

Collaborate and die! Exploring different understandings of organisational cooperation within Scotland's uncertain North Sea oil and gas industry.

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Abstract

This study ethnographically explores how collaboration is enacted within two differently structured sub-sea engineering organisations local to the oil & gas industry in Aberdeen, Scotland. Literature suggests organisational collaboration practices are largely dependent on trust, historical cooperation, establishing interpersonal relations and information sharing networks. Such notions are suggested as readily enacted in Aberdeen. However, following changes in industry landscape, we uncover a variety of additional factors pertaining to macro-level local industry climate, and meso-level organisational cultures that shape different perceptions, understandings, and enactments of collaboration. To grow current scholarly thinking, we define how such diverse understandings actively prevent organisational collaboration in the restrictively competitive climate of Aberdeen's oil & gas industry. Implications for expanding understandings of collaboration in employment sectors facing substantial industry destabilisation and reformation are discussed.

Keywords: Organisational collaboration, oil and gas, organisational culture, conflict and collaboration, collaborative hydrocarbon extraction, strategic collaboration.

1. Introduction

Recent scholarly interest in understanding organisational collaborations has increased [1, 2]. This is not least due to increasingly complex, and overlapping connections between different global organisations, supply-chain mutual reliance, and rapid technological evolutions in communication and labour practices [3]. Interest has particularly centred on cooperation and collaboration between energy organisations, with industries concerned with non-renewable energy sources garnering focus [4, 5, 6]. Such enquiry comes at a time of unparalleled global energy uncertainty and financial fluctuations in commodity pricing [7].

The city of Aberdeen represents the nexus of Europe's hydrocarbons energy production. Referred to often as the 'Oil capital of Europe' [8, 9], discovery in the mid 1970s of significant sub-sea oil and gas reserves off the local coast, cemented Aberdeen's suitability as a viable headquarters for many global energy organisations (See Stoddart et al). [10]. During the early 2000s there were over fifty independent oil and gas corporations based in Aberdeen, with many headquartered in the city's bespoke-built industrial parks. Oil and gas organisations are typically divided into three categories: upstream, midstream, and downstream; defined by their functional role in oil and gas discovery, recovery, and production. Upstream refers to the search for, recovery and

production of oil and gas reserves. Midstream defines any transportation, storage, and sale of reserves. Downstream describes the refinement and purification of any recovered oil and gas product. Due to proximal positioning of Aberdeen to fossil fuel reserves, the city is renowned as a hub for upstream expertise [11].

The term 'collaboration' has been a 'buzzword' in the UK oil & gas industry for at least two decades. The most recent industry downturn and requirements to improve efficiencies in a very mature local basin have once again brought discussions about the need for collaboration to the fore of Aberdeen's oil & gas sector. The 2014 Wood Report identified collaboration as one of the key capabilities that the local oil & gas industry need to develop, to maximise economic recovery (MER) [12]. The Oil & Gas Authority (OGA) - created in response to the Wood Report - consequently focuses on collaboration as a key element of its Stewardship Expectations and has developed tools and indicators to build what it calls a 'culture of collaboration' [13]. The local policy terminology of collaboration is generally employed in ways that corresponds with widely used definitions in the academic literature; as mutually beneficial relationships entered into to achieve common goals. However, presently there is not adequate knowledge about the nuanced specifics, dynamics and complexities of (collaborative) relationships in this subsea sector, and how partnering organisations define and enact collaboration in practice. Importantly, Aberdeen's local hydrocarbons market comprises different drilling,

recovery, production, engineering, maintenance and supply-chains sectors, a factor seemingly overlooked by much existing inquiry [14, 15, 16, 17, 18]. Within each sector ‘collaboration’ often takes on different meanings and representations. We therefore seek to clarify the different meanings of collaboration at play within two, very different sub-sea engineering organisations as a starting point for establishing distinctions.

Ethnography is an established social science method that seeks to make sense of people’s lived experiences and organisational practices through embedded research, by observing and talking to people in natural settings – in this case, in their workplaces in subsea oil & gas firms. Use of this method, with the rich, deeply contextual data it has produced, makes an important contribution to the literature on collaboration as well as to the existing industry research in the oil & gas sector. Both past academic and industry insights have been predominantly gathered through survey research, as well as less frequently through interview methods. By contrast, our study has allowed us to understand how collaboration is practised, negotiated, challenged and resisted by employees at all levels of the participating organisations, and how these practices might differ from what people say about collaboration in questionnaires or interviews. One research team member undertook ethnographic work in two sub-sea engineering organisations in and around Aberdeen City. Participants were both observed and interviewed in their natural work setting. In what follows, we present the findings from this ethnographic study.

We first review academic literature on collaboration, particularly examining supply chains and the local oil & gas sector of Aberdeen and its relevance to this research. We then outline the methodology for this research, and discuss the value of ethnography for understanding collaboration practices, before providing descriptions of the two subsea engineering firms where ethnography was undertaken. Then follows a presentation of the ethnographic data collected from the two organisations. From this, we develop a typology of collaboration, highlighting the diverse ways collaboration is conceptualised and enacted as local practices. Our typology distinguishes understandings and enactments of collaboration and defines what factors shape these. Moving to discussion, we use this typology to identify three key barriers to local collaboration. Implications for understandings of collaboration, policy and suggestions for improving collaboration, alongside a need for future research are evaluated.

1. Literature: exploring collaboration

Recently, there has been growing sociological interest in understanding macro-level energy collaboration practices with regards to changes arising from post-traumatic events, and a growing global need to move towards renewables-focused energy development. Research by Fischer [19], focussing on “energy shocks” (p. 1) and their impact upon

behaviours and collaboration, defined collaboration as a network of trust-based behavioural practices linked to uncertainties and understandings surrounding policy interpretations. Trust was defined as a unidimensional construct, existing in the local workspace and interlinked with actors' knowledge of others individual beliefs and values, as influenced by perceptions of major incidents. Relatedly, Tang [20] explored technological shifts in the US wind-power industry, defining collaboration as a functional, local practice related to learning-by doing behaviours, that improved partners' understandings of required actions and therefore performance in collaborative wind project development. Another recent, and fascinating study by Aleixandre-Tudo et al., [21] explored collaboration as defined by international collaborative funding and publication research practices between the US, China and the EU. While dimensions of trust are not discussed, Social Network Analysis reveals joint, international research initiatives prioritise open cross-border information sharing and dissemination, with regards to collaboratively developing renewables energy knowledge.

However, few contemporary studies explore local, functional industrial collaboration, between different, same-purpose energy organisations, in specific city-sectors. Within existing literature, there is no definite agreement on how smaller, local-level industrial energy collaborations should be defined - and indeed, whether organisational relations that encourage co-operative vs adversarial behaviour should be termed 'collaboration';

or whether ‘partnership’, ‘cooperation’ or ‘inter-firm alliance’ are preferable terms to convey the characteristics of such relationships. In the private sector, joint ventures, alliances and supply-chain partnering are all common forms of collaboration [22, 23, 24]. A widely cited definition of collaboration by Mattessich & Monsey [25] is ‘mutually beneficial and well defined relationships entered into by two or more organisations to achieve common goals’. Relationships includes a commitment to: “develop structure and shared responsibility; mutual authority and accountability for success; and sharing of resources and rewards” (p. 23). In relation to supply chain collaboration, Macbeth [26] prefers the terminology of partnering, defined as an “approach to business in which companies expect a long-term relationship, develop complementary capabilities, share more information and engage in more joint planning than is customary” (p. 78).

In relation to supply chain collaboration, which describes some of the collaborative relationships observed in this study, a review study by Hudnurkar et al. [27] distinguishes six definitions of collaboration in supply chain, ranging from those focusing on ‘cooperative strategies [...] for lowering cost and increasing revenue’ (p. 41) [28] to knowledge creation and sharing [29], to the successful interaction of entities in a chain to provide the necessary coordinated outputs [30]. All the reviewed definitions emphasise the necessity for independent and autonomous collaborating firms.

The most frequently cited benefits of collaboration include access to specific capabilities; more rapid innovation, quality and value enhancement; greater efficiency; greater cost effectiveness; spreading financial risk; greater technological improvement; and sustainable competitive advantage [27, 31, 32]. Such benefits are seen to be particularly pronounced when companies are operating in competitive and volatile environments [11, 33], such as Scotland's North Sea oil & gas sector.

However, despite scholarship on the benefits and enablers of collaboration, critics have argued that competitive advantages are unlikely to come from collaborative relationships, and that weaker players in supply chains stand to lose as much in seemingly collaborative relationships as in adversarial ones [31]. Additional risks of collaborations relate to knowledge leakage and the possible misappropriation of the created value [33].

2.1 What enables and drives collaboration?

Many factors might be seen to impact on the success of collaborations, relating to environmental, cultural, individual, structural and communicative challenges [11, 25]. Some of the most commonly discussed success factors in the literature include:

- a) Mutual trust and respect

- b) History of collaboration or cooperation in the industry; enables understanding of roles and responsibilities and trust in the process
- c) A favourable political or social climate; political leaders do not oppose cooperation
- d) An appropriate organisational structure; e.g. every level of the organisation participating in decision making, adaptability to changes and challenges, flexibility
- e) Open and frequent communication and good formal and informal communication channels
- f) A shared vision, with concrete and attainable goals
- g) Adequate resourcing

It is worthwhile unpacking the importance, to successful collaboration, of trust in greater detail, since it is often understood as the most important factor in shaping collaboration [11, 27].

Trust is defined as a willingness to rely on an exchange partner and can be understood as the belief that a collaborator will not indulge in opportunistic behaviour [34]. Within business and management studies and drawing on psychological dimensions of trust, Costigan et al. [35] identified various interpersonal and impersonal types of

organisational trust: lateral trust refers to trust within employees, and vertical trust refers to trust between employees and leaders. Khodyakov [36] critiques what he sees as one-dimensional conceptions of trust that treat trust as a variable rather than as a process, instead developing a three-dimensional approach to trust: Thick interpersonal trust (depends on similarity and strong emotional relationships between people, a particularised trust); thin interpersonal trust (weak social ties that are invaluable for obtaining access to otherwise unavailable resources, a generalised trust that depends on either a potential trustee or a trust intermediary); institutional trust (an impersonal trust that has the potential to encourage voluntary deference to the decisions made by institutions and increase public compliance with existing rules and regulations).

Trust increases the efficiency and effectiveness of organisational cooperation and collaboration and of different dimensions of organisational innovativeness [37]. It is strongly shaped by previous collaborative experiences. Blomqvist et al. [38] highlight the links between trust and contracts in collaborations: contracts embody the psychological symbolism of trust and, as such, successful collaborations usually have a simple and flexible contracting procedure that establishes ground rules and is itself an important mechanism to build trust.

Trust (or a lack of it) makes the timing for collaborations important: institutional (or inter-firm) trust is generated by adherence to the social norms of the industry/business environment, which are set up over time in the course of many exchange relations [39] When the norms of the industry are unclear or in a process of change, institutional trust is likely to be low and personal relationships will become relatively more important [11, 38].

Some scholarly thinking has expanded upon linked perspectives in relationships between organisational collaborations and trust. Haque [11] used distanced questionnaire methods to explore definitions of trust as a motivator of organisational collaborations between upstreamⁱ Aberdeen-based oil and gas companies. He concluded that the presence of different notions of trust (i.e. contractual trust, competence trust, process-based trust, strong form of trust and cognitive trust) were prioritised highly in decision-making regarding alliance negotiations. Haque's thinking departs from considering trust as a singular notion. However, data was collected in 2001, at a time where the industry was experiencing significant financial success. Conversely, participants interviewed for our study - in 2019 and 2020 - referred to this time as the 'golden era' of oil and gas. Therefore, while an interesting retrospective, it is problematic to apply such ideas gestated

ⁱ Operations concerned with oil and gas discovery, drilling, and recovery

within a vastly different local climate to extrapolate present relations between subsea-engineering organisations.

2.2 How does collaboration happen?

The existing literature on collaboration for innovation distinguishes between three enabling levels of collaboration. Macro-level collaboration concerns the system that governs the environment external to the organisation within which the organisation exists. It involves company laws and legislations, contractual aspects that give rise to joint ventures, networks, consortia and other inter-firm partnerships (as well as a range of inter-sectoral, public-private partnerships). Meso-level concerns processes at the organisational level, for example corporate governance and company policies that promote collaboration to happen in specific ways. However, for collaboration to be successful it must also involve the micro-level: for teams and employees to be engaging in regular interactions, developing shared goals and a shared vision, and producing common working practices. Such shared working practices can be temporal, spatial, or cultural.

When looking specifically at the oil & gas sector in Aberdeen, there are a variety of relationships ranging from competitive to collaborative and supplier-customer; meaning

that managers must negotiate the complexity of different expectations and diversity of practices. At the same time oil & gas companies play multiple roles: as competitors, suppliers, and customers at once [33]. Different types of collaboration then are specific to the role of companies. A multi-industry survey of research and development (R&D) collaboration in Finland, Henttonen et al. [33] found that firms that had strong mechanisms for Intellectual Property Rights (IPRs), contracts, lead time, and knowledge tacitness were more heavily engaged in R&D collaboration with their customers; at the same time contracts and lead time were emphasised as appropriability mechanisms in R&D collaboration with competitors (i.e. coopetition). Moreover, strong IPRs, contracts, secrecy, and lead time were connected to R&D collaboration with suppliers. Crabtree, Bower and Keogh [39] and Chakkol, Finne, and Johnson [40] argue that these multiple roles and relationships can increase conflict between companies, rendering personal relationships important, and making key individuals in organisations more central to collaboration than formal company practices.

2.3 Collaboration in Aberdeen's local oil & gas sector

The small amount of literature that exists on collaboration in UK oil & gas broadly agrees that partnering and other collaborative working arrangements have been adopted since the early 1990s. However, the extent, quality and depth of such collaborations is debated.

Crabtree, Bower and Keogh [39] examined collaboration and conflict in the Aberdeen-based oil & gas sector, at a time when the industry was undergoing ‘a major change in contracting relationships, from highly adversarial, arm's length subcontracting to close, 'win/win' partnerships’’ (p. 181). Drawing on semi-structured interviews and ethnographic data, the authors find the multiple roles that companies need to play in their various business relationships – as partners, customers, suppliers or direct competitors – to potentially lead to external conflicts in the sector, which might be exacerbated by the ‘close geographical proximity of these companies’ (p. 188).

The study also concludes that internal conflicts between subunits of organisations have emerged as a result of larger contractors forming integrated services divisions that aim to provide total solutions to their customer, while continuing to run separate departments that provide individual services and products. The latter’s customers tended to be the main competitors of the integrated solutions division. Internal conflict also resulted from engineers increasingly contracted out to their employer’s customers, for example in a design consultancy role: ‘although employed by the supplier, the employee inevitably forged relationships within the workplace and became heavily influenced by the culture of the customer's organisation’ [39] (p. 189). We found similar tensions between the necessity for knowledge sharing and the necessity for intellectual property protection and the conscious retention of information in some contexts.

Green [16] views collaboration more positively and identifies a number of characteristics of collaborative relationships between oil companies and their contractors: they are long-term (five years or more); contractors are selected more on their values, policies and behaviours than costs; resources are put into team building; contribution to the end result by all parties is emphasised over individual activity; there is a focus on early involvement, from the design stages; all parties should benefit from the alliance, possibly through risk-reward structures. A study from the late 1990s (but published in 2004) identifies twenty-eight factors affecting supply chain collaboration in the UK oil & gas sector, drawing on questionnaires with senior UK oil & gas employees [16]. The success factors are in line with the wider consensus for successful collaborations discussed earlier [25]: trusting attitudes; shared or aligned goals and objectives; open behaviour; shared knowledge; clear roles within relationship; commitment to the relationship.

A later study by Cumbers, MacKinnon and Chapman [41], of innovation and collaboration among small and medium size enterprises (SME) in Aberdeen's oil & gas sector draws on surveys and some additional interviews. Research found that, while there is significant innovation, given SME's advanced knowledge base and supply-related networks which usually include universities and research institutes, collaborative innovation is limited in scale and scope, and only usually happens bilaterally with key

customers, on an 'on demand' basis. Government-supported and operator-led efforts to reduce costs through rationalisation and outsourcing have negatively impacted on SMEs in the Aberdeen oil complex and are found to be constraining innovation. While regional networks and collaboration are important for innovation, the authors find that successful SMEs are able to 'draw upon localised assets yet simultaneously being plugged into wider [extralocal] networks' (p. 1704).

2. Research Methods

2.1 Using 'focused' ethnography to understand collaborative practices

Ethnography is a well-established knowledge gathering practice within social sciences [42, 43]. Developing from reflexive approaches to anthropological research, the methodology represents an immersive approach to community observation. Researchers come to know subjects and cultures of study with a degree of depth and clarity uncommon with transient or distanced models [44].

In examining available oil & gas sector research, the most common method by which data are gathered is Likert scale survey methods [11, 13]. While survey methods are useful at scoring large-scale population data, they offer little insights into subjective behaviours

dependent upon personal understandings [45]. Collaboration is a practice where different sense-making underpins specific performances [41, 46]. Ethnography is an ideal, yet underutilised method for examining how different peoples and organisations conceptualise local collaboration.

Traditional ethnographers often spend long periods of time immersed in their chosen community of study. This has led some scholars to suggest the measure of successful ethnography is length of time spent in a research environment [44, 47, 48]. However, thinking eschews considerations for the robustness of analysis and quality of data collected during fieldwork. Recent theorising of modern, shorter ethnographies suggests time in environment alone simplifies the ethnographic paradigm as solely suiting longitudinal research strategies [48, 49, 50]. These ideas encourage researchers exploring locales with limited access to avoid ethnography in favour of case-study or questionnaire approaches, propagated by the belief that any ‘shortened’ ethnography may be less legitimate [44, 51]. Opposite to these perspectives, a different set of scholars uphold that with appropriate research design, short ethnographies can be highly successful.

Milen [52] and Smith [53] posit social, practical configurations of many modern institutions prohibit the long embedding typical of traditionalist ethnographies. This thinking is well evidenced [see 54, 55, 56]. In response, Smith suggests a modified,

condensed form of organisational ethnography that prioritises the structuring of knowledge collection around “the people, the language, and the context” (p. 51) [53]. Crucial to Smith’s approach is that the ethnographer reflexively consider their own professional expertise and social position relative to the environment. Theorising suggests that, for example, as an engineer studying engineering practices, the researcher holds a priori knowledge that structures contextual theorising of language and observations. Enhanced understandings and shared experiences between researcher-participants benefit condensed ethnographies. Smith argues that - rather than adopt a quasi-distanced approach that seeks to separate any prior conceptions - scholars should openly document their past understandings, theorising, and local-social position within the site of study. Ethnographers should consider how these factors inform ethnographic focus in an institutional workplace. By employing this perspective, ethnographers may ‘condense’ the study of experience to identifying intense, relational insights that play out in the local field of study, as they relate to the experiences of the researcher themselves. The researcher is both the primary tool of knowledge collection, and the mode of evaluation and introspection by which new meanings become attached to social occurrences, language and interactions.

2.2 Research approach

Ethnography was conducted at two sub-sea engineering organisations in and around Aberdeen City. Both organisations were selected for their individual and archetypal natures – and differences. One organisation was a small consultancy, many of which exist in Aberdeen. The other was a large conglomerate, again typical of the locale, where several such large consultancies exist. Organisations were approached with assistance from the sponsoring organisations of this research: The Oil and Gas Technology Centre, based in Aberdeen. Initial contact names were provided. Both organisations were first approached through email contact, and sent a short outline of the project. Following this, an initial meeting was held – at each organisation – with a senior stakeholder. Following meetings, approval to conduct ethnography was granted. As token remuneration for participation the research, both organisations received a discount on their membership fee to the Oil and Gas Technology Centreⁱⁱ.

Such sub-sea engineering organisations represent social bubbles that lend to ‘short and sharp’ ethnography. This is because - unlike many traditional sites of research - the scheduling of work is routine and stable. Employees have set times when they began work, defined lists of tasks for completion, and set breaks. Typically, employees worked for eight hours a day. This allowed for planned observations of all tasks, discussions, and interactions with little to no ‘down-time’. Participants were observed and interviewed in

ⁱⁱ This membership allows access to meetings, seminars, and industry development news.

their natural work setting with minimum disruption to daily activities. Staff at both organisations drew on their experiences within these specific firms. As participant lived experience is an evolving and iterative process, participants were equally encouraged to discuss working in other sub-sea organisations servicing the UK Continental Shelf (UKCS). This was to establish a broader picture of evolving norms and values that shape contemporary collaboration practices and how these are nurtured. Combined perspectives allowed for development of a rich tapestry of participant lived experience. A total of four weeks was spent at each organisation, yielding approximately 220 hours of ethnographic data.

Drawing on Smith's focused approach, Dr Nick Adams conducted embedded ethnographic research. Nick has an established background working as a practitioner of industrial and organisational (I/O) psychology within onshore and offshore hydrocarbon and drilling climates. In addition, he has spent several years researching the sociology of organisational cultures within UKCS drilling organisations. He has been based offshore - on a remote drilling asset - during drilling, hydrocarbon recovery, and sub-sea engineering work, and has previously published on the topic of cultures of masculinity in the UKCS offshore industry [57]. Pairing represents an effective match between researcher and research location. Past knowledge and understandings of processes, people, specific technical terms, and local organisational cultures lends an 'insider'

quality to this short and intense research. Knowledge of industry, place and peoples allowed ethnographic research to commence immediately at a fast-pace. From day one of embedding, lengthy observations and discussions ensued, and preliminary data-analysis began.

2.3 Two sub-sea engineering organisations

The first organisation, CoAx Energy,ⁱⁱⁱ was a small sub-sea engineering establishment. CoAx operates as a consultancy, offering sub-sea engineering services to oil & gas operators and organisations. The organisation consisted of approximately twenty workers. Although small, CoAx staff comprise established experts in sub-sea engineering. Many engineers had over fifteen years' experience in UKCS design and implementation operations. Most were masters-level educated, some with PhDs. The age of the organisation was approximately eight years. However, several senior engineers at CoAx had worked together previously. Some staff had known each other for around twenty years. In addition to senior engineers, the organisation employed four recent graduates. CoAx holds satellite offices in non-UK locations, including Norway and Asia. Notable for such a small organisation, CoAx retained an impressive research and development portfolio. Research focused on the design of novel solutions for existing

ⁱⁱⁱ CoAx Energy and SE Solutions (SES) are pseudonyms.

North Sea recovery issues. CoAx holds a small, but significant position in the Aberdeen North Sea hydrocarbon industry. The organisation had several ongoing projects, mostly for major “Tier 1^{iv}” operators focussing on UKCS hydrocarbon recovery. Of significance is that these projects were often extended at an agreed renewal stage. This indicated that the expert engineering service CoAx provides is recognised and valued by their clients.

The second organisation, SE Solutions (SES) was a much larger engineering consultancy. SES comprised of over 1000 employees at their primary site. This was a sprawling campus with numerous departments developing different sub-sea solutions. Broadly, labour was split into four divisions: engineering, technology, supply chain, and sales and marketing. In addition, several local campuses existed. The scale of engineering projects was vaster than at CoAx. SES held numerous relationships with high-profile global operators and organisations, providing critical infrastructure solutions for North Sea, and global oil & gas ventures. SES also had several offshoots; organisations were owned by SES but operated under different names as separate entities. For example, a future technology department existed on the main campus. This company developed novel solutions to sub-sea extraction and exploration, including R&D departments focussing on robotics, as well as new types of pipeline, cabling and renewable energy projects.

^{iv} Tier 1 is common industry terminology for a major oil & gas supply, drilling or extraction organisation. Such organisations are defined by their diversity of interests in global locations, their financial stability, and their successful and longitudinal business practices.

SES is best defined as a Tier 1 contractor with a diverse set of specialisms and experience. During ethnography, it became clear that many workers had always desired to work for SES. Employees defined their time in other sub-sea organisations as “climbing the ladder”, to secure a staff position at SES. This was reflected in discussions with SES contractors. These workers operated at SES on a day-rate basis. However, many desired to transfer to staff positions^v. SES had numerous ongoing projects, some of which were shrouded in confidentiality. While specialisms were broad, SES provides bespoke client solutions for complex onshore and offshore extractions. They also develop future technologies to maximise the longevity and lifespan of existing discovered offshore oil and gas fields.

2.4 Sampling, selection and analysis

The ethnographic research took place beginning in November 2019 and ending in February of 2020. Participants at both organisations were selected using random, informal sampling. This method was chosen to give the greatest spread of participant difference in both organisations, and is well documented as a valid practice in locational ethnography

^v Day-rate contracting is where a worker is paid an agreed ‘day rate’ for their work. While sometimes perceived as more lucrative, this position lacks the employee benefits and security of a staff position. For example, the termination notice period for contractors is often immediate.

[44, 58]. Once the researcher was embedded within the organisations, small groups of employees were sent an initial email asking for permission to shadow or interview. These workers were often suggested, at random, by peers, or after simply being introduced to the researcher. Often, recruitment represented a ‘snowball’ approach, where employees requested an interview or ‘shadow-time’ after hearing about the study from colleagues. This was the case at both CoAx, and SES.

CoAx contained a comparably small number of employees compared with SES. Thus, this ‘snowball’ effect was more prominent. Almost all workers were interviewed and observed. This comprised a sample of fifteen workers. The number of workers who identify as men in Scotland’s North Sea oil and gas industry - compared with those identifying as women - is well-publicised as representing a significant gender imbalance [see 57]. Almost all engineers at CoAx were male, apart from two female engineers. Two additional female workers were interviewed also – one in an administrative role, and one in a marketing role. At SES, thirty-three participants were interviewed. Most of these were male also, with four females (all in technical, engineering roles) interviewed.

As is the case with much embedded, realist ethnographic research, interviews and observations were often conducted simultaneously. For example, at CoAx, many workers shared tight-quarters, making combining interviews and observations a necessity. At SES,

some stratification was possible, with workers scheduling time to be interviewed. However, all interviews were conducted when employees engaged in work. While research represented close-immersion with participants, the researcher's identity as a curious observer was always preserved and recognised. As the researcher did not engage in tasks himself, the likelihood of 'going native' was considered minimal [59, 60].

Discussions at both workplaces often involved bespoke intellectual property. Thus, it was agreed audio-recording of interviews was not appropriate. Interviews were transcribed on-the-fly in shorthand – as they occurred, using a portable laptop. Any quotations highlighted in interviews that the researcher deemed especially notable to subject-matter were indicated, transcribed, and later noted into a field journal headlined with the topic under discussion. Additionally, many audio notes as daily 'audio-logs' were made by the researcher to mark themes important for revisiting during analysis. Lengthy observational notes as Word documents and Apple Notes files were also developed daily, alongside end-of-day summaries and notations. All participants signed an informed consent document. This confirmed - for reasons of intellectual property protection - research data would not be shared beyond the immediate research team.

Following completion of ethnography, research data was collated and analysed. Initially the software programme NVivo was used to separate prominent themes and order notions

of collaboration, cooperation, and conflict. However, due to the volume of ethnographic data, and the mixed data mediums, a more traditional thematic analysis was conducted. This was in accordance with thematic partitioning for complex ethnography popularised by Clarke & Braun [61, 62] which has seen similar, successful use - both in coding complex data while maintaining authenticity, and ensuring any 'real-world' perceptions and observations deemed important by researchers and participants are not lost or deemphasised by convenient statistical or methodological software [63].

Initial themes were constructed from repeated reviewing of the collected data from each organisation. Several further passes of data were conducted to refine themes – and eventually – code specific dominant themes into set categories. Finally, such themes were separated into nodes defining different understandings of collaboration per organisations, and how such understandings were constructed, interact, and garner local, contextual meaning as facilitators and constraints of collaboration.

3. Findings: developing a typography of collaboration for North-East Scotland's subsea oil & gas industry

3.1 Collaboration as a transaction

At CoAx, staff described commercial relationships as “enacting collaboration”. Success was defined by single-sided transactions resplendent of high profitability and lucrative contract delivery. Definitions were used in a blanket-fashion to discuss different and diverse business dealings. At times, relationships appeared to foster some traditional dimensions of trust collaboration prevalent in literature, for example, communication, repeat business, and shared knowledge [11, 38, 35]. Notions were clearest during meetings and video-conference negotiations. However, often relationships appeared as negotiation-centred structures, where profits resembled the primary focus.

In discussion with engineers, transactional perceptions of collaboration were explained as anchored to the competitive nature of sub-sea contract bidding. Participants elucidated that small organisations face risks by engaging in trust and communication-based collaboration. The main barrier to facilitating trust-based communications is a requirement to protect intellectual property (IP). CoAx can engage in a low number of client projects at any one time. This is due to their small staff and size. They select potential clients per a best-match with their skills to maximise likelihood of profitable financial outcomes. Presently, there are many small sub-sea consultancies operating in Aberdeen. Institutions exist within the same local “tender pool” from which clients select

a “bidder” for projects. The most crucial aspect of differentiating one consultancy from another is their engineering expertise ‘currency’. Bespoke technology ranks highly as a desirable local commodity in the current industry downturn. In-house technologies promote faster completion of projects, and provide solutions to time worn industry problems. For these reasons, protecting IP is of paramount importance to smaller sub-sea engineering organisations; IP itself emblematises smaller sub-sea solution providers tangible market viability. Because of this value placed on IP in a competitive local climate, trust between smaller organisations was near-absent.

Protecting IP was enacted reciprocally during numerous transaction-led and exchange-based negotiations. Workers termed such interactions “collaborating” despite negotiations resembled a reluctance to discuss specific projects, costs, technology, and processes and procedures. Instead, an information-exchange process occurred. Organisations “traded” information in a transactional format. Typically, one organisation initiating contact to share knowledge of a possible bid for tender. This progressed from email to conference and Skype calls. Inter-organisational information transfer began by discussing topics such as established or likely financial day-rates alongside broad project scopes and likelihood of successful completion. The swapping of this information, is what all engineers working within small sub-sea organisations defined as “collaborative practices between other [small] sub-sea organisations”. While many negotiations were

observed, only a fraction of these moved to a further stage of arranged meetings or partnership. The primary reason for this was a reluctance for prospective partners to share bespoke knowledge that may devalue established intellectual property.

James^{vi} – a senior engineer – elaborated how the present status of the North Sea oil & gas sub-sea market shaped this lack of trust. He had worked for a small sub-sea contractor for five years before moving to CoAx. He posited that “pre-downturn (i.e. pre-2014) it was easier to work together”. As there was more money, there was “less competitiveness and more inherent trust”. Reductions in oil price had caused many small sub-sea contractors “to fold”. Alternatively, organisations holding bespoke technology were acquired by larger, more established, financially stable sub-sea contractors. The situation left “many smaller companies fighting over the same work, the same scraps if you will”. Like others, James upheld that the competitive cultural landscape of Aberdeen manufactures an increased need for “unique selling points”. Thus, negotiating interactions between smaller sub-sea organisations become transactional. Behaviours are structured by requirements for each party to protect their knowledge and ideas. By organisations internalising these notions, James described ‘collaboration’ as “resembling a poker game” where small

^{vi} All participant names are pseudonyms. In some cases, job titles have been simplified to avoid participant identification.

organisations attempt to reveal “just enough information to collaborate” without “showing their whole hand”.

3.2 Collaboration as communication

At SES, ‘collaboration’ was often linked to openness and transparency. Workers defined collaboration as: “being open, being honest”, “not being scared to share information”, and “talking openly, being transparent about our intentions. Both with suppliers and clients alike”. Understandings linked back to a strong organisational culture predicated upon internal sharing of information and established norms of honesty and candour.

Unlike at CoAx, SES routinely shared current industry operations and availability with external organisations, openly discussing expertise linked to specific client requests and tenders. While utmost importance was placed on client confidentiality, such openness was surprising, and most prevalent within the supply-chain division of SES. Meetings conveyed a willingness for SES staff to “talk openly” and “be completely up-front” with organisations that supply SES with technology, and with clients whom SES supply. In one meeting, dialogue opened with a frank discussion of a supplier situation. SES explained in detail the specific supplier arrangement and how this impacted their

expectation of project delivery and timeline. When this meeting was discussed with participants later, the importance of transparency as industry currency was revealed.

Mark, a senior sales and marketing manager, employed at SES for fifteen years, elucidated these practices. His narrative built on previous themes of a shifting local climate highlighted at CoAx. Mark argued that changes in UKCS operations following industry downturn caused a revaluing of openness and honesty. Like CoAx, he acknowledged local culture is now competitive, and protecting IP is key for maintaining value. However, Mark explained how transparency and openness operate as currency from which to maintain and stabilise collaborative relationships. Namely, this is realised through the enactment of both notions as methods of building trust.

Mark exemplified a client who required use of SES drill ships in specific waters. During negotiations, he shared the current whereabouts of some SES drill-ships. While this action was met with surprise. Mark explained his sharing as to demonstrate project timelines provided to clients were accurate, and that assets would have to relocate to client worksites. Such was the appreciation for this honesty, the client reciprocated by engaging in a new engineering project. Mark explained this “collaborative relationship” went on to be a long-standing collaboration that remains in place still.

Smaller organisations stress their lack of openness during negotiations. This is explained as fallout from a competitive industry climate that demands IP protections. However, examples at SES demonstrate the manifold nature of organisational capital. This can vary per industry perspective. Unlike CoAx, SES did not perceive sharing of information to devalue their market status. Instead, transparency had a positive, strengthening effect on collaboration. However, such mismatched organisational norms clearly curtail collaboration between small and large organisations. Jason, a senior SES technology engineer explained this:

“You see it all the time with smaller companies. They don’t want to tell you anything [...] We had a small company recently, and we wanted to work with them. They said they had a solution to a project we were working on, we outlined everything...and I mean, they just wouldn’t tell us anything about how it could be done... it was all: ‘pay us’ and then we’ll do it. It came to the point that we said: ‘if you can’t share even the basics of how this could be done, then we’ll have to pass you up. We have no way of knowing if you can actually do what you say!’ And, that’s what happened, they held back, and we couldn’t collaborate with them...”

Jason illustrates how stratified understandings can hinder collaborative partnerships. Due to their size and divisional nature, larger providers are better positioned to be transparent and open. Smaller organisations instead conceptualise their primary capital as novel intellectual property. Larger organisations reframe the practice of openness itself as a primary source of industrial capital. While smaller organisations perceive industry climate as forcibly driving less openness, larger ones see this as an opportunity to capitalise on the rarity of this social commodity to enhance their trading and market position.

3.3 Collaboration as a forced negotiation

‘Forced collaboration’ was uncovered during ethnography of CoAx. CoAx is a small, bespoke-level consultancy trading on expertise service. However, large tenders for clients call for a generalised approach to engineering services. Tenders for “all-in” and “end-to-end” solutions are common in the current financial climate of the UK hydrocarbons market. Terms refer to delivery of a complete offshore, oilfield, or hydrocarbon recovery solution, as opposed to one specific expert-led project, such as a pipeline design. The small size of consultancies like CoAx, and their specialised position prohibit them from bidding on such large ‘complete’ contracts.

However, contracts are lucrative. To bid for these, organisations like CoAx “chain” together with many other small companies to give the appearance of an overarching larger provider capable of delivering the tendered solution. These conjoining relationships were often defined as “collaborative”. However, use of this term almost always included recognition that how tendering organisations negotiated and communicated were driven by “forced” necessity.

Simon - a senior engineer who had worked at CoAx for several years - explained this. Ideally, CoAx make efforts to bid for “smaller, and readily available” contracts. However, during initial stages of the downturn, smaller companies were routinely acquired by larger engineering organisations. This increased the perception of large conglomerates as preferential and reliable candidates for delivering solutions. By clients structuring tenders around requests for ‘end-to-end solution delivery’, they effectively engineer-out any opportunities for smaller companies focussing on small-level expert solutions to engage in bidding. Small consultancies react by “chaining together” to present as one larger entity.

Staff at CoAx viewed this partnering positively. Workers suggested - despite being a climate-reactive occurrence – that “chaining together” was rational and allowed different experts to work successfully together on projects not normally accessible separately.

However, SES provided a different perspective on these partnerships. James, a negotiator working within supply-chain, elaborated:

“It’s a problem [chaining]. It may sound like an ideal situation in practice [...] But in reality, who is managing the situation? OK, so here [at SES] we have lots of departments, but these are broken down into management divisions, and these managers talk to each other [...] with these chained relationships, I don’t think any of the [small] organisations have a great deal of insight into how these different components fit together...at all”.

Other SES staff echoed these sentiments. Stephanie, a project engineer, discussed her past experiences with chaining. Her employer had been a small, Aberdeen-based consultancy. The organisation had partnered with five companies. As project deadlines drew nearer, it became clear each organisation had been working in increasing isolation. When final project specs were shared, numerous changes and customisations had occurred within each design and delivery phase, at each separate company. Customisation resembled perceived improvements from the internal perspective of each partner. However, from an external, client perspective, improvements comprised several separate high-level engineering projects which no longer could be fitted together to conform to the original, more general design scope.

Similar stories were shared, involving examples ranging from pipelines incorrectly constructed to differing size, pressures, and materials, to design specs misunderstood and misinterpreted. Occurrences were ascribed to cultural misunderstandings, distanced communications, and absence of structured and transparent information sharing. These accounts rendered it difficult to envision ‘chaining practices’ as often successful. Examples evidence the importance of effective relationship management and clear communications during collaboration.

3.4 ‘Restrictive collaboration’ and shifting oil & gas identity

Understandings of collaboration were also conceptualised as belonging to a wider process of identity shifts within Aberdeen. Collaboration was framed by some younger engineers as central to their institutional identity.

Robert, a junior engineer at CoAx revealed he felt collaboration – understood as “working together, effectively to achieve a common goal that benefits all parties” was essential. His narrative recognised the different stages of the downturn facing UKCS oil & gas, highlighting a need for smaller organisations to work together, to survive the current

financial market stalemate.^{vii} Robert focused on collaboration during his university engineering education: “at [university], it was all about collaboration, the necessity to collaborate”. Going forward into industry, he expressed surprise that prioritising collaboration was “not mirrored by local practices”. Robert continued that while “everybody” wants to collaborate, few individuals knew how to engage in collaboration effectively. His sentiments were mirrored by many others at CoAx.

Salient were recognitions for local shifts in how engineering work is structured in Aberdeen, specific to changes in industry vis-à-vis oil price and transforming notions of competitiveness. Younger engineers at both CoAx and SES advised that the historical “boom time” oil & gas industry in Aberdeen had been highly competitive. Competition was framed as positive – a facilitator of organisational growth that pushed small and large sub-sea organisations to “up their game” in skill and technology development. This “healthy” notion of competitiveness existed as a locally recognised bubble, supporting a collective belief for many decades of oil reserves within the UKCS, and driving understandings that peak oil price could be sustained for many years to come. However, shifts in organisational identity relating to competitiveness began to take hold in the mid-2010s, following the first years of a sharply declining oil price. Workers internalised

^{vii} At the time research was conducted (February 2020) Brent Crude oil price was \$25. This is the lowest valuation in seventeen years.

changed understandings of competition as negative. Institutional norms surrounding IP tightened. Reluctance to share information became linked to a new competitiveness norm, defined by knowledge that competition had become a fundamental component of survival. This embedded notion opposes past healthy forms of industry rivalry.

Peter, a pipeline engineer at SES outlined the local effects of shifting legacy notions of competition. He asserted that established local perceptions of competitiveness as a necessary survival mechanism operated at odds with the personal thinking of engineers that collaboration was essential. Peter expressed concern for how little local culture was factored into any existing collaboration initiatives, arguing it was “all well and good” developing tools and initiatives to collaborate. However, if the competitive, negative industry climate was not factored into such materials, it is unlikely tools would reach local use. Others at CoAx and SES echoed these sentiments. Numerous workers referred to internal and external pressures to ‘collaborate’, but cited the absence of any recognition of the local industry climate as paradoxically ensuring the industry stalemate competitive climate and a fundamental lack of collaboration.

3.5 Collaboration as a strategy

A strategic form of collaboration was observed at SES, the larger sub-sea consultancy. Strategy consisted of SES - as a large and renowned engineering house - acquiring smaller sub-sea organisations, technology, and key peoples. This allowed SES to remain a bigger and more financially stable organisation than most, while offering similar bespoke engineering services that CoAx staff associated solely with smaller organisations.

As SES grew larger through acquisitions of different companies, the organisation became “more segmented and divided”. SES comprises four broad departments engaging in different activities, in addition to some ‘external’ organisations owned and funded by SES. Engineers at CoAx, defined larger sub-sea engineering houses as anonymous entities, suggesting individual personalities and skills become lost in a wider organisational machine. CoAx staff argued “smaller, more bespoke and expert consultancies” were “much more adept at providing better communications, monitoring, and trust in external relationships”. However, the opposite of this was observed during comparison between the two organisations.

The tiered structure of SES fostered an ingrained culture of internal collaboration between departments. This had enduringly positive effects on external collaborative practices. Negotiations between different SES departments were approached as if these resembled external clients. The functional design of SES headquarters located teams in stratified

workspaces, which promoted use of digital message tools including Skype, conference calls and video project platforms. Some workers had limited access to workspaces beyond those immediately required. “Close but distanced” communications were made necessary by the secure nature of the buildings. The business structure of SES is also relevant. SES comprises input-output business relationships with suppliers, contractors and external clients. SES are supplied materials, skills, and knowledge from external companies. They use these commodities to construct bespoke solutions for global clients. To this end, SES operate a ‘middle’ position requiring communications and negotiations from a perspective of both the receiver of products, but also as the supplier of products.

Importantly, SES staff asserted that “regularly doing collaboration internally” improved external practices. Attitudes and values of staff all positioned collaboration as a “necessary tool” for conducting business, but this was represented in different ways. Within supply chain, workers suggested effective communication, openness and transparency were key to collaborative practice. Examples involved direct information sharing and total honesty during client dealings. The cultural values at SES promoted these practices internally. As staff had “gotten so used to working this way”, the exercise of such behaviours as external strategy was “not effortful”. This was true of engineering, technology, and sales and marketing divisions. However, even during such internal practices, collaboration held different meanings.

Sales and marketing defined external collaboration as “acting with transparency”, engineering and technology prioritised factors such as the sharing of technical information, process and procedures, and projects scope and timelines. Sales and marketing suggested that “good collaboration” was best defined by “suppliers being [...] open with their problems and shortcomings in the delivery of agreed merchandise”. Conversely, technology and engineering suggested that the reliability and timely delivery of supplier products was more important than effective communications. However, when discussing relationships with clients, these departments prioritised effective communications and the outlining of clear deliverables as the most important factors.

Disparate understandings reveal insights into why smaller companies like CoAx may struggle to collaborate with larger organisations. To smaller engineering organisations like CoAx, collaboration is a transactional practice where information that may destabilise their current market position is protected. For larger, commodity-diverse organisations like SES, successful external collaboration is defined by the extent an external collaborator shares such information. Sharing is prioritised because the larger scale of the organisation, the divisional nature of departments, and the natural separation between roles and deliverables fosters notions of collaboration as a practice defined by transparency. The resultant discordance of this mismatch in perceptions leads to a

problematic foundation upon which to build organisational interactions between differently sized organisations.

3.6 Rejection of the term ‘collaboration’

There was some rejection of the term collaboration both at COAx and at SES. Workers distanced themselves from the term as having positive, or meaningful connotations, characterising this reluctance as “collaboration fatigue” or “exhaustion”. This resulted from previously heavy, yet ill-defined use of the term in industry documentation, proposals, and strategies dealing with local industry downturn. “Collaboration fatigue” was equally prevalent at both organisations. Workers at CoAx and SES defined “collaboration” as meaning different things per different time and place, and per situation.

Jacob, a senior engineer at SES discussed this disparity. He positioned collaboration as a “buzzword”. Engineers such as himself “were sick of hearing” the term: “[Collaboration] never means the same thing. I mean, honestly, it’s just a word that gets slotted into conversation [...] like ‘significant opportunity’”. Jack, a graduate engineer from CoAx had a similar impression. He advised that the term was a “catch all phrase” to describe “something intangible”. Similar sentiments were echoed by numerous workers. Notable was a significant level of unease for any use of the term to characterise business

relationships. Notions were not linked to local downturn or industry climate. Instead, the term used frequently, but with no clear attached meaning or significance, led to an overall devaluing of its use.

4. Discussion

Central to our literature review is that economic uncertainties within volatile industrial markets are often presented as driving positive trust-based collaborations that prioritise individual relationships [11, 25, 26, 27, 38]. Such micro-level, trust-predicated cooperation is frequently conceptualised as facilitating rapid meso-level innovation, efficiency, and spreading of financial risk, among other positive factors [7, 27, 31, 33, 37, 41]. However, within studies, little consideration is given to the impacts of macro-level industrial climates that govern the local-social landscape within which such meso and micro trust-based relations naturally play out. Likewise, the possibility of collaboration meaning different things to different organisations and actors within a specific local sector is rarely acknowledged.

We earlier discussed Khodyakov's [36] critique of a normalised one-dimensional view of trust. Khodyakov's response is a multi-level model of local trust conceptualised as: thick interpersonal, thin interpersonal, and institutional trust levels. This thinking may be

applied to elucidate upon some existing local studies of trust in Aberdeen's energy sector that uphold the above conceptualisations. Most notably, Green and Keogh [16], Haque, Green and Keogh [17], and Haque [11] suggest local, Aberdeen oil companies form easily positive and lasting collaborative relationships with clients. Scholars advocate that clients select organisations based on values, policies, and behaviours above financial costing contributions by all parties, team-building, and mutual benefits are recognised as hallmarks of trust-based collaborative partnerships.

However, such findings are extrapolated from methodologies examining micro-level notions, yet assume inherent high levels of 'thick' interpersonal trust exist as Aberdeen's standardised macro-cultural climate. For example, questionnaire-based data collection used in all studies focused solely on understandings of collaboration held by workers within specific institutions. Like local efforts to measure collaboration using surveys [12, 13] data collected relates only to specific levels of *thick meso-level* trust contained within a definitive institutional context. This tells us little about how this trust is enacted as a formulator of collaboration within the wider *macro* context of interacting different meso-level organisations, nor how a wider macro-level industry culture may constrain trust-based collaborations.

The rich ethnographic findings of this study go some way towards filling this gap. Saliiently, engineering organisations in Aberdeen display willingness to collaborate, yet are mostly prevented from doing so by the current competitive climate constructed by a marked decline in oil price, reduced ability to generate local revenue, and the absorption of smaller organisations by larger conglomerates. Thus, collaboration here is a threat to the organisation's survival. Larger companies enduring prioritise the acquisition of bespoke IP from smaller companies as the primary commodity that defines cooperation. Smaller companies prioritise the protection of such IP as their primary source of legitimacy, relevance and buoyancy in an increasingly restrictive trading climate. Smaller companies resist collaborative sharing, because when they do, they 'die' – via mechanism of acquisition by larger conglomerates. While the size and diversity of larger organisations offers some protection against acquisition, conglomerates are not immune. As the local basin continues to mature, valuation of commodities shift. Larger organisations with previously desirable engineering and technological capital find themselves similarly vulnerable to acquisition (or fragmentation) via mergers, as local cultural climate increasingly prioritises honesty and transparency alongside novel IP. Our study identifies three key intertwined barriers to collaboration facing Aberdeen's local oil & gas economy.

4.1 Cultural climate

The most significant barrier is cultural climate. Ethnography revealed the local competitive climate of Aberdeen's oil & gas sector does not lend to collaboration. Aberdeen's present cultural climate is one of extreme competition. Where previously many sub-sea organisations enjoyed 'friendly' competitive relationships that fostered growth through casual information sharing, this is now largely eroded. Erosion is due to continually falling oil price, the acquisition of small companies by larger organisations, and a mass of redundancies and collapses of established engineering organisations in the last ten years.

Chen et al., [34] and Khodyakov [36] focus on interpersonal relations as a core facilitator of organisational collaboration. Both suggest notions of *thick* 'particularised' trust developing from frequent supplier-client relationships and natural familiarities arising from regular interpersonal contact. A similar position is taken up by Chakkol, Finne, and Johnson [40], Crabtree, Bower and Keogh [39], and Green and Keogh [16]. Scholars position that increasingly diverse organisational structures - and the multitude of different and distanced individuals involved in cross-industry negotiations as business normality - place natural strains on forming external collaborative relationships. Due to the

prevalence of diversified organisational structures, forming 'close' interpersonal relations (i.e. *thin* context-dependent trust relations) become of key importance to facilitating collaborative practices. The integrity of such relations is more important for progressive, inter-organisational collaboration than overall company norms or policy, or the wider culture within which such relations play out. Similar observations are positioned from recent research exploring renewables focused collaboration, although trust is not deconstructed in the same multidimensional manner [20].

However, in Aberdeen, such close personal formations are constrained – rather than facilitated - by complex industry culture. Primarily, interpersonal trust and sharing are curtailed by universal recognition that knowledge-sharing represents a social minefield. Presently, all local sub-sea engineering organisations vie for work within the same competitive pool from which contracts are allocated. Discussions of ongoing work, projects, and potential tenders outside one's immediate organisation, but within a local social pool, immediately risk devaluing of market position. This is because - to paraphrase James at CoAx – all local companies are now fighting over the same scraps of work. For this reason, close interpersonal relations are replaced by formal and personally distanced communications that prioritise financial outcomes, minimise information sharing, and protect locally held IP at all costs. Paradoxically, while these practices focus on protecting organisational market position, they serve to construct a stalemate situation. A lack of

information-sharing, and therefore absence of a social foundation upon which to establish tangible interpersonal trust between actors at different organisations aborts many early-stage negotiations before any collaborative progress can be made.

Despite this culture, vulnerabilities within the local field of sub-sea engineering are not allocated equally. Chakkol, Finne, and Johnson [40], Green and Keogh [16] and Chen et al., [34] argue the importance placed on interpersonal relations as facilitators of collaboration are resultant from the complexities of organisations. This suggests that less complex, smaller organisations may be less pressured towards a reliance on interpersonal-led trust to form collaborative relationships. However, again paradoxically, such smaller organisations may naturally lean towards interpersonal interactions as a means of developing trust and forming lasting bonds with social actors at other organisations [11, 34]. This suggests that even within competitive climates, smaller organisations may ‘do collaboration better’, due to being positively positioned towards voluntary collaboration. However, such notions largely eschew examination for the effects of local cultural climate. In this study, we found the opposite of this thinking.

Importantly, unlike CoAx, the larger sub-sea engineering organisation - SES - prioritised openness and transparency in all dealings with clients and suppliers. Enactment can largely be attributed to such values ingrained as normative organisational culture.

However, notions are driven less by requirements to rely on interpersonal relations to establish *thinner* (context-dependent) inter-organisational trust, due to any inherent complexities that problematize internal meso-level *thick* (particularised) trust. While SES was certainly complex in nature, this complexity itself lent to enhanced information-sharing, transparency, communications, and openness at the meso, internal level of SES operations. SES relied little on interpersonal relations in any business dealings, instead they traded on overall reputation and recognition for their clear communications. SES operated negotiations and interactions from a rational standpoint that recognised the current industry climate. Instead of ‘clamming up’ and refusing to share information, SES commoditised their open and transparent practices by espousing openness in all macro-level business dealings, and linking this behaviour to a core value of the organisation at the internal meso-level. Clients recognise the rarity of these practices in the current climate, and reciprocate by engaging in repeat business, contract extensions, and new projects. To this end, SES secure a prominent and financially stable position in Aberdeen’s local oil & gas market, without reliance - or being naturally driven to rely upon - a high-level of interpersonal predicated *thin* trust relations. Instead, *thick* trust is manufactured from a commodities-driven standpoint, where SES possess the size, market stability, and climate-recognition to capitalise on desirable social behaviours of openness and transparency at an early stage of trading. This is before such time that enactment of

these behaviours becomes impossible, and brings detrimental market effects upon organisational trading, growth, and market stability.

The opposite of this position is true for smaller organisations, such as CoAx. These consultancies find themselves locked in a market stalemate. Presently, the competitive climate of the UKCS is such that information sharing represents the most salient step towards forming trust-based collaborative relations, which underpin new business that brings financial stability. However, due to smaller consultancies reduced number of clients, and reliance on bespoke technology and services, these organisations are prevented from displaying the same openness tendencies as larger organisations. They are ‘too late to the party’ to begin open and transparent meso-macro models of trading, as this will naturally bring some initial devaluing of their market position and risk their existing IP. Instead, small consultancies ‘hang on’ in the current climate by relying on their position as bespoke, expert service leaders in sub-sea engineering development and practice, focussing on developing existing client relationships and ensuring repeat business. While this could be viewed as enacting ‘close’ interpersonal negotiations to build inter-organisational *thin* trust, ethnography of CoAx revealed interpersonal relations - and *any* levels of trust - factored little in establishing repeat business. Instead, constructive industry climate dictated that clients focused more on the pricing of projects, and the inconvenience of having to develop a new contract for tender when renewing

local contracts. Likewise, during renegotiations, CoAx staff focused on establishing ‘fair price’ and ‘expert service’ as opposed to managing interpersonal trust, friendships, and good will.

For these reasons, the current industry climate of Aberdeen’s oil & gas industry appears to largely prohibit and ‘edge out’ collaborations between multiple smaller organisations, and small and large organisations. This occurs due to an increasingly competitive cultural landscape that prevents the easy formation of established (and even fragile) trust-relations. Instead, in this climate, trust appears to largely be predicated upon information sharing, openness, and transparency. While some larger organisations recognise and commodify this position, smaller consultancies are unable to do so, due to their already marginal and fragile market position risking further destabilisation, and possibly eradication, through adopting such practices.

4.2 Conflicting definitions of collaboration

The multiple and conflicting definitions of collaboration are a second barrier to bringing organisations together. Significantly, even within only two organisations operating within the relatively narrow field of local sub-sea engineering, six different definitions of

collaboration were established. ‘Collaboration’ takes on different positive and negative meanings, which shape disparate intentions for how such ideas may be enacted.

Many of these definitions frequently appear incompatible, yet interlink with upholding a competitive local climate that devalues trust-building. For example, transactional notions linked to smaller engineering consultancies prohibit the enactment of collaboration as a communication upheld by larger organisations. The enactment of collaboration as a strategy of acquisitions and mergers by larger conglomerates drives the perception and enactment of collaboration as a forced negotiation and ‘restrictive’ enactments held at smaller organisations. This is realised in practice by the reactive chaining together of smaller companies to bid for larger project tenders, but this practice is rejected as ‘non-collaborative’ by larger companies. In evaluating these notions together, disparate terms and enactments lead to an overall rejection of the term collaboration as holding any tangible connotations other than an industry buzzword.

This position is reflected in existing industry publications. Earlier, we mentioned the wood report – a document discussing necessary strategy for economic recovery of remaining UKCS hydrocarbon reservoirs [12]. This document contains forty-eight separate references to inter-organisational collaboration. By way of brief examples, page fifteen defines collaboration as “a core strategy”, necessary to provide “[collaborative]

influence between operators on exploration, field development and infrastructure [to] enhance revenue for the UK” (p. 15). On page eighteen, it is proposed that “through an increase in industry collaboration on cluster developments” the shortfall in production efficiency, loss of key infrastructure, and the abandoning of stranded assets “may be reversed” (p.18). Page twenty-five suggests that:

“Little collaboration has yet been achieved in terms of field and infrastructure development. Infrastructure, both managing ageing assets and securing the necessary investment in new assets is perhaps the UKCS’s most significant Achilles heel and [a] new regulator must be empowered to achieve significantly better collaboration here”. (p. 25).

Collaboration is positioned as a necessary practice for UKCS economic progress and commodity recovery. However, as within CoAx and SES, a singular working definition of collaboration is lacking. Findings suggest scattered definitions present in ethnography are propagated by industry documents. The stratification between different meanings clearly prevents collaboration from taking hold within the present industrial landscape of Aberdeen. While on paper ‘collaboration’ as a descriptive phrase is employed to conjure connotations of mutual benefit, profit-share and economic recovery, these actions are largely curtailed by the absence of any tangible meaning, instruction, or guidance for these practices as anchored to definable usage of the term.

4.3 Trust

We have already discussed local cultural climate as a barrier to formulating effective interpersonal trust-based ‘collaborative’ links between different local oil & gas organisations. However, it is important that we relate these findings back to the existing literature on local trust-based organisational collaboration.

Collective consensus regarding organisational trust can be conceptualised by prioritising the development of meso-level trust relations within organisations as a necessary starting point for effective intra-organisational collaborations [35]. Positive, trust-based cultural practices allow for open sharing of information, transparency of aims and objectives, and prioritisation of mutual benefits [27]. This is the position taken by much local research on collaboration in Aberdeen. The presence of such factors is suggested to encourage innovation [41], close “win-win” partnerships [39] (p. 181), lasting collaborative and financially positive business relations [16, 17, 24, 31], and positive interpersonal friendships [17, 56]. However, framing these ideals through the thinking of Khodyakov [36], such organisational relations are positioned as assumptively defining a local macro-level cultural landscape characterised by high levels of *thick* (i.e. established and secure) interpersonal trust. This is despite such observable notions and practices remaining

localised to institutional micro and meso organisational levels where trust may readily be destabilised by shifts in wider macro climate.

Our ethnography exemplifies such shifts. Most significantly, the local industrial climate of Aberdeen previously resembled a landscape where thick interpersonal trust was normative of organisational negotiations. This was defined by a ‘plenty for all’ culture, where oil price was high, competition framed as ‘good natured’ and IP protections were less stringent. However, growing uncertainty regarding an oil-driven future, continued drops in the price of Brent Crude North Sea oil, and a significant ‘thinning-out’ of different oil & gas operators, drilling contractors, sub-sea engineering organisations, and support service organisations heralded a revaluing of the playing field upon which local relations that facilitate or constrain collaborative practices are enacted. To this end, local culture may be conceptualised less as consisting of thick, macro-level trust relations that comprise a network of established and particularised emotional bonds, certain outcomes, and strong personal, financial, and group-oriented ties [36]. Instead, we move to suggest the local cultural climate of Aberdeen’s oil & gas industry largely is now best characterised by macro-level *thin* trust relations, comprising weak and fragmented social ties between organisations and individuals. This climate lends to uncertain outcomes for partnerships, distanced social relations, and a revaluing of transparency and openness as the most desirable local currency for facilitating collaborative relationships. Khodyakov

[36] suggests the macro-level presence of such climate fosters only sporadic access to resources, devalues generalised trust, and inhibits organisations from working together. While this is largely the case for many remaining sub-sea organisations in Aberdeen, some larger consultancies have adapted to weather this storm. Adaptation consists of an early recognition that rare practices of transparency and openness are the most valued as new foundational constructors of organisational trust. For this reason, such adaptive organisations flourish under the present competitive climate, as they possess the most desirable contextual capital that lends to translations of financial stability, market growth, and acquisitions of less-fortunate, and it must be said - less able to adapt - organisations.

4.4. Suggestions for overcoming barriers

Drawing on the ethnographic findings that support this study, we make tentative suggestion for ways that organisational collaboration, in a difficult local climate may be improved. Most notably, existing collaborative policy definitions require refinement. As we discuss earlier, local policies introduce varied and conflicting definitions of collaboration that ‘play into’ the collective local industrial perception of ‘collaboration as a buzzword’. Reversal of this trend requires a concentrated (and cooperative) local industry effort to redefine and reclaim the term collaboration as a functional descriptor to describe the enactment of desirable local relationships that respect IP protection, factor

mutual profitability, and describe cooperation divorced from the end goal of organisational acquisition or IP transfer. Given the rich data from participants at the forefront of subsea operations, such a definition may be best approached through developing formal cooperative policies.

Significantly, creation of cooperative and collaborative policy should focus less of defining the descriptor collaboration, but instead concentrate on defining processes of collaboration that factor the above protective provisions. This may be achieved through the construction of a collaborative steering group that includes both representatives from large, and small subsea engineering organisations. The goal of such a group is to ‘work the problems’ of restrictive culture, exploitative ‘forced’ collaboration, and the ‘catch-22’ of ‘shielding’ IP protection. With success, participating parties may move to ‘test’ collaborative partnerships over small shared projects. If such mutual relationships become normative, it is reasonable to expect the local climate of *thin* uncertainty and distrust for cooperative partnerships may begin to dissipate, as multi-level *thick* organisational trust links are again increasingly established within both macro and micro-level organisational interactions at different industrial levels, as these relationships yield mutually positive industry outcomes [11, 36, 38].

4.5 Limitations of this research

Results reported are dependent on the interactions between the two different subsea oil and gas organisations studied. Organisations are archetypal of similarly sized corporations local to Aberdeen. Both employ predominantly men in technical roles, engage in competitive bidding for projects that lend to financial profits, and remain acutely aware of the present limitations and pitfalls of inter-industry cooperative partnerships. It is clear from our lengthy ethnographic research and analysis that further research should be conducted. This should focus on defining organisational collaboration from the perspective of multi-dimensional understandings of trust – something few present studies approach. Future studies may wish to replicate our ethnographic methodology, while examining differently structured organisations (i.e. interactions between two small or two large partnerships). This research design may also be useful for examining other industries undergoing similar cultural and economic reformations to Aberdeen's local oil and gas sector. However, we acknowledge the uniqueness of the heavily gendered nature of UKNS energy operations. While the presence of multiple different and distinct cultures of masculinity have previously been explored within Aberdeen local offshore energy bubble [57], we recognise this onshore-based research frames industrial collaborative practices through a somewhat homogenous male lens. However, this perspective is less to do with selective methodological sampling, and more

reflective of actual industry demographic. We suggest that despite this perspective, our study develops existing energy discourse by considering alternate stances on understanding industrial energy collaborations via novel methodology, trust, and cultural considerations.

5. Conclusion

This research has explored linkages with the literature on changing industrial notions of trust and demonstrated how such restrictive notions are embedded in North Scotland's shifting local energy climate. Local sub-sea engineering organisations in Aberdeen 'collaborate and die' via three interlinked mechanisms. A prevalent local competitive climate of distrust ultimately prevents collaboration until organisations financially fold. Concurrently, local competitive climate throttles collaboration potential through prioritising intellectual property as a primary commodity – creating a stalemate situation. Finally, local climate sometimes forces small consultancies to 'collaborate' by "cashing in on" some their available intellectual property, resulting in death-by-acquisition from large – catch all – global conglomerates. Most existing literature exploring collaboration espouses the importance of trust, interpersonal relations, and mutual gains. However, the importance placed on these factors rests upon scholars considering trust as simply defined: a unidimensional, stable and ever-present construct. Studies prioritise

questionnaire methods, short interviews and distanced modes of analysis. What links existing research is a lack of exploration for the influence of overall local culture as shaping collaboration understandings and enactments, and how such notions interlink with more nuanced notions of trust. Unlike much existing research, our study developed new knowledge through a short, focused ethnography that prioritised examining the local-cultural context within which any ‘collaborative’ notions and practices play out. Our findings demonstrate that while collaborative partnerships within Aberdeen’s local oil & gas industry are suggested as readily accessible to organisations, this thinking is predicated on assumptions of inherently high levels of macro-local *thick* trust. In opposition, this study demonstrates the impact of a shifting local trading climate towards a culture of competitiveness, now best defined by inherent high levels of macro-local *thin* trust. Such a climate largely prohibits collaboration due to facilitating cultural norms of IP protection as of immediate importance for survival, and fragmenting understandings of ‘collaboration’ into a myriad as different definitions linking to different meanings and intentions. Such norms render it extremely difficult for oil & gas organisations of same and different sizes to form lasting and secure trust-based relations.

Future studies should benefit from employing focused ethnography to examine industrial collaboration. Researchers can move towards examining local-cultural climate within which trust-relations play out as a point of key importance for understandings facilitators

and barriers to organisational partnering. In particular, we uphold the merits of exploring trust as multi-dimensional, and linked to multiple societal and organisational levels as a necessary perspective to understand the linkages between local cultural climate and industry collaboration. This approach lends itself to growing scholarly understandings of local-industrial collaboration, begins to update academic literature to reflect real-life practices, and approaches practical policy-centred suggestions for fostering future collaborative progress.

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