and how they might be applied in a highway maintenance specific context. The research question associated with this package of work was "what tools and techniques are available for the facilitation of collaboration?". To answer this question, the intention of this phase of the research (see Figure 4.3) was to investigate collaborative planning as a tool to understand how it supports collaboration and how it could be developed to account for the specificities of highway maintenance. An advantage of the EngD research format permitted this investigation to be carried out as field work, and not to be constrained to a desktop study of current literature. As an example of a tool to aid collaboration, lean construction processes (specifically techniques based on The Last Planner System™) were studied to explore why organisations tend to select such off the shelf methods and to understand how such processes play out in practice. As well as providing a key outcome for the study, the undertaking of Objective 1 provided the RE with a sub-project that met several preliminary needs as follows:

- To adjust to an engineering working environment for which the RE had no previous experience.
- To explore the Sponsor organisation's culture, contract portfolio, organisational structure, team configuration and working style.
- To begin the process of building relationships with the key players within the organisation, essential for leveraging action research opportunities.
- Understand how the research would sit within the organisational context and identify required adaptations to research design and methodology accordingly.

4.2.1 WORK UNDERTAKEN

The first planned stage of the research was to establish an up to date understanding of the complex highway maintenance and management projects provided by the Sponsor organisation, their application of collaborative methodologies to support service delivery in this context and the implications for the context of this study. In line with this, a literature review to support this phase of research was undertaken and can be found in Paper 1 in Appendix A. In summary, the literature revealed:

- Past research is fixated on formalised and implementable styles of collaborative working and fails to include in its analysis informal collaborations arising from day to day activities
- Collaborative planning provides a social networking opportunity but the softer issues tend to be overlooked
- Collaboration success is focussed on the delivery of project objectives with wider organisational learning not considered

As the RE began to settle into the Sponsor organisation and the literature review was underway, the decision to implement a collaborative working initiative was taken by senior managers in the design team of Study 1 (see Figure 4.2) during September 2011 which coincidently aligned with the commencement of the RE's activities with the Sponsor. This presented an opportunity to observe first-hand the methods by which the Sponsor manages the processes for highway maintenance service delivery and gain an appreciation of the micro-level practices. The Sponsor organisation appointed an external consultant to manage a programme of collaborative planning meetings (see Figure 4.4) based heavily on Ballard's (1994) Last Planner System™. Much of the RE's time in the early stages of the research was spent observing, and later facilitating these collaborative planning meetings with the design teams (see methodology section of Paper 1 in Appendix A).

Figure 4.4 Collaborative planning meetings and process mapping workshops

Numerous conversations (formally as prearranged meetings as well as impromptu discussions) were held with members of the management team to supplement the growing understanding of the needs of the Sponsor organisation. These conversations were recorded in research diaries and revealed issues relating to the lack of a defined strategy resulting in frequent misinformed direction of effort: *'people are running fast, but are they going in the right direction?'*. It was felt that the organisation had a wide range of capabilities but was

failing to effectively structure them through the project delivery phase. An off the shelf collaborative planning tool was adopted by the Sponsor as a solution to address this problem; a solution created exogenously to the case for which it was to be applied. Weekly meetings (see Table 3.2 for quantities) lasting around one hour per discipline (roads, structures, small works) followed The Last Planner (Ballard 1994) methodology whereby task lists were generated and planned works versus actual work was analysed, see Figure 4.5. As the meetings progressed, the RE undertook process re-engineering sessions with the design teams and validated early finding with senior designers and supervisors.

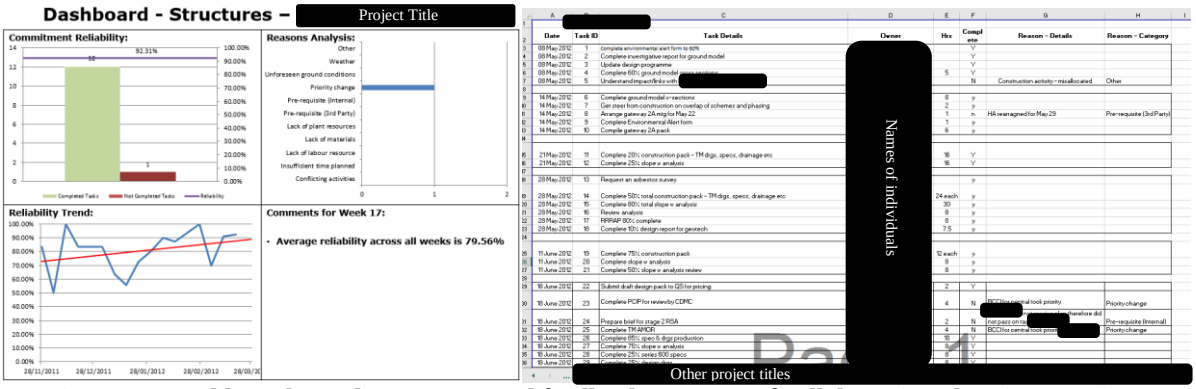


Figure 4.5 Dashboards used to capture and feedback progress of collaborative planning meetings

4.2.2 FINDINGS

The work for Objective 1 culminated with the production of Paper 1 which presents the full findings. In summary, the work undertaken revealed:

- Bringing people together physically did not automatically lead to collaborative working behaviours. For instance, the body language observed (and exhibited in Figure 4.4) suggested disengaged participants, distracted by their mobile phones and sat back with arms folded while one person tended to dominate discussions.
- Organisational processes were created but frequently deviated from. Processes were felt to be created to satisfy a need at tender stage by well-intentioned bid teams who were not equipped with appropriate operational knowledge to understand how the processes would or would not support delivery, suggesting the presence of locally optimised solutions.
- Structured meeting formats did not prevent devious behaviour. Participants were more concerned with the quantification of collaboration results (such as those in Figure 4.5) than the wider organisational learning opportunities.

The collaborative planning meetings helped managers to reveal process deviations and prompted efforts to ensure designers adhered to the documented process (regulatory institutions). This identification of process deviation is discussed in the literature as a social recognition of a problem (Lounsbury & Crumley 2007). Their model (see Figure 2.2 on page 30) is revisited in Objective 4.

Observations revealed that the collaborative planning process failed to account for the behaviours whereby design teams formed more intricate networks to collaborate informally "behind the scenes" to devise locally optimal solutions to the complex issued they faced. As described in Paper 1, as an embedded researcher, the RE could observe the behaviour outside of the formal weekly meeting and witnessed individuals devising work-arounds to give the appearance of adhering to official processes whilst continuing to operate as they saw fit. Much of this behaviour aligned with what the literature discusses in terms of responses to cognitive and normative institutional forces. These findings began to reveal tensions between regulatory and cognitive dimensions of institutions (Zucker 1987), suggesting the presence of multiple institutions.

The collaborative planning meetings observed provided insights to an off the shelf solution being applied to a situation of underperformance. The Sponsor's aim was to bring about process improvement and to better structure in-house capabilities. A preoccupation with the application of an externally created method failed to fully understand the factors that led to the organisational conditions that prompted the need for an intervention. The people involved were expected to collaboratively participate in the solution they had not had any part in developing. Furthermore, they had not been involved in the problem identification. The observations of Study 1 saw a few key players attempt to apply an off the shelf solution to a highway maintenance design team but the RE did not observe attempts to create or support a culture of collaboration, either within or outside of the weekly meetings. Conceptually, these observations suggest collaboration was seen as an applicable state of being, or as described in the literature review, as a noun.

Those who had defined the problems and agreed on the solution had done so in the absence of a systematic investigation to analyse the root causes of the problem they were attempting to resolve, see Figure 4.6. This suggests participants understanding of the organisation was inconsistent with the proposed change (Feldman 2003), in this case, to be collaborative. Little consideration was given to the underlying factors, wider constraints or institutions that might

influence the application of an off the shelf solution such as collaborative planning. Whilst the external consultant was experienced in the technique and was able to challenge accepted practices from an outsider's point of view, they had little appreciation of factors such as organisational history, relationships and team dynamics, tensions, promotions, contractual and commercial challenges, previous disputes (and so on) that affect the collaborative environment. This resonates with research undertaken by Lowstedt et al. (2018).

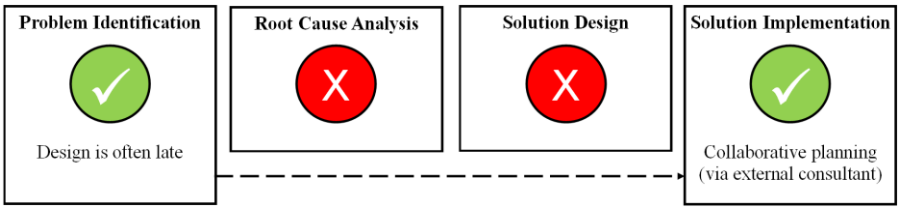


Figure 4.6 No root cause analysis

The completion of Objective 1 and the findings from Paper 1 provided a departure point and a justification for shifting attention away from an application of tools and techniques towards the quest for a more holistic strategy for managing the provision of complex programmes to understand why collaboration is required. Paper 1 concludes with a call for collaborative working to account more for the subtleties of human behaviours. As shown in Figure 4.1 it is between Objective 1 and 2 that the study moves from viewing collaboration as an idealised state towards an understanding of collaboration as a reaction to issues. From an industrial perspective, the undertaking of Objective 1 revealed a disconnection between wanting to act collaboratively and the reality of collaborative practices and a tendency to apply a solution before fully understanding the problem.

4.2.3 SUMMARY

Collaborative planning as a formula for facilitating collaborative working arrangements failed to account for the subtler behavioural aspects (see Paper 1) or alter the embedded business as usual attitudes. The broader regulatory institutional forces were not explicitly considered when designing the implementation of the collaborative planning intervention, nor were the cognitive/normative institutions that influence individuals' interactions. This oversight served to isolate any improvements in performance and limit any broader learning opportunities. Whilst regulatory institutions to maximise profit were present so were cognitive institutions that led teams to collaborate outside of the formalised weekly collaborative planning setting. The motivation to introduce the collaborative working initiative was associated with a desire

to add value and remove waste from the design process, not to fix poor collaborative relations.

Whilst objective one was completed in the early stages of the 4-year project, and was a standalone objective (as was objectives 2 and 3) the implications of its completion continued to inform the study throughout and in this sense underpinned the rest of the research. Whilst Lean construction processes offered a mechanism with which to examine the processes used by the Sponsor organisation to manage highway maintenance projects, this initial attempt to understand the phenomenon of collaboration through the principle of lean did not work. The Lean techniques of Objective 1 instead provided a departure point to move towards a reconceptualisation of collaboration as the ontology of the study shifted from "doing collaboration" to "becoming collaborative", informed by institutional theory (see Figure 1.4). This standpoint is explored further in Objective 2 which investigates the contractual arrangements.

4.3 OBJECTIVE 2

Identify the contractual arrangements for highway maintenance and management

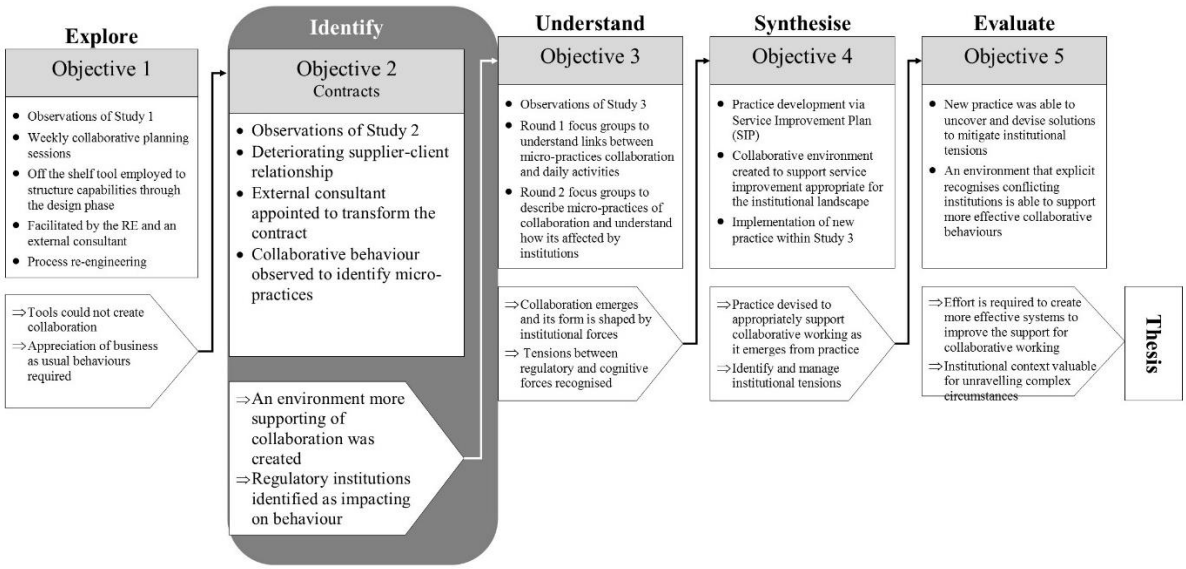


Figure 4.7 Objective 2 of 5

Having explored the processes by which highway maintenance and management services are delivered to reveal that collaboration was inhibited, the logical next step was to consider factors affecting the enactment of collaboration. To this end, the purpose of Objective 2 was to examine the contractual arrangements to describe the structural and regulatory constraints

acting upon the delivery of highway maintenance and management services (see Figure 4.7) in order to answer the research question "how does contract governance influence collaboration?". This work was supported by the work of Objective 1 which, as discussed, identified the influence of regulatory mechanisms on the enactment of collaborative behaviour. Revelations that processes created at bid and mobilisation stage are not adhered to (because they are inappropriate and often not fit for purpose) led the study toward the need to investigate further the contractual underpinnings of the projects observed to gain an understanding of the regulatory forces at play. In particular, the work undertaken towards Objective 2 sought to understand the situation whereby relational outcomes are required to support project delivery but where contractual adversary exists.

4.3.1 WORK UNDERTAKEN

Whilst undertaking Objective 2, the RE developed links with operational teams (unlike the design teams of Objective 1) of a comparable contract – Study 2, see Figure 4.2. Further details of this project are provided in Paper 2. Whilst the highway maintenance services provided were essentially the same as that for Study 1, albeit in a different geographical locale, the form of contract was significantly different. The contract governing Study 1 was awarded in 2009, a time of national economic stability and largely based on a cost reimbursable model. The contract for Study 2 was developed as a reaction to the economic downturn and was based on a lump sum financial model with much tighter payment mechanisms. Despite being technically the same client, the working relationship between supplier and client was markedly different. Many of the same Sponsor organisation's personnel who had worked on Study 1 also worked on Study 2 and the contrast in the relationship was raised in interviews conducted by the RE. The relationship was described as more adversarial and less collaborative (see Paper 2).

Eighteen months into the delivery of Study 2 the level of dissatisfaction in the quality of the services provided led to the initiation of a transformation project. Paper 2 explains in more detail the conditions that led to this. The initial transformation project failed to make any significant changes and a second transformation project was developed in response. Reflecting on the poor outcomes of the initial project, project participants recognised a failure to engage with a wide group of people. As with the collaborative planning initiative of paper 1, the transformation project was developed by an external consultant parachuted in to facilitate the improvement project. As discussed in the literature the Sponsor organisation

was again observed to narrowly conceptualise collaboration as something that could be externally created and applied to situations under specific conditions by certain people (London & Pablo 2017). Project participants stated that the key difference with the second project arose from their recognition of a need for greater collaboration because the initial attempt had involved only a few key participants and had failed to create a culture of collaborative working. Once again, the need for an alteration to accepted practice was triggered by a social recognition of a problem (Lounsbury & Crumley 2007), see Figure 2.2 on page 30. Given the RE's experience gained from working with the design teams on Study 1 she was asked to work with the consultant to support the operational teams with their collaborative planning objectives under the second attempt at a transformation project. This provided an opportunity for the RE to once again observe the micro-practices of collaboration in flight whilst to gaining a deeper understanding of the effect contractual arrangements have on collaboration.

Most of this work involved action research and participant observation at collaborative workshops where the RE increasingly co-facilitated the sessions. Alongside the workshop facilitation and observation, work connected to Objective 2 included:

- Meeting with senior managers to understand their perceived problems of the contractual arrangements for the project.
- Attendance senior leadership team meetings for exposure to culture/leadership style
- Travelling to other offices to observe first hand he behaviours/attend meetings/facilitate sessions
- Building rapport with project personnel. Senior managers assisted in identifying key people to interview. Individually tailored emails were sent with accompanying FAQs inviting people to participant in interview. Interviews were conducted with all positive respondents.

4.3.2 FINDINGS

Much like the approach taken by (Garvin 2009) this study largely disregarded the philosophical and policy-oriented question of whether particular contracts are appropriate for the delivery of the service. Instead it focused on examining the conditions under which collaborative working behaviours can be achieved when regulatory mechanisms are not designed to explicitly support such behaviour and are instead typical of uncollaborative

behaviours. Paper 2 explores more fully the revelations that a heavily contractual relationship persisted and not one built on relational principles. As such the relationship was reported to quickly become adversarial as contractual compliance was employed as the preferred method to govern the delivery of services. An examination of the observed micro-practices through a lens of institutional theory helped the RE to explain why people acted un-collaboratively. Interviews showed people were not averse to the values of being collaborative; in fact, many of the micro-practices observed evidence a desire to be more collaborative. For instance, staff from both the Sponsor organisation and the client organisation supported the idea of co-located teams, although this was never initiated. Regulatory institutions were observed to dominate and supress cognitive desires to collaborate. For example, tensions arose when reactionary work was required to deal with emerging defects on the project road network and required solutions to be developed that deviated from the prescriptive activities (tied to payment mechanisms) set out in the contract documentation. This situation was observed to encourage small groups to develop isolated, informal solutions (much like the work arounds observed in Objective 1) that either carried no benefit for other areas of the project, or negatively impacted on teams up- and down-stream because of disruption to only one part of a greater process. These observations supported the literature discussions about discrepancies between formal narratives and lived realities (Löwstedt & Räisänen 2012). The rhetoric of being collaborative was observed to be incompatible with the activities project participants felt they had to undertake to be contractually compliant. As discussed in Paper 3[1], the dominant regulatory institutions manifested in micro-practices such as:

- The delivery of "a bare minimum design" so as not breech design fees set out in the contract
- "The client will get no more than has been paid for" and the contract will be used as the tool to enforce that approach
- "Contractual letters that proliferated like confetti"
- Assigning Service points to the supplier for instances of contractual non-compliance.

The research of others suggests it is the relationship that governs and the contract is merely complementary; therefore, changing the contract without addressing the relations and

[1] Contract A in Paper 3 refers to Study 2 in this thesis. Contract B refers to Study 3.

behaviours will have little or no effect (Thompson et al., 1998). To the contrary, in their study of contact type (PPP specifically) on early contract termination Odoemena & Horita (2017) found that contract type and associated problems of enforceability and conflict interests outweighs other factors. Findings of this study (see Paper 2) revealed even when contractual arrangements were associated with adversary, conflict could be mitigated with the introduction of a collaborative working arrangement observed through the transformation project. Paper 2 goes on to discuss that whilst contracts unsupportive of a collaboration can be approached with a collaborative working methodology, it must occur as a 'bolt-on' and as such requires considerable effort to sustain. The additional considerations required to realise a sustainable approach are discussed further in Objective 4 and 5.

After the completion of Paper 2, based predominantly on commercial factors the mutual decision was made by the client and supplier for an early termination of the contract. Although the transformation project had gone further than the collaborative planning initiative explored in Paper 1 to develop a more holistic service improvement and collaborative approach to working, the approach failed to sustain the momentum once the external consultant withdrew. The argument to be made here is that this was because insufficient attention was paid to the underlying institutions that shaped the nature of the collaboration that emerged (with facilitation). Comparable studies that aim to nurture trust through project delivery also found that interventions focussing on the barriers rather than addressing the context of projects led to worsening cultures (McDermott et al. 2005). Additionally, the work undertaken to realise Objective 2 highlighted implications associated with the introduction of a collaborative approach part way through the delivery of a contract:

- A culture of uncollaborative behaviour has already been established, dominated by regulatory institutions
- Additional resource required to facilitate/manage the improvement process – superficial and unsustainable
- The effort to implement this initiative required many people to undertake tasks in addition to their "day job"
- People already damaged by negative management practices
- Client/supplier relationship was reported to be damaged beyond repair
- Financial loss by both supplier and client had already been suffered
- Resistance to change – the change that would not occur (Feldman 2003)

4.3.3 SUMMARY

Findings discussed here and in Paper 2 further support the discussion of Objective 1 and the recommendation to shift from a view of collaboration as a noun and something that can be applied, to a conceptualisation of collaboration as a verb which takes into consideration the complexity of factors and institutions that play out as collaboration emerges. Managing collaboration should therefore not be about trying to control complexity but about gaining a better appreciation of the factors creating the complexity that surrounds it. The transformation project made strides towards this. The approach taken was less reductionist than that observed in Objective 1, but for the reasons discussed, it was ultimately unsustainable. Attention paid to the micro-practices of collaboration both within and outside of formal "collaborative" settings, such as those facilitated as collaborative planning meetings has revealed macro factors (regulatory institutions such as contracts) that influence the enactment of collaboration day-to-day. The work for Objective 2 has built on the conclusions of Objective 1 that called for a recognition of the embedded business as usual attitudes. This work has introduced the notion that an appreciation of macro-institutional factors through an understanding of micro-practices can provide a mechanism to view collaboration as a verb and treat it as an ongoing accomplishment and a journey of becoming.

4.4 OBJECTIVE 3

Understand how relationships are managed for the maintenance and management of highways

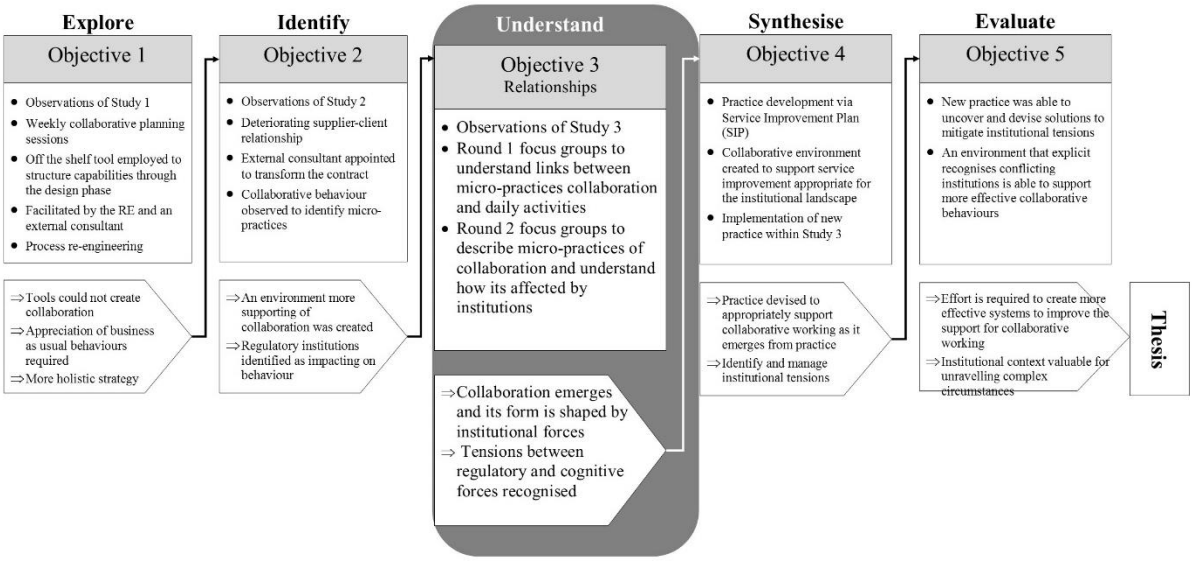


Figure 4.8 Objective 3 of 5

The purpose of this objective is to discover what effects the mechanisms through which highway maintenance work is managed impacts on how people collaborate, see Figure 4.8. Through attempts to identify the contractual arrangements that govern the delivery of highway maintenance and affect the ability to work collaboratively the research revealed, via an investigation into micro-practices, the significance of relational dynamics. This work attends to the research question "how are collaborative relationships managed?"

4.4.1 WORK UNDERTAKEN

Observations associated with Study 3 were used to support and provide further validation of the research to date. Study 2 and 3 combined led to the production of a journal paper, see Paper 3 in Appendix C and a conference paper, see Paper 4 in Appendix D. An earlier draft of Paper 3 (described in Figure 1.3 as Paper 3a) was presented at the ARCOM Doctoral workshop "Building Asset Management" at Glasgow Caledonian University in 2017 before being developed further for the journal submission.

The possibility to observe Study 3 came about when the RE offered to support the project management of a review of contractual method statements. The review was ordered by the newly appointed Project Director of a highway maintenance project to establish the extent to which current methods of working complied with the contractual obligations set out in the method statements. The review was prompted by a series of high value deductions made to the Sponsor's monthly service payment from the client for instances of contractual non-compliance. This method statement review provided the RE with access to the wider project team and to understand how relationships are managed in these conditions.

Study 3 is one of the largest highways PFI contracts in the world. For context, the following maintenance and management activities are typically delivered each month:

- 1,200km of highway is inspected by a team of 15 inspectors
- The Operational Control Room deals with around 4,500 enquires relating to defects on the project highway network (team of 7 people)
- Around 1200 electrical tests are carried out
- 311 potholes are repaired
- 2000 trees surveyed and 800 trees pruned
- 1215 bollards and signs cleaned
- 4000 gullies cleansed

- A team of 20 plan and coordinate 1200 jobs

To meet Objective 3, research focused on the approaches taken to manage collaborative relationships. Work undertaken so far had revealed formal contractual mechanisms tend not encourage collaboration. To investigate further the idea of an existence of tensions between regulatory forces and more cognitive behavioural forces, this phase of the research focused on micro-practices to explore the day-to-day tasks and how collaboration features in this picture. Table 4.1 presents the micro-practices observed during the undertaking of Objective 3.

Table 4.1 Observed micro-practices of collaboration

Theme	Micro-practice observed	Implications for practice
Inevitable interaction	Ad-hoc collaborations Informal relational behaviour Informal signposting to sources of information	Unchecked deviation away from standard processes and procedures
Cost over quality	Modification of organisational routines Preoccupation with technical and commercial issues	Creates tension between client and supplier Negative impact on relationships intra-organisationally
Strategic and operational disconnection	Work around solutions to get the job done Self-organising governance	Misinterpretation of requirements Contractual non-compliance
Collaboration as a process	Formalised interactions for knowledge sharing (e.g. pre-arranged meetings) Structured information sharing Perceived need of facilitation provided by 3rd parties	Revelation of previously obscured issues Collaborative identification of possible solutions Unsustainable external intervention

As discussed earlier, literature in the field of institutionalisation (for example see Zucker (1977)) as well as more widely (for example see Tello-Rozas et al. (2015)) talks of the intertwining of macro- and micro-level factors. Here, an action research framework and the employment of focus groups was used to understand how different day-to-day, micro-level activities experienced collaboration differently. Paper 4 discusses this work further. Fourteen participants across four focus group sessions undertook a paper based exercise. Participants were asked to list the key activities pertaining to their job role. This list of activities then became the bars on a chart that was subsequently layered with information regarding the identified activity's success, criticality, experienced feelings, levels of collaboration, and the

significance of financial and commercial issues. Figure 4.9 displays an example of this activity.

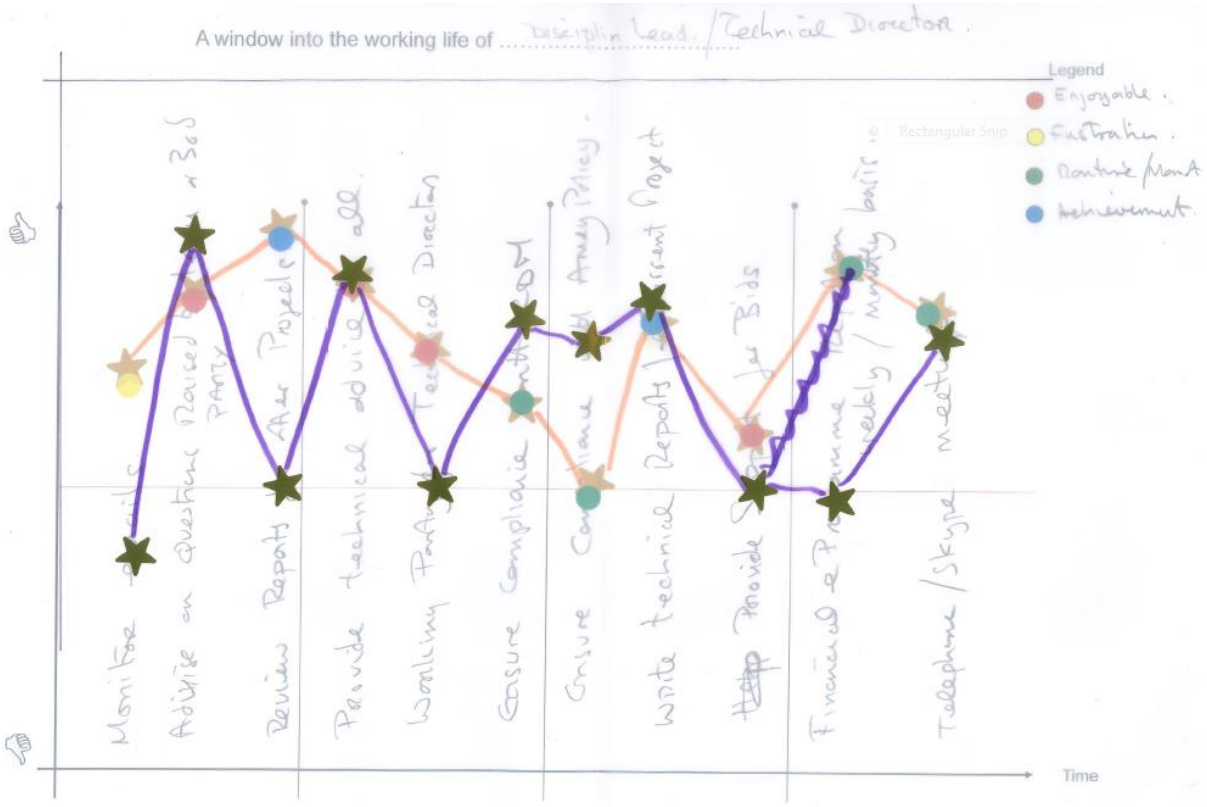


Figure 4.9 Example of paper based data captured in focus groups

The RE then facilitated an additional 27 follow up focus groups of between one and three hours in duration and engaged with 66 individuals (see Table 4.2) across the PFI project (Study 3) with the purpose of encouraging all participants to work together to understand the problems facing them in their jobs and to recognise the pressures facing their colleagues. The themes and patterns that emerged in the first four focus groups involving the paper based exercise were investigated further in the 27 follow up focus groups. The follow up focus groups served two key purposes:

1. To provide a forum for the RE to test the themes identified in round one and to observe (as a participant) the discussion to gain vital insight into group level phenomena
2. To engage a range of employees to inform the development of a service improvement plan (discussed fully in Section 4.5)

Table 4.2 Follow up focus group participants

	May	Jun	Jul	Aug	**Total**
Follow up focus groups held	3	11	5	8	**27**
New participants (i.e. not engaged in previous focus groups)	14	31	13	8	**66**

These 27 focus groups were organised around the six work streams within Study 3: (1) inspections, (2) operations, (3) planning and programming, (4) monitoring and reporting, (5) asset and lifecycle and (6) staff engagement. All staff were invited to attend any focus group. In addition, targeted invites were sent to staff working specifically within the work streams to ensure appropriate representation. In the facilitated focus groups, participants noted their views on sticky notes and the RE reviewed all responses before grouping the comments by theme (see Figure 4.10).

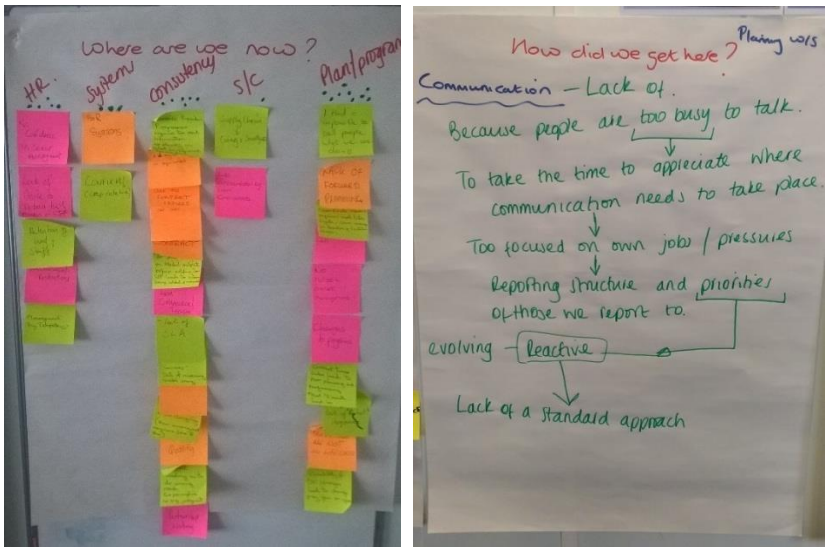


Figure 4.10 Examples of the information gathered from focus group participants in answer to the questions 'where are we now' and 'how did we get here'?

4.4.2 FINDINGS

The initial four focus groups and the paper based exercise identified 196 micro-practices. These self-reported micro-practices, such as 'provide technical advice' and 'attend meetings' (the full list and categorisation can be found in Appendix G) were of a more functional nature, concerned with *what* they did. The RE observed micro-practices of Table 4.1 were more concerned with *how* they did it. The following six categories emerged from the data and to enable analysis, the 196 activities were assigned to one or more of these categories:

- Identification of workload / resources / costs
- Undertake review / auditing / monitoring / supervision

- Produce documentation / reports
- Meetings / Communications
- Provide advice / feedback / support / guidance
- Receive advice / feedback / support / guidance

Findings of these four focus groups revealed that as projects progressed the levels of collaboration associated with the participants' daily activities was felt to decrease over time. Whilst the findings of the focus groups suggested what people recognise as collaborative working decreases overtime, observations showed informal collaboration to be ever present, suggesting only collaborative practice that is formalised is recognised as having value. For example, only meetings labelled as "collaborative planning" were recognised as being collaborative. This finding supports the earlier assertion that collaboration is conceptualised as a noun. Ad-hoc conversations that the RE observed as micro-practices of collaboration whereby people would form informal but intricate networks to navigate their way through the complexity of highway maintenance delivery were not recognised as collaborative behaviours by project participants. Despite this, the focus group activity suggested people want, need and enjoy collaborating. Those activities relating to meetings and communications were consistently associated with positive feelings such as enthusiasm suggesting people enjoy the opportunity to interact with others. This chimes with the organisational strategic priority to be collaborative. Operationally, however, its importance became less prominent leading to competing logics within the same institutional field, a situation increasingly recognised in management research (Besharov & Smith 2014). As mentioned above, these themes were taken to 27 follow up focus groups for validation and to explore how the micro-practices identified might highlight connections to macro institutional forces. The following section discusses the findings of these sessions.

Follow up focus groups revealed issues that were categorised into 6 themes shown in Table 4.3. These focus groups helped uncover links between observed micro-practice and larger, macro institutional forces.

Table 4.3 Focus group findings by theme

1. Consistent Standards	2. Staff Skills and Development	3. Planning and Programming
Project delivery is fragmented and siloed (by work stream). A lack of consistency across the work streams has led to isolated processes and localised solutions. Where collaboration occurs, it tends to be within and not between teams.	Staff skills are heavily focused toward technical and practical abilities and the attainment of recognised qualifications (primarily operational). Softer skills and the abilities to effectively communicate within and collaborate across teams are not considered.	Work streams plan their work differently. Pressure to meet contractual obligations prevents collaboration across teams to collaboratively programme work to take advantage, for example, of shared road space booking.
4. Effective Systems	5. Staff and Stakeholder Engagement	6. Communications
Ineffective systems (coupled with inconsistency in their application) requires staff to develop localised work arounds and adaptations to fulfil their obligations. Poor interfaces between systems hinders collaborative solutions.	A social and physical divide hinders collaboration between office based and operational staff. Frequent and numerous changes in senior management leading to conflicting strategic priorities is felt to be the root cause of staff disengagement.	Communications are perceived as a nice to have. The completion of daily operational activities is prioritised over communication activities. The communication that does occur is inconsistent.

During the period of observation, many peculiar and onerous contract obligations and many instances of obligations that created conflict for project staff were brought to the RE's attention. For example, an interviewee explained "we have a five-day deadline, so all customer correspondence has to be responded to within five days. The financial deductions on that are £219 a minute, for every minute that the letter's late". Another similar example was shared by OCR staff whose failure to meet contractual obligations to clock in by a defined time carries a £2,000 deduction if late by one second. In comparison, a failure to meet contractual obligations to maintain structural parapets on the project network results in a £0.20p per month deduction. This signals a tension between cognitive forces relating to professional conformity and regulatory contractual obligations, with multiple institutional forces operating within the same space at the same time. Engineers recognise the importance of highway asset maintenance and the potential safety implications maintaining parapets has for the network and those who use it. The importance of maintaining parapets is in tension with the perceived triviality of clocking in on time because of the huge disparity in financial deductions associated with each example.

One to one interviews to validate focus group findings support the prevalence of siloed working and explain the impact. For instance, when asked about silo working the customer services manager responded as follows:

'*Yeah, that's exactly how they're working, so street lighting will do what street lighting want to do, and even within street lighting, you'll have pockets of teams that do their own thing – "I only do new works street lighting." "Yeah, but can you help us with this? When are you going to do this maintenance repair on this street light?" "Don't know. I only do new works."'*

The siloed approach coupled with a reluctance to share information across teams was observed to create additional challenges for those who require knowledge of the wider situation to inform their role. As a work around solution (as discussed in Paper 3, Appendix C), the inevitability of human interaction saw individuals build personality based links within and occasionally between the silos (what Feldman (2003) calls 'little thread bridges' and referred to in Paper 3 as informal collaborations) to get the job done. These informal collaborations, whilst helpful for local work around solutions, were often found to be disruptive to wider project objectives.

The siloed working discussed above was occurring against a backdrop of action by managers that was felt to promote organisational competition through a fear of severe financial deductions in connection with any underperformance/failure to meet obligations set out in the contract. Regulatory institutional forces were observed to be present in relation to elements such as laws, regulations and contract documents and drove behaviours that encouraged competition between teams. The cognitive social elements (aligned to professional conformity, societal expectations) were not recognised as valuable in the quest for contractual compliance. Interview comment: *'I think sometimes we can get a bit carried away with focusing on the financial side of it over people sometimes'*. Institutional theory suggests that rational decisions made by managers to act in ways that encourages (or even demands) competitive behaviour between teams is not born solely out of a motivation to achieve profit maximisation / deduction minimisation but is an irrational decision making process based on macro institutional forces to be adversarial. For example, whiteboard meetings known by the team as 'whiteboard beatings' were the mechanism used by previous management to highlight areas of underperformance and routinely shame those teams (and often individuals) with the most deductions associated with their work stream.

"You wouldn't believe that people would do those things to people"

"It was the humiliation. And the language was beyond belief…and loud and aggressive"

"I never got the wrath of him but I was scared of him…would hide problems because we couldn't risk the humiliation of raising them"

Conformity with regulatory norms is important, especially in the case of Study 3 due to high financial deductions associated with noncompliance. Institutional theory says firms seek legitimacy and therefore organisation routines emerge as they attempt to conform (Scott 1987). Where the Industrial Sponsor's employees seek to conform to the Study 3 contract, adversarial routines emerged and they were allowed to grow because the counter norm (relational) was weaker in this instance.

As explored in Paper 4, only formal collaborations (and that labelled as such) are recognised or valued as collaborative practice. Regulatory institutions to formalise and document interactions were seen to overrule cognitive/normative institutions to collaborate. For example, informal decisions are made, or solutions are generated, to address a problem and then one person would say '...if you just drop me an email to confirm that in writing, I'll do it'. Such behaviour suggests the dominance the contract has over informal cognitive institutions to collaborate. Interviews were used to further interrogate the findings arising from the focus groups. Here, contract obligations were found to powerfully structure the cognitive practices of individuals as highlighted in this interview transcript:

RE: *This is a complete guess, but if you had to guess what proportion of people in the company would bend the rules or backdate a signature...?*

Interviewee: *A good 50%.*

RE: *So it's a culturally accepted procedure.*

Interviewee: *Yeah. I think that's on the change now, but prior to this last two years with [current business director], we probably had 90% of people. Easily 90%, because it was the culture that the managers probably would have instructed you to change the dates.*

RE*: Interesting – just to comply, because of the penalties that could have been...?*

Interviewee: *Yeah.'*

Table 4.4 summaries the micro-practices that were revealed through the enactment of specific institutional forces/logics. The RE's industrial supervisor was present for many of the focus group sessions and was able to help validate the findings displayed here.

Table 4.4 Micro-practices enacted in support of institutional forces/logics

	Institutional forces/logics	Micro-practices
Regulatory	Process driven - Collaboration as an off the shelf methodology (collaboration as a noun)	Devious behaviour to circumnavigate the process Process deviation Local optimisation
	Competitive	Towing the line Arguments Deeply entrenched silo working with teams pitted against one another ("white board beatings")
	Profit maximisation	Bonus payments to senior management based on financial performance Behaviour prioritises short term improvement of financial indicators
	Contract compliance	Confirmation of informal agreements required in writing Alteration of documents to demonstrate compliance
Cognitive/Normative	Job satisfaction	Locally optimised solutions Informal collaborations (founded on personalities) at the micro level to compensate for org level adversarial relations
	Professional conformity	Adhering to training/industry standards when contract stipulates an alternative approach
	Societal expectations	Politeness Personality based relationships Fairness Respect

Social order exists only as a product of human activity – the actions taken, the interpretations of the actions and the sharing of the interpretation with others (Scott 1987). Repeating this over time is institutionalisation. For example, the siloed approach to working within Study 3 is therefore a socially constructed reality produced by the humans interacting within that space. To blame the contract and the adversarial nature of the relationship with the client ignores the fact that the contract and the adversary has been interpreted by people and that interpretation has been shared and accepted and enacted. For collaboration to flourish, an alternative interpretation must be created and shared.

Institutional theory has helped in the understanding of the tensions that were observed to affect project delivery. The theory helps to explain why the tensions exist and rationalise what is perceived as unfair, obstructive and unproductive behaviours. A clearer understanding of the conditions that led to the manifestation of the tensions prompted the

development of a practice to guide practitioners in their mitigation and management of largely unavoidable tensions, see objective 4.

4.4.3 SUMMARY

Observations of and an investigation into the micro-practices of collaborative activity revealed relationships frequently driven by regulatory motivations to fulfil contractual obligations and meet commercial and financial objectives. These findings lead into Objective 4 which seeks to develop practice to support collaboration given the challenges discussed. Unlike in projects in literature where the contractual arrangements support collaboration because the goals of all participants are aligned throughout the project delivery phases (e.g. alliances), findings here suggested the governance of this project encouraged competition amongst teams.

4.5 OBJECTIVE 4

Synthesise learning from objectives 1, 2 and 3 to design practices to improve project execution

The following section sets out the work undertaken to meet Objective 4 which is largely concerned with the development of a new practice to support collaboration as it emerges in a live project environment. The work described here is a synthesis of the learning obtained so far through the completion of Objectives 1, 2 and 3. Study 3 is used here to test the practice developed.

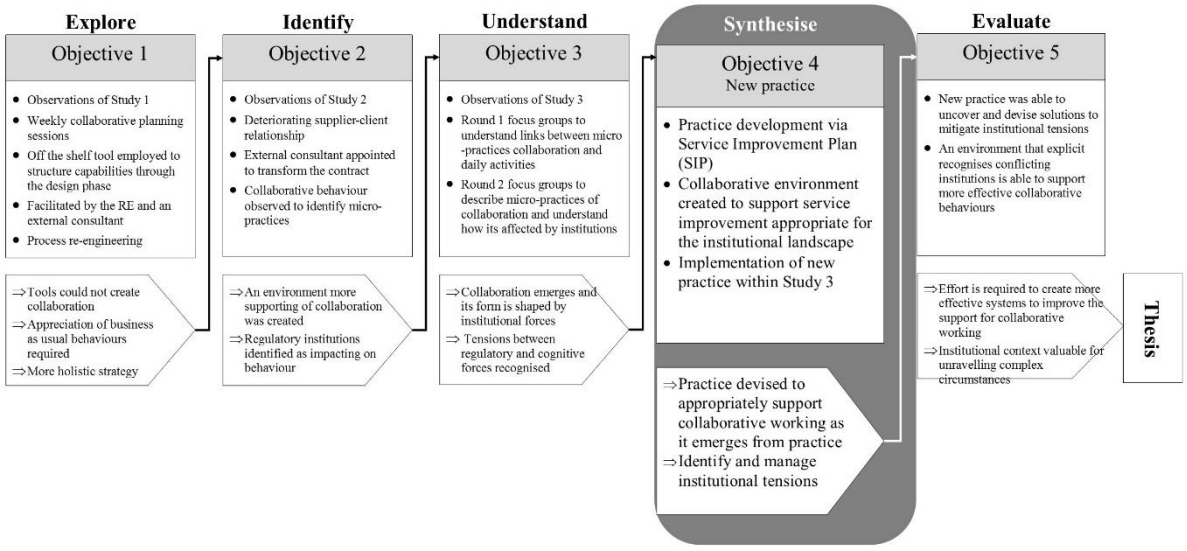


Figure 4.11 Objective 4 of 5

In March 2017, an opportunity arose to work with the Head of Business Improvement to establish a new Business Improvement Team within Study 3 and to design and deliver a programme of improvements. This proposition demonstrates a recognition of the RE's ability to inform and support a collaborative approach to project execution. It was appropriate that the RE take on this role for three reasons. Firstly, it provided an opportunity for the RE to develop the findings from Objectives 1, 2 and 3 and design new collaborative practices in a suitable live project. Secondly, it provided a live project environment in which to test the newly designed practices with direct access to staff at an operational (micro-practice) level. Thirdly, working closely with the Project Director and the Head of Business Improvement provided the RE with additional exposure to strategic decision making, allowing the RE to influence the delivery of highway maintenance whilst simultaneously receiving strategic level feedback on the practice design, see Figure 4.11. The work undertaken here attended to the research questions "how does collaboration influence project performance?", "how is commercial strategy translated into highway maintenance service delivery?" and "how is collaborative working enacted during project delivery?". The new practice that was designed to support the evolution of collaborative behaviour became known as the Service Improvement Plan (SIP).

4.5.1 WORK UNDERTAKEN

Whilst working to establish the Business Improvement (BI) Team the RE's duties included:

- The development of a project initiation document setting out the proposed approach for the SIP. The methodology section of this document was designed to specify that macro organisational factors were to be considered whilst a micro-practices approach to engagement were taken. The discussion that follows outlines this approach further.
- Recruitment of a Project Manager and Trainee Project Manager to oversee the SIP. This allowed the RE to influence the recruitment process and encourage the selection of team members who exhibited collaborative traits (Zhang et al. 2018). Despite the Business Director's preference for a Project Manager with operational experience, the decision was made to recruit someone with no industry experience but who had previous project management experience in a collaborative project facilitation arena.
- Taking up the role of Research Engineer within the newly formed BI Team to support the Head of Business Improvement and the newly appointed Project Manager.

- Coordination, design and facilitation of a programme of focus groups (as discussed in Objective 3) with all work streams on the contract to inform the development of the SIP. Whilst observing micro-practices of collaboration in a group setting, this activity provided the opportunity to validate the initial findings presented in Paper 4. Furthermore, exposure to many people across Study 3 provided a springboard to relationship building and provided the RE with contacts for additional interviews and validation conversations.

Figure 4.12 Evidence of focus group facilitation

4.5.2 SYNTHESIS OF LEARNING

For the SIP to be effective, the institutional challenges identified in the earlier phases of the research needed to be managed better and the approach needed to attend more closely to the relationship between institutions and the actors who populate them (Lawrence et al. 2011). The identification of these challenges and the methods with which they were tackled was informed by learning obtained in the execution of Objectives 1-3. To summarise, the challenges were as follows:

- Unsustainable and ineffective off the shelf collaborative planning toolkits, exogenously created and applied by short term consultants
- Regulatory institutions and contractual arrangements that prioritise a profit motivated approach to service delivery
- Informal collaborative relationships driven by cognitive institutions to "get the job done" lead to informal locally optimised solutions that, at best fail to affect widespread improvements, or at worse create problems elsewhere

To address these challenges, the RE designed the SIP to support the project participants in Study 3 on a collaborative journey from current state to future state. The loose roadmap for this journey comprised five reoccurring questions informed by the RE's industrial supervisor's recent enrolment on the roads academy programme (Gov.UK 2017): (1) where

are we now? (2) how did we get here? (3) where do we want to go? (4) how will we get there? and (5) how will we know we've arrived? The structure for this journey was intentionally loose to align with earlier critique of formally structured collaborative working interventions. The aim here was to allow the collaborative working to emerge more organically and be shaped as far as possible by the participants and the insights they shared. However, the RE recognises the process could not be totally natural because to gather the necessary observations required a certain level of intervention. Focus groups (partly described in Objective 3) were the method used to gain these insights and to answer the five questions above. In addition, the group approach was a critical step in the practice design. As well as wanting to answer the question "how did we get here?" (to deduce if and how institutional forces affected the micro-practices) the RE wanted the participants to learn from one another to collaboratively understand how they got to where they were (see Figure 3.5). To share knowledge in this way would not have been possible in individual interviews, however, one to one interviews were also used to supplement and validate the focus group findings.

4.5.3 FINDINGS

4.5.3.1 WHERE ARE WE NOW?

Collaboration is dealt with in construction management literature as a noun and as an applicable methodology, conceptualised as something to be achieved. In practice "off the shelf" collaborative planning tool kits are often applied as a solution to a poorly understood problem (see Objective 1). Research undertaken that led to the production of Paper 1 revealed micro-practices whereby people circumnavigated the "rules of play" and continued to operate as they always had. Institutional theory helped to understand the presence of such micro-practices of collaboration. In an environment that prioritised process compliance (signalling the domination of regulatory institutions) the more cognitive and normative institutions that encourage people to interact on a personal level, to conform to social norms and seek professional integrity were rejected during the formal collaborative planning meetings. Away from the gaze of the external facilitator, these cognitive institutions continued to take place and manifested as non-compliance. As such, no significant performance improvement was achieved because the holistic collaborative environment was unchanged. To overcome this, the methodology for the SIP purposefully avoided "doing collaboration to people". As this discussion goes on to outline, various techniques were

employed with the intention of creating a collaborative environment in which those with "on the ground knowledge" could work with the BI Team to collaboratively identify the problems and co-create a bespoke approached for the purposes of improvement. The first step in this journey was to describe the current state by generating answers to the question: where are we now? The focus groups described in Section 4.4 - Objective 3 and Table 4.2 on page 68 were used to answer this question.

As discussed, focus group discussions uncovered six key problematic themes (revisit Table 4.3 on page 71), one of which was a lack of consistent standards. For example, archival documentation showed 125 separate dashboards were in use across the various teams within Study 3. Each dashboard contained a different representation of the contract data and had been created on a team by team basis to serve their specific needs. As team members came and went, additional dashboards to represent the data differently were added to the suite. In addition, reports based on dashboard data were created for reporting purposes. Due to the vastness of the data held in the systems and the inconsistency in its management, depending on how specifically a report was requested, what may appear to be two similar requests can produce two very different reports that lead the reader to different conclusions. This was observed to have negative implications when the report data is used to inform instructions to teams. Thus, different work streams often receive conflicting strategic instructions due to alternative interpretations. When asked about the intention to standardise quality the response was:

'I think it's long overdue, to be honest. I used to look after [quality with a previous employer], and it just makes life so much easier when everyone's got a standardised set of instructions and procedures to work to. There was a lot of localised goings-on happening, so I think that was recognised by the management in the need to pull it all in and control it. It's way overdue... They'd have a copy of a procedure, and, 'Oh, no, I've been working to this one from 2014.' 'Oh, I changed mine in 2016,' so everyone had their own versions of the truth, and that probably still is the case until we've got it all locked down.'

Selznick (1957) views institutionalisation as a process that happens to organisations over time and in a varied manner but is less powerful in organisations that have more specific goals and more specialised technical operations. Furthermore, effective leaders are able to define and defend the organisation's institutional value (Selznick 1957) which is an interesting assertion

to consider in this study which seeks to establish how an appreciation of institutional forces can consciously affect the approach taken to support collaborative working practices.

4.5.3.2 HOW DID WE GET HERE?

The themes identified by the question "where are we now?" were interrogated by the group (facilitated by the RE) to generate a shared understanding of why the identified themes became problematic. Previous improvement initiatives (as explored in Objective 1) tended to impose off the shelf solutions to preconceived problems upon people. Often this was done by consultants who would then withdraw from the project. Alternatively, the work undertaken here was designed, not only to enable those delivering the service to have significant influence over the problems identified but to support them to understand why the problems exist. The RE encouraged participants to move away from providing excuses for the problems identified and supported a discussion that drove towards the root cause (see Table 4.3 on page 71). The focus groups revealed a lack of consistent strategic direction to be a common cause to a variety of the problems discussed in the sessions. This finding was supported in one to one interview discussion, for example:

'Back here, three, three-and-a-half years ago, was a very chaotic time because everyone would have a different way of working something and there was no one right way, which makes it very difficult for people. If you've got no one set of the truth, they can all work the way they choose and you'll naturally get a lot of differences with that. As a manager, then, you can't really say, 'Well, your way's right. Yours is always right. I quite like your way.' You have to give them some proper guidance.'

A highly contractual approach (refer to the findings of Paper 2) taken at the outset allowed, and even encouraged, adversarial behaviours to push project delivery to breaking point, again signalling the presence of dominant regulatory institutions.

4.5.3.3 WHERE DO WE WANT TO GO?

The problems identified in answering the question 'how did we get here?' were thematically grouped and six themes were identified (revisit Table 4.3). Focus groups were held (mostly with the same participants involved in the problem identification phase – see Table 4.2) to discuss possible answers to the question 'where do we want to go' with the aim of collectively understanding and shaping what the ideal scenario might look like. This

approach was designed intentionally to avoid the imposition of changes. The intended approach was to encourage and observe people as they democratically generated solutions from the bottom up (micro practice approach). Literature reviewed suggested for individual actors to influence organisation strategy, organisational vision must be routinely connected to the individual (Rubin 2009) but with an understanding that formal procedures at the macro level can inhibit such connections (Powell 1998). Observing people as they generated solutions to the problems they experienced allowed the RE to understand more about how micro-level collaboration transitioned from one stage to another (Tello-Rozas et al. 2015) and how the challenges perceived at the operational level could be linked to macro-institutional forces. Practically, facilitating collaborative practice in this way was intended to encourage people to align their interests with the wider team to avoid conflicts (Suprapto, Bakker, Mooi, et al. 2015) thus mitigating (not eliminating) the dominant regulatory institution. This approach was a response to the findings of Objective 1 and the observations that saw local, informal collaborations to circumnavigate formal collaborative efforts (see Paper1). From this point forward, the focus groups were organised around these emergent themes for three reasons: (1) discussion revealed most topics cut across operational work streams, (2) to avoid reinforcing the silo approach experienced within Study 3 and (3) to facilitate cross work stream collaboration. All contract staff were invited to attend the focus groups to encourage a diverse representation. In addition, one-off drop-in style information sessions were held so that anyone could see what progress had been made (see Figure 4.13).

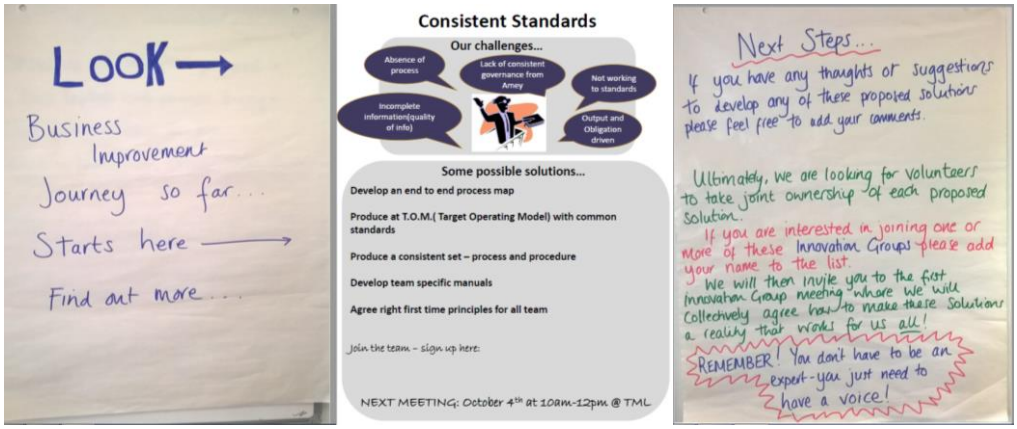


Figure 4.13 Examples of posters used to engage participants in the SIP

4.5.3.4 How will we get there and How will we know we've arrived?

The six multi-disciplinary teams worked together to collaboratively identify tasks required to achieve the identified improvements. For improvement activity at the micro-level to address

the macro factors identified, the solutions identified were designed with appreciation of the institutional landscape (see paper 4).

The work undertaken in relation to the fifth question on the SIP journey (how will we know we've arrived?) is discussed later in section 4.6 as it concerns the work undertaken to satisfy Objective 5 - the evaluation. At this stage, however, it is important to note that the work undertaken to meet Objective 4 included the development of a strategy to be able to recognise when success had been achieved. Firstly, all solutions were tracked in a master programme. This allowed progress of the solutions to be monitored and support requirements identified. Secondly, each solution was designed to have a tangible outcome, most commonly a programme for the delivery of the solution or a process (new or reengineered). This was to enable the quality team on the contract to audit compliance with the agreed approach and identify early deviations from standards.

4.5.4 EVALUATION AND CRITIQUE OF PREVIOUS ATTEMPTS TO IMPROVE COLLABORATIVE WORKING

The SIP was designed to support the realisation of a collaborative approach to the delivery of highway maintenance and management services where an uncollaborative contractual arrangement does not readily support such an approach. The practice developed (i.e. the five-question journey to support collaborative working) demonstrates how the force of regulatory and cognitive/normative institutions can be appreciated and incorporated into strategies to improve performance through collaborative working. Using institutional work theory as an aid it has been possible to unpack the complex interweaving of the macro and micro level (Zucker 1977). Coupled with a conceptualisation of collaboration as becoming (a verb) and as an emergent phenomenon, this new perspective permitted support that went beyond a superficial facilitation of group meetings to coordinate project activities (e.g. collaborative planning) to foster support tailored to account for the dominant institutional forces acting to shape collaborative behaviour as it emerged. The practice developed here did not involve the application of an off the shelf solution as seen in much of the existing research concerned with collaborative working practice, but instead offers a mechanism with which leaders and managers can develop an appropriate methodology to support collaborative approaches to service improvement that fully considers the uniqueness of the institutional forces at play. This work (supported by Paper 4) demonstrates how attention at the micro-level is crucial for

an understanding of where conflict between macro institutions manifest at the micro-level and the consequences for service delivery.

As the work undertaken to meet the objectives progressed, accomplishments brought about by efforts to adopt more collaborative approaches to project delivery increased in scale and impact. Lounsbury & Crumley's (2007) model for new practice creation (discussed in section 2.4.7 - Problematisation, p.29) supported this evaluation of collaborative practice and led to the development of an adapted model presented in Figure 4.14. Much the same as Lounsbury & Crumley's (2007) model, the trigger point for intervention in all of the observed studies was the social recognition that existing practice was problematic.

To recap, Study 1 observed the implementation of a collaborative planning solution, triggered by a recognition that documented processes were not adhered to and a failure to structure capabilities of the team through the design process created inappropriate variations to accepted practice. When this inappropriate variation to accepted practice was socially recognised, the approach taken was to reinforce the extant practice. This enforcement came in the form of collaborative planning meetings. The aim of these meetings was to highlight to the multi-functional design teams the impact their deviations from standard were having on the wider delivery of the project. Figure 4.14 shows how the impact of Study 1 made no change to the accepted practice. A superficial identification of a failure between teams to interact led to the application of an off the shelf solution (in the form of collaborative planning meetings adapted from The Last Planner System) that failed to consider the institutional forces at play and how institutions continued to influence the type of collaboration that was (and was not) experienced despite the new intervention.

Much the same as Study 1, Study 2 experienced inappropriate variations to accepted practice but instead developed collaborative transformation projects to alter rather than reinforce extant practice. Paper 2 discusses how this project specific improvement initiative was unsustainable, in part because of a failure to explicitly uncover the root causes of the problems experienced. For the reasons discussed in Objective 2 this approach resulted in improvements that were unsustainable and the contract, along with the alternative practice (the transformation project) was ultimately rejected (see Figure 4.14). The conclusions of this work (refer to Concluding Remarks within Paper 3) call for any vision to act collaboratively to be articulated in a way that accounts for the specific needs of those intended to receive it. An active appreciation of the micro-practices at play could inform this articulation but any

support must also account for the institutional environment, particularly where adversarial conditions dominate, and the unintended consequences of evolving organisational routines that are likely to have an impact.

Objective 3 examined the management of relationships in both Studies 2 and 3 (See Paper 3) to uncover the key finding that project participants failed to recognise collaborative practice that was not formally labelled as such. Informal, relational collaborations, founded largely on personality based connections were observed to reinforce a silo approach to project delivery, driven by regulatory institutions that prioritised contractual and commercial factors over cognitive and normative institutions.

Objective 4 described the SIP implemented in Study 3 which built on previous findings and sought to collaboratively develop improvement solutions to address business as usual and accepted practice (see Figure 4.14). Drawing on Institutional Work Theory, observed micro-practices were analysed to detect the presence of macro-institutions. Through the focus groups discussed in Objective 4, attention was directed towards developing a deep understanding of the underlying institutions that act to shape organisation as behaviours as they emerge. The findings of this study suggest an additional trigger point is required for the alternative collaborative practice to be sustained long enough to revise extant practice and is depicted in Figure 4.14 as an understanding of the problem that the alternative practice is attempting to alter. With a meaningful appreciation of *why* observed micro-practices occur it was possible to move away from "off-the-shelf" tools to instead customise the support for collaborative working as it emerges through practice to best suit the adversarial and commercially rigid project. Furthermore, support could be tailored to mitigate the observed tensions between a contract that prioritised the minimisation of financial deductions (regulatory institutions) and staff who acted as they saw fit to "get the job done" (cognitive/normative institutions). The following section will explain how this theory underpinned the development of a practice to support practitioners to appreciate their institutional landscape.

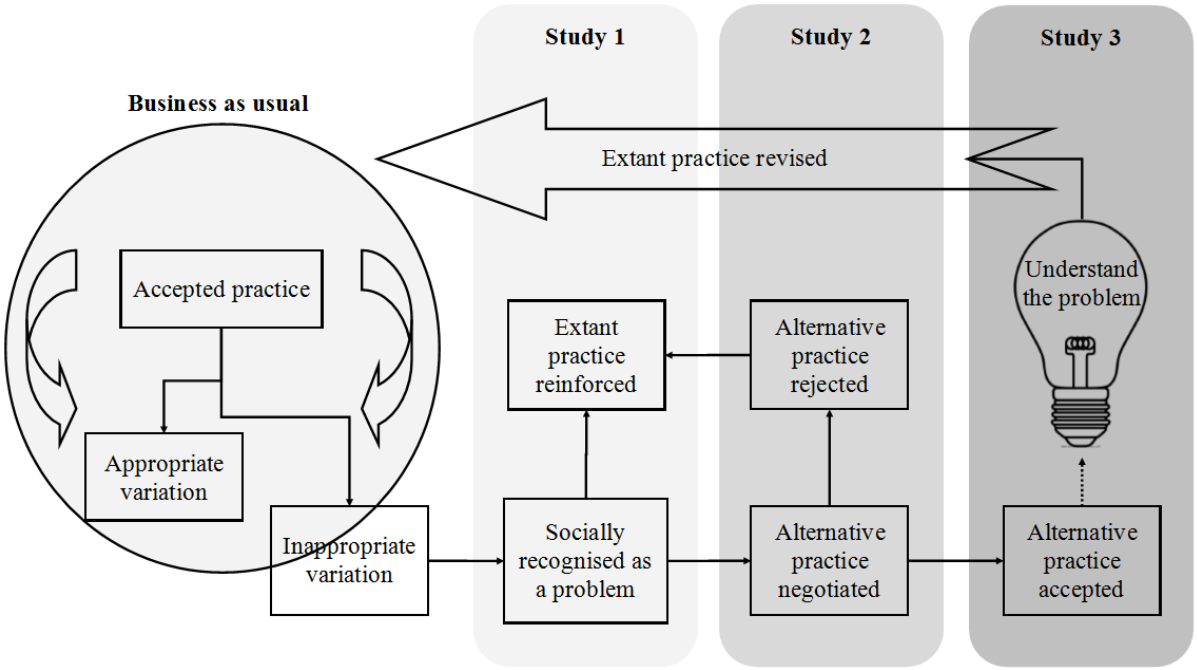


Figure 4.14 New practice creation (adapted from Lounsbury & Crumley (2007))

4.5.5 NEW PRACTICE CREATION

The SIP (practically) and the model in Figure 4.14 (theoretically) led to the creation of a new practice intended to guide practitioners, specifically mangers and those charged with affecting change, in making appropriate decisions when attempting to support a collaborative approach. The aim of the new practice is to move practitioners away from the application of collaborative tools and guide them toward a conceptualisation of collaboration as a journey of becoming. Informed by the work undertaken for Objective 4, the new practice is supported by a series of questions to assess the current state, see Figure 4.16. The questions within the assessment were derived from the activities undertaken for Objective 3 and 4 and answers to the questions "where are we now" (positive and negative factors of the current state) and "where do we want to go" (what should good look like). The New Practice Creation began with an evaluation of the collaborative approach adopted through the SIP and a synthesis of the factors effecting collaborative working. These factors were categorised according to the six themes identified through the focus groups (revisit Table 4.3) and are presented in Figure 4.15 below. During the derivation of the factors from the focus group and interview data the factors naturally separated into two broad themes: factors relating to the systems and factors relating to the micro-practices of behaviour that support or destabilise collaborative working. For instance, under the theme of consistent standards, participants identified silo like working to be a factor inhibiting better collaboration. Further questioning revealed silo working was most often attributable to people being encouraged to focus on the performance of their own

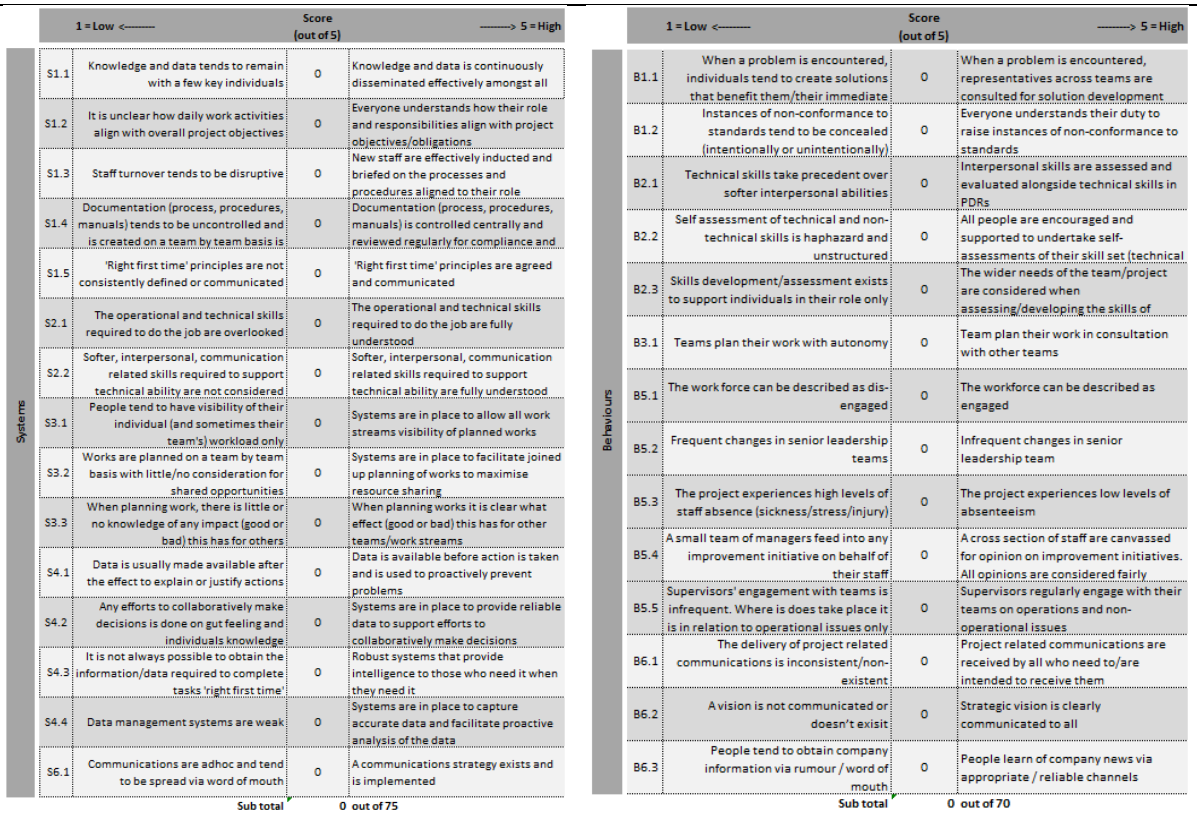
discrete area. Therefore, this was categorised as a behavioural indicator. Thus, question B1.1 in Figure 4.16 addresses this factor. The second item within the consistent standards theme arose from participants view that collaborative working should maximise the sharing of intelligence. The main inhibitor of this was felt to be the inadequacy of the data handling systems for dispersing knowledge. Thus, question S1.1 addresses this factor.

1. Consistent Standards	2. Staff Skills & Development	3. Planning & Programming
(B) Avoid local solutions/silos (S) Maximise the sharing of intelligence (S) Work instructions linked to strategic objectives (S) Minimise any disruption from staff turnover (S) Connection between sub-processes is mapped and understood (S) Non-conformance to standard is easily monitored (B) Non-conformance is reported	(S) Operational/technical skills are understood (S) Soft skills and capabilities are understood (B) Essential vs. desirable skills are mapped (B) People understand their skill set (technical & soft skills) (B) Cross training for reliance and inter-team support	(S) Maximise workload visibility (S) Avoid siloed planning and limitations for resource sharing (B) Avoid siloed planning and limitations for innovative solution (S) Understanding of how planned works affect other teams
4. Effective Systems	**5. Staff & Stakeholder Engagement**	**6. Communications**
(S) Timely sharing of data to prevent missed opportunities for proactive action (S) Maximise collaborative efforts with accurate data (S) Access to same high quality data for all (S) Effective systems facilitate proactive data analysis	(B) Engaged workforce (B) Retention (B) Sickness/absences (B) The views of a diverse group are regularly solicited (B) Supervisors engage with workforce on non-operational issues	(B) Consistency of messages (B) Strategic vision is clearly and meaningfully disseminated to all (B) Avoid/minimise the spread of rumours and speculation (S) Communications strategy

(B)= Behavioural (S)= System

Figure 4.15 Factors affecting collaboration

Work undertaken so far has shown reactionary tendencies toward improvement initiatives (collaborative planning initiative in Study 1 and a transformation project in Study 2) which have failed to account for the subtleties of collaborative behaviour as it emerges in practice. At the point where problems are socially recognised, solutions tend to be selected and rolled out before a thorough understanding of the problem has been achieved. The purpose of the New Practice Creation is to encourage practitioners to consider the wider institutionalised factors when attempting to influence the collaborative environment. Following the same process described above for the two consistent standards examples, 29 questions have been developed to assess the 29 factors identified in Figure 4.15. Completion of this assessment (see Figure 4.16 (and Appendix H on page 244) generates two indicative scores, one relating to behavioural factors (out of 70) and another related to systems (out of 75).



Systems		1 = Low <---------	Score (out of 5)	---------> 5 = High
	S1.1	Knowledge and data tends to remain with a few key individuals	0	Knowledge and data is continuously disseminated effectively amongst all
	S1.2	It is unclear how daily work activities align with overall project objectives	0	Everyone understands how their role and responsibilities align with project objectives/obligations
	S1.3	Staff turnover tends to be disruptive	0	New staff are effectively inducted and briefed on the processes and procedures aligned to their role
	S1.4	Documentation (process, procedures, manuals) tends to be uncontrolled and is created on a team by team basis is	0	Documentation (process, procedures, manuals) is controlled centrally and reviewed regularly for compliance and
	S1.5	'Right first time' principles are not consistently defined or communicated	0	'Right first time' principles are agreed and communicated
	S2.1	The operational and technical skills required to do the job are overlooked	0	The operational and technical skills required to do the job are fully understood
	S2.2	Softer, interpersonal, communication related skills required to support technical ability are not considered	0	Softer, interpersonal, communication related skills required to support technical ability are fully understood
	S3.1	People tend to have visibility of their individual (and sometimes their team's) workload only	0	Systems are in place to allow all work streams visibility of planned works
	S3.2	Works are planned on a team by team basis with little/no consideration for shared opportunities	0	Systems are in place to facilitate joined up planning of works to maximise resource sharing
	S3.3	When planning work, there is little or no knowledge of any impact (good or bad) this has for others	0	When planning works it is clear what effect (good or bad) this has for other teams/work streams
	S4.1	Data is usually made available after the effect to explain or justify actions	0	Data is available before action is taken and is used to proactively prevent problems
	S4.2	Any efforts to collaboratively make decisions is done on gut feeling and individuals knowledge	0	Systems are in place to provide reliable data to support efforts to collaboratively make decisions
	S4.3	It is not always possible to obtain the information/data required to complete tasks 'right first time'	0	Robust systems that provide intelligence to those who need it when they need it
	S4.4	Data management systems are weak	0	Systems are in place to capture accurate data and facilitate proactive analysis of the data
	S6.1	Communications are adhoc and tend to be spread via word of mouth	0	A communications strategy exists and is implemented
		Sub total	0 out of 75	

Behaviours		1 = Low <---------	Score (out of 5)	---------> 5 = High
	B1.1	When a problem is encountered, individuals tend to create solutions that benefit them/their immediate	0	When a problem is encountered, representatives across teams are consulted for solution development
	B1.2	Instances of non-conformance to standards tend to be concealed (intentionally or unintentionally)	0	Everyone understands their duty to raise instances of non-conformance to standards
	B2.1	Technical skills take precedent over softer interpersonal abilities	0	Interpersonal skills are assessed and evaluated alongside technical skills in PDRs
	B2.2	Self assessment of technical and non-technical skills is haphazard and unstructured	0	All people are encouraged and supported to undertake self-assessments of their skill set (technical
	B2.3	Skills development/assessment exists to support individuals in their role only	0	The wider needs of the team/project are considered when assessing/developing the skills of
	B3.1	Teams plan their work with autonomy	0	Team plan their work in consultation with other teams
	B5.1	The work force can be described as dis-engaged	0	The workforce can be described as engaged
	B5.2	Frequent changes in senior leadership teams	0	Infrequent changes in senior leadership team
	B5.3	The project experiences high levels of staff absence (sickness/stress/injury)	0	The project experiences low levels of absenteeism
	B5.4	A small team of managers feed into any improvement initiative on behalf of their staff	0	A cross section of staff are canvassed for opinion on improvement initiatives. All opinions are considered fairly
	B5.5	Supervisors' engagement with teams is infrequent. Where is does take place it is in relation to operational issues only	0	Supervisors regularly engage with their teams on operations and non-operational issues
	B6.1	The delivery of project related communications is inconsistent/non-existent	0	Project related communications are received by all who need to/are intended to receive them
	B6.2	A vision is not communicated or doesn't exisit	0	Strategic vision is clearly communicated to all
	B6.3	People tend to obtain company information via rumour / word of mouth	0	People learn of company news via appropriate / reliable channels
		Sub total	0 out of 70	

Figure 4.16 Extract from practice assessment

A score resulting in a quadrant 1 position (see Figure 4.17) indicates a chaotic situation whereby behaviours are unlikely to result in joined up solution generation and systems are not robust and are unlikely to mitigate variations in practice. Conversely a quadrant 4 position suggests robust systems supported by open and supportive behaviours displayed by people receptive to new ideas. As such, off the shelf tools, such as Lean construction, and the collaborative planning techniques explored in Objective 1 are likely to bring about positive improvements, but with an important caveat. The "application" of any such tool must be a part of a wider appreciation of the institutional factors, both regulatory and cognitive, that may influence the enactment of any such tool. In these cases, it would be understood that the use of tools would not be with the intention of bringing collaboration to a situation (collaboration as a noun) but would be viewed as a helpful support to collaboration as it continues to emerge dynamically (collaboration as a verb). Furthermore, the use of such tools should be monitored to understand how they affect the institutional landscape the micro-practices within. A score resulting in a quadrant 4 position suggests a culture that would be supportive of carefully implemented tools. Where an assessment score results in a position within quadrant 3 it is possible that people are collaborating too much. A score that places results in this quadrant suggest an absence of robust systems to guide activity with

consistency leading to increased human interaction to make sense of the situation. In literature this situation is described as dysfunctional collaboration (Zucker 1987). In these situations, it is likely that cognitive and normative institutions have prominence. It is predicted that in this situation, prescriptive tools such as collaborative planning observed in Study 1 would help to structure the already well developed behaviours that are largely aligned to typically collaborative working environment. In stark contrast a result in quadrant 2 suggests well developed systems may be so prescriptive that they are limiting potential for innovatively co-created solutions due tightly prescribed activities. Organisation with scores in this quadrant are predicted to be highly process driven.

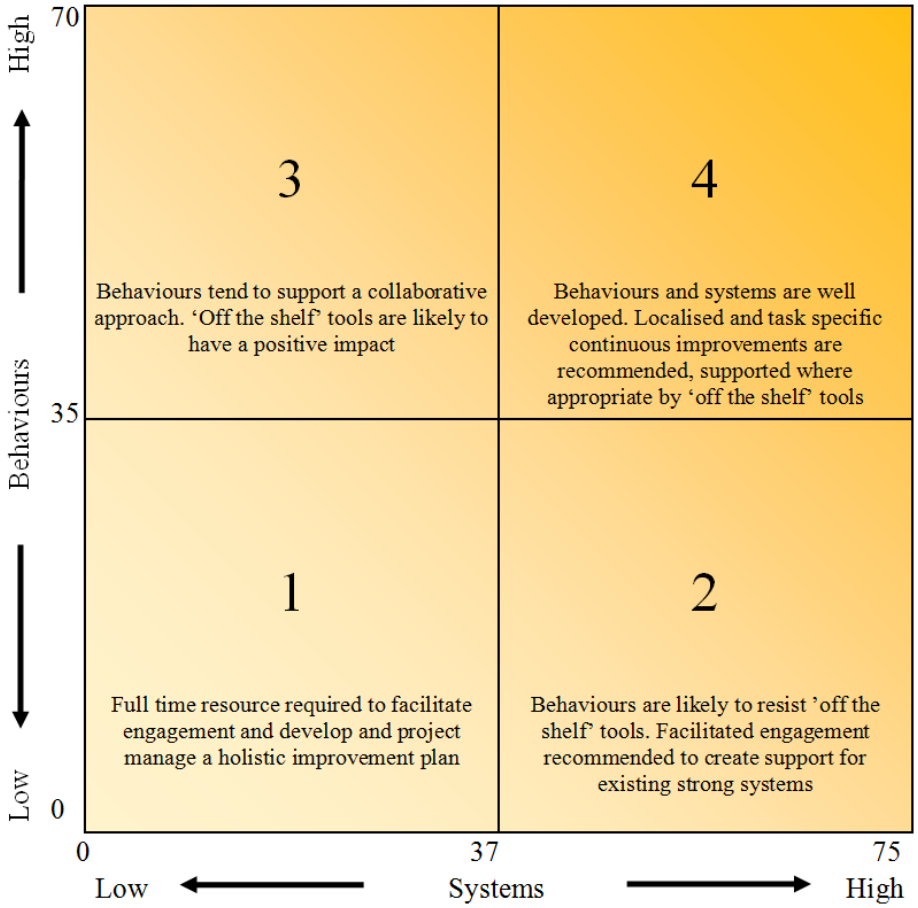


Figure 4.17 Recommendation summary

The scores correspond to recommendations intended to shape the support for collaborative working as it emerges (see Table 4.5). It is important to state; the resultant recommendations do not provide a checklist of actions to undertake to become collaborative. Nor is the assessment a measure of how collaborative behaviours are. Furthermore, the recommendations offered do not lock in a particular approach to "doing collaboration". The New Practice Creation and the associated recommendations are instead to guide practitioners

to decipher the institutional landscape and to appreciate the forces that act to create the organisation and therefore shape the type of collaboration that continuously emerges. The arrows between the high and low scores are double headed because it is recognised that the emergence of collaboration within organisations is dynamic and as it emerges it is shaped by macro-institutional forces. Therefore, it is assumed that a repetition of the assessment at another point in time could reasonably be expected to generate a different score that is just as likely to be lower than the first score as it is to be higher. A final point on the matrix is that it is not necessary to assume that a quadrant 4 position is the most desirable. What is desirable and what this New Practice Creation aims to support is for an organisation to understand where in the matrix is resides as it is this knowledge (appreciation of the institutional landscape) that will help it to best support the type of collaborative behaviour that is likely to emerge in practice.

Table 4.5 Recommended action to support collaborative practice

	Recommendation
Quadrant 1	The introduction of any formalised support for collaborative working practices is likely to be highly disruptive to the status quo. Resistance to the disruption caused is likely to be the main reason for failure. Any new off the shelf approach is likely to be unsustainable and/or result in localised improvement unless careful pre-planning and carefully managed support is carried out. A long-term plan of support and a full assessment of the current state is required. Regular updates to and from the Senior Management are recommended in order to identify the macro-institutional that are likely to impact the micro-practices of collaboration and vice versa. A full-time resource to manage the transition to the improved working practices is recommended alongside an assessment of additional resources required to support.
Quadrant 2	The introduction of tailored support for collaborative working practice is likely to enhance collaboration but existing behaviours are likely to resist "off the shelf" tools. Facilitated engagement is recommended to create support for the existing systems that are well developed. The transition to any new practice should be project managed with regular updates to and from the Senior Management in order to identify the macro-factors that are likely to impact the micro-practices of collaboration and vice versa. A medium to long term plan and a full assessment of the current state that a better supported collaborative environment is intended to alter is recommended, with particular attention paid the underlying causes of existing poor behaviours. It is recommended that the project manager identify champions to support the transition.
Quadrant 3	The introduction of supported collaborative working practice is likely to improve performance as existing behaviours are good. A medium to long term plan and a full assessment of the current state that greater support for collaboration is intended to alter is recommended. "Off the shelf" tools are likely to be accepted as people already exhibit collaborative behaviours but are lacking the support of robust systems to provide structure. Support for the new way of working should be project managed with regular updates to and from the Senior Management recommended in order to identify the macro-factors that are likely to impact the micro-practices of collaboration and vice versa. It is recommended that the project manager identify champions to support the transition.
Quadrant 4	The introduction of collaborative working tools and techniques are likely to improve the performance of an already largely collaborative working environment. Monitor any changes that are likely to impact already established systems, processes and procedures. Continue to consult with those affected (directly and indirectly) by the introduction of any new tool/technique. Continue to inform Senior Management of progress.

4.5.6 SUMMARY

To satisfy Objective 4 a new practice was designed and implemented within Study 3, known as the New Practice Creation. Throughout the activities described above, the RE made observations and validated these observations with project teams and senior leaders and where necessary referred to the literature. The RE was continually looking for evidence of micro-practices that would indicate the presence of regulatory or cognitive/normative institutional forces. The findings of Study 3 and the SIP led to the New Practice Creation.

The aim of the New Practice Creation was not to eradicate or change institutions. Theory suggests this would be futile as institutions are resistant to change (Zucker 1987) particularly, as previously discussed, the concept of proto-institutions (Phua 2006) suggests an industry-wide institution of adversary. Instead the practice was designed to encourage practitioners to approach collaborative working with an appreciation of the institutional landscape. Most importantly, a consideration of regulatory and cognitive/normative factors permits an identification of possible tensions and a sensitivity for the challenges this creates for service delivery. The adoption of a micro-practices approach permitted the identification of behaviours that indicated the presence of institutional forces. By placing greater emphasis on the character of the institutional structures that constrain the choices individuals make (Zucker 1987) it is possible that leadership can work to minimise and mitigate the institutions effects. The role of managers in creating and maintaining institutionalised routines is substantial (Zucker 1987). Unlike the localised, informal pockets of collaboration observed under Objective 3 and the 'little thread bridges' (Feldman 2003) that served to destabilise service delivery at the contract level, the holistic approach to delivery created stability; organisational participants were able to consciously understand how their actions made sense in the context they operate within (Feldman 2003). This approach facilitated the development of solutions to address the day-to-day problems identified in the focus groups but critically in a way that served to support the contract/project as a whole. It is important to note that improvements brought about are not a result of new, dominant institutional force to be collaborative. The need to fulfil strict contractual obligations remains. In this sense the collaboration occurring is incredibly fragile (Bresnen & Marshall 2000). By building on the learning from objectives 1, 2 and 3, the realisation of Objective 4 has led to the development of a New Practice Creation to improve service delivery when collaboration is required but when dominant regulatory institutional forces do not facilitate it.

To support practitioners with the New Practice Creation, an assessment has been developed. The purpose of the assessment was threefold: (1) to encourage practitioners to consider the institutional forces that act to shape the way collaboration emerges (2) to assess the preparedness of the organisation/project/contract to embark on more collaborative approaches (3) to recommend appropriate approaches to support collaborative working practices that align with the institutional landscape. The practice does not prescribe specific tools for use nor does it stipulate application techniques. The purpose of the assessment is to prompt a

consideration of the underlying circumstances that are likely (given the research here) to affect attempts to improve collaboration.

4.6 OBJECTIVE 5

Evaluate the impact of the practices

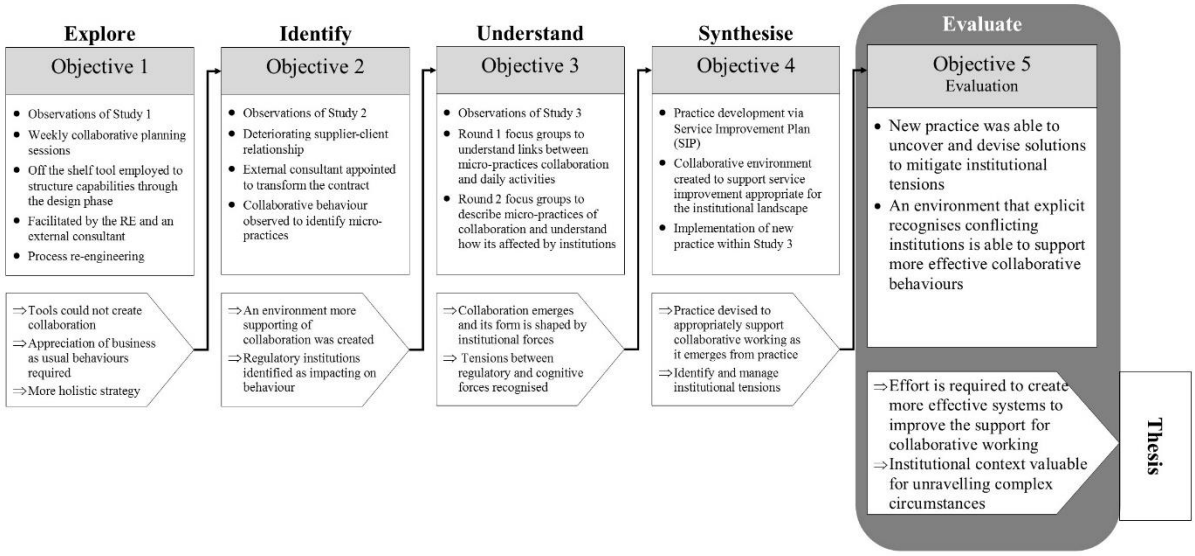


Figure 4.18 Objective 5 of 5

4.6.1 EVALUATION OF THE NEW PRACTICE CREATION MODEL

The purpose of Objective 5 (see Figure 4.18) is to evaluate the impact of the New Practice Creation Model on service delivery and collaborative working practices to answer the research question "how can collaborative working practices be managed better?". A typical approach to would be to measure the impact with indicators such as cost savings realised, reduction in deductions and increased in works complete. In this case, quantification of the benefit brought about by the new practice is problematic for the following reasons:

- The New Practice was implemented within a live project environment. Business as usual continued for the participants involved, as well as for those uninvolved with the SIP and the New Practice. Inevitably, action on the periphery of the new practice created impacted to both erode and enhance the solutions developed. It is impossible to define the scope of the solutions and therefore quantify the benefit, especially in terms of monetary savings.

- In order to enhance the collaborative nature of the practice, the solutions developed intentionally cut across multiple work streams. This once again made it difficult to define the scope of the solutions and assign quantifiable benefits.
- Isolating improvements brought about by the new practice was further complicated by the deteriorating relationship between the Industrial Sponsor (the service provider) and the Local Authority (the Client). Early 2018 saw both parties return to the courts to settle a long running contractual dispute; a dispute for which the courts had previously ruled in favour of the service provider. Following months of mediation, the Client upheld their right to appeal, this time with the Judge's decision ruling in favour of the Client. The heightened adversarial backdrop to the daily provision of the service was felt to increase the risk of financial deductions as any lenience on the part of the client was felt to have dissipated. Here, the challenge was to prevent old habits (as described in 4.5.3.1 on page 78) returning. Such a dramatic alteration to the underlying landscape of the project further complicated any attempts to measure any of the improvements. Even if it were straightforward to measure the benefits of the new practice, any measurement would be against a backdrop of worsening delivery conditions. There is no control to compare the observed situation to one where the new practice had not been initiated.

In the absence of a quantitative analysis of the impact of the new practice, six one to one interviews lasting between 30 minutes to an hour were conducted with the following range of project participants to evaluate progress:

- Inspection Manager
- Principal Planning Manager
- Quality Manager
- Project Manager
- Customer Services Manager
- Business Improvement Manager

The views of Managers were prioritised for the evaluation interviews as it is people in these roles who are required to shape the support required. In addition to the formal interviews conducted, the embedded nature of the researcher within the Sponsor organisation resulted in

many informal conversations regarding the perceived performance of the contact in relation to the New Practice Created.

Two dominant themes emerged from the evaluation interviews. The first theme centred around a perception by all that "things have improved" and that "we are better at that now". The second theme was the dominance the structure of contract has over the everyday decisions people make and the behaviours they enact. The perceived unfairness of the onerous obligations set out in the contract and the impact of the this perception on collaboration (Loosemore & Lim 2015) has dissipated. The regulatory institutions are still dominating actions but through the new practice created, these forces are being managed positively. The following interview extract illuminates this point:

"now we've got different issues because […] where previously [the defect record] was on paper, paper's not much of an issue if you don't want it to be, but now everything is tracked isn't it, so we know where people are what time they've done things if they've put a dodgy photo onto the system. You can see it. Before you wouldn't see if they hadn't taken quite the right picture".

There is wide recognition that the contract cannot be changed and the often-contradictory obligations will not go away. *"I think it's a lot stricter now to do the work".*

The ridicule for mistakes (which encouraged errors to be buried, leading to contractual noncompliance) has gone, to be replaced by support through a structured approach to mitigate the constraints to service delivery brought about by the peculiarities of the contract obligations. Previously, the fear of incurring a financial deduction due to improper defect rectification and the resulting derision prompted a cover up: paper records would "*go missing*".

"I don't think it's people not wanting to collaborate it's the actual work that they have to do and the fact that there will be a financial penalty if we don't get it done"

The relatively short duration and temporary nature of most construction projects is cited as a barrier to the realisation of a suitable culture (Baiden et al. 2006). Structured interactions provided by the New Practice Creation to support the ever present and inevitable human interaction, is felt to be supporting people to, with increasing confidence, reveal their delivery challenges and, with guidance, develop wide reaching and cross cutting solutions. furthermore, participants in the process feel an increased sense of sustainability brought about by the permanence of the embedded Business Support Team (BIT):

"what you tended to find here it is after a few months, regular meetings sort of go…[now] with the business improvement meetings you know there is another one coming and you know there's going to be an invite, where as any other meetings…because nobody asks about it, it just sort of fades away".

The assessment was evaluated alongside the developed practice during the one to one interviews described above. In addition, interview participants were asked to think about the systems used to manage the delivery of the service on the contract (both technology and non-technology enabled systems) and rank the effectiveness of those systems out of 10. They were also asked, out of 10, how collaborative they felt the behaviours on the contract to be. These two scores (represented as percentages) provided data points to locate positions within the assessment matrix, indicated in Figure 4.19 with a blue spot. Following this, participants were asked to answer the 29 questions in the assessment (see Figure 4.16). The scores from this assessment provided a secondary data point, indicated in Figure 4.19 with a green spot. The numbers within the coloured spots indicate the individual participants.

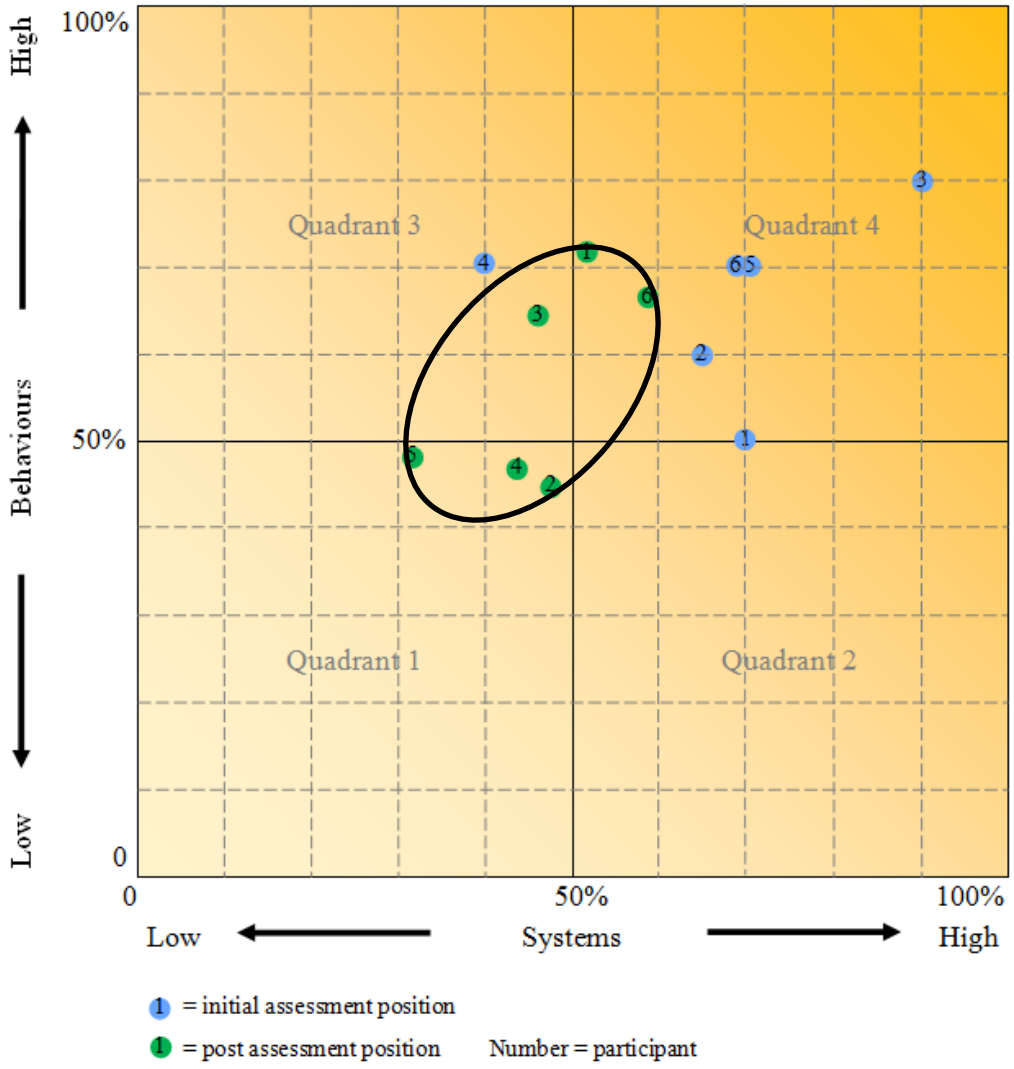


Figure 4.19 Assessment evaluation - assessment prediction versus assessment result

The clustering of the green spots (assessment results) around the centre suggests the assessment questionnaire provides a consistent assessment of the conditions present. The distance between the blue and green spots with the same number (i.e. the alternative results of the same participant) suggests people did not consider the same range of topics covered by the assessment when providing their initial assessment of the systems and behaviours of the contract. To reiterate, the questions within the assessment derive from the six cross cutting themes that emerged during the focus groups (see Table 4.3on page 71). This evaluation further reinforces the value of the assessment for prompting practitioners to consider the range of underlying factors that act to influence collaborative working.

The blue number three is an interesting anomaly in the assessment results. Cross referenced with the interview data reveals interesting considerations for project performance and for the

assessment. This participant, a Business Improvement Manager, has a broad overview of Study 3 and has, through the SIP and the creation of the new practice presented here, interacted with a wide range of people. When asked to rank the effectiveness of the systems, the discussion turned to the difference between effective and efficient. This participant justified the score of nine out of ten for effective systems based on company data that shows contractual obligation compliance to be over 99%. The participant felt the systems therefore had to be effective because, despite all the problems and the difficulties the contract suffers in terms of delivery and deductions, the overall compliance with contractual obligations is high, therefore the *effectiveness* of the systems must score nine. Discussion went on and this participant felt the efficiency of the systems and the range of work arounds that took place on a daily basis to get the work done represent an efficiency score of two out of ten. In the instance described here, the effectiveness of the systems was acting as a safety net, mitigating other negative effects of siloed working and rivalry between teams. On reflection, a possible refinement to the assessment would be to generate and overlay six separate matrices for each of the six thematic indicators that form the basis of the assessment as different measures may fall within different quadrants. The recommendations could in turn be refined to offer more targeted support for the alternative topics.

As with any assessment that is intended to be self-completed is open to interpretation and susceptive to subjectivity. The evaluation carried out here and the clustering of the results suggests reliability. Further testing of this practice and assessment on other projects is required for greater confidence in the resulting recommendations. However, it is important to once again state that the intention is not to prescribe and apply a pre-developed solution to a problem based on the results of this assessment. The motivation behind the development of this practice is to encourage practitioners, through a structured framework, to consider the wide range of institutionally ingrained factors that influence decision making. In doing so the intention is to prevent kneejerk reactions and unsustainable application of "quick fixes" that fix little and destabilise long term improvements.

Despite the improvements in Study 3, there remains no institutionalised contractual framework to anchor collaborative behaviour through contractual clauses and governance measures (Lloyd-walker et al. 2014). It is unclear whether another change in management (which for Study 3, is all but certain as there are many contract years remaining) would see the return of a management regime that fails to appreciate the importance of a supportive

collaborative environment. Significant headway has been made to develop and nurture a more collaborative environment informed by an appreciation of the institutional forces that are at work. But much damage has been done and there is much more work required. The assessment for Study 3 suggests practice is still hovering around the periphery of quadrant four.

4.6.2 LEGACY

Before summarising the work in this chapter generally, it is important to first summarise how the action research intervention has contributed to innovation in this field and how this innovation is intended to be used. Organised into three parts and supported by Figure 4.20 which pulls together the various elements already examined in this chapter, this legacy discussion covers:

- Understanding the problem
- Factors affecting collaboration
- Action to support collaborative practice

4.6.2.1 UNDERSTANDING THE PROBLEM

The first step to better supporting collaborative working practice is to recognise, and more importantly, to deeply understand the problem to be addressed. The New Practice Creation model, revisited as part 1 of Figure 4.20 (see Figure 4.14 for the full version), was created as a result of this research to graphically communicate to practitioners that action must go beyond attempts to alter existing practice in isolation. Shallow solutions deployed to create more collaborative working without first understanding what might be preventing effective collaboration are fragile. The literature told of change as a normal condition of organisational life and of human interaction that is inevitable (Tsoukas & Chia 2002) and of the fragility of collaboration (Bresnen & Marshall 2000). The model created here leaves behind an approach to supporting collaborative practice that builds on less fragile foundations.

In response to the Sponsor Organisation's aim to achieve collaboration innovation, the New Practice Creation Model has been used on other contracts within the sponsor organisation and with the supply chain to encourage and support a move away from the application of expensive, unsustainable, off-the-shelf, consultant applied solutions that have been observed to fail to account for the unique aspects of the scenarios they aim to improve.

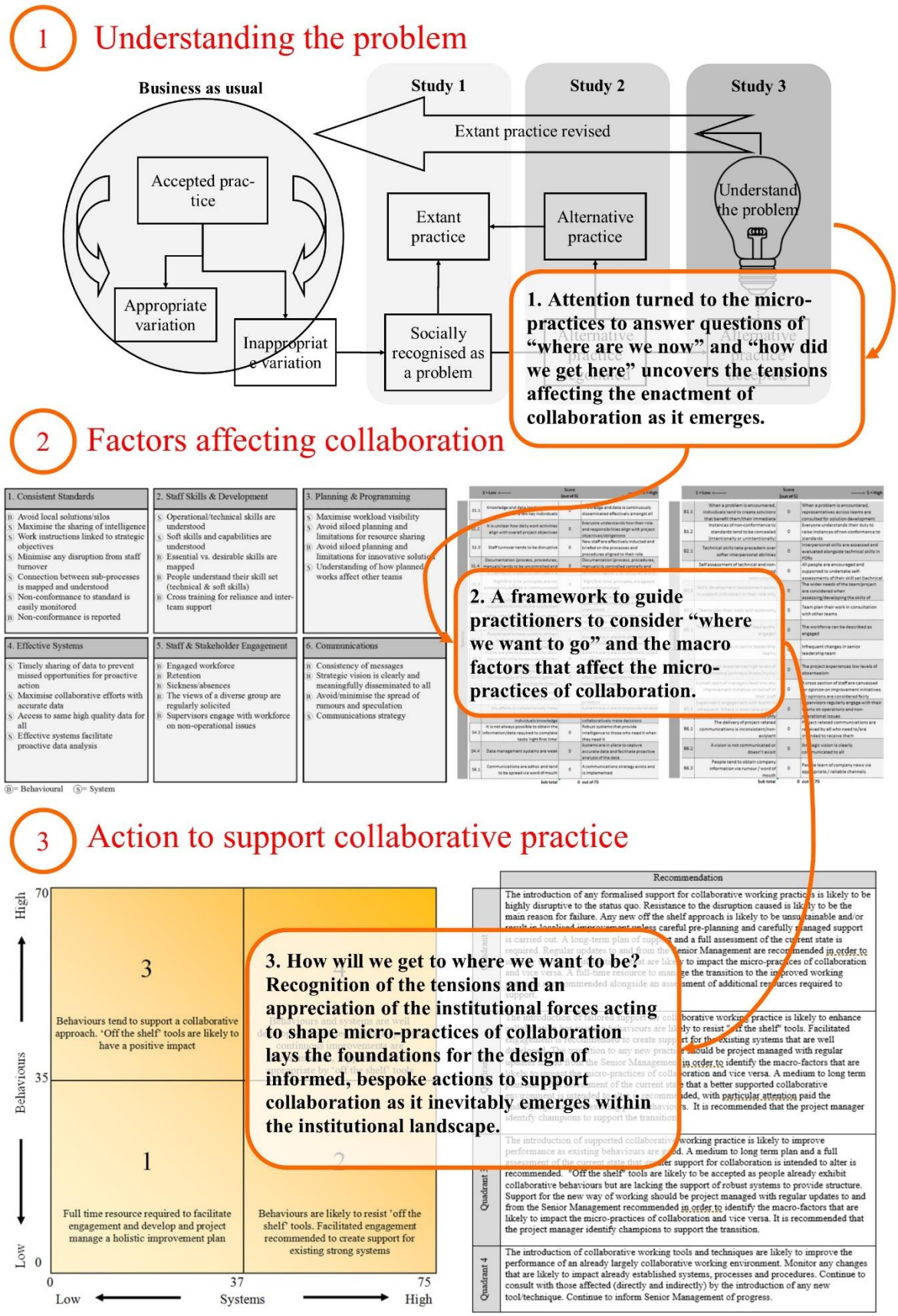


Figure 4.20 Summary of research legacy

4.6.2.2 FACTORS AFFECTING COLLABORATION

The micro-practice approach adopted in this study demonstrates the inseverable nature of macros and micro levels of analysis and how macro factors affect the enactment of micro-practices of collaboration. A key contribution of this research is the synthesis of hours of observations and workshop sessions to create a summary of the factors likely to affect collaborative working practice (refer back to Figure 4.15 for the full version). Of further value is the questionnaire developed from this summary to guide practitioners to consider practically how these factors can be identified in their specific organisational landscape. This contribution to practice addresses the critique of managerial action that often neglects tacit knowledge at the micro level (Rouleau 2005).

Since the work undertaken towards objective 3 and 4 of this study, the guiding framework recapped in part 2 of Figure 4.20 have been deployed by the Sponsor organisation during the mobilisation stage of new projects as this research has highlighted the requirement to set stronger foundations with regard collaborative working. From a practitioners perspective, this industrially applied research and the theory presented herein supports an institutional perspective towards the development of collaborative working arrangements. Practitioners have been able to use the New Practice Creation model to reflectively evaluate their current environment of collaboration and identify the tensions that require consideration. Educating senior leaders to recognise and account for the tensions they can better support collaboration as it emerges.

4.6.2.3 ACTION TO SUPPORT COLLABORATIVE PRACTICE

The inevitable emergence of collaboration was a key finding of this study. Observation of failures to recognise the ongoing nature of collaboration led to isolated and local optimised solution generation to deal with the challenges of service delivery in a complex multi-disciplinary environment.

Managing collaborative working for the purposes of service improvement should not be about identifying blockers and removing. Instead, a deep understanding of the tensions affecting practice and why these tensions occur is required. Understanding the creation and recreation of routines permits an understanding of why routines do and do not change (Feldman 2003). Where tensions are recognised but not understood it is easy to blame the contract for poor collaboration. This fails to recognise that any interpretation of the contract

had been shared accepted and enacted. The New Practice Creation Model guides the establishment of an alternative interpretation.

The New Practice Creation Model supports collaborative working practices as they emerge over time. The recommendations of how to tailor support to specifically meet the needs of the case are revisited in part 3 of Figure 4.20. As such, the innovation that the New Practice Creation Model leaves behind for industry is not a ready-to-use product but a set of recommendations, supported by a framework of considerations and guided by institutional theory. In the same way that this study asserts that collaboration be treated as an ongoing journey of becoming, the support for collaborative working must also continue to evolve as the journey unfolds.

As discussed earlier in this thesis, collaborative strategy cannot be used as the means to pursue collaborative practice ends because means and ends are constructed simultaneously in practice (Lave 1988). Findings of this study support the view of others that collaboration will not simply occur by physically bringing people together (Kokkonen 2017), much the same as applying technology cannot increase or decrease productivity or performance (Orlikowski 2000). Recognising that being collaborative is a continuous improvement journey the New Practice Creation Model deters practitioners from implementing collaborative working for the purposes of business improvement because being collaborative will be at the centre of the delivery approach. In this sense The New Practice Creation Model operationalises the need to study the effects of the institutional environment on governance in order to devise contingent strategies (Delhi et al. 2010) at a level that is accessible and actionable in industrial practice.

4.7 SUMMARY

Agency from an institutional work perspective is something often accomplished through the coordinated and uncoordinated efforts of a potentially large number of actors. Distributed agency invites researchers to explore how individual actors contribute to institutional change, how those contributions combine, how actors respond to one another's efforts, and how the accumulation of those contributions leads to a path of institutional change or stability. They suggest that researchers should consider the various contradictory and complementary institutional work done by the different actors as well as consider the actions of the multiple actors involved in institutional processes, considering distributed agency lead researchers to consider the multiple levels at which those actors operate. (Lawrence et al. 2011).

This chapter has provided a detailed account of the research undertaken to achieve the research aim, the supporting objectives and answer the research questions. It has explained how the information gathered has been used to formulate an understanding of the processes, contractual arrangements and relationships involved in the delivery of highways maintenance and management projects. In addition, this chapter has explained how this knowledge has been utilised to develop a supportive environment for more effective collaborative working practices. The next chapter will discuss the key findings of the research undertaken in association with the literature.

5 DISCUSSION

5.1 INTRODUCTION

This chapter discusses the key findings of the research in relation to the literature. The discussion is organised in line with the journey the thesis has taken thus far, see Figure 5.1.

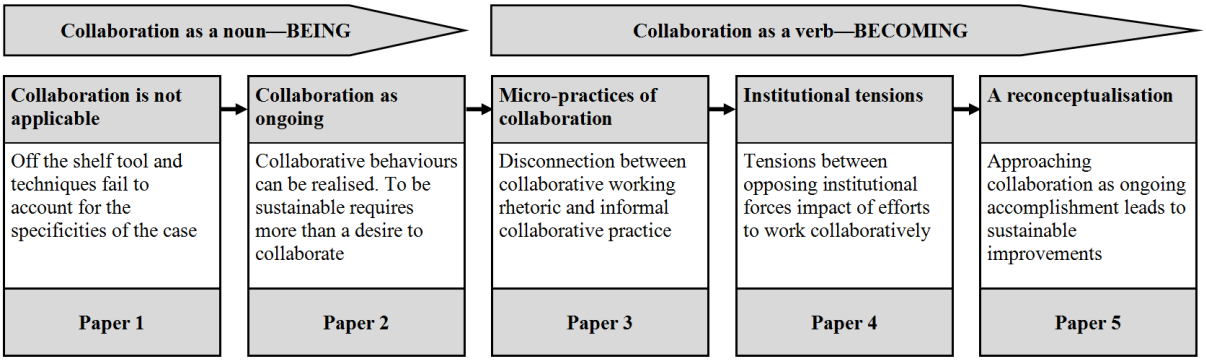


Figure 5.1 A summary of the findings

5.1.1 COLLABORATION IS NOT APPLICABLE

Work undertaken found off the shelf collaborative tools can offer valuable accounts of the merits and demerits such tools and techniques have on management practice but tend not to account for the specificities of the case they are intended to improve. A review of other research in this area found collaboration to be conceptualised as externally created and based on assumptions that knowledge can be captured and shared unproblematically (Newell et al. 2006). An examination of the micro practices of collaboration through the theoretical lens of institutional theory led to an identification of a failure on the part of applicable models of collaborative working to account for the embedded business as usual attitudes. The formalised collaborative planning methodologies explored via the work toward Objective 1 provided a social networking opportunity but a preoccupation with measurable benefits of collaboration such as percentage plan complete and reliability score not only detracted from softer cognitive/normative institutions (such as professional integrity and personal relationships) but also failed to consider the implications that these carry for the wider organisation. The tools applied (objectives 1 and 2) to support a more collaborative working environment were insufficient to radically change embedded attitudes, mainly due to the neglection of such attitudes as a consequence of the dominant regulatory institutions.

Early findings of this study resulted in recommendations that collaborative working initiatives be further developed to account for the subtle behavioural and cognitive/normative aspects of project delivery to avoid the pitfalls of prescriptive and rigid and approaches. The organisation of people into collocated working groups was found not to be the solution to the problem of collaboration but the catalyst for further necessary changes. The findings of this Study have demonstrated a vital need to adapt approaches to collaborative working to account for the embedded behaviours of individuals and their perceptions of the behaviour of others. As this study turned toward an understanding of why people do what they do (Dekker 2006) an institutional perceptive provided a useful structure to unravel the multiple complex set of circumstances influencing the observed behaviours. As the adopted micro-practices approach drew on institutional theory it became possible to begin to uncover linkages between macro-institutions (such as contract governance) and the enactment of collaboration.

5.1.2 COLLABORATION AS ONGOING

Winch (2001) and his conceptual framework for governance within an institutional context stipulates uncertainty decreases as a project progresses. Whilst this might be true for traditional construction or one off infrastructure projects it is not the case for highway maintenance contracts, particularly when we consider some contracts such as those for the management of constantly changing highway asset are 25 years in length. Uncertainty in these cases can arise at any time and it is difficult (or impossible) to design an all-encompassing contract, free of contradictions. Work undertaken here observed the tensions that arose between needing and wanting to develop workable solutions to reactionary highway maintenance issues (driven by cognitive forces) and the need to abide by contractually binding working methods tied to significant financial penalties (regulatory forces).

When supported more holistically, cooperation was found to affect performance and overcome many of the barriers put in place by an inherently uncollaborative contract form. This finding raised a need to go beyond the selection of the “right” contract to an understanding of how contracting practices affect social ties between the actors delivering complex projects such as those explored in this thesis. Furthermore, this finding suggests the need for a new perspective of collaborative working, particularly when contracting practice is adversarial. Theoretically, outcomes of this stage of the research prompted a re-conceptualisation of collaboration as a verb and as an ongoing accomplishment and offered a

new perspective on collaborative working when contracting practice is adversarial. Practically it raised questions for the operationalisation of collaborative working to avoid a rushed application of off the shelf techniques as reactionary responses to experiences of adversary.

5.1.3 MICRO-PRACTICES OF COLLABORATION

Existing studies position collaborative working as an innovative phenomenon whereby project teams go over and above normal expectations to deliver exceptional service with positive results. Such conceptualisations are perpetuated through organisational propaganda that tells of values at the organisational level to be collaborative. Driven by a reframing of collaboration as ongoing, a micro-practice investigation adopted here showed that collaboration is not exceptional and is normal and inevitable. Although focus group findings revealed that only collaborative activity labelled as such was recognised and valued by project participants, micro-practice observation showed collaboration to be a normal part of daily life but often haphazard, informal and relational, driven by a need and desire to get the job done. Furthermore, research revealed activities associated with meetings and face to face communication to be satisfying for participants, a finding that aligns with cognitive and normative institutions to behave in line with socially accepted behaviours. Alongside this, the findings suggest that everyday informal communications that create informal, locally optimised solutions, frequently result in unintended dysfunctional consequences.

The organisational level rhetoric of "we are collaborative" was observed to be insufficient to overcome what other studies discuss as the preoccupation with delivering project objectives to target (Newell et al. 2006; Austin et al. 2007). The finding here showed how technical concerns were prioritised over relational factors and at the expense of creating and supporting collaborative environments. As such regulatory institutions were seen to dominate when organisational rhetoric to be collaborative was not structured to positively impact project delivery. Instead transactional arrangements, formed around contractual obligations, allowed uncollaborative behaviours to flourish. Regulatory institutions that favoured adversary were legitimised through the micro-practices performed by staff in a manner consistent with them which did not draw disapproval from managers. The examples outlined in Chapter 4, such as the white board meetings, demonstrate how the performances of managers and supervisors (and subsequently their subordinates) creates and understanding for all about how the organisation operates (Feldman 2003). This enactment of (un)collaborative behaviour was

observed to occur simultaneously with cognitive forces that favoured interaction and team work creating tension. This practice was observed to play out until such a point that it became socially recognised as a problem (see Figure 4.14).

Once problematised, attempts to address the problems perceived to be created by uncollaborative and siloed approaches to delivery began in the guise of collaborative improvement projects (see Research undertaken for objectives 1 and 2). Findings showed these solutions were often applied as reactionary fixes to poorly defined problems. A reconceptualisation of collaboration as ongoing (coupled with institutional awareness) with attention turned towards micro-practices revealed two things: (1) informal collaboration, or collaborative efforts not labelled as such were not recognised and (2) not all collaboration is good. Sub-teams were found to collaborate to devise locally optimal solutions that served to negatively impact on other areas of delivery due to unintended consequences and contractual non-compliance. The latter suggests that understanding collaboration should not be limited to the mechanisms that stabilise it and there is a need to understand how to intentionally destabilise collaborative networks as well (London & Pablo 2017).

Informal collaboration (explored in Paper 2) was observed in Study 3 to occur as a mechanism to navigate the complexity faced. Interactions that occur in addition to formal lines of authority have been termed the ‘informal organisation’ (Weick 1969). In flatter organisations (i.e. those where relationships tend to radiate out through horizontal organisational structures rather than vertically) informal contacts will be initiated to get the work done and will be more numerous and their impact on performance more substantial than in tall organisations (Seidl & Whittington 2014). Supervisors support cannot be counted on and so support is sought from others engaged in similar activities (Weick 1969). Subordinates may be reluctant to ask supervisor for assistance through fear of highlighting incompetence and damaging their chance of promotion. The important point Weick makes is that the structure of organisations indirectly produces psychological consequences. The micro-practices approach adopted in this study revealed such linkages between macro regulatory institutions and micro-practices of collaboration.

5.1.4 INSTITUTIONAL TENSIONS

Study 3 (section 4.5) describes the REs design and implementation of an approach intended to practically link macro-institutional factors to micro-practices at an operational level. In doing so institutional theory was used to make sense of the micro-practices observed. Unlike

in project alliance arrangements where contractual drivers encourage parties to waive their rights to sue parties that do not perform (Lloyd-walker et al. 2014), strong regulatory institutional logics (for Study 3 in the form of financial deductions for any failures to meet contractual obligations) were observed to drive un-collaborative working practices. Focus groups unearthed a reoccurring situation of siloed working practices. Felt to be a consequence of the hefty financial deductions, different work streams were encouraged to focus on their discrete obligations. In support of previous studies, the contract type was found to influence the ability of parties to build trusting relationships (McDermott et al. 2005). True collaboration requires behavioural drivers that foster openness and a willingness to share the pain and gain from experimentation whilst protecting collaborators from blame (Lloyd-walker et al. 2014) but instead fear of repercussions of failure to delivery contractual obligations left participants reluctant to engage in open and collaborative problem solving. The dominance of the regulatory institution that drove this management style had significance because of how it influenced what the subordinates understood about how to operate within the organisation. The whiteboard meetings conducted by managers signified teams were in competition with one another: not to be the best but to avoid being the worst performer. The approach to come together as a contract team and collaboratively formulate plans to benefit the delivery of the contract holistically was not taken. As Feldman (2003) found with building managers, interviews revealed that previous management had engaged in actions that disrupted cooperation amongst their subordinates.

This study (and specifically Paper 4) has revealed how multiple institutions acting in the same operational space create tensions for project participants, such as the example of the whiteboard meetings described in 4.4.2). Findings have shown how teams, and individuals within teams, driven by a fear of reprisal, develop their own isolated solutions to the discrete problems facing them and in doing so unwittingly create problems elsewhere. Triggered by a collective social recognition of the problem, which in the case of Study 3 manifested as significant financial deduction, a contract-wide Service Improvement Plan (SIP) was initiated. An evaluation of the SIP showed how an investment in effort to understand and appreciate the underlying circumstances affecting project delivery allowed managers to drive beyond a discussion of the symptoms of problems to an examination of the root causes of the tensions experienced. As a result, support was reformed to provide bespoke solutions for collaborative working to flourish. As such, an ability or willingness to enact collaborative approaches to service provision is determined more by the institutional forces than the notion

that being collaborative leads to increased efficiency and profitability. Whilst there are studies that say the level of team integration is related to procurement approach (Baiden et al. 2006) and advise which forms of project procurement best support collaborative working environments (Lloyd-walker et al. 2014) the focus of this study is toward an understanding of how collaboration is enacted given the peculiarities of ongoing highway maintenance work. Examining micro-practices of collaboration whilst simultaneously considering the macros factors at play (Zucker 1977) has shown that attempts to change micro-practices without appreciating the macro situation creates isolated and unsustainable improvements. Furthermore, a conceptualisation of collaboration as ongoing mobilises a critique of off the shelf collaborative techniques that have been shown to create localised unsustainable changes to extant practice.

This study has identified regulatory institutions of adversary in the pursuit of regulatory compliance whereby people in the organisation act in a manner that is at odds with the vision articulated at the top. This has been discovered in other research (Feldman 2003). Weick talks of the subordinate ultimately determining the amount of influence exerted by those who lead (Weick 1969), thereby asserting four factors: that the person at the top is in a vulnerable position; subordinates do not realise the amount of control they actually have; for hierarchy to be maintained, it must be continuously re-established by the person above sending acceptable orders; and self-interest always determines the acceptance of orders. The important point for driving a collaborative approach is for support for it to come from the top. That is not to say that only the person at the top rules. The control of the one person is made possible by the pattern of relationships (not the traits of the individuals per se) that makes their influence possible (Weick 1969). The ability to connect the macro-level strategic decisions consistently and meaningfully to the micro-level delivery of services requires effective patterns of relationships. The findings from this work (and presented in Paper 5, Appendix E) demonstrate that people related factors of leadership competence are positively and significantly associated with project performance, indicating that a project manager or engineering manager focusing on people-related leadership significantly improves project performance (Ahmed & Anantatmula 2017; Zhang et al. 2018). In support of this, the practice developed in 4.5.5 isolates behavioural factors for consideration when planning the support for a collaborative approach to improvement. The findings of this study show how the vision and associated values set at the organisational level are not consistently enacted at the contract, or local, level. The behaviour of managers and supervisors at the local level was

associated with inhibiting the emergence of the vision they articulate. Whilst organisational participants valued the concept of being collaborative they often felt this was not enacted by their seniors or supported by the organisational structure which instead supported teams to work in silos. Like studies before, senior managers were found to enact behaviours that benefited themselves whilst working against the interests of others (Lloyd-walker et al. 2014), and in this case the ultimate customer: the general public.

5.2 SUMMARY

This discussion has set out how an examination of the micro-practices of collaboration identified regulatory institutions to be dominant practice in all three of the studies observed. All three studies were governed by contracts devoid of incentives to encourage collaboration. The findings revealed any such incentives are not essential if support afforded to collaborative service delivery is adapted to suit the institutional landscape in which it resides. The practices developed here did not involve any fundamental changes to regulatory contractual obligations but instead facilitated an alternative approach among the project teams to collaborate. The institutional landscape was incorporated into the design of the service delivery and project improvement strategy.

This study addresses the criticism levelled at neo-institutional theory for its tendency to divert attention away from the multi-level nature of how new activity emerges and focus on the actions of the few; the powerful ‘heroes’ as Lounsbury & Crumley (2007) calls them which results in attention around the latter stages of practice creation. Here a case is made for greater attention to be paid to the micro-practices of a wide and diverse body of actors in understanding the institutionalised conditions in the build up to practice creation.

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6 CONCLUSION

6.1 INTRODUCTION

This concluding chapter outlines the contributions the study has made by first revisiting the aim and objectives of the study before summarising the outputs. Following this is a brief discussion of the theoretical and industrial contributions made and the wider implications of the study. A critical evaluation of the research is given, followed by recommendations for the Industrial Sponsor before concluding with suggestions for areas of possible further research.

6.2 REALISATION OF AIM AND OBJECTIVES

The aim of this study was to establish how collaboration can support the delivery of highway maintenance and management services through a consideration of the contractual arrangements, the management of relationships and the application of tools and techniques. Key findings as they apply to the research objectives are recapped and presented in Table 6.1

Table 6.1 Research objectives and key findings

Key:
P Primary evidence
S Supporting evidence

Objective	Key findings	Evidence				
		Paper 1	Paper 2	Paper 3	Paper 4	Paper 5
1. Explore the processes for delivering highway maintenance and management services	Collaboration is dealt with as applicable. Bringing people together does not automatically create better collaboration.	**P**				
2. Identify the contractual arrangements for highway maintenance and management	Contracts can be the inhibitor of collaborative practice. Collaborative practice can be grafted on to otherwise adversarial project delivery but the effort is resource intensive and unsustainable.	**S**	**P**	**S**		
3. Understand how relationships are managed for maintenance and management of highways	Micro practices reveal a focus on technical and commercial concerns at the expense of creating appropriate environments for collaboration to flourish.		**S**	**P**	**S**	
4. Synthesise learning from objectives 1, 2 and 3 to design practices to improve project execution	Tensions between regulatory and cognitive institutional forces and act to shape the micro-practices of collaborative practice. With an understanding these tension practitioners can reform their support for collaborative working.	**S**	**S**	**S**	**P**	
5. Evaluate the impact of the practices	With a greater appreciation for the institutional forces that shape individuals' actions, support for collaborative working can be bespoke with normative tools and techniques employed with greater effect.			**S**	**S**	**P**

6.3 RESEARCH QUESTIONS

Through the work summarised above, the research questions have been answered as follows:

1. What tools and techniques are available for the facilitation of collaboration for performance improvement?

   Collaborative planning methodologies were selected by the Sponsor organisation as the preferred tool with which to support a more collaborative approach to service delivery. The work towards meeting Objective 1 delved more deeply into question through an examination of the steps taken by the Sponsor organisation to manage a collaborative approach to project delivery. Observations were made as the RE facilitated the roll out of an "off the shelf" procedural tool designed to result in collaboratively planned works. This work package revealed how the Sponsor organisation tends to approach collaborative working. Answering this research question exposed the inadequacies of conceptualising collaboration as applicable. Ready to use tools and techniques provide a useful structure in which collaboration can occur, but a failure to account for the subtle behavioural aspects prevents the embedding of any such structure

2. How does contract governance influence collaboration?

   In addressing Objective 2 it was possible to answer this research question and identify the effects that adversarial contractual arrangements have on motivations to take a collaborative approach to service delivery. Through linkages to macro institutional forces it was possible to see how contract governance influences the enactment collaboration. Where regulatory forces dominate and motivations are to prioritise profit over quality and to minimise financial deduction, collaboration emerges in silos. These disjointed patterns of collaborative behaviour serve to benefit isolated groups to the detriment of the service delivery as a whole.

3. How are collaborative relationships managed to support service delivery?

   Conceptually, work in this area revealed how only interactions that were formally labelled as "collaborative" (for example, collaborative planning meetings) were recognised as being such. With attention turned to the micro-practices of collaboration, work towards Objective 3 uncovered an inevitability of human interaction and the evolution of multiple informal relationships founded on personality based linkages.

Without appropriate support to manage these evolving relationships service delivery was negatively impacted.

4. How does collaboration influence project performance?

   Answers to this research question can be found throughout this thesis and collaboration has been observed to have both favourable and unfavourable consequences for project performance. In summary, through an appreciation of institutional factors it becomes possible to see collaboration as an emergent phenomenon. Where the underlying conditions drive contractually competitive behaviour between work streams, collaboration emerges as disconnected from any organisational level rhetoric to be collaborative. When a collaborative environment is prioritised the performance of the holistic team is enhanced. The practice developed in Objective 4 provides guidance for the support of collaboration in the drive for service improvement.

5. How is commercial strategy translated into highway maintenance service delivery?

   This thesis has demonstrated how commercial strategy that is dominated by institutions to regulate profit are operationalised to encourage competition between service delivery teams. Objective 4 sets out the implications this has for collaborative working.

6. How is collaborative working enacted during project delivery?

   Focusing on micro-practices whilst utilising institutionalisation as a mechanism to link the micro to the macro, has allowed this question to be answered. In short, collaborative working practice is an emergent social phenomenon and the form it takes as it emerges in practice is shaped by macro-institutional factors. In answering this question, this study has provided justification for collaborative working practice to be viewed as an ongoing accomplishment. As such this research calls for a reconceptualization of collaboration as an emergent phenomenon, in a departure from treating is as applicable methodology.

7. How can collaborative working practices be managed better?

   The practices developed through this study have demonstrated how support for collaborative working can be tailored to account for the specificities of an organisation's institutional landscape in order to mitigate the unfavourable consequences adversarial contractual arrangements have on service delivery.

The research undertaken to meet the objectives of this study and answer the research questions resulted in the key findings summarised above, the publication of the academic papers contained in this thesis, leading to the overall achievement of the aim.

6.4 OUTPUTS

Throughout the course of the EngD research five academic papers were produced; three published conference papers, one conference paper accepted for publication and one published journal paper. The contributions these papers make and how they connect to the research objective of this study are discussed within the objectives of chapter 4. The papers and the key contributions they made are summarised here:

Paper 1

This study of collaborative planning demonstrates that off the shelf tools can bring about improvements in programme predictability but in doing so revealed a need to do more than bring people together to achieve collaboration. Whilst the off the shelf tool adopted did not explicitly allow for it, collaborative planning kick started project level learning for the transfer of knowledge that could not be transmitted via IT systems and documentation.

Paper 2

This study revealed how transactional contracts prioritise profit over quality and stimulate non-collaborative behaviours. Contra to previous work that positions relationships as a consequence of the contract, this study offers a view that with appropriate support, collaborative relationships can thrive in unfavourable contractual conditions.

Paper 3

The purpose of this study was to dive deeper into the micro-practices of collaboration to understand the disconnection between collaborative rhetoric and collaborative practice. Unlike other work, this study reveals a need for sustained collaborative effort, suggesting a need to reconceptualise collaboration as ongoing.

Paper 4

This study has provided the language with which to describe the forces acting on practitioners, simultaneously encouraging and discouraging a collaborative approach to service delivery. This study has provided a theoretical lens of institutional theory through

which the complex tensions can be navigated as attempts are made to explain and give meaning to the challenges faced when working more collaboratively. Furthermore, this study has shown what can be achieved when a non-relational form of contract is employed. This study has shown that a deep and meaningful appreciation of the institutional forces within a construction management context (Bresnen 2017) can support a sustainable journey towards being collaborative (Marshall 2014).

Paper 5

This study takes a novel look toward institutional theory to understand how micro-practices of collaborative behaviour are shaped by macro-institutional logics. The paper proposes a framework for an alternative approach to service improvement that addresses the failure to recognise conflicting logics, understand why conflict arises and effectively manage the consequences, particularly in adversarial environments.

6.5 CONTRIBUTION

As discussed in Chapter 1 this study makes three key contributions which, as depicted in Figure 6.1, nest within one another. As the purpose of an EngD is to attend to both academic and practical gaps in knowledge, so too do the contributions. Firstly, the work undertaken addresses a lack of insight into micro-practices within institutional theory, something institutional work theory is trying to tackle. To do so has demanded a more holistic account of institutional action that moves beyond simple dyadic relationships and discrete logics, toward the assumption that actors, at any given time, are subject to pressures from many different institutions and are often responding locally, creatively, incrementally, and more or less reflexively (Lawrence et al. 2011). The perspective of this research study has attended more closely to practice and process than to outcome—asking “why” and “how” rather than “what” and “when.”. This work demonstrates how attention paid to the micro-practices of collaborative action that simultaneously looks to an understanding of institutional pressures assists us to “see” collaboration as an emergent social phenomenon. Whilst the scope of this study was limited to developing an understanding of collaboration, the implications of these findings contribute to research across multiple fields of study by setting out how institutionalisation can be harnessed as a mechanism with which to understand the unfolding of a plethora of circumstances involving any social interactions.

Secondly, this research attends to the paucity of work concerning institutional theory in construction management literature. Mobilising this underutilised theory in the field has introduced novelty; reverently connecting institutional logics with micro-practices to conceptualise collaboration as an ongoing accomplishment. This fresh approach is a departure from an entrenched literature that positions collaboration in a way that it can be applied. There is an abundance of literature that deals with collaboration in construction but unlike the research that has gone before, this work reveals a significant volume of granular level detail about how and why collaboration unfolds in practice. This important contribution is largely attributable to the methodology adopted which allowed the RE to be immersed in the case study for many years. As well as contributing novelty to academic knowledge, the outputs of this study contribute valuable insights. This study shows how a consideration of intuitional work theory offers important lessons to a field which continues to suffer considerably from non-collaborative and adversarial contracting practices. As with the first contribution, it is expected that this will have implications wider than for the topic of collaboration because these lessons teach of a need (and offer practices that demonstrate how) to understand the underlying forces that shape social phenomena.

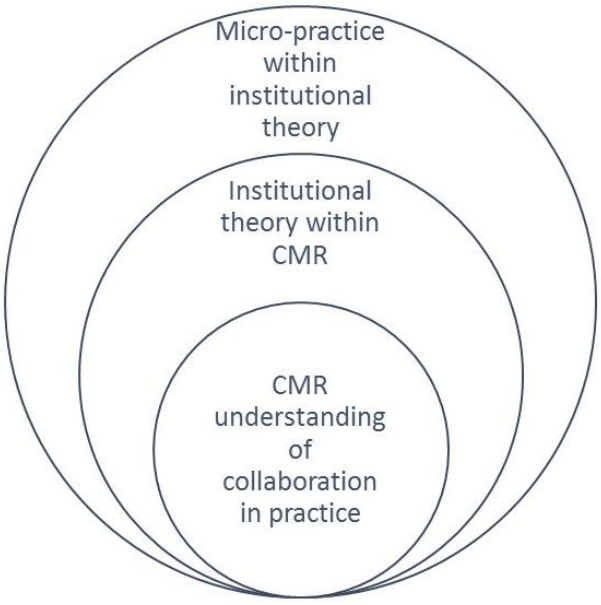

Figure 6.1 Contributions of the study

The third contribution at the centre of Figure 6.1 is largely a practical one as this research has sought to understand how collaborative working unfolds within these complex highway maintenance projects. In doing so a contribution is made to industry in the form of a practice to provide actionable recommendations for an enhanced support of collaborative behaviours

as they unfold during project delivery. The construction industry continues to be characterised by transitional, transactional contracting practices. Adversary continues to be present. Public sector clients that must demonstrate proper disbursement of public funds seem most reluctant to move away from transactional lump sum contracting practices. Whilst the prevailing methods used to govern the UKs highways maintenance and management services continue to be at odds with the industry's desire for a more collaborative approach, suppliers have little choice but to continue in this vein. This study contributes with a recommendation that wider institutional factors be considered when enacting a collaborative approach within often adversarial contracts. To do this a practice has been developed to support managers in their consideration of these wider institutionalised factors. In doing so this work provides an additional contribution to industry through a translation of what are perceived as irrelevant, often abstract, academic theories into something that can support industrial practice (as the nested diagram above depicts). In the case of this study, whilst the RE found institutional theory to a valuable theoretical lens with which to explain and explore industrial phenomena, it was a difficult theory to explicate in plain terms. A valuable contribution has been to make this theory relevant to practice and translate it so it can be used to express the need to consider institutions, to understand where they are generated and to see how they affect practice in order to better support a collaborative approach.

6.6 IMPLICATIONS FOR THE SPONSOR

The implications and impact on the Sponsor have been monitored and presented to the Industrial Sponsor and senior managers throughout the research, with decisions made by managers because of the research informing the next stage of the research process. The Sponsor has been able to use this research to inform the development of a dedicated contract improvement team. A recognition of the dominance of regulatory institutions has led to the development of an approach that has made contractual obligations relevant to each stage of delivery. From a researcher's perspective, it has been exciting to experience the positive impact the findings of this study have had on service provision. The work undertaken is encouraging and supporting teams to work together strategically (not in isolated pockets) to navigate the complexity of the contract and find working practices that best balance regulatory and cognitive/normative logics. The results of this study are being used to develop similar service improvement plans on other similar contracts within the Industrial Sponsor organisation portfolio, drawing on the central premise of the approach that wider

organisational factors and the uniqueness of the case must form the basis of any improvement project design. The developed practice, validated by a selection of managers, has proved to be a useful practice to engage management in the organisational aspects that need to be addressed to promote sustainable and effective, collaborative improvement practice.

6.7 IMPLICATIONS FOR WIDER INDUSTRY

The methods adopted here to focus on the micro-practices has meant that these findings are particular to the intricacies of this case: the contracts employed, the economic climate at the time of tender, the people involved, their motivations (personal and professional), the nature of the highway maintenance services being delivered, the geography of the service provision, the style of leadership exhibited by management and the decisions made over time. The practices developed here were designed to facilitate a collaborative approach to service delivery in response to the criticism of prescriptive collaborative initiatives laid out in Objective 1. As such, the SIP was a bespoke design tailored to the specific needs of the case and effort was spent to understand and appreciate the institutional landscape with an approach to enhance service delivery designed to best fit. That said, the bespoke approach was founded on six generalizable themes, themes used in the development of a practice intended to guide any organisation to develop an approach to collaboration as an ongoing accomplishment. The practice developed has been designed to support practitioners in their ambitions to promote more collaborative working. But the assessment and associated recommendations could easily be adapted to support a wider range of change management initiatives.

6.8 LIMITATIONS AND DIRECTION FOR FURTHER RESEARCH

The overarching purpose of the EngD is for the research to be industrially applicable. This creates a challenge given the inaccessibility of either world to the other. Academics can struggle to gain access to industrial settings and industry practitioners find it difficult to assess what is oft perceive as non-practical, theoretical academia. A key objective for the EngD RE is to bridge these two worlds. This task requires a frequent ‘swapping of hats’. For the RE, wearing the academic hat in an academic setting was often straightforward, as was wearing the industrial hat within the workplace. A more challenging undertaking was to wear the opposing hat and, in doing so fulfil the need to generate a unique contribution to academic knowledge whilst providing industry with an applicable contribution to practice.

An important part of academic rigour is to critically evaluate the research carried out, gain an understanding of the effectiveness of the research given the choice of methods and how the research may have been improved. A conventional positivist paradigm might be concerned with a critical review of internal validity, external validity reliability and objectivity, but a more accurate reflection of a qualitative paradigm attempts to demonstrate credibility, transferability, dependability and confirmability (Marshall & Rossman 1999).

1. Credibility – was the study accurately identified and described?

Despite the rich descriptions of the case, textual representation only provides a series of snap shots over time (Tsoukas & Chia 2002). Great efforts have been made here to represent the diverse interactions of organisational members and to explain the transitions between the snap shots provided. The research design explicitly canvassed a wide range of perspectives (type of professional, role, gender, age, qualification and seniority) from across the case study to ensure data analysis was not limited to the viewpoints of one group. The RE has benefited from the support of industrial supervisors who have acted as strong advocates for the research.

The RE recognises that alongside the benefit of exposure within the Sponsoring organisation, such advocacy affects the REs engagement and participants' engagement with the research process. The RE has developed an in-depth understanding and empathy for the research participants, but to provide an account of the true unfolding of collaboration is not possible. Whilst the observations for this study have been vast, the RE could not be everywhere all the time. Textual representations of the case can only be suggestive of the actual ongoing practice.

2. Transferable – is the study useful to others in other situations?

The approach taken to study the intra-organisational micro-practices of collaboration offers an alternate view to traditional viewpoints that view collaboration as between partners across organisational divides and along supply chains. Single case study, for all its benefits has the drawback that stifles scientific generalisation (Yin 2014). Due to the scope and structure of this study it has not been possible to explore how other firms might deal with the institutional forces that have been seen to affect this case. Furthermore, the structure of the EngD programme and the sponsorship arrangement prevented the RE from purposefully selecting the site (and to lesser degree the participants) for data collection (Creswell 2009). Literature

tells us that adversary is an industry wide ailment and that other firms grapple with the enactment of collaborative working which has led to the assumption that the findings of this study would have value if transferred. That said, any attempt to reproduce the work of this study should consider that qualitative research does not claim to be replicable, and cannot because of real world changes (Marshall & Rossman 1999).

Replication of the approach developed here to guide the support for collaboration calls for investment in resource and time to better facilitate collaborative working. It is recognised that this may be met with resistance by senior managers who have to operate within strict budget constraints. This study has not attempted to justify the need for the approaches recommended here in terms of commercial or financial benefits realised.

3. Confirmability – should the findings of the study be confirmed by others?

In managing bias of this nature, industrial and academic supervisors were utilised to play "devil's advocate" (Marshall & Rossman 1999) and challenge the unfolding findings practically and theoretically and in essence drawing on their experience and viewpoint as a sounding board for the observations made. Individuals in the Industrial Sponsor organisation were also drawn upon to discuss findings. Corroborating and refuting data in an iterative manner with a range of people was the method used in determining what to accept as truth.

The action research framework of this study facilitated an opportunistic approach for the iterative development of the practice intervention and the benefits of this approach were discussed in Chapter 3. The adoption of emergent-spontaneous data collection technique such as this meant the RE had to forego a planned-systematic approach when it came to the selection of projects to be included in the study. Because of the problem-solving nature of the research practice being developed, the opportunities that were presented to the RE were of the kind that were experiencing difficulties of some kind. As such, the assertions made in this study have not been tested on projects with non-adversarial or relatively non-problematic conditions. Further research is therefore required to understand how alternative institutional forces, particularly those that as less regulatory, affect the micro-practice of collaboration as it emerges in practice.

The scope of this study has not allowed for an exploration of how other firms enact their rhetoric of being collaborative (as per their websites, strategy docs, vision statements etc.) and whether all firms react to institutions to conform to regulatory forces in the same way.

Further researcher is required to compare and contrast how other organisations that use traditional, transactional contracts manage the potential tensions between adversary and collaboration.

4. Dependability – is the study able to account for the changes brought about as the understanding of the research setting is refined?

As set out in Section 3.2 on page 33, this research aligned with an interpretive epistemology and took a constructivist stance and as such asserts that the mere presence of the researcher alters the environment and influences the data gathered. Due to the researcher's sustained and intensive engagement with the participants, the background, interests and personality of the research is likely to have shaped the interpretations formed during the study (Creswell 2009). Observations and interviews through this study were carried out by same researcher to mitigate bias of this nature. Whilst this provides consistency, it increases the likelihood of confirmability issues, a frequent criticism of a qualitative research design concerning subjectivity on the part of the researcher. In this case the RE recognises a weakness of bias but argues bias has been largely mitigated and any negativity is outweighed by the benefits of the RE's entry into the real world and the ability to describe in detail the complex social systems studied.

Whilst the findings here have not been tested outside of the interventions of these three studies, they have been tested within these three live and dynamic real-life scenarios. This dynamism, however, makes it unrealistic to claim the changes observed all resulted solely from the practices developed as part of this research. Other factors that cannot be isolated from the study are likely to have had an influencing factor on the findings. Whilst consisting of only three studies within one case study organisation, the results presented here benefit from the volume of participants included over the four and half years of the study. Although embeddedness made data collection simpler at times, consideration has to be paid to the risk of bias, incomplete or compromised data (Creswell 2009).

Outside of the scope of this largely intra-organisational study is a consideration of a situation in which two opposing parties (e.g. client and supplier) are assessed to be in different quadrants of the assessment (see Figure 4.17). an interesting avenue for further study would be to investigate the implications of opposing scores for both intra- and inter-organisational collaboration.

Except for some analysis in paper 1 of the boundary objects of collaborative planning, this study has paid little consideration to the non-human actors of collaboration. For instance, almost no attention was paid to the interaction human participant have with the systems used to transfer knowledge from individual to individual. Further research may benefit from an analysis of such factors, particularly in connection with the need purported in this study for collaborative working to be supported by robust systems and processes.

An important test of a proposed new concept is whether it engenders new, interesting questions or provides fresh, useful perspectives on existing ones (Lawrence et al. 2011). This study has indicated how the concept of institutional work has significant promise in this respect. A superficial and reductionist view of collaborative working environments has been shown here to be insufficient to understand the full picture. That said, much of what it means to be collaborative remains unknown. It is expected that this research will prompt the research community to reframe collaboration as an ongoing journey of accomplishment and therefore pose alternative, fresh research questions to continue to understand how it unfolds in practice. Mobilising institutional theory within construction management research is intended to encourage researchers to question the macro factors that act to continuously shape and reshape project environments. This study has focused on collaborative working within a highway maintenance context but an abstraction of the insights presented here for application to other fields of study across construction management, and beyond, would call into question our knowledge of things we thought we knew.

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APPENDIX A

PAPER 1: A NOVEL COLLABORATIVE PLANNING METHODOLOGY FOR COMPLEX INFRASTRUCTURE DESIGN PROJECTS

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Abstract

The design of complex infrastructure projects requires inputs from a complex set of interconnected disciplines. If it progresses without sufficient information it can evolve in an inappropriate direction and can lead to downstream problems and re-work. Collaboration has been identified as a crucial enabler of effective design and can have great effects on the final design performance of the completed asset. However, the design phase is frequently late, exhibits low programme predictability and has been identified as an area in need of improvement and greater control. Traditional project management techniques are reported to be insufficient to deal with the increasing complex nature of construction and engineering projects. Furthermore, process knowledge fails to be captured resulting in deficient cross project learning. The purpose of this research is to identify how collaborative planning can be developed to support such design processes and to test these within live project environments.

Following an extensive literature review, a series of collaborative planning meetings were organised for those involved in highways design activities. These meetings were structured and facilitated in such a way as to reveal issues which could have led to design inefficiencies. Weekly observations were made over a four month period with the team members of nine design schemes in order to examine the factors which enabled and inhibited the development of effective design solutions.

The collaborative planning process revealed deviations from the standard process procedures resulting in process discontinuities, negative design iterations, wasted opportunities and inefficient use of resources. As the collaboration was structured through the workshops it was

possible to further reconfigure the design process and realise benefits in terms of programme predictability. Visual aids proved to be to be a powerful way of understanding how objects can enable multifarious people to mutually understand a process.

The research demonstrates how collaborative planning, augmented with process mapping, can yield process performance and increase programme predictability of large scale highways maintenance schemes. However, results indicate that the act of bringing people together to collaboratively plan their work is not an end in itself but the catalyst for other necessary changes. The findings provide a point of departure for research which seeks to develop strategies for managing design input for major highways infrastructure schemes.

Keywords: Collaboration, Highway design, Infrastructure, Lean, Process improvement

Paper type: Published conference paper

Introduction

Construction is a project based industry with a highly complex, fragmented and uncertain operating environment (Fearne and Fowler, 2006). Characteristics which set it apart from manufacturing are on-site production, one-of-a-kind products delivered through a web of highly complex and complicated activities (Koskela, 1992). The fragmented nature of the industry and the placement of responsibilities for design, fabrication, assembly and production with different organisations with their own separate objectives lies at the root of many of the industry's problems (Mitchell et al., 2011, Austin et al., 2001); indeed it is these characteristics that pose barriers to innovation (Koskela and Vrijhoef, 2000). Within complex infrastructure projects the need to coordinate disparate inputs throughout the project lifecycle are particularly acute (Hodgson and Cicmil, 2006, Winch, 2010). In particular, the efficient coordination of multiple design inputs in the design phase and the management of uncertainty pose particular challenges (Lawrence and Scanlan, 2007, Williams, 2002).

Design is a critical factor for business success (Yin et al., 2011) and there is a significant body of research dedicated to collaborative design performance (Mitchell et al., 2011, Yin et al., 2011, Baldwin et al., 1999, Austin et al., 2007). But for lean construction, lean design is considerably less discussed or researched and is as equally ill-defined as lean construction (Jorgensen and Emmitt, 2009). There is a lack of underlying theories for design (Mitchell et al., 2011) or construction (Koskela and Vrijhoef, 2000). In the literature it is not clear whether "lean design", "lean design management" or "design for lean construction" are or are not the same phenomena (Jorgensen and Emmitt, 2009). However, the main lean principles of increasing value for the customer and the elimination of waste from the system remain the same.

This research investigates how aspects of lean thinking can help improve the design phase of complex infrastructure projects with particular focus on how the collaborative planning process should be developed to account for the specificities of highways design. Within the UK, the Highways Agency (HA) has realigned its procurement strategy following recommendations made by major studies since the late 1990s to take into account partnering and framework contracts (Wolbers et al., 2005). The last two years have seen the HA increase pressure to see lean implemented throughout its supply chain, with the roll out of HALMAT to assess lean maturity (Highways Agency, 2010). However, fragmentation between design and production is problematic (Jorgensen and Emmitt, 2009) and there is a need for greater

integration of the programming of design and construction processes (Jorgensen and Emmitt, 2009, Egan, 1998). Contractual and organisation efforts have been made to integrate the fragmented responsibilities of construction resulting in multiple layers of contractual agreements within single projects to protect the various stakeholders, further reinforcing the image of an industry characterised by a lack of trust and adversarial practices (Fearne and Fowler, 2006, Egan, 1998, Latham, 1994). Developing ways to manage the collaborative planning process arguably provides a crucial first step in ensuring more efficient and effective design of such projects.

The application of lean thinking in complex infrastructure design projects

Value is delivered on site but it is created in design (Zimina and Pasquire, 2011). However, although detailed design interfaces with the construction process, efforts to improve design have tended to view it in isolation (Mitchell et al., 2011). This might be because the iterative nature of design contrasts with the linear nature of construction and makes the interface between the two phases complex and difficult to manage. Increasing pressure to integrate the design and construction phases (Egan, 1998) results in information being drawn from design before it has reached appropriate maturity in order to drive procurement (Mitchell et al., 2011). It is important, therefore, that information inputs are timed to meet the needs of other participants in the design process in order to efficiently and effectively produce the design deliverables (Baldwin et al., 1999). The problem comes with recognising the optimum time to provide the necessary information. Design rarely has a conclusion and instead it is improved until a deadline is reached (Mitchell et al., 2011). Thus, from the waste/value understanding of lean, design iterations create a lot of "waste" in the form of drafting, rework and time spent on options that are later decided against (Jorgensen and Emmitt, 2009, Highways Agency, 2010). The challenge to managing design is to enable positive design iteration (whilst avoiding negative iterations) and ensure crucial parameters are not fixed too soon to prevent positive improvements but are fixed early enough for the design process to progress (Jorgensen and Emmitt, 2009).

It was competition from the Japanese production market, particularly in the car industry, that was the impetus for the West to research Japanese methods (Green, 1999), leading to the publication of The Machine that Changed the World (Womack et al., 1990). Since the 1990s lean has become increasingly prominent in construction heavily influenced by the management and production debate (Jorgensen and Emmitt, 2009). Whilst Lean began in the

manufacturing sector, most famously with Toyota, it can be just as effective applied to administrative and office processes (Mann, 2010). An application of Lean principles to the design process can significantly help to improve process efficiency and the outcomes of the application of simulation modelling and lean principles in the construction industry are reported to be outstanding (Marzouk et al., 2011).

Current Lean literature makes efforts to point out that lean is not a set of tools for implementation but a long term strategy, a new way of thinking and a never ending search for a better way (Liker, 2004). However, many examples of implementation fail to spell out what the ethos of lean is and how it can be attained. It is too "soft" to explain and attention is instead diverted to lean tools and techniques where it is easier to demonstrate and quantify lean implementation. Rather than shy away from these soft issues, it is crucial that Lean research turns its attention to better understanding how and why the softer interpersonal and behavioural issues affect project management and design delivery.

In a project-based environment, it is normal practice for different people to be doing different things in different places at different times for different organisations, often working simultaneously on different projects. The 'silo-like' mentality that is all too often present makes the flow of information across these divides problematic (Tribelsky and Sacks, 2011). The construction industry is characterised by little problem solving in groups, a lack of suggestion schemes, few employee surveys and a culture where human resources are seen as a cost to the business (Green, 2002). The failure to address the softer issues continues with project management literature which is dominated by tools and techniques (Green, 2006) and by prescriptive assumptions focussing on project organisation (Ivory et al., 2006).

Whilst there is little research concerning highway construction and infrastructure maintenance, there is much research concerning collaborative working, frameworks and evidence to suggest successes, although, evidence of the long term performance of framework agreements is lacking (Ansell, 2009c). The last decade has seen an increase in examples of collaborative working (Tennant and Fernie, 2010). Whilst it can be said that collaborative working, integration and lean are not meaningfully defined (Green, 2011), we can say that collaboration is not just about sharing information (Jorgensen and Emmitt, 2009). Collaborative planning could provide a useful technique for bringing together representatives of all parties' onsite activity to commit to improve programme reliability and increase productivity (Highways Agency, 2010).

The role of collaborative planning and collective learning in highways design

Research has indicated that the planning and coordination of fragmented tasks to improve productivity can be achieved through collaborative planning and the application of the Last Planner system of production control (Ballard, 2000). Last Planner is a key lean project management method, originated in 1992 (Ballard and Tommelein, 2012) and is immediately relevant to the challenges faced by the industry (Green, 2011). A benefit of Last Planner is that it can be easily combined with existing practices making it a good first step on the long lean journey, but all aspects of the principles of Last Planner must be followed through if maximum effect is to be realised. As a technique for improving project performance, Last Planner has been successfully applied to construction and design phases of construction projects (Ballard, 2002), but the benefits reported are isolated to the project in question. Ballard (ibid.) suggests further work should be undertaken to categorise reasons to facilitate the implementation of the learning process, including the recording of results. However, although he identifies a failure to learn from plan failures and failure to implement a learning process, he does not allude to what such a learning process would, or should, look like; something that the collaborative planning process could be developed to include.

Second generation perspectives on knowledge management reveal how although some knowledge is possessed, made explicit and transferred from one person to another, other knowledge is embedded in practice and must be shared through dialogue and social networks (Newell et al., 2006). In other words, the interface between design and construction is largely social, involving people and their interactions (Mitchell et al., 2011). Project teams assume that knowledge can be captured and transferred unproblematically using ICT (Newell et al., 2006). In practice, knowledge traverses the divide and it is vital therefore to understand which forms of knowledge are possessed and which are embedded in order to share them effectively between people and across projects (Newell et al., 2006). Collaborative planning arguably provides a social networking opportunity through open dialogue and therefore lends itself well to the transfer of knowledge that is concerned with processes as opposed to the product; the whys and ‘hows’ rather than the ‘whats’ (Newell et al., 2006). It is important to know what and when things are needed but also why they are required (Terry and Smith, 2011). Gaining an understanding of the “why” is where collaborative planning is essential for lean thinking. A genuine understanding of value leads to a genuine understanding of what is not of value. Others would add that knowledge of the project, client user and stakeholder

value, are likely to be insufficient for effective collaborative design and construction without a deeper understanding of the underlying contextual circumstances that define value (Jorgensen and Emmitt, 2009). However, research has shown that the "softer" issues surrounding human interaction are not appreciated or ignored during project reviews (Newell et al., 2006). The most challenging part of Last Planner is to learn from plan failures (Ballard and Tommelein, 2012) and learning from failure must come in the form of understanding why people did what they did, and not an establishment of what should have been done (Dekker, 2006).

Projects are referred to in terms of their deliverables (product knowledge) rather than the way the project was developed and managed (process knowledge) (Newell et al., 2006). Focussing on process is essential for lean success (Mann, 2010). But, product knowledge rather than process knowledge is what is captured at the end of a project. Newell (2006) argues this is due the concentration on delivering the project objectives to target with no consideration for the benefits for the wider organisation. The focus is often on short-term objectives that fail to recognise the need for long term organisational relationships (Austin et al., 2007). Where work is predominantly project based it is vital that an understanding of organisational knowledge is developed (Bresnen et al., 2004), especially if cross project learning is to be successful. It is here that collaborative planning could play a significant role in enabling knowledge flows around the design process.

Methodology

The study reported here was an exploratory investigation of nine highways schemes in the design phase in the UK. The study was aimed at understanding how the application of collaborative planning techniques could improve the performance of highway design and could promote learning across the organisations and disciplines involved.

The research comprises a single-case with multiple embedded units of analysis, chosen to represent typical projects undertaken by the organisation. Although some criticism is levelled at case study research (Yin, 2009) the value of this methodology lies in the collection of rich empirical data and a deep understanding of the context brought about through participant observation over a period of four months. While the findings are specific to the organisation in question, the results offer the opportunity to generalise to broader theoretical positions

around the wider application of collaborative planning that tends to be overlooked in the extant literature.

Due to constraints, the details of each and every scheme of the collaborative planning process cannot be presented here. Instead, salient points to demonstrate particular issues have been drawn upon. The projects were chosen to give representation across the disciplines of roads, structures and small network renewal schemes. These projects embody the complex inter-professional (highways, environmental, drainage, structures, traffic management, geotechnical and the like) working relationships found in project based organisations. The team members were working on numerous projects simultaneously and with different team compositions. Adding to the complexity was the geographically diverse design teams distributed across offices in Central England, Scotland, Southern England and Northern Ireland. Spatial organisation was further complicated with liaison between design and construction/operational teams that are based in depots situated around the road network. Members of the teams rarely, or never, met face to face and there was a tendency not to pick up the phone to discuss issues with geographically dispersed team members.

The research was conducted within an action research framework (Naoum, 2007, McNiff, 2002) where weekly collaborative planning sessions were established with the nine schemes and the data gathered through participant observation. This ethnographic and phenomenological approach permitted an insight into the inner workings of project teams whilst enabling a rich understanding of the meanings and interpretations of social interactions. Using an external facilitator/consultant to manage the collaborative planning process, each scheme (of between 3 and 10 team members) met for 20-30 minutes each Monday to review and record tasks set the previous week as complete or incomplete. A percentage plan complete (PPC) score was assigned based on tasks completed divided by the number of tasks planned for completion, expressed as a percentage. Reasons were captured for any non-completion and a fresh list of tasks was set for the following working week. The discussions were recorded and the impacts on the design process evaluated, as well as the implications from cross-disciplinary learning.

Findings and discussion

Throughout the observation period the issues challenges and opportunities that emerged tended to fall into one of three themes: collaboration, reliability and process deviation, each of which is now discussed in turn.

Collaboration and intra-group dynamics

Many of the schemes observed during this study brought together for the first time team members who had not previously met face to face or via telephone to collaboratively plan project work. Researcher participation at approximately 90 hours of planning sessions allowed the observation of interesting team dynamics. It was clear from the outset that an individual's job title often did not correspond with the individual's behaviour. Team leaders were not necessarily the individuals who lead the teams during collaborative planning sessions. For example, programming was highlighted as an area of weakness amongst all project teams. Each team possessed a Team Leader and a Project Manager. The Project Manager, as one might expect, should be responsible for managing the project. However, it was the Team Leader's responsibility to own the design programme. In collaborative sessions tasked with planning work this led to confusion and lack of ownership and accountability of the process. The result was no one taking the lead. For collaborative planning to work effectively people need clearly defined job roles. The collaborative planning process could be developed to assign clear roles for the collaborative planning sessions in addition to professional roles and give responsibility to members to carry out regular tasks such as ensuring programmes are brought to planning meetings and organising representation of appropriate members of the project team. Doing so would enable the collaborative planning technique to further support ownership and leadership.

Project ownership was observed as a problem area and interviews allowed further probing. "Programming is not taught in civil engineering degrees", "I'm not a programmer...the programme I put together is based on a template" and "programme or no programme, everyone knows what should be done and when" are examples illustrating the low regard Team Leaders have for programming. During the earlier collaborative planning sessions, Team Leaders and Project Managers attended planning meetings without a programme for reference. When asked to bring programmes to future meetings it transpired that programmes had not been developed; it was many weeks into the process before teams began to take ownership of the process.

When asked about the time required to conduct collaborative planning sessions the response from one manager was: "the time commitment is good, it needs to be done...but some [team leaders] are paying lip service...they still need to understand the bigger picture of programming stuff...they don't seem to understand that you have to give people time to programme their own work...got to sit down and think who your teams going to be whether they have a small part or a big part, they need to be there from day one...they need a heads up that we'll need your services in x months' time...they don't seem to grasp the idea of working as a team...they see it as a failure if they have to ask for help". Getting the mind-set right is easy to say but difficult to do. "Attitude since the start of this commission...it has been difficult for them to feel a belonging to [the commission]...before you were in the depots and part of [the commission] in one office everyone together...Now because we are part of consultancy there is no feeling of belonging...lost a sense of belonging to part and parcel of the team...the commitment is there but the sense of belonging is lost...two and half years later and it still bugs them that they are not part of [the commission"].

As with lean manufacturing, lean in the office meets resistance but Mann (2010) argues that background to the resistance is different. Measuring actual versus expected output in an office is not straightforward and office workers are not used to being held accountable to the same extent as production workers in manufacturing, partly because around half an office workers time is spent on non-value adding tasks such as corrections and waiting for information. In support of this assertion, analysis of the tasks on the weekly production plans during the collaborative planning sessions revealed that for some schemes, 54% of tasks were related to design with only 38% being purely design work. Therefore between 46% and 62% of tasks were non-design (non-value-adding) but related to project management and project administration, such as arranging and attending meetings and chasing paperwork. Planning collaboratively does not automatically fix this but it enables the issues to be driven to the surface by giving project teams the tools to collect the data required to see. During interviews, Managers said this is having positive effect on teams.

Intermediaries are able to encourage teams to see how they can learn from others (Newell et al., 2006). Intermediaries naturally emerged in the collaborative planning sessions as they were able to see the cross project learning opportunities arise and offer their knowledge. It is unlikely that this knowledge would have been asked for, or known to exist. Managers need to focus on the management of meaning and take seriously their role as interpreters (Ivory et al.,

2006). Collaborative planning can facilitate project level learning which is crucial for the transfer of process knowledge and the softer issues that cannot be represented by a drawing or be transferred via ICT (Newell et al., 2006). The collaborative planning process should be developed to identify these individuals and ensure their attendance.

The role of the facilitator in the collaborative planning sessions cannot be underestimated or their impact ignored. At the outset, team members asked the external consultant for their experiences of undertaking collaborative planning with other clients. The past experience of the facilitator helped give confidence to sceptical members that this process had been tried and tested and worked in the past to bring benefits. Somewhat contradictory to this is that an external facilitator brings with them a healthy amount of naivety in relation to the inner workings of the organisation. This was utilised to help to draw out underlying issues. Unfamiliarity between the design teams and external facilitator added to the novelty of the process and aided buy-in during the early stages. The alternative would be to facilitate the sessions using in-house resources.

Collaborative planning and process reliability

At each weekly collaborative planning meeting, the percentage plan complete (PPC) was tracked and reasons for non-completion captured. Average PPC over 15 weeks of collaborative planning sessions was 70%, consistent with other similar studies (Ansell et al., 2007). As non-completion lessens, PPC increases leading to 'improvement in productivity, quality, timeliness, safety and other dimensions of project performance' (Ballard, 1994). Observations made during this study indicated that an increased PPC score does not necessarily correspond to improved productivity. The act of bringing people together to collaboratively plan their work is not an end in itself but the catalyst for other necessary changes.

The collaborative planning sessions were found to bring a level of accountability that was otherwise absent but the process required a high level of trust amongst participants to set realistic tasks. Observation of the sessions revealed that the process lacks control. For example, individuals were not prevented from selecting tasks out of sequence; it was left up to individuals to choose what work they do or do not do. Some flexibility on the part of the designer is necessary due to the iterative nature of the creative design process, but a haphazard ordering of work tasks can result in undesirable negative iterations. This again

brings into question the role of team leaders and project managers. Collaborative planning sessions were reported to have "opened their mind and concentrates what they do in the week...we need to make sure we do it and push it forward...team leaders should be pushing it". However, some teams are working under team leaders who "instead of spending 10 minutes finding a solution they'd rather spend 20 minutes writing a 4 page email of why it can't be done...we're trying to change their mentality...they need training in being team leaders...not having enough resources has put major pressure on them because they've got to do the work as well so they can't be proper team leaders". It became clear that running collaborative planning sessions each week was not sufficient to radically change the pre-existing working practices. The process must be supported with appropriate training to enable leaders to lead. A deficiency in skills to programme effectively has been emphasised. To overcome this it is felt that the collaborative planning process must become more robust to better communicate the wider need for planning.

Weekly dashboards were created to visually display the results of the collaborative planning pilot. The dashboard included a graph depicting the PPC scores and a line illustrating the trend in the scores. This sparked many comments and much debate and highlighted the power of visual management. For some teams, maintaining a positive trend line was more critical than using the sessions to plan tasks to enable downstream work. At the outset, the facilitator predicted that the creation of peer pressure at meetings would fuel commitment. This happened to an extent. More noticeable were team leaders questioning whether the tasks being set were achievable within the week before the next collaborative planning session to prevent low PPC scores rather than to make ready future work. The peer pressure and competition observed was between teams and not within teams as predicted. But this tended to encourage the wrong behaviour. The Last Planner motivation for setting weekly tasks is to ensure readiness of work to enable the progression of downstream tasks. Instead some teams set tasks on the basis of work they were confident of completing to ensure high PPC scores, with no regard for making ready future work. This is a factor requiring attention when developing the collaborative planning technique.

Collaborative planning and process improvement

The primary reasons for non-completion of tasks were similar to those found in related studies (Ballard, 2002) with 151 of the 283 reasons stated for non-completion of work tasks attributable to unavailability of pre-requisite work. When capturing reasons, a distinction was

made between unavailability of internal (97 instances) and third party (54 instances) pre-requisite. The high frequency of pre-requisite information cited as the reason preventing the completion of weekly work tasks highlights the ineffective handover of information indicating a problem with the process.

Reviews with the client form gateways in the process designed to capture information about design progress to date and ensure necessary paperwork and approvals are in place before the scheme progresses to the next stage of design. Deadlines and milestones naturally divert attention to the product knowledge (Newell et al., 2006), however it is the process knowledge concerned with the how and why that enables learning, which is supported by the collaborative planning process. In many cases, the pressures on designers do not arise from the drive to integrate with construction, but are due to compression of the time "allowed" for design development. As a result, design iterations continue to evolve in a way that is potentially inappropriate due to lack of specialist input. Common causes of problems are starting design tasks too early based on assumed information and releasing design information in batches (Baldwin et al., 1999), both of which were observed in this study. Whiteboards were used to display the standard process and magnets tracked schemes as they progressed through the gateways. Doing so highlighted deviations from the standard process and instances of negative design iteration. For example, a scheme was held at Gateway 1 awaiting client sign off. Rather than obey the hold point and wait, the design team continued to schedule tasks for the stages between Gateway 1 and 2. Should the client decide to change the scope of works as part of the Gateway 1 review, any design work completed out of sequence would be rendered useless. By mapping the actual process against the standard process it was possible to identify discontinuities and highlight areas where the process was failing to support project delivery. The decision could then be taken to reengineer the process to better suit project delivery, or modify work practices to adhere to the process. Either way, collaborative planning coupled with process mapping enabled the capture of process knowledge; information about how and why a project is delivered the way it is. Even before any re-engineering of the process takes place, significant leaning has taken place in recognising deviation from process and the pitfalls this brings.

The white boards worked well to support the collaborative planning process as they created a visual aid and provided an "at a glance" understanding of where in the process the scheme was. In this way, the whiteboards acted as both a sense giving tool (Ivory et al., 2006),

promoting the urgency and importance of the projects and as a 'boundary object' (Star and Griesemer, 1989) in the ways in which it enabled translation of meaning across communities. Ivory (2006) warns that it is possible for pre-existing discourses to be too well entrenched for sense giving tools to have much impact. Through observations made, this is felt to be a significant issue that is all too easy to overlook. The collaborative planning process needs to consider the embedded "business as usual" attitudes. Although the white board process mapping clearly illustrated the deviation from process and out of sequence working, teams made no efforts to develop a solution. The collaborative planning participants need support from team leaders to encourage continuous learning and feel empowered to challenge barriers.

Conclusions

This research aimed to examine how collaborative planning combined with process mapping can lead to improvements in performance and programme predictability during design. As is discussed above, the benefits of coming together to collaboratively plan project work are well documented. Less well covered in literature surrounding lean and collaborative planning is the "soft" issues and the wider implications these have for the organisation. Collaborative planning is largely a social interaction, enabling the improved flow of information and greater understanding of the process. However, carefully facilitated, it has shown how the collaborative planning process can reveal deviations from design process protocols, identify negative iterations and highlight opportunities for improvement. However, the collaborative planning process also requires significant development if it is to take account of the specificities of complex infrastructure design environments. For example, it should be developed to include process mapping and process tracking as an integral part of the collaborative planning process to enable the capture of process knowledge. Doing so would build significantly upon the analysis of reasons for PPC failure by highlighting deviation from the accepted process and provide the evidence required to either reengineer the process to better support the delivery of design or inform a change in working practice to ensure adherence to the process. It is also clear that individuals require clearly defined roles and that training is required to support team leaders to become better leaders and to enable them to support their teams to improve. Perhaps the most significant enabler of effective collaborative planning concerned the use of visual cues. The white boards were a powerful tool through which to coalesce the inputs of the actors and to provide a basis for common understanding.

The major challenge going forward is to develop the collaborative planning process to account for the more subtle behavioural aspects that carry the potential to affect the consistent realisation of collaborative planning benefits implementation. The approach must be developed in order that it can account for these nuances, but without prescribing rigid and normative approaches that could serve to stymie both the creativity of designers as well as broader learning opportunities.

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APPENDIX B

PAPER 2: CONTRACTS, COLLABORATION AND CONFLICT RESOLUTION: FORGING RELATIONSHIPS IN THE FACE OF ADVERSITY

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Abstract

Contracts have traditionally been used to coordinate expectations and structure relations, with clients using them to define and manage commercial relationships with suppliers. Whilst extant literature is concerned with large capital projects of a 'one-off' nature, this research is concerned with individual contracts within 'on-going' strategic infrastructure maintenance programmes. Whereas relational contracting strategies are associated with better client-supplier relations, 'on-going' strategic infrastructure maintenance programmes tend not to use such contracts. This presents a problematic contextual backdrop for the successful delivery of such programmes.

This research seeks to understand the conditions under which collaborative working arrangements can be achieved within non-collaborative commercial frameworks. An in-depth case study is used to explore collaboration within transactional lump-sum arrangements. The research reveals how the interpretation of a lump-sum contract led to the prioritisation of cost savings over quality and initially stimulated behaviours that inhibited collaboration. However, over time informal working practices and a collaborative working philosophy emerged reminiscent of that expected under relational contracts. Collaboration was established in an informal project culture that ran counter to a persistent adversarial commercial framework. Formal performance measures were resolved and performance appeared satisfactory to the client, even though it was enabled by informal working practices running counter to the client's chosen contract. Contra much previous work that deterministically positions relationships as a product of the contract, this study reveals that

collaborative behaviours can thrive even in unfavourable contractual conditions. This, in turn, calls for a re-theorisation of the relationship between contracts and behaviours within long-term programme arrangements.

Keywords: Adversity, Collaboration, Contracts, Infrastructure, Relationships

Paper type: Published conference paper

INTRODUCTION

Major infrastructure schemes have received a great deal of attention in the project literature where it is largely concerned with large one-off projects such as Heathrow Terminal 5 (Gil, 2009) and the 2012 London Olympics (Grabher and Thiel, 2015). Ongoing term maintenance contracts, on the other hand, receive rather less attention even though they present very different challenges. Specifically, ongoing strategic highway maintenance and renewal services must deal with the effects of short-term contracts within on-going programmes, geographically disparate teams and often the legacy of previous incumbents. One such example concerns strategic highway maintenance and renewal contracts which, in the UK, are divided by geographic area and procured via contracts of five years in length. At the end of the term, contracts are re-tendered the service provider usually changes. Contracts procured through competitive tender are awarded to the lowest price supplier, still the dominant selection criterion (Loosemore and Richard, 2015), with no guarantee of future work. Thus, a traditional, lump-sum contract approach is used to structure and govern a complex service delivery requiring close cooperation both between the client and supplier organisations and across the respective organisations.

In this paper we examine the collaborative relations that emerge within contractual relationships when they are set up within traditional transactional contractual arrangements. These situations present an unusual situation whereby relational outcomes are required in the face of contractual adversity, a situation that is poorly understood and theorised within the construction and project management literatures.

Issues with Highways Maintenance and Renewal

The client-supplier arrangement in the context of highway infrastructure maintenance and renewal necessitates inter-firm interactions at all stages of service and project delivery. Traditionally, contracts have coordinated expectations and have structured and governed the management of these relationships. Clients engage with suppliers using contractual forms structured around payment mechanisms including lump-sum, reimbursable, cost-plus and relational arrangements such as partnering and alliancing. According to transaction cost economics, pure market relationships facilitating competition are suited to occasional, standardised and simple transactions, in which assets may be fully specified (Regan et al., 2015), whereas relational contracting, based on cooperation, is better for recurrent, complex

and customised transactions (Eriksson, 2010b). The highly complex and customised supply of highways infrastructure requires projects of the latter type, even though they are procured under traditional transactional arrangements. A significant proportion of the services provided though infrastructure maintenance and renewal contracts are reactionary work to emerging defects on the strategic road network. Tensions are created when complex service provision requires deviation from patterns of activity set out in the contractual documents. Providers of strategic highway maintenance and renewal cannot at present intelligently predict potential road network failures. Where complexity and unpredictability make it difficult (or impossible) to define contractual contingencies for probable future events, activity must occur in a commercial environment of incomplete contracts (Pinto et al., 2009). Rather than concede to the challenges above actors must work with these constraints to achieve high social development, to enable less reliance on contractual control (Rose and Manley, 2012).

Theoretical Importance of Collaboration and its Influence

The benefits of a collaborative approach are widely accepted with a significant volume of research commenting on how to encourage and improve it (Yin et al., 2011, Austin et al., 2007, Ballard, 2000, Jorgensen and Emmitt, 2009, Marshall, 2014, Cox and Thompson, 1997, Powell, 1998, Bresnen and Marshall, 2000). Research concerning collaboration has two foci: one concerned with the contractual mechanisms for coordinating inter-organisational relations and the other concerned with the sociological aspects of relational capability. These two views at times offer competing explanations of organisational collaboration (Powell, 1998). This study considers these two foci in parallel to investigate how relational capability can be transplanted into informal, extra-contractual mechanisms to overcome the limitations of adversarial cost-based contracting. The analysis extends to examine the implications of common features of these types of arrangements, such as TUPE (Transfer of Undertakings (Protection of Employment) Regulations) rules protect employees' rights when the organisation or service they work for transfers to a new employer. This is particularly relevant in short term contracts within on-going maintenance programmes where employees transfer between organizations and bring with them an allegiance to the previous incumbents, but has not been considered in relation to its effect on contractual relations. This situation sees people with in depth knowledge of the geographical area working within a new organisational structure alongside people familiar with the organisation but new to the

geographical locale. Such human resource topics lie at the heart of the issues at the interface between project-based firms and the projects (Winch, 2014).

THE CONTRACTUAL CONTINUUM

The governance of an effective project network is driven by formal and informal means. Formal direction is provided by the contract, but informal direction is provided by important social factors (Rose and Manley, 2012). There is much research testifying to the complementary rather than substituting nature of contractual and relational governance (Poppo and Zenga, 2002, Lumineau and Henderson, 2012, Lu et al., 2015), highlighting the coordination function of contracts (Cao and Lumineau, 2015).

Transactional Contracts

Traditional procurement is the default option of government (Regan et al., 2015) and public sector clients continue to procure highway maintenance and renewal services under transactional forms of contract. Despite efforts over the last decade or so to move from adversarial and structural to more relational and collaborative approaches to the market (Smyth and Fitch, 2009), construction continues to be an industry characterised by a lack of trust and adversarial practices (Latham, 1994, Egan, 1998). Multiple layers of contractual agreements within single projects designed to protect the various stakeholders, are said to signal distrust between exchange partners and encourage opportunistic behaviour (Poppo and Zenga, 2002) and whereby the wrong individual attitudes ripples down through the team (Gil, 2009). There is a preference within the UK construction industry for contractual compliance rather than collaborative working practices (Thompson et al., 1998). Project quality has been defined as "the consistent conformance to customer expectations" (Basu, 2014, p.181), but it is argued that quality conformance only ensures conformance to standards; if the standards are not fit for purpose, getting things right first time will do nothing to reduce the performance gap or increase client satisfaction (Winch et al., 1998) and result only in the efficient production of something the customer does not need or want (Rother and Shook, 1999). The preference for compliance over collaboration is beginning to change as clients become dissatisfied and collaborative benefits are more widely recognised.

Relational Contracts

Non-adversarial collaborative contract forms are rarer but receive considerable attention in academic debate (Gil, 2009, Rahman and Kumaraswamy, 2005, Zou et al., 2014). Firms differ in their ability to do relational contracting (Powell, 1998). One party cannot impose a collaborative type of relationship upon the other; neither party can directly control the facets of the relationship on its own leading to a great deal of importance being placed upon the actions and intentions of both actors (Lamming et al., 1996, Vaaland, 2004, Dahlgren and Soderlund, 2001). And while the management of relationships cannot be legislated or purely contractual, its development depends on solid contractual underpinnings (Zou et al., 2014). Lumineau and Henderson (2012) make and important distinction between contractual control governance and contractual coordination governance. Increasing contractual coordination governance significantly contributes to more cooperative negotiation strategies during a dispute between buyers and suppliers. Traditional contracts tend to control and relational contracts coordinate.

Relational contracts that formalise collaborative working arrangements are designed to instil an ethos of cooperation amongst project teams from day one. It follows, therefore, that relational contracting arrangements are reported to result in higher quality team working leading to better project performance (Gil, 2009, Suprapto et al., 2015b). When steps are taken to foster a collaborative approach and a relational contracting strategy is chosen to encourage client-supplier cooperation in large infrastructure projects they are almost always a reactive response to client/market driven forces where behaviours are adjusted accordingly; they are not implemented as proactive strategic decisions to manage relationships (Smyth and Edkins, 2007).

Discussion in the literature tends to differentiate between relational and transactional contracting arrangements but little consideration is paid to the spectrum of interim contractual arrangements (Cox and Thompson, 1997). Sako (1992) cited in (Cox and Thompson, 1997) recognises the range of possible options and suggests there is a continuum between arms-length contractual relations, typified by short term, one-off transactions where contractual defaults are addressed through legal action, through to obligation contractual relations typified by interdependency and goodwill where defaulting parties are quick to make amends in the spirit of trust. Within highway maintenance and renewal, projects are divided by geographical area with suppliers supplying essentially the same service to different parts of the client organisation in different geographical areas whilst operating under different

contractual arrangements. If and when at the end of a contract period a supplier successfully re-tenders to provide essentially the same service for a second term they may well be faced with a new and different contractual arrangement, further adding to the confusion. And this confusion only represents the adversarialism in tier one of the supply chain (Thompson et al., 1998).

Inappropriateness of Existing Methods of Contracting for Collaboration

Traditional contracting arrangements, typified by strong confrontational interactions, are inappropriate for collaborative working arrangements (Rahman and Kumaraswamy, 2005) and counteract the development of trust (Kadefors cited in Pinto et al., (2009)). There is evidence to suggest that the relationship is what governs and the contract is merely complementary and therefore changing the contract without addressing the relations and behaviours will have little or no effect (Thompson et al., 1998). In the same vein, there is a willingness within the construction industry to implement collaborative approaches to working relationships but the application is not profound. Solutions to major problems are often ad hoc 'bolt-on' elements (Anvuur and Kumaraswamy, 2008). Firms often show willing to experiment with a suite of tools and techniques but are either unwilling or unable to instil a culture of collaboration (Boyce et al., 2012) with the potential impact of team building hindered by the 'formalisation' of collaborative practices (Suprapto et al., 2015a p1357). Without re-engineering all elements of the contractual relations, relational contracts implemented on a project by project basis are little more than tokenism (Cox and Thompson, 1997). Unlike one-off capital infrastructure projects, ongoing programmes of infrastructure maintenance procured via one-off contracts (examples of which are almost completely absent in current literature, see Thompson et al., (1998)) in theory provides the unusual opportunity to learn from previous contracts and apply innovations to subsequent contracts that are contextually the same. But evidence to show this systematically occurring is absent. The relationships developed and learning acquired are constrained to the discrete duration and geographical locale of the contract. Evidence of firms going beyond a project by project approach towards a behavioural approach is piecemeal (Smyth and Fitch, 2007, Gadde and Dubois, 2010).

The Role of Relationships in Managing Uncertainty

Clients planning to implement cooperative relationships need to reassess their entire procurement process in order to facilitate trust and cooperation with contractors (Eriksson and Pesamaa, 2007). Smyth & Edkins (2007) call for greater consideration to be given to the proactive management of relationships to foster collaborative working. Relevant to the provision of highway maintenance and renewal is that the public sector is particularly weak in consistently managing the interface with the private sector (Smyth and Edkins, 2007). In a traditionally contractual operating environment, a mismatch of value interpretation resulting in a failure to deliver the promises set out signals contractual noncompliance thereby creating tension and conflict between supplier and client. Where change is likely, changes that have not been provided for in the contract, a greater reliance on established relationships is needed to maintain the contractual bond (Zou et al., 2014). This study seeks to understand the conditions under which collaborative working relationships can be achieved within what are seemingly non-collaborative commercial frameworks.

METHODS

The study is based on a single case, chosen as the best method to collect data to support the argument through an in-depth examination of a private sector organisation providing public sector infrastructure maintenance and renewal services. The case study contract under investigation is a bespoke form of lump-sum contract designed to deliver services in a particular geographic locale in the UK for 5 years. Before this contract began, the maintenance and renewal services for this area had been provided by a different supplier under a cost reimbursable form of contract.

Data was collected through participant observation over the course of seven months. A constructivist approach was taken as it recognises that concepts and theoretical level of analysis emerge from the researcher's interaction with the field (Bryman and Bell, 2011). The researcher is an embedded observer of practice within the supplier organisation and adopted an action research approach (McNiff, 2002) (although in this case the change observed was initiated by the organisation and not the researcher) in order to provide a rich description and for revealing the impact of contract type on inter-firm cooperation in the under researched context of strategic infrastructure maintenance and renewal and how the introduction of relational principles over time affects project delivery. Observations focused on a series of workshops, a key element of a contract-wide improvement plan designed to bring together key actors of the supplier and client organisation to debate and agree the greatest problems

threatening project delivery, identify the root causes of the problems and formulate proposed solutions. These workshops were facilitated to encourage open and frank "off the record" discussions. The proposed solutions were later presented to a panel of judges made up of both client and supplier representatives who had to agree that positive change would result from the actions suggested. The workshops were the forum where people came together and the evolution of relations took place allowing for rich data to be gathered.

The observations were supplemented with seven face-to-face unstructured interviews lasting between 60 and 90 minutes. The interviews sample universe consisted of key project team members within the supplier and client organisation including four senior members of the delivery team (two from the client organisation and two from the supplier) one project engineer (supplier organisation) and two business improvement managers (one from the supplier organisation and one consultant) working directly on the case study project. Convenience sampling (Robinson, 2014) was employed to identify participants. Data was supplemented with analysis of company documents, produced predominantly as outcomes of workshops. The unstructured interviews were audio recorded and transcribed verbatim for analysis. The interview transcripts were thematically coded and abstractions were made. The analysis focused on emerging themes from the data for a qualitative interpretation. The literature review provided concepts to look for, but the main purpose of the unstructured approach to interviewing was to allow the participants to focus on what they felt was important.

THEORETICAL MODEL

In Figure 1 we set out a model which offers an alternative concept to the relational and transactional contract dichotomy and suggests that rather than being substitutes in terms of their impact on outcomes, relational behaviour can flourish within unfavourable transactional contractual conditions.

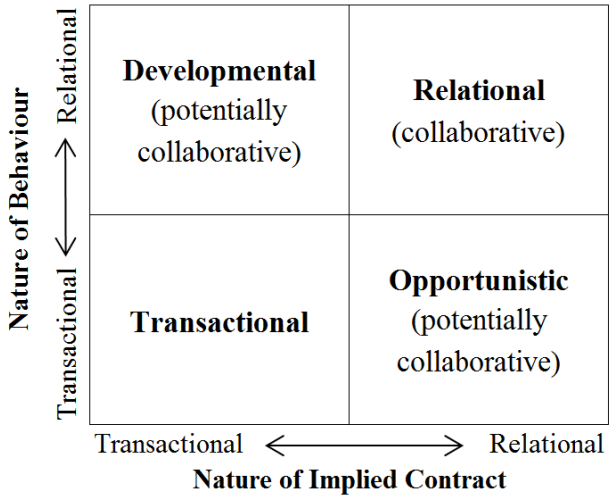

Figure 1: Theoretical positions of relationships in the Behaviour / Contract matrix

The argument communicated through this model is that relational behaviour can be realised when transactional, typically adversarial, forms of contract are used which we call developmental relationships. These relationships occur when a collaborative approach is required but when the procurement strategy does not specify such an approach. In the transactional quadrant there is little need or desire to be collaborative, typical for the procurement of simple and standardised good and services (Eriksson, 2010a). The relational quadrant requires and enables high level of collaboration as typified by relational contracting strategies. The opportunistic quadrant is where a relational form of contract is employed but opportunistic behaviour is enacted and there are examples in literature of this in the lower tiers of the supply chain within projects using relational contracts (Gil, 2009 p.163, Bresnen and Marshall, 2000 p.827). Contra to previous work that positions relationships as a product of the formal contractual documentation, this study reveals that collaborative behaviours can thrive even in unfavourable contractual conditions. These findings support prior research that claims contractual and relational governance can complement one another (Lu et al., 2015, Yi et al., 2009, Poppo and Zenga, 2002) but furthermore, we reveal that relational and collaborative behaviours emerged from adversarial contractual conditions suggesting that the notion of formal contract documents locking projects in to one mode of behaviour is flawed and the position of projects within the matrix can move along either axis during execution.

RESULTS AND DISCUSSION

Inhibitors of Collaboration

Cost Before Quality

The delivery of highway maintenance services to a public sector client by a private service provider requires the bringing together of two main parties that have different commercial and/or social objectives. It is the interest of the private sector to receive payments and it is the public sector interest to provide the essentials for the fabric of society (Ball et al., 2014). Ingrained within the public sector is a requirement to demonstrate best value and it is believed that the best way to ensure accountability and auditability in the safeguarding of public funds is to document it in contractual forms and manage it by way of dedicated management information systems designed to provide transparency (Dowling et al., 2008). When set against a backdrop of economic austerity and Government drives for cost savings, the chosen approach of the client was to utilise a low cost lump-sum form of contract to procure the services required. According to interviewees, this lead to the focus of the relationship being contractual rather than relational and the relationship quickly became adversarial when contractual compliance was employed as the preferred method to govern the delivery of services.

Payment Mechanisms

The payment mechanisms of the reimbursable contracts delivered by a previous supplier were felt by interviewees within the client's senior delivery team to have encouraged a more collaborative approach and provide a foundation for positive relationships unlike those experienced under the current lump-sum arrangement. The budget for the lump-sum form of contract was much reduced compared to the previous cost reimbursable arrangement and this is reported to have driven behaviour within the supplier organisation that the client will get no more than has been paid for and the contract will be the tool used to enforce and control that approach. Clients need to be more wary of equating low price with good value (Loosemore and Richard, 2015). Interviews with the client organisation revealed that the lump-sum arrangement gave them the feeling of battling to achieve more than "a bare minimum design" from a supplier whose aim was understood to be not to breech the design fee set out in the contract.

Contract Interpretation

Interviewees mentioned that the interpretation of previous contracts was mutually well established whereas the new lump-sum contract was less well understood. As service delivery

commenced it was soon felt that the contract left many areas of delivery open to interpretation as delivery moved away from a technically prescribed approach, as in previous contracts, to a less specific, risk-based approach. Interviewees said that contracts work better when parties collaborative to the ethos of the contract rather than to the letter of it, indicating that incomplete contracts require collaborative working relationships to be able to jointly navigate the grey areas and mitigate the incompleteness. However this was not the stance taken at the outset. The behaviour exhibited by senior management at the start of the contract was reported to be "military like", showed favouritism, was played "straight down the line", and was blunt "to the point of rudeness". This stance is reported by an interviewee to have massively exacerbated the problems on both sides as supplier and client went head-to-head rather than collaboratively working through the tensions. These comments resonate with literature highlighting a reliance on the skill and personality of team members for success (Kovacic and Filzmoser, 2014).

Contractual letters are said to have proliferated like confetti. Formal communications making reference to contractual clauses were felt to further drive a wedge between the two parties rather than encourage collaborative resolution to issues that were often felt to be minor, consistent with prior research (Lumineau and Henderson, 2012). Such a mismatch between applications of the contract between parties generates conflict, degrades cooperation and leads to disputes and trust deterioration (Cao and Lumineau, 2015). For the case study organisations, much of the adversity experienced centres on the (mis-) interpretation of the commercial aspects of the contract at project mobilisation and as the project was delivered. When uncertainty is high, the early post-contractual phase is of special importance in public projects. After signing the contract, a process will start where both parties jointly make sense of the relationship both contractually and behaviourally and how this is handled decides how the relationship develops (Dewulf and Kadefors, 2012). Early contractual control governance significantly contributed to a less cooperative negotiation strategy (Lumineau and Henderson, 2012).

Interviewees felt the contract to be inappropriate and that it failed to provide a robust platform to work from, signalling that contractual compliance does not necessarily result in a quality service if the contract is not fit-for-purpose. The misinterpretation of the commercial aspects of the contract affected multiple areas of the project delivery. One interviewee commented that the best designs with the best project delivery teams will not be delivered if

commercially the price cannot be agreed. Project teams on both the supplier and client side felt powerless to influence the commercial aspects of the contract which further eroded the already tenuous relationships.

Recognition of Failings

Eighteen months into contract delivery and the issue of a formal notice to terminate was the point at which executive management recognised the seriousness of the issues facing the contract, although conspicuous signs of failure were present beforehand. The number of "points" awarded by the client to supplier for contractual non-compliance escalated significantly in the months leading up to the issue of the formal notice. Prior to this the supplier had made one-sided, isolated efforts to affect positive change but widespread improvement action was not taken until after the client threatened contract termination.

In the aftermath of the formal notice the supplier and client jointly embarked on a contract-wide improvement plan. During a series of collaborative workshops the root of all problems was identified to have originated prior to contract delivery during the 6 month contract mobilisation stage where is now recognised that the contract requirements were not fully understood.

Whilst the road to failure was compounded by the lump-sum transactional arrangements that allowed uncooperative behaviours to entrench and act as blockers to collaborative, open, honest and trusting relationships, in the face of adversity, collaborative approaches more akin to partnering forms of contract were transplanted into project delivery. This collaborative approach disclosed conflicts in the relationship by mutually understanding and removing uncertainty about events and issues threatening the project. A lot of the issues that had been aggravating project delivery were brought to the fore. The improvement plans facilitated an understanding of the other party's concerns and uncovered the underlying causes of tension in the relationship. By stimulating openness in this way it became easier to communicate across the organisation boundary and compromise on disputed areas. Following the step-change brought about by the improvement plan, which saw highly collaborative working practices transplanted into an adversarial project environment, the formal notice issued by the client was lifted.

These findings provide insights into how the interpretation of lump-sum forms of contracts can lead to the prioritisation of cost savings over quality and drive behaviours that inhibit

collaboration, resulting in failure to deliver quality services. 'Rather than be a mechanism to unite buyer and supplier in a common cause (i.e. to construct the works), the contract was being used as a wedge to drive distance between them' (Thompson et al., 1998 p36). Whilst in the case study examined here the transactional lump-sum contract represents a wedge between the parties, it is argued that it is being driven in by the confrontational and adversarial behaviours displayed by senior management and emulated by members within the project teams. Rather than substitute the lump-sum contractual wedge for a relational contract that would, in theory, facilitate unity through a collaborative approach to delivery, the findings here suggest that a transactional contract and a relational approach to delivery are not mutually exclusive, as depicted in Figure 1 and it is possible to move between quadrants during the lifecycle of a project. This proposition builds further on prior research which discusses the complementary natural of contractual and relational governance (Lumineau and Henderson, 2012, Cox and Thompson, 1997, Yi et al., 2009) by revealing the conditions under which contractual governance can shift from a controlling to a coordinating function. Whilst a transactional, traditionally arm's length contract may not be the optimum contracting strategy according to (Thompson et al., 1998), it is possible to have relationality through transaction. What is not clear at this stage of the research is the cause of the shift within the contract/behaviour matrix during project execution towards more collaborative working relationships. We can speculate that a desire within both the supplier and client organisation to ensure the safety of the road network prompted a shift in the matrix from the transactional quadrant to the developmental quadrant as a way to move beyond the impasse created by the incompleteness and misinterpretation of the contract documentation. Conflicts, if settled successfully lead to an integration of different perspectives and therefore better results (Kovacic and Filzmoser, 2014). The contract wide improvement project discussed is a clear example of this in practice. Furthermore, the findings support research that states an ability to enact quality inter-firm cooperation influences project performance more than the contracting arrangements and that relational attitudes and team working quality have the ability to mediate the effects of contract types (Suprapto et al., 2015b).

Findings here support the stance that many clients lack the insight and tools to take a leadership role and are unwilling and unable to employ strategies to foster better performance because of internal governance constraints (Loosemore and Richard, 2015). Mechanisms of contractual governance and sanctions in the place of relational collaboration and joint problem solving are giving project delivery teams' extensive problems. Considerable effort

has been spent on reversing the negative effects of a highly contractual approach that was allowed, at the outset, through adversarial behaviours, to push project delivery to breaking point.

Interviews revealed that the need to work together to build strong working relationships is recognised throughout both the supplier and client organisation but is often overlooked in favour of technical capabilities. The adversarial behaviour exhibited by senior members of the project team continued unchecked because their engineering credentials took precedent. The culture to collaborate must be led by and demonstrated by the senior team but requires strategic and systematic application to avoid the pitfalls of emulating the adversarial behaviours displayed by a few individuals. As experienced across much of the construction and civil engineering industry, the case study organisation has failed to apply learning from previous projects with favourable working relationships. The peculiarities of on-going programmes of highway maintenance and renewal provides the client with learning opportunities, and the TUPE regulations provides the supplier with the opportunity to harness knowledge acquired on previous contracts. Instead of embracing these factors as sources of relational advantage, they have been cited as the causes of adversity.

The ability of the project teams to affect positive change following a near terminal chain of events demonstrates that the quality of cooperation affects performance more than the contractual arrangement. Collaborative behaviour has been proven to take hold in unfavourable, contractually adversarial conditions. The findings presented run counter to existing literature which asserts a continuum between transactional and relational contractual arrangements and therefore calls for a re-theorisation of the relationship between contracts and behaviours within long term project arrangements in so far as collaborative relationships can prosper without relational contractual arrangements. Furthermore, the position of relationships within the matrix in figure 1 can shift when a situation necessitating collaboration overrides the contractually defined relationships.

CONCLUSIONS

This research contributes to literature on project contracting and collaboration through a consideration of the peculiarities of one-off contracts within a programme of on-going infrastructure maintenance and renewal. Clients tend to procure work under transactional contracts despite the high levels of inter-organisational cooperation required. This study has

found that under adversarial conditions, collaborative working relationships can develop over time despite an underlying lump-sum transactional contractual arrangement. This has implications for the understanding of how contracting practices impact the social ties between actors executing intra- and inter-firm working. The research provides insights that will help clients and suppliers of ongoing infrastructure maintenance recognise potential sources of adversity when opting to use non-partnering forms of contract to facilitate projects that require high levels of inter-organisational transactions. This contributes to theory with the offer of a new perspective on collaborative working arrangements when procurement arrangements are highly contractual (see Figure 1) demonstrating that collaborative relationships can be encouraged to emerge whilst operating traditionally arms-length transactional contract.

This study supports the notion that what matters to project performance more than the form of contract is the ability to develop collaborative attitudes but further research is required to understand why projects procured under transactional contract arrangements are able to shift within the contract/behaviour matrix during project execution. What are the factors that cause such a shift and what the likely implications for the delivery of highway maintenance projects. Practically, the findings suggest the need for an assessment of the preparedness of an organisation to enact a collaborative working arrangement, particularly when undertaking work that clients continue to procure under lump-sum forms of contract, and how to operationalise the collaborative working practices before adversity forces action.

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APPENDIX C

PAPER 3: 'BECOMING COLLABORATIVE': A STUDY OF INTRA-ORGANIZATIONAL RELATIONAL DYNAMICS

Full Reference: Grove, E. et al., 2018. "Becoming collaborative": A study of intra-organisational relational dynamics. *Journal of Financial Management of Property and Construction*, 23(1). pp.6-23

Abstract

Purpose: The intra-organisational relationships of through-life support services providers are complex, especially given the multifaceted nature of the provision required. For example, capabilities within the UK highways maintenance arena must support engineering design, routine maintenance and the ongoing management of the network. While collaboration in construction projects has formed a major research focus in recent years, there is a paucity of work examining collaboration in-flight.

Approach/methodology/design: Through a micro-practices approach two contracts delivering highway infrastructure maintenance and renewal services are examined to explore the intra-organisational relationships that determine the quality of service delivered.

Findings: Despite the rhetoric of collaboration and integrated working that pervades the contemporary project discourse, there was a clear focus on addressing immediate technical and commercial concerns rather than on creating the conditions for integrated working to flourish. On the occasions where the collaborative environment was prioritised a more integrated service was delivered.

Originality/value: In contrast to other accounts of the ways collaborative working shapes performance, this research reveals an acute need for a sustained collaborative effort; as soon as 'collaborative working' was normalised, the level of integration and seamlessness of service was diminished. This questions normative notions of what defines collaborative working in projects, and suggests a need for reframing it as an ongoing accomplishment of actors involved. Such a perspective resonates with notions of 'organizational becoming',

particularly as attempts to foster collaboration are themselves constitutive of the unfolding and shifting nature of intra-organizational relationships that emerge in complex contractual arrangements.

Keywords: Collaboration, Highway maintenance and management, Infrastructure, Relationship management

Paper type: Published journal paper

Note to reader: This paper refers to Contract A which is referred to as Study 2 in the main thesis. References in this paper to Contract B refer to Study 3 in the main thesis.

INTRODUCTION

Major infrastructure schemes have received a great deal of attention in the project literature where it is largely concerned with large one-off projects such as Heathrow Terminal 5 (Gil 2009) and the 2012 London Olympics (Grabher & Thiel 2015). Ongoing term maintenance contracts, on the other hand, receive rather less attention even though they present very different challenges. Specifically, strategic highway maintenance and renewal services must deal with the effects of ongoing programmes of work, complex multifaceted project environments, geographically disparate teams and the legacy of previous incumbents, including, in the UK, the transfer of project staff according to Transfer of Undertakings (Protection of Employment) Regulations (TUPE). The rapid mobilisation of projects sees significant numbers of staff transfer to the supplier on day one of the new contract. This creates a challenging environment for intra-organisational relationships whereby project staff dependent upon a diverse skills and the collective knowledge have little time to sort out who knows what (Meyerson et al. 1995). Despite a plethora of literature attending to the benefits of a collaborative approach to project delivery, there is a paucity of research that seeks to understand the micro-practices at play within intra-organisational collaborative working relationships and how these relationships are sustained in such through life service arrangements.

The prevailing methods used to govern delivery of highways maintenance contracts in the UK are at odds with the industry's desire to take a collaborative approach. Traditionally, contracts have structured and governed the management of the supplier-client relationship in these types of projects. In addition, contract documents are used intra-organisationally to coordinate expectations and provide common meaning (Star & Griesemer 1989) to the multiple functions of the supplier organisation whilst aiming for, from the clients' perspective, seamless service delivery. Contracts procured through competitive tender and awarded to the lowest price supplier is still the dominant selection criterion (Loosemore & Richard 2015), with no guarantee of future work. Thus, traditional, financially driven contracts are used to structure and govern complex service delivery requiring close cooperation not only between client and supplier but across the respective organisations. Despite the adversarial contracts employed, a collaborative approach to project delivery is attractive to the sector and features repeatedly in strategy documentation as a core value. Furthermore collaboration is supported and encouraged through British and international

standards (The British Standards Institute 2016) and is celebrated by industry awards (New Civil Engineer 2016). Despite the pervasiveness of collaboration as a non-financial indicator of project success, we know very little about how it unfolds in through life service agreements.

Actors within organisations form intricate networks that simultaneously collaborate around more complex issues and understanding how this happens is crucial for understanding how actors organise themselves and the consequences this has for the organisation centrally (Tello-Rozas et al. 2015). Collaboration is often depicted as a set of specific behavioural and contractual actions and obligations, each of which can be codified and evidenced through as outcomes achieved (Suprapto et al. 2015; Kovacic & Filzmoser 2014). This reduces collaboration to a normative set of actions and outcomes, but says little of how they propagate, or what happens to collaboration when progress inevitably deviates from the original programme. To address the observed deficiency this research looks to social movement literature and adopts its micro-practices approach to understand empirically how collaborative working plays out in these difficult scenarios and the resulting effects it has upon project delivery and organisational structure. To accomplish this, the focus of this paper will be upon the aforementioned mismatch between the industry's strategic aspirations to work collaboratively and the application of non-collaborative forms of contract and the impact this has on project execution. After a discussion of why a micro-practices approach to understanding collaborative working is appropriate, we outline the method by which observational data was gathered to provide empirically grounded evidence of collaboration activity. The findings presented describe the dynamic relationship between collaboration at the micro-level and the formulation of strategy at the corporate level where collaboration is overlooked by management. Informal and formal micro-practices of collaboration are identified with an accompanying discussion that recognises the journey towards becoming collaborative as an ongoing social accomplishment. This paper contributes theoretically to debates in collaboration and management literatures as it adopts the lens of organisational becoming (Tsoukas & Chia 2002) through which to examine the framing and reframing of collaborative working vision statements.

LITERATURE REVIEW

Arriving at an acceptable definition of collaboration for the industry has proved to be troublesome as its meaning alters depending on perspective (Hughes et al. 2012). This is

problematic when attempting to uncover the expertise involved (Poirier et al. 2016). The variety of organisational and individual agendas present in collaborative situations makes it difficult to agree on the common practice (Huxham 2003). Attempts at differentiated definitions have been made (Hughes et al. 2012) which while helpful in highlighting the array of associated aspects fails to provide a succinct unifying definition. While a universally accepted definition may not be available in the literature, a working definition is required here. A widely cited definition by Gray (1989) makes explicit reference to problems and the quest for solutions in defining collaboration as the "process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible". We adopt this definition and view it as applying equally to two or more individuals within an organisation, between divisions within organisations as well as across organisational boundaries.

In construction management research (CMR) there is much rhetoric around the benefits of collaborative approaches to delivering complex programmes with a significant volume of research commenting on factors that encourage and inhibit it (Bresnen & Marshall 2000), how to measure it (Yin et al. 2011), control it (Ballard 1994), how to employ fit-for-purpose contracts to foster it (Cox & Thompson 1997), and the best tools to support it (Bolstad & Endsley 2003). The trend in current literature is to identify antecedents or conditions for successful collaborations and such explorations and descriptions of the features of collaboration and the consequences of intervention provide useful accounts of the merits and demerits tools and techniques have on management practice. For instance, the prevalent neo-institutional, macro views of collaboration are concerned with meta-analyses that document antecedents and provide normative explanations (Suddaby et al. 2013). In this sense, collaboration is conceptualised as something that can be externally created and applied to situations under specific condition by certain people, for example business improvement consultants. Normative views of collaboration are unhelpful for dealing with contingent circumstances. We see a need to move beyond the assumptions that the correct collaborative processes can be applied, resulting in collaborative working and instead attempt to think of collaboration on its own terms and we are therefore recommending a more nuanced understanding which takes greater account of the micro-level practices in action.

Far from being externally created and applied we argue that collaborative working is a phenomenon socially constructed from within organisations by the actors involved. This

reversal of ontological priority has resonance with Tsoukas and Chia's (2002) call to treat change as a normal condition of organisational life. Attempts to impose a structured approach to collaborative working should be viewed as Tsoukas and Chia view the imposition of change initiatives; attempts to shape change result in further change. Their theory of 'organisational becoming' has been applied in the construction management context with findings showing that success is achieved when localised norms are consistent with senior management expectations (Bresnen et al. 2005). But this is not a straightforward venture given the differences between formal narratives of organisation change and lived reality (Löwstedt & Räisänen 2012). Project managers provide their teams with more immediate sources of meaning than the wider initiatives of the organisation, strengthened by the autonomy typical of project managers in construction (Bresnen et al. 2005). We argue here that a conceptualisation of collaboration as an ongoing endeavour in line with that of organisational change is more helpful for our understanding of what constitutes collaborative working and a focus on the micro-practices is advantageous for two reasons.

Understanding collaboration in-flight

Firstly a micro-practices approach attends to the dearth of grass-roots level empirical research into organisational collaboration. The dominant orientation toward quantitative science undertaken external to the phenomena in focus is criticised for the irrelevance of management research both to academia and industry practitioners (Koskela 2017). Whilst collaboration has been the focus of many researchers work, few have taken an ethnographic approach to investigate the underlying micro-practices. Organisational studies tend to be separated into macro (concerned with organisational theory) and micro (concerned with organisational behaviour) (Pondy & Mitroff 1979). Whilst the focus for this paper is to understand collaboration with attention turned toward micro-practices, we recognise this must occur with sight of the macro and associated broad and complex sets of meta problems (Trist 1983). Combining the macro and micro perspectives encourages researchers to think of organisations as contingent outcomes of on-going interactions and to offer a more nuanced view. Routines and conversations are elementary forms of daily life and, despite their mundane nature, they relevantly link the micro and the macro and provide a richer picture when routines are not separated from the people applying them (Feldman 2000). Just as using a microscope aids an understanding of the whole through its tiny parts, routines and conversations offer an interesting insight to examine strategic change (Rouleau 2005). To the

extent it reflects the macro, the micro is never trivial (Seidl & Whittington 2014). To describe the adjustment in the level of analysis and how this refocusing on the micro reveals otherwise hidden knowledge, we take Tsoukas and Chia's analogy of a tightrope walker (Tsoukas & Chia 2002) and apply it to a car travelling along a motorway. If the focus of analysis is upon the car, it may be viewed as stable as it travels within the lane markings at a constant speed. But if we reduce the level of analysis to the driver it becomes possible to observe the constant adjustments made to the steering wheel, the rise and fall of the foot on the accelerator pedal and the eyes that make regular glances to the mirrors to check for other road users. At certain levels of analysis stability can be seen and yet at another levels high degrees of dynamism are apparent. Both the macro and micro view are important.

As discussed, organisations have high level aims and strategic objectives to work collaboratively but we know little of how this impacts on collaborative working practices at the project level. Criticism has been levelled at management and organisation theorists for not fully capturing the complexity of organisational dynamics (Smith & Lewis 2011) and there are calls to re-theorize the firm from the perspective of the individuals who reside within it and, simultaneously, define it from the perspective of their lived experience (Suddaby et al. 2013). Dauber et al. (2012) in their configuration model of organisation culture attempt to explain this complexity facing organisations. Their model, a response to the deficiencies identified within earlier models of organisational culture such as that of Allaire and Firsirotu (1984) proposes a feedback loop to show how individual actors could inform the governing strategies and espoused organisational values. To create such a symbiotic relationship it is imperative that we connect the vision routinely and meaningfully to the individual and institutional self-interests so that they grow individually and advance institutionally (Rubin 2009, p.63). But developing routines for knowledge dissemination in this way is a double-edged sword as Powell (1998) describes: informal mechanisms (at the micro level) may preclude wide dissemination, while formal procedures (at a macro level) can inhibit learning and the challenge is to develop regular venues for the informal transmission of information, such that the process itself becomes tied to knowledge seeking and creation. Whilst helpful for visualising the disconnection between the strategic rhetoric of and the actual practice of collaboration and for describing how the two evolve in isolation, causing problems for project delivery, the dichotomist view is too simplistic. It fails to describe where the linkages are, when the cross-overs occur and how one side impacts upon the other. In an effort to avoid the

classical macro/micro opposition we instead attempt to trace the micro-practices as they play out in order to understand the linkages and complementarities between them.

Collaboration as an ongoing accomplishment

Secondly, as well as not knowing enough about the micro-practices of collaboration we do not know how collaborative working is accomplished. The concept of micro-practices adopted here is drawn from social movement literature which has much to say about the micro-practices of protest tactics and mobilisation mechanisms but struggles to articulate how they might lead to a refinement of political agendas at a macro-level. In response to this Tello-Rozas et al. (2015) takes a micro-practice approach to describe the social movement phenomenon in South America and trace how actors organise themselves and collaborate to address important issues that political authorities seems unable or disinclined to address. In devising their processual model, Tello-Rozas et al. directed attention toward the detailed actions and interactions of people's activities by opening the "black box" and revealing that where numerous collaborations coexist, informal authority usually prevails over formal and that such informal authority emerges dynamically from different meetings and events. Their model identifies the micro-practices of collaboration at play within social networks organised around issues of quality of life and sustainability and describes how collaborative behaviours increase in scale as they transition from a mobilising pathway, through organising to a pathway of acting at which point the collaborative achievements are in a position to affect change at a greater scale. CMR could learn much from Tello-Rozas et al. appreciation of the micro-practice of collaboration, not only for the rich description of the practices described but for the attempts to document the change that occurs as collaborative behaviours transition from one stage to the next. Whilst concerned with the micro level of analysis, it is important to avoid the "descriptive trap" of offering detailed micro-ethnographies that are almost too contextualized for the reader to appreciate the far-reaching insights they can produce (Suddaby et al. 2013). Tall ontologies that effectively connect the micro and the macro are important and doing so explains a good deal of what is happening (Seidl & Whittington 2014).

Taking a micro-practice approach for understanding how collaboration is accomplished attends to the limitations of the prevailing approach in CMR. Tools and techniques such as collaborative planning initiatives born from the last Planner System (Ballard 1994) are frequently applied within the industry to facilitate and formalise project teams interactions.

But these systems tend not to take account the more subtle behavioural aspects that carry the potential to affect the consistent realisation of collaborative planning benefits. For instance, BS11000 attempts to deliver stability and control by providing structure to collaborative working practice. It deals with collaboration as something that can be reduced to routines and processes. In contrast we propose that it should instead be viewed as an ongoing achievement under constant renegotiation for which prescribed standards are not helpful for understanding the emerging properties of working collaboratively. Previous research recommends the collaborative planning approach be developed in order that it can account for these nuances, but without prescribing rigid and normative approaches that could serve to stymie both the creativity of designers as well as broader learning opportunities (Boyce et al. 2012).

As we will show later, collaborative approaches to working are pervasive within project teams with the potential for unintentional consequences that normative descriptions do not take into account. Being collaborative or not being collaborative should not be thought of as a binary situation. We should stop viewing collaboration as a special event created and facilitated by specific actors under specific circumstances and instead view it as ubiquitous. It is the inevitability of human interaction and the resulting adaptation to new challenges and opportunities that leads Tsoukas and Chia to describe organisations as being in a "state of perpetual becoming" (Tsoukas & Chia 2002, p.576). Most concepts, they say, are radially structured with a stable centre that defines communal practice, surrounded by a less stable periphery. Where action stems from this stable central core, the resulting action tends to be stable. The conceptualisation of collaboration as something that can be created and controlled assumes a central stability. But, as we will come on to later, life can throw unexpected events into the periphery. In response to these unexpected events, actors must extend their imagination beyond the stable central core. This is complicated further by the fact that as humans we not only draw on experience from the world around us but also on our own thoughts as we continually reweave our beliefs. The actions we take as a consequence of this reweaving undoubtedly alter subsequent organisational routines. This bears risks for the organisation when we consider our earlier point regarding definitional ambiguity and how collaboration as a term means different things to different people.

The multiplicity of expertise required for engineering projects results in significant differences in the values of the professionals involved which are difficult to integrate (Fellows & Liu 2012), particularly where two main parties have different commercial and/or

social objectives (Ball et al. 2014). As such, collaborative structures are likely to change over time because of ambiguity of membership and complexity in local environments (Bryson et al. 2006) and in response to the specific activities in which the team is embedded (Marshall 2014). The shifting nature of collaboration when guided by strategic visions and steered by joined up senior management can result in best practice examples (Highways Industry 2016). Organisations within the industry provide a strategic rhetoric of collaboration via their vision statements, value propositions and strategy documents (see Table 1). But collaboration is not the remedy for all problems, indeed it can make matters worse or create problems that did not exist before due to unexpected reverberations owing to the complexity of the environment (Bryson et al. 2006). Rather than trying to control collaborative behaviour through the application of tools and techniques, we are instead advocating an appreciation of its fragility (Bresnen & Marshall 2000) and an effort to learn to see how and why interactions occur whilst working to continually refine and modify practice to handle problems and opportunities as they arise. In this sense we promote the conceptualisation of collaboration as becoming.

The normative descriptions found within CMR tend to paint a picture of collaboration that was once like this, now it is like this and in the future it may be like this. Tsoukas and Chia (2002) note that such definitions fail to capture the motion of getting from A to B. It could be argued that as the number of these snap shots in time increase we receive a fuller description of the motion but the fact remains that each snap shot on its own contains no element of movement and we are still without an account of the change between the stages. It is only from placing oneself at the centre of the unfolding phenomenon can we hope to know it from within (Tsoukas & Chia 2002). From a practitioners point of view, there is a need for management to "learn to see" (Womack et al. 1990) and engage the lower levels of personnel because management tend to over-estimate their organisational capabilities (Jeong et al. 2006).

Table 1: Collaboration as a core value

Source	Stated Vision / Value
AECOM (2016)	Collaborate (core value)
Amey (2016)	We are collaborative (core value)
Arup (2015)	Sustaining a collaborative culture (annual report)
Bam Nuttall (2016)	Founding members of the Institution of Collaborative Working (who we are)
Chartered Institute of Highways and Transportation (2016)	Collaborative (core value)

Galliford Try (2016)	Collaboration (core value)
Highways England (2014)	Drive collaboration through improved company-wide ways of working (strategic plan)
Kier (2016)	Collaborative (core value)
Network Rail (2016)	To fulfil our vision, we need to collaborate effectively with our industry partners (vision)
WSP (2016)	Our strength is in the power of our collaboration and teamwork (core values)

THE CASE

A case study design has been used to support an in-depth, exploratory research approach of the ethnographic type (LeCompte & Schensul 1999) taken to examine an organisation. The case study organisation is large private sector company providing a diverse range of services to the public sector, including infrastructure maintenance and renewal services. The case study observed featured two embedded units of analysis; each is a separate contract delivering highway maintenance and renewal services. Both contracts are for the provision of public services by a private sector organisation for a public sector client, although operating under different contractual arrangements. Contract A is concerned with the delivery of routine maintenance and repair as well as the design and management of capital investment projects. The contract was procured under a bespoke form of lump-sum contract with cost reimbursable elements designed to deliver services to the strategic road network in a particular geographic locale in the UK for 5 years. Before this contract began, the maintenance and renewal services for this area had been provided by a different supplier under a cost reimbursable form of contract. Contract B, unlike contract A, is a local highways maintenance and management contract procured as a private finance initiative for a period in excess of 20 years. These contracts were selected primarily for reasons associated with the experienced relationships between supplier and client. Tensions relating to commercial disagreements were common to both contracts.

During a twelve-month period, the researcher spent five days a week in the supplier organisation, participating in activities related to the two observed contracts and following managers and operational team members in their project related tasks. In exchange, the researcher provided supporting activities (coordinating document reviews, supporting report compilation, analysing data, facilitating workshops and so forth).

To broaden the understanding of collaboration in action within complex multifaceted project organisations, this case study has been designed to examine the social interactions and

working relationships at the micro-level and how these are impacted by and impact upon strategic managements' decision making processes.

METHODOLOGY

A micro-practices approach to collaboration, borrowed from social movement literature, is used to observe the conditions within a supplier organisation and the activities that influence both the management of inter-functional and intra-organisational relationships to discover the extent to which espoused intentions to work collaboratively correlate with experienced realities. The methodological design was influence by the work of Tello-Rozas et al (2002) whose model describes the varied and intricate micro-practices within complex collaborations involving civil society. This observational approach, concerned with how things evolve and why was applied here to trace the complex everyday collaborations within project organisations in the context highway infrastructure management. This was accomplished through an in-depth examination of the interaction between project team members which presented an opportunity to develop a deep bottom-up understanding of collaborative working practices in flight. The primary researcher was embedded within the organisation and therefore this approach was appropriate as advantage could be taken of the readily available access to groups and events that are otherwise inaccessible to study. Furthermore the researcher was able to perceive reality as someone on the "inside" described as 'invaluable in producing an accurate portrayal of a case phenomenon' (Yin 2014). The major challenge is potential for bias. The knowledge gained facilitated an understanding of what is implied by working collaboratively in a form that it is expected to advise future practice. This was further complimented by an understanding of how the top-down high level rhetoric of working collaboratively could be translated into guidance and support for operational level working practices.

Practice was observed to explore and understand what forms collaboration takes, how it is enacted and by whom with the aim of unearthing and documenting the activities people engaged in to accomplish their duties within the broader contract delivery. Particular attention was paid to the activities requiring input from multiple people. Through these observations it was possible to distinguish patterns in the everyday human interactions and identify micro-practices of collaboration. Interpretive analysis of the observed daily work activities and interactions between employees provided a deep appreciation of the motivations driving the micro-practices at play and permitted the identification of boundaries

between micro-practice and strategic level rhetoric. Throughout the research period, empirical observations were systematically combined (Dubois & Gadde 2002) with theoretical models as data collection and data analysis was undertaken in multiple cyclical rounds. Observations were supplemented with nine face-to-face semi-structured open-ended interviews lasting between 30 and 90 minutes. Interviews are recognised as the most important source of case study evidence (Yin 2014) and were used in this study to validate observations made and identify further opportunities for observational data gathering. The interviews sample consisted of members of the project teams within the case study organisation working directly on one of the two contracts/projects, see Table 2. Convenience sampling (Robinson 2014) was employed to identify participants. Data was supplemented with analysis of company documents, produced predominantly as outcomes of workshops. The semi-structured interviews were audio recorded and transcribed verbatim for analysis. All sessions were facilitated by the same researcher which allowed for internal consistency and equivalence (Kidd & Parshall 2000). Meaning condensation (Lee 1999) was the dominant interview analysis technique employed. The emergent themes for qualitative interpretation were derived from the data set and situational observations in an iterative fashion. The literature review provided concepts to look for, but the main purpose of the exploratory approach was to allow the participants to focus on what they felt was important.

Table 2: Interviewees

	Role	**Contract**
1	Engineer	A
2	Account Director	A
3	Business Improvement Manager	A
4	Customer Services Manager	B
5	Principle Planning Manager	B
6 & 7	Director	B
8 & 9	Business Improvement Manager	B

FINDINGS AND DISCUSSION

Despite the benefits discussed in CMR literature and the desire of industry practitioners to take a collaborative approach to project delivery, the findings presented here centre around the precedence that matters of a technical and commercial nature are found to have had over

collaborative working. To illustrate this point the observed micro-practices of collaboration are separated into informal and formal and accompany a discussion of the implications these findings have for the conceptualisation of collaboration as an ongoing accomplishment. Table 3 provides a summary of the themes and micro-practices discussed.

Informal collaborations: the inevitability of human interaction

In CMR literature collaboration is treated as exceptional; a situation that requires specialised applied intervention to be achieved. During the early stages of the observation period within the case study organisation, it quickly became apparent that working collaboratively (i.e. parties who see different aspects of a problem constructively exploring their differences and searching for solutions that go beyond their own limited vision of what is possible) was not an exceptional occurrence but a "normal" part of the working day. The interactions of project staff were observed to coalesce around a common goal to "get the job done" and emerged in the absence of a convener and without organised facilitation or direction (Tello-Rozas et al. 2015; Trist 1983). These engagements typically took the form of ad-hoc, around the water-cooler discussions between colleagues and can best be described as informal relational behaviours enacted during project delivery. During these interactions individuals were seen to identify linkages and signpost one another to potential sources of knowledge elsewhere within the project and occasionally, outside of the boundaries of the project and across the wider business. Collaborating constructively to explore options to overcome the day to day challenges faced was observed to be something that project staff did intuitively. Far from being a formally instigated collaboration initiative, the collaborations observed were an outcome of inevitable human interaction (Tsoukas & Chia 2002).

Less apparent was the increasing disconnection between strategic project objectives and operational practice. When faced with challenges that emerged during project delivery, project staff within contract B were observed making decisions informally and amongst themselves to act contrary to the method prescribed in formal and contractually binding documentation. This devious behaviour was not the action of mavericks intent on defying instruction but instead an illuminating example of the evolution of project delivery routines whereby project personnel, over time, neglected to undertake certain specified activities in an effort to get the job done via a quicker and easier route. For the adaptations to become an accepted alternative approach to project delivery (albeit an informally recognised alternative), collusion with other project team members was required. Acting collaboratively to alter

organisational routines (Feldman 2000) saw project participants co-evolving to yield self-organizing governance as projects progress within an often fixed formal framework (Fellows & Liu 2012). To overcome the unhelpfulness rigidly fixed frameworks bring to project delivery, team members at the grassroots level devised their own working methods in isolated groups/teams, disconnected from any strategic managerial visions for project delivery.

These constant revisions remained informal. Explicit details of the subversive, though effective, actions were not routinely shared with management beyond the team level. The evolution of job roles in connection with contractually binding method statements is but one example of sub-groups within the project delivery team collaborating informally to devise ways of working that better suit themselves. Interviews revealed that it was not uncommon for contract staff to be unaware of the documented processes and procedures or how they applied to their day to day role: "It would help if this [method statement] made any semblance of sense to me but it doesn't […] from my perspective, if I picked up [this method statement] now and put it in the bin nothing would change on a day to day basis". Further interrogation revealed many instances of specific activities outlined in multiple documents, leading to an intensifying web of non-compliance. To compound the issue, the linkages were at times contradictory. Delbridge's (2007) term 'conflicted collaboration' sees simultaneous interdependence and disconnection resulting in both coercive and collaborative experiences for workers. At the 'coal face', team members have just enough knowledge of who is performing which tasks in their immediate network in order to complete their corresponding activities, even if to achieve this they must undertake activities that contravene the formal documentations that were intended to guide project delivery. The project tools (method statements and process maps, for instance) that were designed to facilitate team working were at times the source of frustration; rather than facilitate shared meaning they obscured and confused (Nicolini et al. 2012). Being preoccupied with the properties of organisations (rules, org charts, roles etc.) neglects the fact that order in organisations needs to be accomplished every day and is in a constant state of revision (Bryman & Bell 2011). Documents that served the purposes of winning the contracts were observed to be unsuitable to guide delivery. Dissatisfaction with the appropriateness of the documents was strongly articulated by a member of contract B: "whoever wrote the method statements in the beginning should be shot and whoever signed them off should also be shot".

Discussion with project staff on contract B revealed that under previous managers, achieving project milestones (which carried significant financial penalties) took precedent over the management of method statement compliance. This was observed to manifest as a failure on the part of management to recognise not only the need for continual reconfiguration of organisational routines to suit emerging problems and opportunities, but the inevitability of interaction and the resulting adaptations. In contract B, these unchecked alterations led to operational practice that evolved so far from the documented procedures that it became a larger problem of contractual non-compliance. This later had a knock on effect which led to serious ramifications for the project as a whole, in particular the toll it took on the health of the relationship between supplier and client at the highest level. From a collaborative working point of view, the problems brought about by well-intentioned people modifying organisational routines had consequences that stretched beyond the sub-teams involved and jeopardised the client supplier relationship at the highest level. In the same vein, interviews with project staff in contract A told of the payment mechanisms and a preoccupation with financial deductions to govern project delivery which drove behaviours within the project team that prioritised costs over quality. As mentioned previously, this contract had previously been tendered on a cost reimbursable basis were felt to have encouraged a more collaborative approach and provide a foundation for positive relationships unlike those experienced under the current lump-sum arrangement. The shift in procurement strategy, triggered by the national economic situation of the previous half-decade, saw the budget for the lump-sum form of contract much reduced compared to the previous cost reimbursable arrangement. This is reported to have driven behaviour within the senior delivery team of contract A that ran counter to the collaborative working rhetoric of the supplier organisation centrally.

Much of the adversity experienced centres on the (mis-)interpretation of commercial aspects of the contract during project mobilisation and as the project entered into its delivery phase. It has been stated that when uncertainty is high, the early post-contractual phase is of special importance, especially in public projects when after signing the contract, a process will start where both parties jointly make sense of the relationship both contractually and behaviourally and how this is handled decides how the relationship develops (Dewulf & Kadefors 2012). Elsewhere, early contractual control governance has been shown to significantly contribute to a less cooperative negotiation strategy (Lumineau & Henderson 2012).

The above accounts resonate with Balthazard et al.'s account of the Columbia space shuttle accident where people inside NASA were discussing critical information with each other but not with senior decision makers; lifesaving knowledge that might have saved the spaceship and its crew (Balthazard et al. 2006). The disasters were found not to be due to intentional managerial wrongdoing but an organisational culture that created an environment where known technical problems became an operating norm. "As critical and fundamental that knowledge sharing might be in an organization, it is not safe to assume that it will occur unless it is a recognized norm or expected behavior as part of the organization's culture" (Balthazard et al. 2006). The focus of management in the contract observed in this research was found to be on addressing the immediate technical and commercial concerns of the project with the contract type leading to behaviours that prioritised cost savings over quality team working. Developing and nurturing collaborative environments for the facilitation of integrated working were initially overlooked.

Table 3: Emergent themes

Theme	Micro-practice observed	Implications for practice
Inevitable interaction	Ad-hoc collaborations Informal relational behaviour Informal signposting to sources of information	Unchecked deviation away from standard processes and procedures
Cost over quality	Modification of organisational routines Preoccupation with technical and commercial issues	Creates tension between client and supplier Negative impact on relationships intra-organisationally
Strategic and operational disconnection	Work around solutions to get the job done Self-organising governance	Misinterpretation of requirements Contractual non-compliance
Collaboration as a process	Formalised interactions for knowledge sharing (e.g. pre-arranged meetings) Structured information sharing Perceived need of facilitation provided by 3rd parties	Revelation of previously obscured issues Collaborative identification of possible solutions Unsustainable external intervention

Formal collaborations: temporary interventions

As the extent of the contractual non-compliances mentioned above became clear a more considered approach to collaborative working was observed within contract A whereby small

groups of individuals were assembled and problem identification and solution generation was facilitated by consultants brought to the project for that specific purpose. Observations, supported by interviews, suggest that rather than resulting from proactive decisions to coordinate collaborative working in line with strategic aspirations to work collaboratively, the facilitated sessions at this stage were largely reactionary in response to dysfunctional events brought about by reoccurring episodes of contractual non-compliance. During a series of formal collaborative workshops the root of all problems was identified to have originated prior to contract delivery during the six-month contract mobilisation stage where it is now recognised that the contract requirements were not fully understood. Observations, supported by discussions with project staff revealed that the ineffective mobilisation of contract A was not a single dysfunctional event. Projects are often bid for and mobilised in ways that do not support project execution. Where the processes and procedures designed to facilitate project delivery are ineffectual (as discussed above) there was felt to be a reliance on the knowledge possessed by project staff. This risk of this knowledge being lost was realised in contract B: "there are less than a handful of people still working on the contract, or within [the case study organisation] who were involved during the bid and mobilisation stages. There are references that people were given golden handshakes to stay for the first 5 years. Once they expired we saw a mass exodus of knowledge from the contract and I think we are probably feeling the effects of that now".

Whilst the road to failure was compounded by the transactional arrangements that allowed uncooperative behaviours to entrench and act as blockers to collaborative, open, honest and trusting relationships, in the face of adversity, collaborative approaches were transplanted into project delivery in the form of formally facilitated "collaborative workshops". This overtly collaborative approach disclosed previously hidden non-compliances through a mutual understanding of past events and by removing uncertainty about issues threatening the project. A lot of the issues that had been aggravating project delivery were brought to the fore. The improvement plans that ensued facilitated an understanding on the part of management of the concerns of project staff.

Findings show that it is possible to foster an environment where the co-creation of meaning can lead to the collaborative delivery a more integrated service. Furthermore, the case study organisation has shown that a successfully collaborative approach can be realised when working relationships have previously been under considerable strain. But crucially, what

this tells us is that collaborative working left to its own devices is at the mercy of inevitable human interaction (Tsoukas & Chia 2002). Whilst people largely act with well-meaning intentions, if without strategic direction there is a risk that the resulting practice will not align with intended outcomes. Without an appreciation of the vision and a "what-this-means-to-me" message, we have seen that collaborative efforts, misguided, can lead us in the wrong direction, especially when activity is underpinned by adversarial contractual arrangements (Regan et al. 2015). As observed, when motivated by a desire to re-frame strategic vision and disseminate project goals in a way that is meaningful for those who need to hear it, employees are more engaged with their work are said to be more likely to behave in positive and cooperative ways, to the benefit of both the firm and themselves (Salanova & Schaufeli 2008).

CONCLUDING REMARKS

In seeking to understand micro-practices of collaboration this observational research has opened the black box (Tello-Rozas et al. 2015) to reveal the everyday interactions enacted within the delivery of highway infrastructure maintenance and renewal. Whilst the focus has been on micro-practices, the macro-level has been considered in an attempt here to offer a more holistic understanding of collaboration. In doing so we have shown that operational level knowledge should be systematically utilised in the framing and reframing of strategic vision. To do so would recognise that collaboration is a not an end goal but a perpetual state of becoming. We have seen that when unguided by strategic direction, collaborative endeavours at an operational level have the potential to take us away from where we ought to be. It is within this state of operational blindness of strategic vision and organisational strategic intent that we have positioned our discussion of the micro-practices of collaboration, and not in an assumed state of clearly defined and communicated project goals. As discussed, actors within organisations form intricate networks to collaborate around more complex issues that the documented processes of delivering infrastructure maintenance and renewal services do not account for. A joint social construction of reality emerges from shared experiences and enacts formal as well as informal coordinating patterns of behaviour (Bouwen & Taillieu 2004). We have seen informally coordinated collaborative actions unfold without orientation organisational strategic vision. The primary implication for practice was the evolution of organisational routines whereby project teams, in response to everyday

challenges collaborated informally and developed workaround solutions which manifested as contractual non-compliance.

For team level collaborative practice to be aligned with the strategic rhetoric of collaboration, those charged with the enactment of the vision must receive clear communication of that vision. This communication must go beyond a top-down passing-on of the message generated at the strategic level. The articulation of the vision must account for the differences in need at each stage of the project and as such the vision requires re-framing to ensure that those who need to hear it and enact it have received the message as it was intended. To realise this, knowledge must be extracted from the enactment of the vision to inform its replenishment. An active appreciation of the micro-practices of collaboration at play managers would harvest the knowledge required to reframe the vision in order that it consistently and effectively guides subsequent collaborative working practices. This is not to say that all acts of collaborative working should be formalised. However, management ought to be mindful that project teams will inevitably collaborate and when an environment that facilitates constructive interactions is not provided, unintended consequences of evolving organisational routines are likely to impact on project performance. In this vein, managers of project teams must work hard to create the collaborative environments required for successful project delivery (given the challenges these types on contracts bring) and learning to view collaborative working as an ongoing accomplishment would assist them in their endeavours. Bid and mobilisation stage have been identified as the root cause of many project problems. However, in the face of adversity, project teams were able to effectively transplant formal collaborative working arrangements and bring about pockets of improvement. It is therefore not enough to establish a project team with people identified as exhibiting collaborative behaviours and send it off with a message to be collaborative and expect it to happen naturally. We must recognise that collaboration can deteriorate due to its fragility (Marshall 2014) and it can also, with considerable effort, be transplanted into failing projects. When the level of analysis is adjusted from the macro to the micro it is possible to see that even stable collaborative environments are in a constant state of flux.

Through an examination of the micro-practices of collaboration we have offered an alternative perspective on collaborative working which moves away from labelling its component parts towards a view of becoming collaborative as an ongoing accomplishment (Marshall 2014) which is subject to creep slippage and drift which needs careful monitoring

and management. We have seen that collaboration is often informal and under-organized, whereby individuals act instinctively to develop reciprocity in the absence of rules; one of the most important dynamics in collaboration (Gray 1989, p.17). Organisations are good at talking the talk; they believe collaboration is beneficial and taking a collaborative approach to working is the way they want to do business. But when it comes to walking the walk, high level aims are not well communicated through project teams. Vision changes as senior management changes resulting in disconnect between the high level aim and espoused organisation value of collaboration and the low-level micro-practice of collaboration in action. Practically, the findings highlight a need for appreciation that operational level collaboration will occur in spite of the un-collaborative contracts employed to govern these types of projects. A sensitivity to the associated risks of informal collaboration should be developed. Despite the challenges, we have seen that senior management can proactively support formally organised collaboration in temporary infrastructure projects and build relationships that contribute positively towards joint performance, when the collaborative environment is prioritised as a foundational aspect of these complex long-term arrangements. In this sense collaboration must be worked at, it is in a constant state of renewal as it is framed and reframed sympathetically in response to the micro-practices of day to day project delivery requirements. Collaborative working therefore is not an achievable state of being but an ongoing journey of becoming. While this study revealed that formal "bolt-on" collaborative interventions can bring about improvements in service delivery, further research is required to assess the sustainability of such change facilitated in the short term by external third parties and the implications this has for sustained collaboration.

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APPENDIX D

PAPER 4: THE COLLABORATIVE JOURNEY: RIDING THE BUMPS OF THE INSTITUTIONAL LANDSCAPE

Full Reference: Grove, E. et al., 2017. The collaborative journey: Riding the bumps of the institutional landscape. In P. W. Chan & C. J. Neilson, eds. Proceedings of the 33rd Annual ARCOM Conference. pp. 4–6.

Abstract

Managing multiple intra-organisational inputs for the delivery of highways maintenance is a complex endeavour, especially given the multifaceted nature of the provision required. While collaboration in construction projects has formed a major research focus in recent years, attention orientates toward an application of a collaborative approach and in doing so conceptualises collaboration as an exceptional event. Construction management research faces criticism for its failure to consider institutional theory, a perspective dominant in business management research. This working paper sets out a reconceptualization of collaboration as an ongoing accomplishment which requires both an understanding of the micro-practices to reveal its on-going nature, and to reveal the institutional logics that shape collaborative practice. Focus groups identified activities undertaken during project delivery according to the collaborative behaviour exhibited. Findings uncovered tensions between the regulatory and cognitive institutions governing project delivery. This research encourages practitioners to consider the underlying institutional forces during the reconstitution of working relationships. This paper has synergy with 'organisational becoming' and contributes to our understanding of collaboration within construction management literature.

Keywords: collaboration, institutional theory, highway maintenance, organisational change.

Paper Type: published conference paper

INTRODUCTION

Despite the quantity of research attending to collaborative working practices (Fellows & Liu 2012; Mignone et al. 2016; Suprapto et al. 2015; Donato et al. 2015), we still do not know enough about emergent micro-practices (M-P) of collaborative behaviour and the implications for the delivery of complex infrastructure programmes. In delivering through-life services such as the management, maintenance and renewal of the UK's highway infrastructure assets, supplier organisations must coordinate their multifaceted service provision. Such suppliers typically possess the resources in-house to provide expertise in a range of engineering disciplines including pavement, structural, environmental, geotechnical and hydrological services. In addition, such organisations have capability in support services such as project management, finance, commercial and legal. Previous research attention has predominantly been orientated towards formalised and established methodologies of collaborative working (Ballard & Tommelein 2012), often applied and facilitated by external consultants (Boyce et al. 2012), These normative accounts fail to provide a rich picture of how and why collaboration evolves. To address this we attempt to uncover the M-P of collaboration and understand it as an ongoing accomplishment (Marshall 2014). Furthermore this exploration will help to reveal the institutions that shape the M-P and in doing so identify tensions between collaborative working rhetoric and collaborative practice.

LITERATURE REVIEW

Construction management research (CMR) is home to a wealth of research extolling the benefits of a collaborative approach to project delivery, particularly in projects characterised by complexity (Ballard & Tommelein 2012). Past research provides us with helpful accounts of the prerequisites necessary (Zou et al. 2014; Dewulf & Kadefors 2012; Rahman & Kumaraswamy 2005) and the tools and techniques mobilised to facilitate such an approach (Bolstad & Endsley 2003; Hawkins & Little 2011). The research described here is fixated on formalised and implementable styles of collaborative working and consequently, fails to include the collaborations arising from everyday routines and mundane interactions. Previous work by the authors has shown collaborative behaviour that emerges in an informal and pervasive manner can carry with it serious implications for project performance (Grove et al. 2017). Institutional theory, an infrequently utilised perspective in CMR (Bresnen 2017) provides a useful lens through which to explore the M-P of collaboration as an ongoing accomplishment and to inform an appreciation of the influencing forces at play.

The institutional landscape

Scott (2008) sets out three institutional pillars that can be used to rationalise human behaviour: regulatory, cognitive and normative. Regulatory institutions are formally governed and enforced via commercial and financial incentives/sanctions. Cognitive and normative institutions are concerned with the socially shared and accepted behaviours that, when violated, are sanctioned with ridicule, isolation and ostracism (Henisz et al. 2012). Without explicit links to institutional theory, CMR has attended to the regulatory institutions that govern collaborative working arrangements, in particular through the examination of relational contracting strategies (Gil 2009; Rahman & Kumaraswamy 2005; Zou et al. 2014). Whilst important, these are only part of the story. Financial incentives and sanctions can enhance regulatory governance but they can never fully subsume the sociological perspectives (Henisz et al. 2012).

A reconceptualization of collaboration as an ongoing accomplishment would encourage greater consideration of the underlying institutional landscape, or "rules of the games" (Jia et al. 2017). Recognition of the importance of institutions and institutionalisation in CMR is not new (Kadefors 1995), but prompted by Bresnen's (2017) criticism of the failure to consider institutional theory, we explore here how institutionalism can be used to explore the behaviours associated with collaboration. Theory tells us that institutions are created when people formally and informally organise their time and space into regular patterns that impact their activities (Jia et al. 2017). Furthermore, individuals and organisations are said to automatically reproduce the institutions they inhabit. Theoretically, this deterministic assertion presents a tricky dilemma; how are routines altered and new ones created if the institutional force is so great individuals automatically conform to it? Seo and Creed (2002) suggest that this question is partially answered by incorporating theory of agency, but doing so contradicts the central assertion of institutional theory which is that actors themselves are institutionally constructed (Seo & Creed 2002). This paradox is interesting in the context of collaboration when we consider the propensity for informal and emergent collaborative action, governed by cognitive and normative institutions, to subversively alter organisational routines that the regulatory institutions govern. As we transplant institutional theory into the context of collaborative working, the question arises: how can actors change the collaborative environment if their collaborative actions are conditioned by the very institution they wish to change? This suggests multiple and conflicting institutional logics, something not considered

in the extant literature regarding collaborative working within construction. Who decides which institutional forces should be altered? Is this even possible given the exaggerated ability afforded to actors to create and transform institutions (Lounsbury & Crumley 2007).

Seo and Creed (2002) discuss how human praxis, triggered by tension, transforms socially embedded, unresponsive actors into conscious change agents, aware that their interests are unmet. Wanting and needing to do a good job but constrained by ineffective contractual arrangements (regulatory institutions) creates significant tensions for project teams and can lead to staff developing their own isolated solutions which can be disastrous (Balthazard et al. 2006). Such internal fragmentation may allow competing institutional logics to exist within the same institutional field (Lounsbury 2007). When tensions develop, deepen and permeate actors' social experience continually and collectively, change agents are said to be mobilised (Seo & Creed 2002). The problem for management is when change occurs unofficially and results in non-compliant action that defies the regulatory institution. A reconceptualization of collaboration as ongoing which encourages sympathetic consideration of the underlying institutions and their effect on behaviour would help our understanding of the M-P of collaboration as emerging and pervasive.

Collaboration is not exceptional

The discourse dominant in CMR treats collaborative working as an applicable methodology that can be transplanted into any situation and yield positive results (Choo et al. 2004), reducing what is a complex set of interconnected relational issues to a set of tools and techniques (Hawkins & Little 2011). Whilst such accounts provide practitioners with insightful accounts of how collaboration can be applied and the positive and negative effects of the implemented initiative, attention is diverted away from the detailed actions and interactions of peoples' activities.

Attention to the normative and cognitive dimensions of institutions is the major feature of neo-institutionalism and to take a sociological perspective toward the understanding of governance is reported to have the strongest purchase in micro-level studies (Henisz et al. 2012). For example, Tello-Rozas et al. (2015) takes a M-P approach to describe the social movement phenomenon in South America and trace how actors organise and collaborate to address important issues that political authorities seem unable or disinclined to address. In their study attention is toward the detailed actions and interactions as they open the “black

box" to reveal that where numerous collaborations coexist, informal authority usually prevails over formal and that such informal authority emerges dynamically from different meetings and events..

Whilst dominant in organisational and management theory, institutional theory continues to be largely absent in CMR. Researchers forego opportunities to cross fertilise ideas from business management research (Bresnen 2017) where recent work emphasises the endogenous pressures that create change in organisations and the belief systems and associated practices that condition how organisations respond to endogenously created change (Tsoukas & Chia 2002). In the same way Tsoukas & Chia call for a reversal of ontological priority accorded to organisational change, we call for collaboration within CMR to be understood as a phenomenon created from within and not as episodically enacted events.

A renegotiation of the terms

The dominant conceptualisation of collaboration as something that can be applied prioritises stability and assumes that whilst collaborative working is applied, all other factors remain constant. Considering again the theory of organisational becoming (Tsoukas & Chia 2002) whereby attempts to manage change create additional change we begin to appreciate the dynamic nature of collaborative working arrangements. Interpreting collaboration as ongoing permits an appreciation that the way people collaborate is a result of the immediate tensions experienced as well as previous experiences, interactions, collaborations and disputes, all of which were influenced by the institutions that governed. Just as an application of technology cannot increase or decrease productivity or performance (Orlikowski 2000), collaboration will not simply occur through the colocation of people. A view of collaboration as ongoing encourages a focus on the M-P of action.

We have discussed the idea that tensions have the power to create change agents. Tensions may arise when a need to collaborate to "get the job done" is not supported by the governing regulatory institutions that reinforce a senior management approach prioritising financial and commercial factors. Institutional theory can help us to understand the belief systems underpinning the activated institutions as a whole (Jia et al. 2017). The concept of institutional logic helps our understanding of how these incompatible domains (be collaborative and don't be collaborative) act together to shape behaviour and why some rules

are obeyed and others avoided (Jia et al. 2017). In the context of this research this approach could aid our understanding of why collaborative behaviour is enacted in some situations but not in others or during certain periods but not forever. In an attempt to understand why initiatives do not result in the desired behaviours, Jia et al., (2017) suggest the weak link is rooted in various systemic contexts such as incentives constraints, values and beliefs which affect individuals' decision making.

METHODOLOGY

To understand the M-P of collaboration and the influence of underlying institutional forces, data was gathered via interactive focus groups, supplemented by participant observation and one to one interviews. Follow up focus groups were held to further investigate the themes that emerged where a root cause analysis approach was adopted to unearth the underlying issues. Focus groups are an infrequently mentioned data collection technique but have been found to be an effective tool particularly to those studying work environments and associated behaviours (Frey & Fontana 1991). A structured schedule was employed to administer the first round of focus group sessions, participants were asked to list the key activities pertaining to their job role on a sheet of paper. The list of activities then became the bars on a chart. Throughout the session, this base chart was layered with information regarding the identified activity's success, criticality, experienced feelings, levels of collaboration, and the significance of financial and commercial issues. Following the focus group sessions, the 196 separate activities were identified and analysed. Participants were asked to list the activities they complete as a part of their job in chorological order thereby producing an indicative timeline. After normalising the timescale, it was possible to represent the level of collaboration experienced for each activity relative to its position in a timeline and identify a trend.

Fourteen participants in groups of between two and six took part in the first round of focus groups. Thirty two participants took part in five follow up sessions. Participants across all groups consisted of office and site-based operatives, engineers, project managers and commercial managers. The groups comprised individuals known to one another and they shared a common frame of reference (i.e. they worked for the same organisation). The sessions were held at the participants' workplace in private meeting rooms. The primary motivation for employing a focus group technique was to gather data from multiple participants in one sitting. The data was captured via the paper-based materials completed by

each participant. Secondary insights were provided by group discussions and observations, giving additional depth to the experiences captured on paper. Here, benefit was drawn from the stimulation and opinion elaboration that the group dynamics permitted (Frey and Fontana, 1991). Listening to what people say in addition to what they write was important; how people talk has profound implications for how they think and act (Orlikowski 2000). Focus groups bring analytical challenges and can attract methodological and epistemological objection. Any confusion of group conformity with individual opinion (Sim 1998) was mitigated as participants provided data specific to them on their individual charts. Accordingly, the data associated with each activity was of an individual matter. All sessions were facilitated by the same researcher which allowed for internal consistency and equivalence (Kidd & Parshall 2000).

FINDINGS AND DISCUSSION

Following analysis of the data from the focus groups, interviews and observations, connections between M-P of collaboration and institutional forces were evident in three ways. Firstly, M-P of collaboration revealed multiple institutions competing within the same operational space. Secondly, collaborative practice not processualised as "collaborative" is not recognised as having value. Thirdly, as a knock on effect of findings one and two, the M-P observed suggest that informal collaborations are allowed to evolve, causing severe problems for service delivery.

Competing logics of collaboration

For the case study organisation, the adoption of a collaborative approach to service delivery is a core business value and features prominently on the organisation's website, marketing literature and visual displays in the workplace revealing an institutional logic that recognises a benefit to working collaboratively. Focus group data suggested people start out with a desire and ability to take a collaborative approach, but levels of collaboration are perceived to diminish over the life of project. Discussions during follow up interviews suggested that intentions at the outset of a project to adopt a collaborative approach are felt to be easy to achieve when all other factors (e.g. programme, commercial and financial issues) are positive. But when financial disagreements occur, tensions were reported to arise and the motivation to be open and collaborative was felt to be relegated in favour of efforts to maximise profit, One participant said "collaboration may work very well at local level but it

is seen as a ‘nice to have’ until commercial issues come in and overrule". This suggests an alternative institutional logic to that of collaboration that prioritises profit maximisation and encourages an adversarial approach.

It quickly became evident that the strategic level rhetoric to be collaborative is not supported by the regulatory institutions of lump sum transactional contracts, enforceable by financial penalties. Many participants expressed the view that the contract was to blame and prevented a joined up, collaborative approach to service delivery. The contract is described as "too complicated", as having "unrealistic targets" and "unachievable obligations". But as Henisz et al. (2012) states, contracts are only one part of the story. From the outside looking in it is easier to view the contract as the inanimate object it is. What our investigation aimed to uncover was the specifics of the regulatory institution that were able to grasp hold of people and allow what is essentially only pieces of paper to drive un-collaborative behaviours.

Prioritising cost over collaboration (Grove et al. 2016) driven by regulatory institutions delivers conflicting signals to staff. Findings from the focus groups tell us people want, need and enjoy collaborating. When asked to assign emotions to their daily activities, those activities relating to meetings and communications were consistently associated with positive feelings such as enthusiasm suggesting people enjoy the opportunity to interact with others.. This chimes with the organisational strategic priority to be collaborative. Operationally, however, its importance became less prominent leading to competing logics within the same institutional field (Lounsbury 2007) a situation increasingly recognised in management research (Besharov & Smith 2014). What therefore are the consequences when logics that both value and devalue collaboration are in existence? Other studies suggest that competing logics do not automatically lead to organisational demise and for organisational change to occur, one dominant organisational logic need not be replaced with another (Reay & Hinings 2009).

While an organisation might attempt to fix a definition (e.g. we are collaborative) it does not have total definitional control because the definition is being supplemented, eroded, modified and interpreted by individuals in unpredictable ways (Tsoukas & Chia 2002). A close relationship, such as that observed between project staff, motivates people to develop ways of enacting multiple (otherwise conflicting) logics (Besharov & Smith 2014) as they deviate from the formal logic to their "home" logic. Findings here suggest that if we are to become collaborative in an ongoing manner (rather than simply carryout collaboration) we must be

conscious of the likelihood that multiple logics can exist and appreciating how their dominance can alter is important. Whilst popular discussions of collaboration elsewhere in the CMR tend to agree that greater management support and leadership is required for more successful change initiatives, they do so from the perspective that certain critical ingredients are missing from the mix and could potentially be added. We make an alternative assertion that for a collaborative approach to be successfully ongoing, those in a position of influence must learn to appreciate the institutional landscape in which they reside and modify their support accordingly.

Objectification of collaboration

Findings of the focus groups revealed that as projects progressed, the levels of collaboration associated with the participants daily activities was felt to decrease over time. When asked during follow up interviews why the levels of collaboration were felt to wane during project delivery, responses suggested that during the early stages of contract delivery collaboration required conscious effort whereas in the later stages, working collaboratively had become normalised. For example: "after a while [collaboration] becomes business as usual… so therefore doesn't feel quite as collaborative because its normal" and "the quality of collaboration that takes place improves, but it perhaps becomes less frequently required as you perform a task… or becomes more natural and streamlined". What people consider collaboration to be is important here. Whilst true collaboration is inextricably linked with behavioural drivers (Lloyd-walker et al. 2014), our findings suggest that collaboration has been institutionalised as a process rather than a behaviour and people have been conditioned to recognise collaborative working only when it is presented to them in its formal state. Until prompted, the participants tended not to appreciate collaborative behaviour it in its unauthorised form. Legitimising only formally organised collaborative interventions once again demonstrates how attention paid to the M-P of collaboration can help us to reveal and begin to understand the dominance of regulatory institutional forces over the cognitive.

Whilst the findings of the focus groups show what people recognise as collaborative working decreases overtime, observations show informal collaboration is ever present. The failure on the part of individuals to recognise collaboration in its informal state forces it to operate unofficially. The very fact that people best recognise collaboration objectively suggests inherently un-collaborative behaviour. The industry's drive towards a commodification of working together to overcome the challenges of what is a complicated service provision has

served to undermine the innate ability we have as humans to interact positively. Continual efforts to quantify and formulise what is essentially a relational outcome is eroding our ability to recognise or value any interactions that do not form part of a process. Despite a lack of recognition, informal collaboration has been observed to be the method by which project staff manage the multiplicity of logics at play (Reay & Hinings 2009). As an unrecognised and unacknowledged activity, the cognitively governed institution of informal collaboration goes on unseen (and crucially) unchecked by management. Although they do not label it as such, the M-P of the participants of this observational study engaged in collaboration to find solutions to problems they encountered and in doing so they continually alter organisational routines. Practically, the findings indicate that informal collaboration is enacted as people navigate the conflicting regulatory and cognitive institutions. Our findings show that cognitively governed institutions that support informal collaborative practice do co-exist dynamically alongside more dominant logics of profit maximisation as behaviour fluctuates between perceived, desired and achievable levels of collaboration. Furthermore, our findings reveal how this creates problems for service delivery.

Local optimisation

If we revisit our working definition of collaboration, it is the process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible (Gray 1989). The M-P observed tell us that the dominance of regulatory institutions act as a barrier preventing sub teams from exploring solutions beyond their limited vision. A reoccurring manifestation was observed in the planning of highway maintenance works which are carried out by sub teams segregated by discipline. For instance, street lighting, drainage, inspections and lifecycle, plan their own sub-optimal work programs driven by its own contractual obligations. Not only was this M-P of silo working observed to be a lost opportunity to capitalise on available resources (for example the sharing of traffic management), it was felt to often hinder the objectives of other teams. Negative impacts included issues such as abortive works and conflicting communications to the public. The silo approach to delivery was felt by focus groups to stem from the failure of decision makers at contract mobilisation stage to appreciate the operational significance of the contractual documentation. A rushed mobilisation phase does not allow for learning cycles or recognition of new risks that may impact on a project's outcomes (Watton 2017). Regulatory institutions prioritising corporate growth and profit

maximisation at group level were identified to be the driving force behind decisions made at contract level that reward achievements based on annual performance and therefore encouraged short termism. A full understanding of long term contract obligations and how these would be met operationally was overlooked resulting in sub-optimal at best and frequently absent collaborative practice.

Local optimisation of collaborative practice was seen to have a negative impact on project performance but also carries implications for theory. Earlier discussion highlighted theory that says change agents are created and organisational change initiated following internal fragmentation (Seo & Creed 2002). Our findings tell us is that fragmentation alone was not enough and isolated pockets of contradictory collaboration (as experienced by different disciplines within the same contract) failed to change the prevailing regulatory institution that has its roots in profit maximisation. Other literature states a wider recognition of the irregularities is first needed. If irregularities are not problematized, extant theory will not be changed and "rogue activities will wane or persist in a marginalised fashion" (Lounsbury & Crumley 2007, p.1005). Where a problem like the silo approach to collaboration is not collectively recognised as an anomaly and therefore not negotiated on or incorporated into extant practice (Lounsbury & Crumley 2007) the sub-optimal solutions occur in isolation, are not collectively recognised and have little chance of spreading up the managerial chain to affect meaningful change or alter the balance of dominance in terms of institutions.

CONCLUSIONS

Management of the UK's complex highway infrastructure requires project staff to respond to often contradictory institutions governing collaboration. Through a lens of institutionalisation we have seen how regulatory institutions that implicitly and explicitly encourage profit maximisation tend to dominate over the cognitive institutional forces that support people's desire to enact collaborative working. In line with other studies, we have seen that multiple institutions can and do co-exist and are managed by informal collaborative relationships (Reay & Hinings 2009). Practically, understanding how multiple institutions operate with an organisation are critical for understanding the possible outcomes (Besharov & Smith 2014). A reconceptualization of collaboration as an ongoing and dynamic accomplishment highlights a need to adapt the support afforded to collaborative working whilst accounting for potential conflicting institutional logics. The aim of management need not be to replace the dominant institutions at play. Concentrating on the institutional dynamics that affect the M-P

of collaboration, this study has highlighted the importance of recognising how co-existing institutions can be balanced and addresses the criticism levelled at institutional analysis for neglecting internal organisational processes (Lounsbury & Crumley 2007).

Theoretically, a reconceptualization of collaboration as ongoing would prompt research to turn away from the practical, such as formalised collaboration initiatives, toward refection (Tsoukas & Chia 2002) whilst seeking a renewed understanding of the dynamic institutional processes (Bresnen 2017). Reconceptualising collaboration as ongoing, whilst attempting to understand the institutions at play would encourage researchers to recognise potential sources of tension, and identify where future research attention should be directed. The interesting finding to consider is not that multiple logics surrounding collaboration co-exist but the way in which the multiple logics either blend or contradict and the impact this has on the performance of an organisation. The intention here was not to develop additional techniques for the application of collaborative working, but to provide guidance to management who wish to reconstitute their support of working relationships by encouraging them to see the value in appreciating the institutional context within which project delivery operates and in doing so this paper contributes to the institutional theory debate in CMR.

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APPENDIX E

PAPER 5: BECOMING COLLABORATIVE: ENHANCING THE UNDERSTANDING OF INTRA-ORGANISATIONAL DYNAMICS

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Abstract

The multifaceted nature of highway maintenance provision requires the coordination of a complex web of intra-organisational inputs. Collaborative approaches for the management of such complexity frequently feature in construction management research. Research however orientates toward antecedents and processes for the application of a collaborative approach and in doing so conceptualises collaboration as an exceptional and applicable event. Through a longitudinal case study consisting of 4 years of participant observation, this study adopts a micro-practices approach to reconceptualise collaboration as an ongoing accomplishment. This study takes a novel look toward institutional theory to understand how micro-practices of collaborative behaviour are shaped by macro-institutional logics, particularly as institutional theory tends not to consider such intra-organisational processes. It follows the implementation of three improvement initiatives designed to enhance collaborative working for the purposes of service improvement. Findings revealed tensions between regulatory and cognitive institutional logics; tensions that were observed to impact negatively on service delivery, particularly given the non-relation contractual arrangements employed to procure and govern service provision. This paper proposes an alternative approach to service improvement that addresses the failure to recognise conflicting logics, understand why conflict arises and effectively manage the consequences, particularly in adversarial environments. This paper contributes to our understanding of collaboration within construction management literature whilst attending to its oversight of institutional theory.

Keywords: collaboration, institutional theory, highway maintenance, micro-practice organisational change.

Paper Type: accepted conference paper

INTRODUCTION

The UK has an aging transport infrastructure asset with many areas suffering from historic under-investment, a problematic situation compounded by long-term trends of growing road traffic (HM Treasury 2014). Cash strapped local authorities unable to meet financial demands for the development and maintenance of its infrastructure assets (Odoemena & Horita 2017) has seen the rise of partnerships between the public and private sector (PPPs and PFIs) as alternate ways are sought to finance the work needed to keep the UK's roads operational. PFI contracts have received much media attention with disputes over performance common, which does little to address the adversarial reputation of the industry. Lengthy contract terms, often stretching in decades bring an inevitability of uncertainty and highlight many of the limitations of such contracts (Garvin 2009). Other procurement arrangements of around 5 years in length (typical of strategic road network maintenance contracts) bring alternative challenges in the guise of frequently changing service providers and the TUPE of contract staff. Nationally (with very few exceptions) these works are procured under contracts that do not make provisions for collaborative working practices with no signs of partnering becoming a dominate choice (Phua 2006).

The construction industry as a whole is characterised by litigation and adversary with a raft of reports such as Construction the Team (Latham 1994) and Rethinking Construction (Egan 1998), Accelerating Change (Egan 2002) and more recently Modernise or Die (Farmer 2016) which talks of the industry's collaboration problem. The answer they all have in common – to collaborate more. More and better collaboration would allow us to deal with the complexity faced (Walker et al. 2017). Working collaboratively has been linked to better performance in a construction context (Greenwood & Wu 2012) and whilst the benefits of a collaborative approach are widely accepted and there is a willingness within the industry to implement collaborative approaches to working, the application is not profound. Solutions to major problems are often ad hoc 'bolt-on' elements (Anvuur & Kumaraswamy 2008). Firms often show willing to experiment with a suite of tools and techniques but are either unwilling or unable to instil a culture of collaboration (Boyce et al. 2012) with the potential impact of team building hindered by the 'formalisation' of collaborative practices (Suprapto et al. 2015, p.1357).

This research arises from an interest in collaboration within a highways maintenance setting for the following reasons: (1) fragmentation of the multifaceted service arrangement and the

siloed approach to deliver, (2) adversarial client/service provider relationships and the effects on internal project teams, (3) hypothetical value attributed to collaboration as a key strategy element, (4) a lack of empirical research into the detailed practices through which collaboration is mobilised by organisational members and (5) failure of Construction Management Research (CMR) to effectively consider connections between macro institutional factors and micro-practices (M-P) of collaboration.

LITERATURE

Applicability of collaboration

Collaboration is defined here as the coming together of resources to jointly develop solutions. A review of the research that deals with collaboration reveals a commonality; prescriptive recommendations based largely on the experience of isolated success stories are dominated by accounts of the application of tools and techniques (Green 2006). The prevalent neo-institutional, macro views of collaboration are concerned with meta-analyses that document antecedents and provide normative explanations (Suddaby et al. 2013) and treats collaboration as an exogenously created phenomenon. In this sense, collaboration is conceptualised narrowly as something that can be externally created and applied to situations under specific condition by certain people, for example consultants, or collaboration conveners (London & Pablo 2017). Far from being externally created and applied we argue that collaborative working is a phenomenon socially constructed from within organisations by the actors involved.

Collaboration is often depicted as a set of specific behavioural and contractual actions and obligations, each of which can be codified and evidenced through as outcomes achieved (Suprapto et al. 2015; Kovacic & Filzmoser 2014). Practically, firms often show willing to experiment with a suite of tools and techniques but are either unwilling or unable to build a sense of joint belonging or to instil a culture of collaboration (Hietajarvi & Aaltonen 2017) with the potential impact of team building hindered by the ‘formalisation’ of collaborative practices (Suprapto et al. 2015, p.1357). The relationship between collaboration and organisational processes tends only to be discussed to the extent to which the processes render it operable. Collaborative planning methodologies, such as The Last Planner (Ballard 1994), and BS11000 and ISO44001 are prime examples of this where people are mere users of the systems and occupants of space whose activities were never described (Ahrens &

Chapman 2007). Ahrens and Chapman (2007) describe the rhetoric of collaboration and the practice of collaborative behaviour and conclude that doing and saying are fundamentally different, or put another way, formal narratives of organisation change are different to the lived reality (Löwstedt & Räisänen 2012). Just as an application of technology cannot increase or decrease productivity or performance (Orlikowski 2000), collaboration will not simply occur through the colocation of people (Kokkonen 2017), particularly when the unique characteristics of the case receiving the transplant are not considered. Difficulties in realising collaborative change arise when new action is inconsistent with the latent understanding of how the organisation operates (Feldman 2003).

Micro-practices of collaboration

Treating collaboration as applicable and taking a prescriptive approach assumes that collaboration can applied to a situation whilst all other factors remain constant. Despite their mundane nature, routines and conversations are elementary forms of daily life and richer picture are provided when routines are not separated from the people applying them (Feldman 2000). As a microscope aids an understanding of the whole through its tiny parts, routines and conversations offer an interesting insight to examine strategic change (Rouleau 2005). The benefit of refocusing on M-P to reveal otherwise hidden knowledge is explained via Tsoukas and Chia's analogy of a tightrope walker (Tsoukas & Chia 2002) but applied to a car travelling along a motorway. If the focus of analysis is upon the car, it may be viewed as stable as it travels within the lane markings at a constant speed. But if the level of analysis is reduced to the driver it becomes possible to observe the constant adjustments made to the steering wheel, the rise and fall of the foot on the accelerator pedal and the eyes that make regular glances to the mirrors to check for other road users. At certain levels of analysis stability can be seen and yet at another levels high degrees of dynamism are apparent, highlighting the importance of both the macro and micro view and a need to include the occupants of the space in any analysis of the collaborative application and failure to achieve this carries the potential for distorted view of stability. As such, methods designed to support collaborative working do not account for the intricate networks people build to collaborate around more complex issues. Understanding how this happens is crucial for understanding how actors organise themselves and the consequences this has for the organisation centrally (Tello-Rozas et al. 2015).

An institutional perspective

The study of institutional processes and institutionalisation arose as researchers sought to explain and predict commonality across organised systems (Osborn & Hagedoorn 1997). Institutional theorists shift levels of analysis to enquire how institutional features shape organisational structures and to examine the determinants of institutional systems themselves (Scott 1987, p.508). It is impossible to understand an institution adequately without understanding the historical process in which it was produced (Scott 1987). A facet of institutionalisation is the process of instilling value: 'to institutionalise is to infuse with value beyond the technical requirements of the task in hand' (Selznick 1957, p.17). As such, institutionalised organisations have become more than just the producers of things, they are the product of interactions, receptacles of group idealism (Scott 1987). Institutional features of organisational environments shape both the goals and means of actors (Scott 1987) therefore it is important to understand what these features are and how they shape what actors do and why they do it. In the context of this study institutional theory is used to explain why collaborative working remains elusive despite a common rhetoric to be collaborative. The concept of M-P observation to understand how change can be realised at the macro-level exists (Tello-Rozas et al. 2015), as does a rich body of literature regarding institutional forces forming and shaping organisational structures which in turn affects the M-P but it mostly resides in Business Management Research and is largely absent in CMR (Bresnen 2017). Linking the two together in a single study offers novelty whilst practically unravelling the mismatch between collaboration rhetoric and practice.

There are two distinct theoretical approaches to institutionalisation; the environment as the institution and the organisation as the institution. The former approach sets the wider 'state-project' environment as the creator of the institution. This 'statist' view asserts that organisations merely reproduce the institutions created within the environment (Zucker 1987). As such, organisations conform to the collective normative order in a sector wide reproduction of basic processes. The statist view which asserts that only external elements can be institutional creates theoretical obstacles, not least because the creation of new social order is problematic (Zucker 1987). The opposing theoretical approach is that institutional elements arise from within the organisation or from imitation of other similar organisations but not from the state or elsewhere (Zucker 1987). This concept of institution reproduction can help to explain the disconnect between rhetoric to be collaborative and the actuality of adversary. 'People draw on a variety of structures to inform how they perform a specific routine and the same performances can give meaning to a variety of routines or processes for

accomplishing work' (Feldman 2003, p.747). Simultaneously drawing on the organisational level values to be collaborative (which align with personal values to do a good job) whilst performing activities in accordance with a non-relational, zero-sum contractual environment (where your loss is my gain) creates tension at the micro-level of project delivery. But tension does not have to be unmanageable. In a specifically collaborative context, London & Pablo's (2017) review of meta-analyses suggests effective collaboration should lead participants toward coherence (rather than conformity) to exploit the potential for innovation as a result of contradictory ideas. One-sided responses that seek consistency in response to organizational tensions may spur vicious cycles whereby negative effects are reinforced. Conversely, an acceptance of tensions that embraces both sides may create virtuous cycles leading to sustainable development (Szentes 2017). In line with Phua's (2006) discussion of partnering, when firms rationalise that benefits are to be gained by following an industry norm, in this case to act collaboratively, the presence of such practice will likely increase. We argue here that firms do rationalise the benefits of collaborative behaviour but while the industrial institution to be adversarial dominates, any institutional force to be collaborate, will continue to compete/be in tension with it/be less dominant. 'Institutional elements are easily transmitted to newcomers, are maintained over long periods of time without further justification or elaboration, and are highly resistant to change' (Zucker 1987, p.446). Here the approach ought to be about managing the tension between conflicting institutions rather than an attempt to overpower or eliminate the force perceived as problematic. In this vein, (Uhl-Bien et al. 2007) in their conceptual framework of the three entangled leadership roles (i.e., adaptive leadership, administrative leadership, and enabling leadership) reflect a dynamic relationship between the bureaucratic, administrative functions of the organization (or regulatory) and the emergent, informal dynamics of complex adaptive systems (CAS) (or cognitive). To manage a dynamic relationship between the potential conflict first requires a recognition of the tension.

METHOD

Over a four-year period of participant observation, this study followed the implementation of three improvement initiatives designed to enhance collaborative working for the purposes of service improvement. All cases were within the same organisation, a private sector provider of highway maintenance and management services to the public sector in the UK. The researcher assumed the role of a participatory observer with intention of observing existing

practice and affecting change. To achieve this, the researcher assumed a variety of roles within a fieldwork situation and participated in many of the actions studied (Yin, 2014). Throughout this period the researcher had extensive and intensive contact with members of the contracts under investigation as well as considerable contact with others across the organisation. In general, the researcher spent around 40 hours per week as an embedded researcher within the organisation. The researcher had a desk within the company, access to archival documents the same as any other employee and was granted an organisational email account and could communicate with others as an employee. Benefits of this approach included access to groups and events that would otherwise have been inaccessible to study and an ability to perceive reality as someone on the "inside" described as 'invaluable in producing an accurate portrayal of a case phenomenon' (Yin, 2014).

Focus groups, an infrequently mentioned data collection technique but an effective tool particularly for those studying work environments and associated behaviours (Frey & Fontana 1991), were held to further investigate the themes that emerged. A root cause analysis approach was adopted in the third case to unearth the underlying issues of the topics identified. The researcher facilitated 26 sessions of between one and three hours in duration and engaged with 66 individuals. Focus group participants consisted of office and site-based operatives, engineers, project managers and commercial managers and benefit was drawn from the stimulation and opinion elaboration that the group dynamics permitted (Frey and Fontana, 1991). Listening to what people say was important; how people talk has profound implications for how they think and act (Orlikowski 2000). All sessions were facilitated by the same researcher which allowed for internal consistency and equivalence (Kidd & Parshall 2000).

To support the continuous real time data collection retrospective interviews and expert verification was undertaken. Unstructured, conversational style interviews that gave a sense of openness were employed; sometimes exploratory and at other times, confirmatory. When conducting and analysing interview data consideration was paid to the notion that actors' accounts of their own activities are categorically unlike the complex cognitive processes they go through to accomplish them (Ahrens & Chapman 2007). As such, multiple methods were used to triangulate the data (Lee 1999, p.94). The researcher was privy to many discussions of a strategic and confidential nature. In addition, the embedded nature of the researcher exposed the researcher to many unsolicited conversations in the form of company gossip and

"off the record" accounts of participants' observations and reactions to daily life told directly to the researcher and overheard.

FINDINGS AND DISCUSSION

Case one involved participant observation of an initiative to improve the performance of highway engineers designing strategic highway renewal schemes in the Midlands. The works were procured via a contract which combined lump-sum fees with cost reimbursable elements. It was felt that the teams had a wide range of capabilities but was failing to effectively structure them through the project delivery phase which prompted the intervention described here. Collaborative planning was the solution adopted by senior managers to address this problem and an external consultant was appointed to manage the process. Weekly meetings lasting around three hours followed The Last Planner (Ballard 1994) methodology whereby task lists were generated and planned works versus actual work was analysed. The representatives from the design teams rotated in and out of the meetings to report on the progress of the schemes they were working on. Collaborative planning revealed process deviation and prompted efforts to ensure designers adhered to the documented process (regulatory institutions at play). Observations revealed that the collaboration planning process failed to account for the cognitive institutions whereby design teams would collaborate "behind the scenes" to devise locally optimal solutions and work-arounds in order to appear to be adhering to official processes whilst continuing to operate as they saw fit. A preoccupation with the application of such a method failed to fully understand the factors that led to the organisational conditions that prompted the collaborative planning intervention. Those who had defined the problems and agreed on the solution did so in the absence of a systematic investigation to analyse the root causes of the problem they were attempting to resolve.

The tools explored in Case one provided a useful account of the merits and demerits such techniques have on management practices but they were found to be unhelpful for contingent circumstances thereby conceptualising collaborative practice as externally created an applicable. While such techniques provide social networking opportunities the findings show that bringing people together is not the end but is the means for further necessary changes which vitally requires an understanding of the knowledge possessed and embedded. In line with other studies softer issues tended not to be appreciated, or were actively ignored (Newell et al. 2006) and off the shelf collaborative tools did little to understand the embedded

business as usual attitudes. A micro-practices approach that draws on institutional theory to help unravel the multiple and complex behaviours that impact project performance was called for.

Case two adopted a micro-practices approach to observe the operational delivery of highway maintenance and renewal of the strategic road network in the East of England, procured under a transaction lump-sum contractual arrangement. In this case the client-supplier relationship was reported to have quickly become adversarial as contractual compliance was employed as the preferred method to govern the delivery of services. Interviews revealed regulatory institutions to dominate and supress cognitive desires to collaborate. Participant observation of the micro-practice of daily interactions was conducted during a collaborative 'transformation project' initiated to address the rising level of dissatisfaction in the perceived quality of the services provided. The transformation project was designed and facilitated by an external consultant as a 'bolt-on' solution to business as usual activities. Despite initial improvements in service delivery and an increase in satisfaction, when the consultant withdrew, the transformation project failed to be sustained and ultimately the mutual decision to terminate the contract early was taken.

Highway maintenance involving reactionary work in response to defects arising on the network was seen to create tensions for project participants that must manage the conflict between cognitive forces encouraging the development of innovative solutions and the regulatory pressures that confines them to prescribed design fees and contractual obligations. Case two observed the consequences of these tensions and the failed attempt to restore collaborative working practices. Interviews and observations carried out suggested that the transformation project was too little too late. The implication for this study was to investigate further how collaborative working practices can be operationalised to avoid reactionary applications as a response to rising adversary. Doing so called for a reconceptualization of collaboration as an ongoing accomplishment and not as an end goal (Marshall 2014).

Case three involved the operational delivery of highway maintenance services on behalf of a local authority in the Midlands, governed by a PFI contracting arrangement with hundreds of contractual obligations linked directly to service payments. Interviews revealed historically, interactions between project participants occurred at a time when actions by managers promoted organisational competition between teams through a fear of sever financial deductions in connection with any underperformance/failure to meet the obligations set out in

the contract. For example, previous management style was to highlight areas of underperformance in meetings that became known as “white board beatings” and were described by staff as follows:

'You wouldn’t believe that people would do those things to people' and 'It was the humiliation. And the language was beyond belief…and loud and aggressive' and 'I never got the wrath of him but I was scared of him. [We] would hide problems because we couldn’t risk the humiliation of raising them'.

Case three observed the design and implementation of a Service Improvement Plan (SIP) initiated in response to high levels of financial deductions levied by the client for failures to meet contractual obligation. The focus group approach permitted the design of the SIP to delve into the underlying circumstances by going beyond an examination of the symptoms (that manifested as non-compliance deductions) to an understanding, guided by institutionalisation, of how micro-practice at the operational level is affected by macro-institutional forces.

A micro-practice investigation confirmed collaborative practice not as an exceptional event but as a normal part of everyday life. People were observed to collaborate informally to develop solutions to the problems they faced in everyday delivery of their responsibilities. Case three uncovered teams driven by a fear of financial deductions to compete against one another to not be the worst performer. A siloed approach resulted, reinforced by regulatory institutions to meet project targets, which made the flow of knowledge across teams problematic. As such, localised solutions that unwittingly created problems elsewhere were rift. Again, triggered by collective social recognition of the problem, which manifested as significant financial deduction, led to the initiation of a contract wide collaboratively designed SIP. As depicted in figure 1, the difference in this case was the time invested upfront to deeply understand the underlying circumstances. As such, support was reformed to provide bespoke solutions for collaborative working to take hold in a sustainable way.

CONCLUSION

Lounsbury & Crumley (2007) set out a process model for new practice creation which identifies the point at which new fields of practice begin to be developed. In their model, they identify a trigger point as the social recognition that existing practice is problematic. Observations of the three initiatives described above suggest their model does not account for

what happens when irregularities in practice are socially recognised and the boundaries of practice are redrawn but attempts made to alter practice are then resisted and existing practice is not substantively changed. In response, an adapted model is presented in figure 1 with an additional trigger point. For the alternative practice to be sustained and for revisions to extant practice to occur requires a deep understanding of the problem that the alternative practice is attempting to alter.

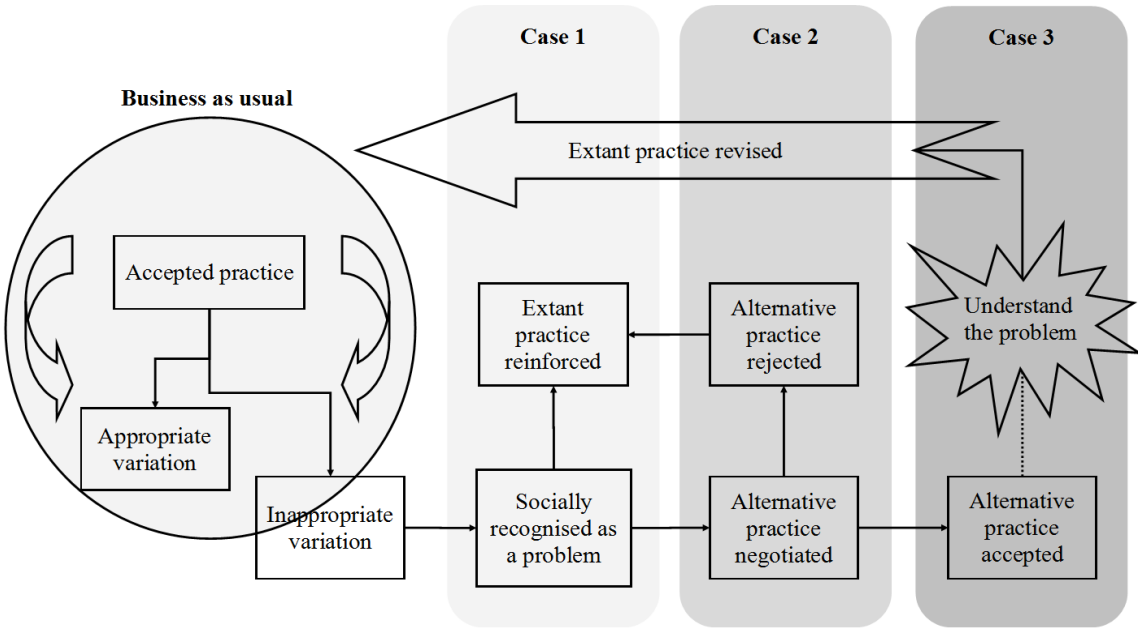

Figure 1: New Practice Creation

Case one observed the implementation of a collaborative planning solution, triggered by a recognition that documented processes were not adhered to and a failure to structure capabilities of the team through the design process created inappropriate variations to accepted practice. The approach was to reinforce the extant practice, as shown in figure 1. Case two also experienced inappropriate variations to accepted practice and in response initiated a collaborative transformation project to alter rather than reinforce extant practice. For the reasons discussed above this approach resulted in improvements but were unsustainable and the alternative practice was ultimately rejected. Cases 1 and 2 showed reactionary tendencies toward improvement initiatives; at the point where a problem was socially recognised a solution was selected and rolled out before a thorough assessment of the problem had been achieved. These findings introduced the notion that an understanding of macro institutional factors can be the mechanism through which collaboration can be viewed as an ongoing accomplishment. Building on this learning, Case 3 saw the design and

implementation of an initiative to collaboratively develop improvement solutions that would alter business as usual and accepted practice through a consideration of the wider institutionalised factors that shape micro-practices of collaboration.

This paper moves beyond an assertion that, through institutional theory, values are instilled (Scott 1987) to an understanding of how this occurs. By placing greater emphasis on the character of the institutional structures that constrain the choices individuals make (Zucker 1987, p.459) it is possible that leadership can work to minimise and mitigate the institutions effects.

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APPENDIX F

CASE STUDY PROTOCOL

1. OVERVIEW OF THE CASE STUDY

- The aim of this study is to establish how collaboration can support the delivery of services through a consideration of the contractual arrangements, the management of relationships and the application of tools and techniques.
- The research will take place within a single company: the EngD Sponsoring Organisation and will last for four years (plus 6 months writing up time)
- Live projects will be selected opportunistically from the Sponsor organisation's portfolio and these projects will form the units of analysis within the single case study.
- Readings of the topic in the form of a literature review will ensure novelty of the research
- The key contribution for industry is to be the recommendation of innovative practice to guide the support for collaborative working
- For research the output will be a unique contribution to knowledge, utilising institutional theory to unpack the enactment of collaboration.

2. DATA COLLECTION PROCEDURE

- The study is to be conducted by a single researcher (the Research Engineer, or RE) who will be embedded within the Sponsor organisation.
- The RE will be introduced to actors within the case as a researcher and her data collection intentions will be explicitly communicated.
- Prior to one to one interviews, participants will be fully briefed on the purpose of the research and their consent formally obtained for the safeguarding of human participants. University ethical clearance will be obtained.
- Data will be collected from observations of everyday activities of people as they go about their employment within the projects of the Sponsor organisation.
- Logistically, the RE will be located within the project environments of the Sponsoring organisation. This will involve the RE altering locations when the projects being studied change.
- Field notes will document the observations made

- Actors/participants within the case will be the individuals working with the projects of the case study. As an embedded researcher, it is envisaged the RE will build relationships with the study participants over time.
- Workshops and focus groups will be conducted. Blanket invites will be issued and participants will be self-selecting.
- The targeting of interview participants will be more precise as the views of more senior employees (supervisors and managers) will be required to validate the development of a practice to guide their support of collaborative working. The RE will remain flexible to cater for the research participants' availability.
- Documents belonging to the Sponsor organisation are to be reviewed in support of the study, in particular:
    - Process maps and activity notes
    - Procedure documents and guidance
    - Contract documents, including obligations and specifications
    - Company reports, strategy documents and annual reports

3. DATA COLLECTION QUESTIONS

Throughout the case study research the research will keep in mind the following questions:

Tools: What tools and techniques are available for the facilitation of collaboration for performance improvement? What does the Sponsor organisation do, how do they do it and why? How effective are current practices?

Contracts: How does contract governance influence collaboration? How do contracts affect the tools and approaches adopted? What are the regulatory constraints affecting service delivery?

Relationships: How are collaborative relationships managed to support service delivery? How does human interaction influence the enactment of tools and techniques designed to enhance collaboration? What are the relationships like within the Sponsor organisation and how are they managed?

Performance: How does collaboration influence project performance? Where a more collaborative approach to service delivery is adopted, is the performance of the team enhanced?

Strategy:	How is commercial strategy translated into infrastructure service delivery? How is commercial strategy operationalised and what are the implication for collaborative working?
Enactment:	How is collaborative working enacted during project delivery? Can collaboration mitigate structural barriers to project delivery? In an environment of non-relational project governance arrangements, how can a more integrated delivery model mitigate adversary?

4. PRESENTATION OF THE CASE STUDY

- The data collected will be presented as a rich description of the case
- It is intended there will be a minimal amount of quantifiable data to support the narratives of the case
- The research must produce, as a minimum, three peer reviewed papers, one of which must be published scientific journal.
- The research will conclude with the production of a thesis comprising the publications noted above.
- As the research follows the EngD programme the research must conclude with recommendations relevant for industry. In addition, the research must offer a unique contribution to academic knowledge.

APPENDIX G

ACTIVITIES IDENTIFIED DURING FOCUS GROUPS AND THE CATEGORIES ASSIGNED

Note: the text in the Activity column is taken verbatim from the paper based activities completed by the participants. However, in a small number of instances the RE has altered text to preserve the anonymity of the participants, projects and Industrial Sponsor Organisation.

Activity Category	Activity
Identification of workload / resources / costs	Allocate task/project
Identification of workload / resources / costs	Determine a programme for completion
Identification of workload / resources / costs	Highlight what resources are required, any studies/surveys
Identification of workload / resources / costs	Forecast costs for the month and rest of project
Identification of workload / resources / costs	Allocate resources and tasks
Undertake review / auditing / monitoring / supervision	Monitor programme of completion
Produce documentation / reports	Reporting and updating client
Produce documentation / reports	Produce final outcome (production of study/report or delivery of scheme on site etc)
Produce documentation / reports	Prepare all completion forms, prepare final accounts, close of project
Identification of workload / resources / costs	Project identified and allocated
Identification of workload / resources / costs	Identify what is required
Undertake review / auditing / monitoring / supervision	Are the designs started
Meetings / Communications	Liaison with the client - collab planning
Undertake review / auditing / monitoring / supervision	File structure in place on sharepoint
Identification of workload / resources / costs	Gather information on what you need to achieve/deliver project programme
Produce documentation / reports	Project programme
Meetings / Communications	Meetings with supply chain
Identification of workload / resources / costs	Allocation of resources
Produce documentation / reports	Update programme
Produce documentation / reports	Finance reporting and projection
Undertake review / auditing / monitoring / supervision	H&S information is present
Produce documentation / reports	Update programme

Produce documentation / reports	Close out information (as built records, work completion forms, financial close out)
Undertake review / auditing / monitoring / supervision	Client satisfaction
Produce documentation / reports	Update programme
Meetings / Communications	Weekly transformation project calls
Produce documentation / reports	Development of transformation plans (initial project)
Undertake review / auditing / monitoring / supervision	Measuring of plans and analysis
Provide advice / feedback / support / guidance	Overall delivery of initial transformation project
Undertake review / auditing / monitoring / supervision	Closure of initial transformation project
Undertake review / auditing / monitoring / supervision	Analysis of process
Undertake review / auditing / monitoring / supervision	Project audits
Produce documentation / reports	Close out reports
Identification of workload / resources / costs	Development of 2nd transformation project
Meetings / Communications	ROBOTS workshop
Provide advice / feedback / support / guidance	transformation project support
Provide advice / feedback / support / guidance	remobilisation - schemes team
Meetings / Communications	Weekly update calls
Undertake review / auditing / monitoring / supervision	Development & progression of sub project with transformation project (my project plan)
Meetings / Communications	Facilitating collaborative focus groups
Undertake review / auditing / monitoring / supervision	NCRs - looking to close them out
Undertake review / auditing / monitoring / supervision	Beginning of reference groups
Undertake review / auditing / monitoring / supervision	Closure of transformation project plans
Undertake review / auditing / monitoring / supervision	Audits for plans
Meetings / Communications	Transformation project calls - close out reports
Provide advice / feedback / support / guidance	General support (management) of transformation project
Receive advice / feedback / support / guidance	Green belt project development (BRO2 reporting) (Lean) Training *(unable to complete)*
Meetings / Communications	Attend "working day" meetings internally
Meetings / Communications	Attend "working day" meetings with client

Meetings / Communications	Running improvement workshops
Undertake review / auditing / monitoring / supervision	Review and revise existing processes
Provide advice / feedback / support / guidance	Input to some commercial activity - scheme final accounting
Meetings / Communications	Attend senior delivery team meetings
Meetings / Communications	Scheme specific meetings/discussions
Meetings / Communications	Site visits/VFL tours, sometimes with client
Meetings / Communications	Collabortive planning meetings
Meetings / Communications	forecast meetings
Meetings / Communications	Programme meetings
Produce documentation / reports	Development of annual commercial plan
Meetings / Communications	Attend senior delivery team meetings
Meetings / Communications	Site visits/VFL tours with client
Undertake review / auditing / monitoring / supervision	CPF' scoring
Meetings / Communications	Non-conformance close out discussion
Receive advice / feedback / support / guidance	Lean six sigma green belt projects
Undertake review / auditing / monitoring / supervision	Efficiency tracking
Meetings / Communications	Improvement workshops
Produce documentation / reports	Record management, retention and handover
Meetings / Communications	Industrial Sponsor representation at staff briefings
Meetings / Communications	Progress meetings - participate/chair
Undertake review / auditing / monitoring / supervision	IT Demobilisation
Meetings / Communications	Attend meetings
Meetings / Communications	Attend team briefings
Receive advice / feedback / support / guidance	Read handover documents
Identification of workload / resources / costs	Plan time usage
Produce documentation / reports	Begin collection of information
Produce documentation / reports	Formulate documents for storing information
Undertake review / auditing / monitoring / supervision	Question development of scheme with senior staff
Meetings / Communications	Continue attending catch up briefings
Meetings / Communications	Hold more detailed discussions with involved departments
Produce documentation / reports	Develop decisions
Produce documentation / reports	Complete data collection
Undertake review / auditing / monitoring / supervision	Interpret data

Provide advice / feedback / support / guidance	Finalise decisions
Produce documentation / reports	Write report (technical note)
Identification of workload / resources / costs	Receive "Esdal" request
Undertake review / auditing / monitoring / supervision	Assess Esdal reposed route
Identification of workload / resources / costs	Gather information
Produce documentation / reports	Undertake calculations
Produce documentation / reports	Report
Meetings / Communications	Undertake meetings
Undertake review / auditing / monitoring / supervision	Control costs
Undertake review / auditing / monitoring / supervision	Supervise works on site
Meetings / Communications	Liaise with clients / subcontractors
Undertake review / auditing / monitoring / supervision	Manage SS
Produce documentation / reports	Assessment and studies
Identification of workload / resources / costs	Cost estimates / reviews
Produce documentation / reports	Produce reports
Provide advice / feedback / support / guidance	Review emails and provide responses (often technical)
Produce documentation / reports	Prepare technical reports and designs
Meetings / Communications	Attend meetings (design or client)
Provide advice / feedback / support / guidance	Review drawings and reports designs by others
Produce documentation / reports	Complete project admin (QA review, workload forecast and review)
Undertake review / auditing / monitoring / supervision	Monitor emails
Provide advice / feedback / support / guidance	Advise on questions raised by team and 3rd party
Provide advice / feedback / support / guidance	Review reports for projects
Provide advice / feedback / support / guidance	Provide technical advice to all
Provide advice / feedback / support / guidance	Working party for technical directors
Undertake review / auditing / monitoring / supervision	Ensure compliance with CDM
Undertake review / auditing / monitoring / supervision	Ensure compliance with Industrial Sponosr policy
Produce documentation / reports	Write technical reports / current project

Provide advice / feedback / support / guidance	Provide support for bids
Produce documentation / reports	Financial and programme reporting (weekly / monthly basis)
Meetings / Communications	Telephone / Skype meetings
Receive advice / feedback / support / guidance	Receive project brief
Meetings / Communications	Pre-start up meeting
Provide advice / feedback / support / guidance	Mobilise resources / inductions
Produce documentation / reports	Optioneering / prelim design
Produce documentation / reports	Buildability / commercial reviews
Receive advice / feedback / support / guidance	Approved by client and move to next stage
Produce documentation / reports	Detailed design calculations / reports
Produce documentation / reports	Technical approval documents
Produce documentation / reports	Specifications / drawings
Receive advice / feedback / support / guidance	Technical approvals
Produce documentation / reports	Submission to contractor for pricing
Provide advice / feedback / support / guidance	Pricing queries / design development
Meetings / Communications	Target cost negotiation / agreement
Identification of workload / resources / costs	Mobilise site resources
Identification of workload / resources / costs	Identify structures to be inspected
Identification of workload / resources / costs	Identify resources required to deliver programme
Provide advice / feedback / support / guidance	Manage team
Undertake review / auditing / monitoring / supervision	Carry out inspections
Undertake review / auditing / monitoring / supervision	Review inspections, make recommendations for maintenance work
Produce documentation / reports	Raise purchase orders
Provide advice / feedback / support / guidance	Invoice queries
Produce documentation / reports	Process payments
Produce documentation / reports	Month end reporting
Produce documentation / reports	Missing timesheet report
Produce documentation / reports	Providing reports or figures for CVR
Produce documentation / reports	Subcontractors payments or certificates
Produce documentation / reports	Final account statements
Produce documentation / reports	Creation of work orders
Provide advice / feedback / support / guidance	Handling red and green claim queries

Produce documentation / reports	Entering payroll into SAP for ASC 6&8
Provide advice / feedback / support / guidance	Handling pay queries
Produce documentation / reports	making invoices for HE to make subcontractor payments
Identification of workload / resources / costs	Forecasting
Produce documentation / reports	raising invoices and credit notes on SAP
Identification of workload / resources / costs	Project background - history
Identification of workload / resources / costs	Project background - location / land
Identification of workload / resources / costs	Project background - STATS
Identification of workload / resources / costs	Project background - TM constraints
Meetings / Communications	Define scope of works - contractor liaison
Identification of workload / resources / costs	Define scope of works - optioneering
Identification of workload / resources / costs	Define scope of works - health and safety considerations
Identification of workload / resources / costs	Define scope of works - surveys
Produce documentation / reports	Design for pricing - drawings
Produce documentation / reports	Design for pricing - specifications
Produce documentation / reports	Design for pricing - start approvals
Produce documentation / reports	Design for pricing - pre construction info
Meetings / Communications	Design for pricing - communication with other teams
Produce documentation / reports	Detailed designs - calculations
Produce documentation / reports	Detailed designs - models
Produce documentation / reports	Detailed designs - update spec
Produce documentation / reports	Detailed designs - update drawings
Produce documentation / reports	Detailed designs - confirm approvals
Meetings / Communications	Detailed designs - communication with other teams
Identification of workload / resources / costs	Identify bid opportunities
Undertake review / auditing / monitoring / supervision	Opportunity analysis - value, client, win chance
Undertake review / auditing / monitoring / supervision	Bid/no bid - strategic/business level vs small/team level
Identification of workload / resources / costs	Bid budget?
Meetings / Communications	Client communication / updates
Receive advice / feedback / support / guidance	Receive tender documentation
Undertake review / auditing / monitoring / supervision	Review requirements
Identification of workload / resources / costs	Resource and programme planning - talk to ops teams
Identification of workload / resources / costs	Strategic setting & operational solutions
Produce documentation / reports	Develop submissions
Undertake review / auditing / monitoring / supervision	Review
Produce documentation / reports	Submit
Meetings / Communications	Post-tender comms

Undertake review / auditing / monitoring / supervision	Validation
Meetings / Communications	Lessons learnt workshop
Identification of workload / resources / costs	Identify mobilisation team
Provide advice / feedback / support / guidance	Handover knowledge
Produce documentation / reports	Prepare drawings
Provide advice / feedback / support / guidance	Deal with emails
Identification of workload / resources / costs	Look ahead for planning work for my team
Provide advice / feedback / support / guidance	Solve any issues has arisen since last week
Identification of workload / resources / costs	Look for more work to keep everyone busy
Provide advice / feedback / support / guidance	Deal with team and issues
Produce documentation / reports	Prepare scheme documents (H&S, etc)
Provide advice / feedback / support / guidance	Deal with emails
Produce documentation / reports	Prepare documents
Undertake review / auditing / monitoring / supervision	Check drawings and scheme documents
Provide advice / feedback / support / guidance	Solve issues as week progresses
Meetings / Communications	Deal with other teams if required
Provide advice / feedback / support / guidance	Propose different solutions for each issue

APPENDIX H

PRACTICE ASSESSEMENT

		1 = Low <---------	Score (out of 5)	---------> 5 = High
Systems	S1.1	Knowledge and data tends to remain with a few key individuals	0	Knowledge and data is continuously disseminated effectively amongst all
	S1.2	It is unclear how daily work activities align with overall project objectives	0	Everyone understands how their role and responsibilities align with project objectives/obligations
	S1.3	Staff turnover tends to be disruptive	0	New staff are effectively inducted and briefed on the processes and procedures aligned to their role
	S1.4	Documentation (process, procedures, manuals) tends to be uncontrolled and is created on a team by team basis is response to needs as they arise	0	Documentation (process, procedures, manuals) is controlled centrally and reviewed regularly for compliance and validity
	S1.5	'Right first time' principles are not consistently defined or communicated	0	'Right first time' principles are agreed and communicated
	S2.1	The operational and technical skills required to do the job are overlooked	0	The operational and technical skills required to do the job are fully understood
	S2.2	Softer, interpersonal, communication related skills required to support technical ability are not considered	0	Softer, interpersonal, communication related skills required to support technical ability are fully understood

	S3.1	People tend to have visibility of their individual (and sometimes their team's) workload only	0	Systems are in place to allow all work streams visibility of planned works
	S3.2	Works are planned on a team by team basis with little/no consideration for shared opportunities	0	Systems are in place to facilitate joined up planning of works to maximise resource sharing
	S3.3	When planning work, there is little or no knowledge of any impact (good or bad) this has for others	0	When planning works it is clear what effect (good or bad) this has for other teams/work streams
	S4.1	Data is usually made available after the effect to explain or justify actions	0	Data is available before action is taken and is used to proactively prevent problems
	S4.2	Any efforts to collaboratively make decisions is done on gut feeling and individuals knowledge	0	Systems are in place to provide reliable data to support efforts to collaboratively make decisions
	S4.3	It is not always possible to obtain the information/data required to complete tasks 'right first time'	0	Robust systems that provide intelligence to those who need it when they need it
	S4.4	Data management systems are weak	0	Systems are in place to capture accurate data and facilitate proactive analysis of the data
	S6.1	Communications are adhoc and tend to be spread via word of mouth	0	A communications strategy exists and is implemented
		Sub total	**0**	**out of 75**
		1 = Low <---------	**Score (out of 5)**	**---------> 5 = High**
Behaviours	B1.1	When a problem is encountered, individuals tend to create solutions that benefit them/their immediate team	0	When a problem is encountered, representatives across teams are consulted for solution development

B1.2	Instances of non-conformance to standards tend to be concealed (intentionally or unintentionally)	0	Everyone understands their duty to raise instances of non-conformance to standards
B2.1	Technical skills take precedent over softer interpersonal abilities	0	Interpersonal skills are assessed and evaluated alongside technical skills in PDRs
B2.2	Self assessment of technical and non-technical skills is haphazard and unstructured	0	All people are encouraged and supported to undertake self-assessments of their skill set (technical and non-technical)
B2.3	Skills development/assessment exists to support individuals in their role only	0	The wider needs of the team/project are considered when assessing/developing the skills of individuals
B3.1	Teams plan their work with autonomy	0	Team plan their work in consultation with other teams
B5.1	The work force can be described as dis-engaged	0	The workforce can be described as engaged
B5.2	Frequent changes in senior leadership teams	0	Infrequent changes in senior leadership team
B5.3	The project experiences high levels of staff absence (sickness/stress/injury)	0	The project experiences low levels of absenteeism
B5.4	A small team of managers feed into any improvement initiative on behalf of their staff	0	A cross section of staff are canvassed for opinion on improvement initiatives. All opinions are considered fairly
B5.5	Supervisors' engagement with teams is infrequent. Where is does take place it is in relation to operational issues only	0	Supervisors regularly engage with their teams on operations and non-operational issues

B6.1	The delivery of project related communications is inconsistent/non-existent	0	Project related communications are received by all who need to/are intended to receive them
B6.2	A vision is not communicated or doesn't exist	0	Strategic vision is clearly communicated to all
B6.3	People tend to obtain company information via rumour / word of mouth	0	People learn of company news via appropriate / reliable channels
	Sub total	**0**	**out of 70**