

Understandings and practices of ‘collaboration’:
An ethnography of two disparate sub-sea engineering
organisations in Aberdeen’s oil and gas sector



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1. Introduction

This report presents findings from a 6-month research project that examined collaborative practices in subsea engineering companies in the Aberdeen-based oil and gas sector. The aim of the project was to understand, through ethnographic research, what constitutes collaboration in a range of oil and gas organisations and to identify the barriers to collaboration in marginal field developments in the UK Continental Shelf (UKCS). It was conducted by researchers in the School of Applied Social Studies at Robert Gordon University Aberdeen.

While collaboration has been a ‘buzzword’ in the UK oil and gas industry for at least two decades, the most recent downturn in the industry and the need to improve efficiencies in a very mature basin have once again brought discussions about the need for collaboration to the fore. The 2014 Wood Report identified collaboration as one of the key capabilities that the oil and gas industry needed to develop in order to maximise economic recovery (MER). The Oil & Gas Authority (OGA), which was created in response to the Wood Report, consequently focuses on collaboration as a key element of its Stewardship Expectations and has developed a number of tools and indicators in order to develop what it calls a ‘culture of collaboration’. As our review of policy documents and industry reports, undertaken as part of this study, demonstrates, the terminology of collaboration is generally employed in a way that corresponds with widely used definitions in the academic literature – as mutually beneficial relationships entered into to achieve common goals.

However, there is presently not adequate knowledge about the nuanced specifics, dynamics and complexities of (collaborative) relationships in the subsea sector and how partnering organisations define and enact collaboration in practice. 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 and gas firms. Use of this method, with the rich, deeply contextual data it has produced, makes an important contribution to the literature on collaboration in oil and gas as well as to the existing industry research. Both 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 was 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.

This ethnographic study is the stand-alone second phase of a wider project on Conflict and Collaboration in Oil and Gas, funded by the Oil and Gas Technology Centre and undertaken by a team of researchers from Robert Gordon University Aberdeen (RGU) and the University of Manchester. The first research phase involved semi-structured interviews with senior professionals in the oil and gas industry in Aberdeen, which sought to examine collaboration and standardisation in the UKCS. When designing the ethnographic research, we built on these initial insights, but seeking to develop more situated, in-depth knowledges of people's and organisation's *practices* – what they do – that cannot be captured solely from interviews, which gather *what people say they do*.

In this current study, conducted solely by RGU between December 2019 and March 2020, one research team member undertook ethnographic work in two very different sub-sea engineering organisations in and around Aberdeen City. Participants were both observed and interviewed in their natural work setting. A total of 220 hours of ethnographic data were collected.

In what follows, we present the findings from this ethnographic study. The subsequent section discusses the value of ethnographic research in understanding collaboration practices, before providing an initial description of the two subsea engineering firms in which ethnography was undertaken. Section 3 reviews the academic literature on collaboration, particularly focusing on supply chains and the oil and gas sector. It then discusses how collaboration has been defined and sought to be measured by industry and regulatory bodies involved in the UKCS. Section 4 discusses the ethnographic data gained from the two organisations and develops a typology of collaboration, highlighting the diverse ways in which collaboration is both conceptualised and enacted in local practices in the sector. Our typology, drawing on detailed ethnographic evidence, distinguishes between the following distinct understandings and practices of collaboration:

- collaboration as transaction
- collaboration as communication
- collaboration as forced negotiation
- collaboration as restrictive
- collaboration as a strategy
- rejection of collaboration

We build on this typology to identify, in Section 5, three key barriers to collaboration: the relationship to risk-expose a company has and which type of collaborative understanding and

approach it has adopted; an industry-wide climate of competitiveness; and levels of trust within and between companies. Given the increasing policy attention to an energy transition towards renewables, we reflect, in Section 6, on how the insights we developed in this study might shape collaborative practices in the future. Finally, we put forward three recommendations in Section 7:

- further research with marginal field operators into collaborative practices, to add to the insights gained from ethnography with subsea engineering companies;
- further research and subsequent resource investment into skill transfer, and what facilitators of, and barriers to, skills transfer exist in the Aberdeen-based energy sector to enable the energy transition that has become one of the strategic priorities for local and Scottish governments; and
- the establishment of a multi-disciplinary steering committee on collaboration between large and small organisations.

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2. Methods

2.1 Introduction

As noted above, this ethnographic study follows on from an earlier project, in 2019, on Conflict and Collaboration in Oil and Gas, funded by the Oil and Gas Technology Centre and undertaken by a team of researchers from the University of Manchester and Robert Gordon University Aberdeen. The initial research phase involved semi-structured interviews with 18 senior professionals in the oil and gas industry in Aberdeen, which sought to examine collaboration and standardisation in the UKCS. Based on these interviews, a range of barriers to collaboration in marginal field development were identified: competition, financing, low levels of trust, temporalities of collaboration and short-term-term thinking, leadership and culture, regulation and lack of measurement, and a “culture of bespokeness”. The detailed findings of this phase of the study can be accessed in the full report.¹

When designing the ethnographic research, we built on these initial insights to develop questions and themes that could guide our observation research and provide situated and more in-depth contextual data on the practices of collaboration in organisations. The resulting guiding themes were:

- Collaboration (meanings; how is it spoken about; role of individuals in obstructing or supporting collaboration; how is it measured; how is it shaped by the notion of an energy transition; what are best practice examples of knowledge sharing, efficient systems and processes)
- Aberdeen-unique cultural properties of collaboration (how people talk about the sector and Aberdeen; place-based identities. In what ways are perceptions shaped by material and symbolic OG infrastructures. What shared identities exist between employees; Temporal/generational/spatial)
- Trust (definitions; different levels - e.g. within team, within company, between companies; levels of interactions between employees; what behaviours associated with trust; what values exist in the company / in teams; defining leadership attitudes and behaviours)

¹ Conflict and collaboration in oil and gas: a social science perspective. In-depth report – Phase I, August 2019. Available from: <https://www.theogtc.com/newsroom/publications/2019/conflict-and-collaboration-in-oil-and-gas-a-social-perspective-report-phase-1/>

- Temporalities of collaboration (temporal dimensions of projects; pace of projects and how different people talk about them; times of speeding up of actions/slowing down and who is responsible for them, how are ‘project times’ shaped by environmental factors and political and economic pressures).

We now set out the value of ethnography as a social science method in general and of condensed organisational ethnographies in particular.

2.2 Condensed organisational ethnography

Ethnography is well established as a fundamental knowledge gathering practice within the social sciences (Fetterman, 1998; Gobo and Marciniak, 2011). Developing from reflexive approaches to anthropological research, the methodology represents an immersive approach to community observation and participation. This aims to allow a researcher to come to know the subjects of study and their cultural behaviours with a degree of depth and clarity uncommon with transient or distanced research study models (Brewer, 2000), such as quantitative survey or qualitative interview methods.

Traditional ethnographers often spend long periods of time immersed in their chosen location or community of study. This has led some scholars to suggest the measure of a successful or legitimate ethnography is the amount of time spent in a native research environment (Brewer, 2000; Delamont, 2004; Hammersley, 2006). However, this thinking often eschews considerations for the robustness of analysis and the quality of data collected during fieldwork. Recent theorising of modern ethnographic methods suggest that prioritising time spent in an environment alone may incorrectly simplify the ethnographic paradigm as solely suiting longitudinal research strategies (Hammersley, 2006; Turner, 2000; Van Maanen, 1979). Some theorists have suggested this may encourage researchers exploring locales where only limited access is possible to avoid ethnographic methods in favour of case-study or questionnaire approaches (Beatty, 2011). This is due to a belief that any ‘shortened’ ethnography may be perceived as less legitimate or incomplete (Brewer, 2000). In contrast to these perspectives, a different set of scholars uphold that with appropriate research design, short ethnographies can be highly successful.

Smith (2005) posits that the social and practical configurations of modern institutions often prohibit the long embedding and participant study typical of traditionalist ethnographies. This thinking is well evidenced in contemporary organisational ethnographies (see Alcadipani and

Hodgson, 2009; Bargiela-Chiappini, 2007; Shenton and Hayter, 2004). In response, she 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). Crucial to Smith’s approach is that the ethnographer reflexively considers their own professional expertise and social position relative to the chosen environment of study. For example, Smith’s theorising suggests that as an engineer studying engineering practices, the researcher may carry with them to the ethnographic locale a priori knowledge that shapes and structures their future contextual theorising of language and observations. Thus, any enhanced understandings or similarities between researcher-participants may unconsciously shape predispositions for analysis and inference. However, expertise may benefit condensed ethnographies in ways that hinder longitudinal projects. Smith posits that researchers with local expertise pertaining to sites of ethnographic study should focus on the linguistic exchanges of social actors as the primary pathway to defining how social relations are constructed and play-out. She suggests: “Language is the key to the ethnographic discovery of how institutions are coordinated” (p. 4). Rather than adopt a quasi-distanced approach that seeks to separate any prior conceptions a researcher may hold, scholars should openly document their past understandings, theorising, and local-social position within the site of study. They should consider how these factors inform their local ethnographic focus in an institutional workplace. As opposed to claiming any objectivity in observational analysis, Smith suggests:

“Using institutional ethnography as a method for realising an alternative form of knowledge of the social, a form in which people’s own knowledge of the world through their everyday practices is systematically extended to the social relations and institutional orders in which they act” (2005, p. 4).

Through employing this thinking, 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.

Similar to Smith (2005), Millen (2000) and Pink and Morgan (2013) both position short-term, yet “intense and focussed” (Millen, 2000. p. 23) ethnographies as useful and legitimate for institutional locales where long-term research access is problematic. For Millen (2000), this approach is termed “rapid ethnography”. Millen discusses the increasing difficulties researchers face to negotiate access to modern, technological workplaces. In part, barriers to

access frequently take the form of formal safety policy and concerns over safety for non-workers in these environments. Suspicion for the role of the ethnographer as a potential 'leak' point for intellectual property and manufacturing patents are also factors that may play a role in deciding upon limiting access time. However, Millen suggests a viable work-around for short-term researcher access. Rather than attempt to renegotiate or extend study time in environment, he suggests time-limited ethnographic strategies for "time deepening" (p. 281).

Akin to Smith's institutional take on ethnography, time deepening involves the researcher developing a short, but concentrated understanding of a small and immediate group of workers, located in a chosen site of study. This is the approach taken in this ethnography of two sub-sea engineering organisations. Smith (2005) suggests researchers must acknowledge the inability to intrinsically separate their own experiences and knowledge from the process of observational data collection. Millen (2000) also acknowledges this, however unlike Smith's rejection of any objectivity in institutional ethnography, Millen suggests that an informed balance may be attained by a researcher developing a contextual framework beyond their own understandings and expectations of findings. This maintains an inductive ethnographic standpoint, yet broadens any intrinsically held beliefs with the introduction of new knowledge. As opposed to this approach generating a fixed-perspective to narrow the ethnographic lens, this thinking attaches new possibilities and perspectives to what may be discovered. This new knowledge gathered by the researcher is employed to inform existing ethnographic measures. Millen positions that any enhanced understanding for the environment of study and purpose of work shapes "more focused observation, better selection of informants [and] greater informant interactions" (p. 284).

Pink and Morgan (2013) develop this thinking further. Like Millen, they suggest that any connotations of shortened ethnographic practices as "quick and dirty" (p. 352) or "superficial" (Knoblauch, 2005. p. 16) routes to knowledge are anchored in misunderstandings of the science. Instead, they posit that appropriately developed short-term observational methods result in "forms of intensity that lead to deep and valid ways of knowing" (p. 352). By way of combining the sentiments of Smith (2005) and Millen (2000), Pink and Morgan put forward a framework of *qualities* that represent how researchers may *do* a short-term ethnography. This consists of four particulars for collected knowledge. These are: the intensity of the research encounter; a focus on the details; the Ethnographic-Theoretical dialog; traces of the ethnographic encounter.

2.3 Condensed organisational ethnography in Aberdeen's subsea sector

A combination of these well-evidenced scientific research methods was utilised to conduct ethnography for this study. Ethnography was undertaken at two sub-sea engineering organisations in and around Aberdeen City. Participants were both observed and interviewed in their natural work setting with a minimum of disruption to daily activities. Staff at both organisations were asked predominantly to draw on their experiences within these specific firms. However, as participant lived-experience is an evolving and iterative process, participants were also encouraged to discuss their experience of working in other sub-sea organisations servicing the UK Continental Shelf (UKCS). This was to establish a broader picture of the evolving norms and values that shape contemporary collaboration practices and how these are formed. This perspective was also used in keeping with the above methodologies to develop a richer tapestry of participants' lived experience within the shortened time-frame available for embedded research. A total of four weeks was spent at each organisation. Combined interviews and observations totalled 220 hours of ethnographic data.

Drawing upon the ethnographic methodologies of Smith (2005) and Millen (2000), it was decided that from our research team, Dr Nick Adams would conduct the practical and 'intense' ethnography of the two sub-sea organisations. This was largely because of Nick's established practical and past background working as a practitioner of industrial and organisational psychology within onshore, and offshore hydrocarbon and drilling climates. Past knowledge and understandings of processes, people, specific technical terms, and local organisational cultures must be acknowledged as lending an 'insider' quality to such short and intense ethnographic research. This is a significant benefit of this approach and represents an effective pairing between researcher and research locations. Commonly researchers arrive at industrial sites of study with little prior knowledge of the worksite, peoples or place (Smith, 2005). Lengthy imbedded ethnographies allow for countering of this shortcoming. Researchers with the luxury of time can become acquainted with specific terms and processes, ways of life, and technical wording over time. However, this thinking lends less time to collecting practical ethnographic knowledge, and more time learning about industry specifics to effectively gather data. This approach is less possible within 'short and sharp' and 'intense' ethnographies. This is because of short-time constraints, busy workplaces, and a naturally restrictive window of time for which a researcher may spend within institutions. Therefore, a priori knowledge of industry, place and peoples actively allowed for ethnographic research to begin immediately at

a ‘fast-pace’. From day one of embedding with the first organisation, interviews and observations were conducted, and data-analysis began. In keeping with Smith (2005), and Pink and Morgan’s (2013) notions of rapid ethnography, time spent within these institutional locales prioritised in-depth interviews focussing on the details of specific inter-organisational collaboration practices. Coupled with all-day and ongoing observations, this realised scholars’ notions of ‘time depending’ and ‘intense’ data-collection that represents hallmarks of successful short-term institutional research. The success of this approach is defined by the quality of data collected and analysed in the following sections.

2.3 Context to the two organisations

This section provides some brief context and background to the two organisations studied for the purposes of developing this report.

2.3.1 CoAx Energy

The first organisation, CoAx Energy² was a small sub-sea engineering establishment. CoAx operates as a consultancy, offering sub-sea engineering services to oil and gas operators and organisations. The organisation consisted of approximately twenty workers. Although small, CoAx staff predominantly comprised of established experts in sub-sea engineering. Many engineers had over fifteen years’ experience in UKCS design and implementation operations. Most were masters-level educated, with some holding PhD qualifications. Past successful projects involved the design of recovery equipment, pipeline, transfer, and extraction utilities, as well as pipeline integrity testing and modelling. The age of the organisation was approximately eight years. However, at least (approximately) eight of the senior engineers at CoAx had worked together on previous projects. Several staff had known each other for around twenty years. In addition to a contingent of around eight senior engineering staff, the organisation employed approximately four recent graduates. CoAx also holds satellite offices in several non-UK locations, including Norway and Asia.

Notable for such a small organisation, CoAx retained an impressive research and development portfolio. Research focussed on the design of novel solutions for existing North Sea recovery

² CoAx Energy is a pseudonym.

issues, including several bespoke and desirable technologies to improve client recovery projects.

CoAx holds a small, but significant position in the Aberdeen North Sea hydrocarbon industry. During ethnography, the organisation had several ongoing projects. These were mostly for major “Tier 1³” 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. CoAx also focussed heavily on business development. Observations included numerous meetings and negotiations towards securing future engineering projects in a variety of UK and global locations. These involved negotiating directly with prospective clients. In addition, CoAx frequently engaged in discussions with other, small sub-sea engineering outfits. This was for the purpose of bidding for larger sub-sea contracts for which their small size would prohibit a stand-alone submission to tender.

Throughout observations, efforts were made to elucidate the collaborative nature of such negotiations, and the extent formed relationships understood and enacted collaboration. Part of this process examined past collaborative efforts and external organisational relationships. CoAx frequently asserted interests in collaboration. However, the majority of their past relationships with clients resembled transactional business dynamics. The nature of how collaboration is defined within the parameters of such relations, and how relations are shaped by the oil and gas industry in Aberdeen is discussed in Section 4.

2.3.2 SE Solutions

The second organisation – SE Solutions (SES) – was a much larger engineering consultancy. SES comprised of more than 1000 employees at their primary Aberdeen site. The workplace was a sprawling campus with numerous different departments and teams working on a range of sub-sea solutions. Broadly, labour was split into four departments: engineering, technology, supply chain, and sales and marketing. In addition to the primary SES site, several other local campuses existed.

³ Tier 1 refers to a major oil and 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.

Like CoAx, SES was structured as an engineering consultancy. However, as may be expected, the scale of engineering projects and clients was much vaster. SES had numerous relationships with high-profile global operators and organisations, providing a range of critical infrastructure solutions for both North Sea, and global oil and gas ventures.

SES also had several offshoots. These organisations were owned by SES but operated under different names as separate divisions. For example, a future technology department existed on the main campus. This department developed a range of novel solutions to existing sub-sea extraction and exploration problems. This included R&D departments focussing on robotics, as well as new types of pipeline, cabling and multiple renewable energy projects.

SES is best defined as a Tier 1 contractor with a diverse set of specialisms and experience. During ethnography, it became apparent that many workers had always desired to work for SES. Employees frequently defined their time in other sub-sea organisations as “climbing the ladder”, to secure a staff position at SES. Employment desirability was also reflected in discussions with SES contractors. These workers operated at SES on a day-rate basis. However, many of these men and women expressed a desire to transfer to staff positions⁴.

SES had numerous ongoing projects, some of which were shrouded in confidentiality. While specialisms were broad, SES provide bespoke client solutions for sub-sea pipeline, cabling, and offshore drilling technical infrastructure. They also facilitate development of future technology to maximise the longevity and lifespan of existing discovered fields.

Perhaps most notable in discussing the topic of marginal field extraction with SES was the number of individuals who acutely recognised the various barriers and successes surrounding past projects. It transpired SES had conducted and funded numerous past investigations and projects involving the recovery of marginal fields, and thus were acutely aware of the issues facing extraction, collaboration, and knowledge-sharing. To this extent, the organisation may be considered expert in this area of sub-sea engineering and recovery.

SES held different understandings and practices of collaboration to that of CoAx. Most notably, the size of SES and the diversity of divisions and sub-divisions fostered a strong internal collaborative culture linked to communication, trust, belonging, and individual growth. These positive cultural definitions shaped expectation and enactments for external collaboration with

⁴ 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.

suppliers and clients. It is important to note that the operational structure of SES is somewhat unique. SES maintains both input-driver external relationships with suppliers as well as output-driven external relationships with clients. SES engineer and provide a range of outgoing solutions to many major UKCS operators. However, they also rely on an influx of engineering solutions, materials and technology from supplier companies. Therefore, their relationships resemble a liner, central position in a three-pronged development process. While SES are the donor of many technologies and solutions to many organisations, they are also the recipient from many providers. This model has interesting implications for collaboration. Most significantly, for SES to secure positive trust-based relationships with their Tier 1 clients and deliver promised solutions, they must nurture and manage supply-chain providers they are ultimately dependent upon. Implications are discussed in Sections 4 and 5.

3. Collaboration in the academic and industry literature

This section represents a review of the academic and policy/practitioner literatures on collaboration in UK oil and gas.

3.1 How collaboration is understood within existing academic and industry research

3.1.1 Introduction

Collaboration has been a buzzword in the UK oil and gas industry for at least two decades. While collaborative arrangements such as joint ventures have always been undertaken by companies in the UKCS, and partnering and other collaborative working arrangements have been adopted since the early 1990s (Green and Keogh, 2000), collaborative obligations towards maximising economic recovery (MER) were formalised in the 1998 Petroleum Act. The 2014 Wood Report identified collaboration as one of the key capabilities that the oil and gas industry needed to develop in order to achieve the objective of MER. The Oil & Gas Authority (OGA), which was created in response to the Wood Report, consequently focuses on collaboration as a key element of its Stewardship Expectations and has developed a number of tools and indicators in order to foster what it calls a ‘culture of collaboration’ (Oil and Gas Authority, Stewardship Expectations, March 2017). The most recent downturn in the industry, and the perceived need to improve efficiency, has once again made discussions around the necessity for collaboration more urgent.

3.1.2 What is collaboration: some definitions, benefits and risks

There is no definite agreement on how collaboration should be defined, and indeed, whether types of relationships between organisations that are encouraging co-operative rather than 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 (Nooteboom 1999, Nooteboom, 2003, Boddy et al. 1998).

As will be demonstrated through analysis of our empirical data later in this report, participants in the study at times used the terminology of collaboration in a blanket-fashion to discuss

different and diverse business dealings, for example standard client-contractor relationship, in which the contractor provides a service to the client for which they pay. However, potential structures for collaborative working might include:

- Separate organisations maintain their independence, but work jointly on some activities or functions
- Organisations with resources or expertise offer assistance to other organisations, e.g. a large national Organisation working with a small local group
- A new organisation to do joint work on some activities or functions
- A group structure where a ‘parent’ organisation governs a group of ‘subsidiary’ organisations
- Merger to form a new organisation working as one body on all activities.

A widely cited definition of collaboration is as ‘mutually beneficial and well defined relationship entered into by two or more organisations to achieve common goals. The relationship includes a commitment to: a definition of mutual relationships and goals; a jointly developed structure and shared responsibility; mutual authority and accountability for success; and sharing of resources and rewards’ (Mattessich and Monsey 1992). In relation to supply chain collaboration, Macbeth (1998) 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’ (cited in Boddy, Macbeth and Wagner 2000). Scholars distinguish between vertical (sourcing and distribution within the supply chain), horizontal (between competitor firms in the same industries) and lateral (between firms in different industries) collaboration (Nooteboom 2003).

In relation to supply chain collaboration, which describes some of the collaborative relationships observed in this study, a review study (Hudnurkar Jakhar and Rathod 2014) distinguishes six definitions of collaboration in supply chain, ranging from those focusing on ‘cooperative strategies [...] for lowering cost and increasing revenue’ (Simatupang et al., 2004, cited in Hudnurkar Jakhar and Rathod 2014) to knowledge creation and sharing (Samaddar and Kadiyala 2006, cited in Hudnurkar Jakhar and Rathod 2014) to the successful interaction of entities in a chain to provide the necessary coordinated outputs (Kampstra et al., 2006, cited in

Hudnurkar Jakhar and Rathod 2014). 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 (Faulkner 1995, Porter 1980, both cited in Boddy, Macbeth, & Wagner 2000; Hudnurkar Jakhar and Rathod 2014; Nyaga et al., 2010). Such benefits are seen to be particularly pronounced when the companies are operating in competitive and volatile environments (Boddy et al., 1998), such as the North Sea oil and gas sector.

However, despite extensive 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 (Turnbull et al., 1993, cited in Bobby, Macbeth and Wagner 2000). Additional risks of collaborations relate to knowledge leakage and the possible misappropriation of the created value (Henttonen Hurmelinna-Laukkanen & Ritala 2016).

3.1.3 What enables and drives collaboration?

A large number of factors might be seen to impact on the success of collaborations, relating to environmental, cultural, individual, structural and communicative challenges (Mattesich and Monsey 1992). 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
- (Mattesich and Monsey 1992)

Trust

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 (Hudnurkar Jakhar and Rathod 2014). Trust is defined as a willingness to rely on an exchange partner and can be understood as the by the belief that a collaborator will not indulge in opportunistic behaviour (Chen et al., 2011). Within business and management studies and drawing on psychological dimensions of trust, Costigan et al., (1998) 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 (2007) 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 (Ellonen, Blomqvist and Puumalainen 2008). It is strongly shaped by previous collaborative experiences. Blomqvist, Hurmelinna, and Seppänen (2005) 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. The difficulties in building trust with relation to forming effective collaborations, and linkages between trust-building and Aberdeen's local oil and gas culture of competitiveness are discussed in detail in Sections 4 and 5.

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 (Crabtree, Bower and Keogh

1997). 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.

3.1.4 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 in 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 the corporate governance and company policies that promote collaboration to happen in a certain way. However, for collaboration to be successful it also needs to 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 and gas sector in Aberdeen, there are a variety of relationships ranging from competitive to collaborative and supplier-customer, which means that managers have to 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 (Henttonen Hurmelinna-Laukkanen & Ritala 2016). 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 Hurmelinna-Laukkanen & Ritala 2016) found that firms that had strong mechanisms for 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. co-opetition). Moreover, strong IPRs, contracts, secrecy, and lead time were connected to R&D collaboration with suppliers. Crabtree, Bower and Keogh (1997) argue that these multiple roles and relationships can increase conflict between companies and renders personal relationships important, making key individuals in organisations more central to collaboration than company practices.

Given this centrality of personal relationships and leadership, it is then important to look at individual attributes that are seen as essential to effective collaboration. They include: strategically minded; team-orientated; good communicator; open to sharing; creative/innovative; empathetic; believing in collaboration; good listener; behaving ethically; and leadership (Chakkol, Finne, and Johnson 2017).

3.1.5 Collaboration in Aberdeen and Aberdeen's local oil and gas sector

The small amount of literature that exists on collaboration in UK oil and 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 examined collaboration and conflict in the Aberdeen-based oil and 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' partnership'' (1997: 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' (1997: 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 being contracted out to their employer's (usually a contractor'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' (ibid: 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 (1997, cited in Green and Keogh 2000) views collaboration more positively and identifies a number of characteristics of collaborative relationships between oil companies and

their contractors: they are long-term (5 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 28 factors affecting supply chain collaboration in the UK oil and gas sector, drawing on questionnaires with senior UK oil and gas employees (Haque Green and Keogh 2004). The success factors are in line with the wider consensus on what makes a successful collaboration discussed earlier (see e.g. Mattesich and Monsey 1992): trusting attitudes; shared or aligned goals and objectives; open behaviour; shared knowledge; clear roles within relationship; commitment to the relationship from senior managers; but also identifies the presence of an integrated team, without inter-company boundaries, as a success factor. Integrated team are viewed as beneficial as they avoid duplication of roles, with team members chosen on merit rather than company membership and can enable ‘face to face’ communication in one shared physical office space (Green and Keogh 2000).

A later study of innovation and collaboration among small and medium size enterprises (SME) in Aberdeen’s oil and gas sector draws on surveys and some additional interviews (Cumbers, MacKinnon and Chapman, 2003). It 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’ (ibid: 1704).

3.2 How local industry, local surveys, and regulatory bodies conceptualise collaboration

General efforts to conceptualise collaboration at a local level have been evidenced within some UKCS regulatory research on working policy and practice.

Perhaps most notably, the HSE (Health and Safety Executive) have developed several sets of guidelines on effective collaboration over the last five years. This is in addition to literature heralding collaboration as a necessary and central objective to achieve productivity, safety, and industry stability moving forward to a new industry climate. However, within such documentation the term collaboration often appears to represent different meanings relative to different contexts.

For example, the 2019 HSE Health and Safety Report (HSE, 2019) contains four distinct references to collaboration, each defining a necessary practice to achieve a different goal. Firstly, “intense cross-industry collaboration and co-operation” (p. 4) is referenced as essential to reduce hydrocarbon emissions on offshore assets. On page thirty-nine, “good collaboration” is employed as a descriptor to define negotiations between operators and the regulator. This is to solve the issue of platform cover by ERRVs (Emergency Response and Rescue Vessels). On page forty-three “close collaboration” is employed to define relationships between OGUK⁵ regulator-external support groups and organisations working to improve UKCS operations. Finally, towards the close of the document, the relationships between HeliOffshore⁶ and OGUK is defined as a “collaboration” (p. 43).

Relevant for these definitions is that in each case, collaboration is employed to define a working relationship through which a mutual goal is expected to be achieved. Nevertheless, what remains unclear are the nuanced specifics of each relationship, how negotiations are understood, and perhaps most importantly, how each partnering organisation defines and enacts collaboration in a manner that is mutually recognisable within this conjunction.

This obscurity is replicated in some more specific uses of the term. In 2019, Oil and Gas UK provided a compendium of information on industry collaboration collected over the last six years (OGUK, 2019). The most cited of these is The Wood Review, published in 2014 (See Wood, 2014). Included within scope is an address for the industry-wide issue of achieving successful economic recovery of current hydrocarbon reservoirs. These are located as stranded, underexplored, or marginalised UKCS fields. Forty-eight separate references to inter-organisational collaboration are contained within the document.

By way of brief examples, on page fifteen collaboration is defined as “a core strategy”, necessary to provide “[collaborative] influence between operators on exploration, field

⁵ Oil and Gas UK, a trade association for the UK offshore oil and gas industry.

⁶ The global helicopter travel association that governs UKCS travel between onshore and offshore.

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 suggest 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).

Notable of The Wood Report is that collaboration is positioned as a necessary practice for UKCS economic progress and commodity recovery. However, a singular working definition of collaboration is lacking. It is entirely conceivable that practices of collaboration within different UKCS sub-sector such as subsea engineering, drilling, production, survey and pipeline operations represent disparate phenomenon, existing as unique notions for the separate UKCS sectors. Such diverse understandings may have various attached conceptions, processes, and goals. Thus, while the goal of bringing together such organisations is recurrently defined as problematic, this may be largely resultant of contrasting local interpretations for what constitutes a collaborative relationship. This is a point consideration discussed in detail throughout this report.

The above sentiment is mirrored in the 2017 UKCS Upstream Supply Chain Collaboration Survey (OGUK 2019). The Survey collected data from more than 150 operators and suppliers working within and servicing the UKCS. Analysis outcomes employ quantitative metrics and Likert-scale modelling to index collective collaboration behaviours in the overall industry. Key findings for 2017 indicated a rise in the Collaborative Index Score from 6.6 in 2016 to 7.1 in 2017. Further, 95% of UKCS operator-scoring indicated collaboration as an integral part of day-to-day business. 43% of survey participants scored their collaborative engagements as successful.

While these statistics are encouraging, it is unclear if definitions used by survey organisations are comparable. For example, within this 95% statistic, it is not known how many of these relationships represent efforts where mutual gain is defined as the primary outcome. Nor is the nature of such collaboratively-defined relationships known, or their origins for development. A majority of these relationships may have been transactional in nature, some may have been development focussed, others still may represent compartmentalised project deliveries

involving sub-contracting. An additional point of significance is the total absence of any qualitative data elucidating upon how the successes of such collaborative ventures were defined.

OGUK employ these results as a marker of demonstrating shifts in collaboration practice from an aspiration to a reality. However, the tangible reality of how collaborative enactment occurs, and what specifically makes any existing collaborative efforts successful remains elusive given the present available data.

4. A typology of collaboration in North Sea subsea oil and gas

This section represents the main body of research findings. After a review of the academic and policy/practitioner literatures on collaboration in UK oil and gas, the different understandings and notions of collaboration that were identified during ethnographic research are presented and discussed. These definitions range from notions of collaboration as a transaction, to understandings of collaboration as dependent on effective communicative practices and styles. Conceptions of collaboration as a forced negotiation, a narrow, restrictive practice and a reactive strategy to Aberdeen's local industry climate are also evaluated. Finally, considerations for local rejection for the term collaboration are presented and examined.

The importance of collaboration is well evidenced in existing academic and local industry publications. However, neither body of work currently provides a tangible example for how collaboration is understood or enacted locally between UKCS sub-sea oil and gas engineering organisations in Aberdeen City. Presently, this research gap prevents construction of a more nuanced 'social science' definition of collaboration. This knowledge is essential to better understand the concept, and ensure any future collaborative initiatives planned or developed factor-in the multiplicity of definitions sub-sea organisations attach to the term 'collaboration'. The following section explores ethnographic data from CoAx and SES to describe how collaboration is both conceptualised as wider notions of understanding, and 'done' as local practices.

4.1 Collaboration as a transaction

Our research produced data that suggests that collaboration practices often resemble a process of transaction. This perception was linked to smaller sub-sea companies, as opposed to larger organisations.

Within small sub-sea consultancy operations, participants often described successful business relationships as "enacting collaboration", "being collaborative" or "how we do collaboration". Success was defined primarily in terms of positive profit margins from completed contracts. Such definitions were anchored less to mutually successful business ventures. Instead, descriptors were employed to represent single-sided organisational successes resplendent of high profitability and lucrative contract delivery.

Significant is that these definitions were used in a blanket-fashion to discuss different and diverse business dealings. At times, relationships appeared to foster some traditional components of collaboration prevalent in literature. For example, trust, communications, and shared knowledge. This was most clear in observations of meetings and video-conference calls and negotiations. However, at other times relationships appeared to form a more negotiation-centred structure, where the structuring of potential profits resembled the central focus.

Participants provided insights into these definitions and how these notions are formed. In discussion with several senior engineers, this transactional concept of collaboration was understood as anchored to the competitive nature of Aberdeen-based sub-sea contract bidding. Participants explained these notions as depending on the size of subsea companies. Smaller sub-sea engineering houses face significant risks by engaging in trust and communication-based collaborative behaviours. The most recognised barrier to facilitating trust-based communications is a requirement to protect intellectual property (IP). Small consultancies are often only able to engage in a small number of client projects at any one time. For this reason, these organisations must select their potential clients based on technical ability to deliver desirable solutions, and the likelihood of a strong financial outcome. Presently, there are many small-size sub-sea engineering houses operating in Aberdeen. These smaller institutions exist within the same local “tender pool” from which clients select a “bidder” for a specific project. Perhaps the most crucial aspect of differentiating one small consultancy for another is their local engineering experience, expertise and solution development. While successes may be evidenced from past projects and informal recommendations, the development of new, bespoke technology ranks highly as a desirable commodity. In-house technology solutions can allow for faster completion of projects, and provide novel 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.

IP protection was reflected in the reciprocal nature of transaction-led collaborations. Numerous examples were observed of exchange-based strategical negotiations in tender discussions and internal meetings. Protection was enacted as 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.

During observations, interactions between small sub-sea engineering houses often commenced with one organisation initiating contact to share knowledge of a possible bid for tender. This progressed from email to conference and Skype calls. Information transfer typically began by discussing topics such as established or likely day-rates. In addition, the topic of the broad project scope and likelihood of successful completion – on time and against budgets – was common. Conversations were structured in reciprocal fashion, with an initial company offering some information, then another reciprocating with additional knowledge. Often this knowledge centred around topics of potential profits, and for shared opinions regarding the larger client organisation who put out the tender. Importantly, the swapping of this information, is what almost all engineers working within small sub-sea organisations defined as “collaborative practices between other [small] sub-sea organisations”.

While several calls were observed, only a fraction of these moved to a further stage of arranged meetings or investigation into collaborative partnerships. The primary reason for this was a reluctance for prospective partners to share bespoke knowledge that may devalue established intellectual property. This encompassed a variety of practices. Examples included an absence of conversation regarding the level of acquired expertise pertaining to specific projects completed. Access to specific suppliers and materials were also a point of discussion which was often rapidly detracted from. Such gaps in knowledge - likely necessary for shared business undertakings - resulted in “stalemate” situations between two or more potential collaborators, with no party willing to overstep their knowledge-sharing boundaries for fear of revaluing their position within the ‘collaborative partnership’ less tenable or negotiable.

Interestingly however, there is also evidence of some of these “transactional negotiations” coming to fruition. Many engineers noted that “new work does come from these negotiations” and “lots of new business is brought about by engaging with prospective companies to work with”. Historic examples of this were readily provided, where positively defined organisational partnerships had been constructed and maintained using this guarded knowledge-transfer approach. This approach was often justified as “this is what the industry is like now”, and “everyone is swimming in the same pond, it’s important not to [associate] with the wrong organisation [i.e. one that will draw greater benefit from the relationship than it contributes]”. Despite such proposed successes, when engineers were asked to define what made these relationships positive or collaborative, participants mostly linked notions of collaboration to local, and internal organisational successes of “turning a profit”, working together to complete a client project on budget, and successfully securing a financially lucrative new project tender.

When describing these relationships in more detail, engineers acknowledged that the approach of “keeping cards close to your chest” was only successful for some transactionally collaborative ventures. Thus, essential prerequisites for considering transactional partnerships appeared to be prior successful dealings with specific organisations or, at a minimum, knowledge of past operational practices for potential transactional collaborators. To this end, the local organisational definition of ‘transactional collaboration’ represents a unique descriptor.

Most interesting at this investigatory stage was to establish how this transactional definition of collaboration had come about. The word ‘collaboration’ suggests trust-based relationships predicated on shared knowledge and organisational transparency. Smaller sub-sea organisations clearly demonstrated both a willingness and desire to realise this classical definition in practice. However, this is a difficult position to achieve currently. The most salient barrier to enacting this definition was noted as the present status of the North Sea oil and gas sub-sea market. Almost all engineers interviewed at CoAx suggested transactional definitions had arisen from the changing nature of the industry. Participants drew a parallel between historic and current competitive practices.

For example, James – a senior engineer - had worked for a small sub-sea contractor for five years before moving to CoAx. He posited that previously it was easier to work together, as there was more money. Therefore, there was less competitiveness and more inherent trust. The historical financial drop in oil price caused many small sub-sea contractors “to fold”. Alternatively, when such organisations had bespoke technology or strong IP projects, institutions were often acquired by much larger, more established sub-sea contractors with global interests and high financial stability. The resultant situation left “many smaller companies fighting over the same work, the same scraps if you will”.

James reiterated that the changing nature of oil and gas landscape in Aberdeen manufactures an increased need for a unique selling point for smaller consultancies. As such, negotiating interactions between smaller sub-sea organisations approaching a collaborative partnership can be shaped to become more transactural. This is causal from the local context within which such relationships naturally play out. Behaviours within these exchanges are structured by a requirement for each party to protect their bespoke knowledge and ideas, retain local recognition and status as a relevant and capable stand-alone organisational entity, and maintain a financial profit to continue profitable trading. Such parameters result in a reprioritisation of

the classical collaborative theme of trust, as trust enactment now represents a fundamental source of organisational instability.

Interestingly, counterexamples of enacted trust-based sentiments within otherwise transaction-based negotiations were witnessed. For example, one meeting involved an open discussion regarding financial stability, business practices, existing clients, and the likelihood and probability of attaining future work from such clients. A hallmark of another meeting featured workers openly discussing existing organisational capabilities for handling a prospective engineering project.

When I asked participants what set these meetings apart from others, I was told by workers that they “knew these people well” and “felt they could be trusted”. The way in which this trust was manufactured supports previous sentiments of transactional definitions for collaboration as locally dependent. Workers volunteered that local trust is manufactured in an “informal manner”. This is opposed to a traditional pathway of manufacture via established business relationships native to the immediate workplace. Instead, this definition of trust predates any immediate business dealings and any industry downturn. When I asked Bret, a graduate engineer, about how this trust was established he replied that these relationships were enacted differently to building trust during a negotiation. Instead, such positive negotiations involved engineers and organisations whom CoAx directors have known for a long time. Engineers had previously worked together on multiple contracts over a span of around twenty years. Thus, these historic relationships could be enacted in a format of reciprocal collaboration usually prevented by the current industry status. This was because the relationships had been formed, and trust established prior to the prevalent competitive local climate established by the industry downturn.

4.2 Collaboration as communication

The previous section discussed a transactional definition of collaboration. This norm was established within smaller sub-sea consultancies largely because of the competitive industry climate. However, interestingly, this definition was not found to be enacted as the same configuration of practices in larger organisations.

Within larger sub-sea engineering providers, the definition of collaboration frequently formed a more social concept linked to actions of openness and transparency. Many workers, when

asked to define collaboration gave characterisations that included: “being open, being honest”, “not being scared to share information”, and “talking openly, being transparent about our intentions. Both with suppliers and clients alike”. For most participants, such definitions were linked back to strong organisational culture predicated upon internal sharing of information and a global organisational norm of honesty and candour. These definitions were especially visible as practices during organisational ethnography of SES. Notably, during observations and interviews, participants frequently shared detailed accounts of their current industry operations and availability with external organisations. This was in addition to discussing openly their levels of expertise linked to specific client requests and tenders. While utmost importance was placed on maintaining client confidentiality, these markers of openness and transparency were surprising, given the converse practices observed with CoAx, the smaller sub-sea engineering organisation.

Examples were most evident within the supply-chain division of SES. Meetings and interviews both highlighted a willingness for SES staff to “talk openly” and “be completely up-front” with both organisations that supply SES with technology, and with clients whom SES supply. For example, in one observed 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 an industry currency was revealed.

Mark, a senior sales and marketing manager, who had worked at SES for fifteen years, elucidated these practices in more detail. His narrative built on previous themes of a shifting local industry highlighted by smaller sub-sea providers. Mark argued that changes in the UKCS operations following industry downturn had caused a revaluing of openness and honesty attached to business practices. Like participants in smaller organisations, he acknowledged local industry had become much more competitive, and that protecting organisational IP was a significant factor in maintaining relevance and value within the immediately local oil and gas subsea engineering sector. However, Mark suggested that a lack of openness relative to IP should not curtail principles of communicative transparency in other operational areas. He commented:

“OK, so, it may seem like we give out a lot of information. It may seem even too much at times, but this is how we do business: transparency. We are honest with our suppliers and our clients. If a supplier has a problem we want

them to talk about it [to us] so we can help [them] work it out. After all, helping them is helping us. Helping us deliver the solution to our client”.

Mark reiterated that openness enacted as communication is a key practice for fostering collaborative working. I asked him to provide an example of how this benefits SES. He explained how transparency and openness operate as currency from which to maintain collaborative relationships. Namely, this is realised through the enactment of both notions as a method of building trust. Mark exemplified working closely with a client who required use of SES drill ships in specific waters. As a part of negotiations, he shared the broad current whereabouts of some assets within the SES drill-ship fleet, with the prospective client. Mark positioned how this action was met with surprise. However, he explained that sharing was for the purpose of demonstrating that project timelines provided to clients were accurate, and that assets would have to be moved from another work location to the new client’s site of work. Such was the appreciation for this honesty, that the client reciprocated by providing new details regarding a further prospective engineering project. Mark explained that this “collaborative relationship” went on to be a long-standing partnership that remains in place still.

Significant of this example is the nature of collaboration as a social practice linked to effective communication. Smaller organisations stress their lack of openness during negotiations. This is explained as an undesirable, yet necessary product of a competitive industry climate that requires the protection of intellectual capital. However, examples from SES demonstrate the manifold nature of organisational capital. This can vary per industry perspective. Importantly, unlike smaller organisations, SES did not perceive the sharing of information to devalue their market status. If anything, transparency had a positive, strengthening effect on working with others, promoting positive business image, attracting new clients and strengthening existing relationships.

At this stage of investigation, it was important to define the limitations of this openness. The most pressing question was what factors cause larger engineering consultancies to prioritise openness and transparency as key facilitators of effectively working together.

One of the most detailed explanations came from Sam, a graduate engineer who had worked with SES for three years. I asked him how SES could prioritise openness and transparency as hallmarks of collaboration. Sam replied that the divisional nature of SES was a key organisational attribute that facilitated transparency. SES was comprised of four broad divisions. However, in addition to this, the organisation had several separate offshoots and

ownership partnerships. Sam explained that the stratification between separate departments allowed for “natural protective barriers”. Barriers refer to the level of knowledge one division or department holds over the operational particulars of another. According to Sam, knowledge at SES was largely localised. While transparency was commonly practiced between all divisions, it was deemed unlikely that someone, for example, in an engineering department, would have significant insights into the projects and workings of a sales and marketing department. Due to this design, communications between divisional departments and external clients was formally specialised to narrow areas of interest relative to ongoing projects. Clients speak to specific departments regarding definitive projects. When there is overlap between departments regarding a specific project, these communications are negotiated internally between key stakeholders from each domestic division and a multi-disciplinary team is assembled to communicate with the client.

This is a distinctly different organisational design from CoAx, the smaller sub-sea organisation where ethnography was conducted. At CoAx, the small number of staff often saw some workers engaged in multiple projects at once. Sometimes, staff took on multiple roles. For example, informally operating as key points of contact for potential clients, whilst also working on existing projects for other clients. This significant overlap between different internal operational divisions is opposite to the clear divisional lines drawn at SES.

The topic of naturalised divisions between departments arose several more times at SES. Many workers recognised the stratifications between different internal departments and how this shaped local behaviours. Most significant in discussing these relationships was a link between formal process and procedures for inter-department communications, and practices of transparency in external communications. Procedures clearly defined SES practices regarding supplier and client relationships. Broadly, protocols upheld confidentiality as paramount whilst defining a need to promote a positive organisational culture of supportive information sharing and clarity of workflow. It was clear that this culture was regularly enacted as an organisational norm. During observations, meetings were clearly structured and involved key stakeholders from each department. When supplier or clients asked questions, there was often a pause where it was decided who was best qualified to give the fullest and most encompassing answer. At times, updates involved multiple responses from different departments that offered different, yet complementary perspectives regarding ongoing projects.

Prior to each meeting at SES, a “preparatory discussion” took place where stakeholders reviewed “existing objectives, delivery goals, and forward plan”, and decided on the information that would be shared with the supplier or client. In all meetings observed, there were no objections to sharing as much (non-confidential) information as possible.

In evaluating contrasting approaches between large and small sub-sea engineering organisations, it is evident that within smaller sub-sea contractors, reluctance for information sharing hinders transparency and openness as core factors of communication. This was largely driven by concerns for devaluing local status and disturbing market potential. A practical example of this was provided by Jason, a senior SES technology engineer. He stated:

“You see it all the time with smaller companies. They don’t want to tell you anything, for fear that you’ll run away and copy their idea, reverse engineer...whatever. Same with their clients, they don’t want you to know, they think you’ll run away and contact them yourself. 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’s quote illustrates how smaller organisation’s refusal to share can hinder collaborative partnerships. However, the opposite of this sharing-resistance was observed in larger sub-sea solution providers, where concerns were minimal. Due to their size and divisional nature, larger providers observed were better positioned to facilitate transparency and openness. This was achieved by the presence of defined processes and procedures for information sharing, and the presence of dedicated and divided teams that deal with different client solutions. In addition, the well-accepted internal cultural norm of transparency as good business practice attached legitimacy to the enactment of information sharing during internal and external communications.

Important to note is that the presence of such defined and accepted procedures and practices operated to alleviate concerns of information sharing. This was highlighted by numerous participants alongside comments highlighting the embedded nature of sharing as a cultural norm. For example, one SES technology engineer stated: “Sharing is a key SES practice, it’s how we are defined as an organisation, by our openness”. A sales and marketing executive

stated: “We share as much as we can, that’s just protocol. We’ve renowned for our open approach to business. Clients respect that, suppliers respect that. It’s how we’ve built the successful relationships we currently have”. A second marketing executive posited: “Sharing and openness is part of our culture, it’s the [SES] way. We’re open with our clients and they come back to us because of this. With the industry at what it is now, it [is] key to become known for being open, being fair, and we are known for that”.

Findings reveal that smaller organisations conceptualise their primary capital as intellectual property. This requires significant protections in the current industry climate. This leads to a transactional definition of collaboration that downplays shared knowledge. However, larger organisations reframe the practice of openness itself as a primary source of industrial capital. While smaller organisations perceived the industry climate as forcibly driving less openness, larger organisations saw this as an opportunity to capitalise on the rarity of this social commodity.

4.3 Collaboration as a forced negotiation

When participants were interviewed, they often discussed collaboration in terms of negotiation. This concept was native to smaller sub-sea engineering service providers, and was dependent on their small-size and peripheral, as opposed to central, industry position. Smaller sub-sea organisations engaged in ‘forced’ collaborative practices with other small companies. This was because their small size, and often specialised technical focus, left them unable to bid for larger, complete tender projects.

Many examples of this were uncovered in ethnography of CoAx Energy. CoAx is a small, bespoke-level consultancy that trades on its expertise service. However, larger tenders for potential client projects often call for a generalised approach to engineering services. Importantly, generalisation can resemble an overarching technical approach that comprises bringing together several areas of expertise to develop a complete sub-sea project solution. While CoAx may excel at delivering one component of this solution, they are rarely large enough to deliver the complete solution package. Further, as CoAx is a small consultancy, their technical expertise may lie in areas which represent only one portion of a complete project tender. Therefore, to bid for such projects the organisation must negotiate and form relationships with other sub-sea solution providers. These must be organisations who possess

the size and skills to take on one or more of the remaining components of the wider project brief. Interestingly, participants interviewed and observed at CoAx frequently defined these conjoining relationships as “collaborative”. However, use of this term almost always included recognition that the means by which tendering organisations negotiated and communicated were driven by necessity. Thus, this collaborative arrangement could be considered a ‘forced’ enactment of collaboration. Unlike previous definitions of collaboration, this interpretation was characterised by its own unique practices and enactments. Our subsequent discussion section further expands on some of the concerns raised by the previous two definitions, namely transaction and inherent protection of IP.

Broadly the process of ‘forced collaboration’ at CoAx was enacted through three sets of negotiating practices. These were: distribution of financial costs, the organisation of work, and the use and sharing of processes and procedures. An overview of this process was provided by Simon, a senior engineer who had worked at CoAx for several years. Simon explained how negotiating compartmentalised tender agreements were a necessary component of collaboration at CoAx. He positioned that, ideally, CoAx would make efforts to bid for “smaller, and readily available” projects and contracts themselves. However, he made it clear that, increasingly, larger “end-to-end delivery”⁷ contracts were becoming more frequent. When I asked why this was the case, Simon explained that during the oil and gas downturn, many smaller companies had been “swallowed up” as acquisitions of larger sub-sea engineering organisations. This increased the commonality for large conglomerates to be viewed as preferential candidates for such tenders. By a prospective client structuring a project around a request for end-to-end solution delivery, they effectively engineer-out any opportunities for smaller companies to bid for this work. Small companies react to this situation by “chaining together” as a group of smaller providers to present as one entity. This arrangement is presented at times as the temporary forming of a new organisational partnership, with a new overarching trading name. More commonly however, association represents one of the larger engineering ‘partners’ as the main contractor that employs the other organisations as sub-contractors.

This requirement for smaller sub-sea organisations to link together is a significant point. Of relevance for understanding different perspectives on collaboration was the disparate ways in which CoAx and SES perceived this practice.

⁷ This refers to a complete project being put out for bidding as a single piece of work. Such a practice is opposed to a project being broken down into several different work scopes, for which individual companies may bid on.

Staff at CoAx viewed this partnership as mostly positive. Workers suggested that, despite being reactive to industry climate, “chaining together” organisations represented a rational solution. This allowed multiple entities with expert experience of engineering solution design to work together on important projects. Partnerships facilitated work for smaller organisations that would not normally be accessible. This enabled workers to apply their expertise and skills on major, and often global client projects.

Unlike CoAx, SES represented a large engineering conglomerate, with historical and current propensity for acquiring smaller businesses. Acquisitions occurred when smaller organisations had developed technology which may improve engineering workflow and practices at SES, or when a consultancy became renowned for a specific set of skills and knowledge SES felt would be desirable for their clients. To this end SES hold the staff, skills, and technology to singularly deliver such ‘end-to-end’ contracts in-house, without engaging in any ‘forced’ or ‘chained’ collaboration.

Staff at SES held a different view of this “chaining together” to workers at CoAx. Importantly, workers discussed their experience of how such a ‘forced’ partnership frequently curtailed “truly collaborative” practices. James, a negotiator working within supply-chain, elaborated on this thinking:

“It’s a problem [the idea of many companies chaining together]. It may sound like an ideal situation in practice – many smaller companies getting to do their thing, [to] work in an area they are an expert in. 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. Every client project is scoped in minute detail and communications are constant, both internal and external. With these chained relationships, I don’t think any of the organisations have a great deal of insight into how these different components fit together...at all”

In support of James’ statement, many other SES staff shared their sentiments regarding the potential pitfalls of forced collaboration. Stephanie, a project engineer working in the core engineering division of SES, discussed a negative example based on her experiences with chained working from a previous workplace. This employer had been a small, Aberdeen-based sub-sea consultancy. The organisation had completed a chaining process with five other companies to bid for a large client project. As the project deadline drew nearer, it became clear that each organisation had been working in increasing isolation. When final project specs were shared, it was evident that numerous changes and customisations had occurred within each

project design and delivery phase, at each separate company. Each customisation resembled a perceived improvement 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.

Several similar stories were shared, involving examples that ranged from pipelines incorrectly constructed to differing size, pressures, and materials, to design specs being misunderstood and misinterpreted completely following multiple interpretations “down the chain” of partnering companies. Such occurrences were ascribed to cultural misunderstandings, distanced communications, and the absence of structured and transparent information sharing. These accounts positioned it as difficult to envision how ‘chaining practices’ could be realised successfully. Examples evidence how crucial effective relationship management and clear communications are during collaboration.

Ethnography at CoAx captured how such ‘forced negotiations’ could occur in practice. The process was most evident in observations of meetings and in participant interviews. These all pertained to the chaining of companies together to bid for larger, multi-level client engineering projects. All meetings observed made use of distanced technological communications. Commonly this was Skype or conference call. The primary reason for this was that most organisations were based outside of Aberdeen, and often, the UK.

The most evident, first motif uncovered was the distribution of financial costs, and how these are negotiated. Financial costs were discussed in general as opposed to specific terms. Often discussions continued internally after external communications were completed. Significant in these discussions were notions of “time as money”. This was encapsulated by the definition of potential projects as viable or infeasible by the ratio of billable hours attached to such work. Several considerations for this metric were made. Firstly, an estimate of billable hours was conducted so as to determine if CoAx had free time to complete the project in addition to existing work. Secondly, this practice was to ascertain which staff would be able to conduct the work. In addition to considering skill-requirements and experience, factoring time requirements was necessary. For example, in allocating work to a junior engineer CoAx would retain a higher profit margin. However, this would also require supervision from a senior worker, who would also require “billable hours” to be allocated for this time. Lastly, discussions were prevalent for how work would be divided. This involved both an ongoing

internal and external negotiation where CoAx - alongside potential collaborators - assessed existing work-scope and defined their strengths and weaknesses within each proposed area. This typically resembled senior engineers voicing their past positive experiences working on similar projects. Discussions focussed on how successes and past positive learnings could be translated to new project goals.

Interestingly, discussions about potential barriers to working together were infrequent. When this topic did arise, conversation mostly centred on ascertaining past links to potential partner organisations. This was often a simple dialogue covering how much information was known about potential collaborations, where they were based, and speculation about their financial stability and reliability at past solution delivery and collaboration with others. An informal, and mirroring process to this occurred internally at CoAx when staff engaged in closed internal discussions regarding potential collaborators. At times, it was clear that the purpose of some communications was to replicate this vetting process in a more intuitive and informal manner. This occurred as an assessment of potential collaborators skills, and industry experience. In external communications, this was executed as questions put to potential collaborators. For example: “Have you done this kind of work before?”, “Have you worked with many similar client projects?”. After calls were completed, senior engineers often discussed the potential for collaboration as dependent on possible partners’ responses to these questions.

The organisation of work was the second significant point to be discussed in communications. Typically, this consisted of defining arrangements for which organisations would deliver each part of an overarching client solution, and how these separate components would fit together.

Within such discussions a prominent theme during negotiations was how each small sub-sea organisation wished to be represented. Often this manifested as a company requesting to be the first-named on the tender application as a named service provider that leads the project and sub-contracts the other partners. This point was also clarified in one-to-one interviews. ‘Naming’ was a point of resistance to organisations working together. Often, suggestions for a “leading company” were met with contentions regarding their industry experience, size of organisation, or lack of a previous client relationship. For example, on one such observed conference call, CoAx raised the question of whether they could be the first named organisation on the grouped tender application. This suggestion received comments of: “No, we’re the larger organisation, and you don’t have the experience with this client – we do. We have the prior relationships so it should be us”. A second respondent from the same organisation replied:

“Yes, we are the pre-approved vendor, so we would look to sub-contract CoAx. Not the other way around”. Comments highlighted the importance of being pre-approved, or pre-qualified to a larger client organisation.⁸ It is important to note here that CoAx *are* pre-approved by many organisations and existing clients as a leading, small, expert-level consultancy.

The third, and perhaps most important point observed within negotiations at CoAx encompassed the use and sharing of procedures when organisations attempted to “chain” together. In discussions with SES, numerous workers highlighted significant problems with “chained approaches”. Specifically, concerns for how such relationships could be effectively managed raised the issue of standardised processes and procedures. This was relevant to observations at CoAx. Conference and video call discussions with potential collaborators often involved entering negotiations about whose engineering standards and processes would govern an overarching piece of work. It was evident during discussions that CoAx recognised the need for uniform standards. They also made every effort to ensure process standardisation. However, negotiations were not always successful. During several observed calls, resistance between prospective partners to working from uniform processes was evident. At times, select organisations suggested using partial standards, or alternatively, all partners working from one organisations’ own standards. Suggestions came with problems that fell into two categories.

Firstly, partnering organisations often had their own standards which they were accustomed to working from. For this reason, at times, they desired for all other organisations to adopt these standards. Secondly, partnering organisations had their own standards, but conversely to point one, were reluctant to share these due to concerns over IP and the potential for these to be replicated and reused without permission and on other projects. Factors that confounded such standards negotiations was considerations for which standards were most applicable for the country and region the overarching work was being developed for. For example, work in the UKCS automatically rendered some international standards and processes redundant. As many of the negotiating companies were of international origin, it immediately positioned them as hostage to working from standards, processes and procedures with which they may not be immediately familiar.

⁸ This process of ‘preapproval’ refers to vetting having occurred, either by the client specifically or a wider regulatory body. A positive outcome of this vetting process would suggest that organisations are capable of producing the solutions that they advertise.

In evaluating the notion of ‘forced’ collaboration visible from ethnography, this practice has both potential positives and negatives. Smaller sub-sea organisations like CoAx have bespoke, expert knowledge accumulated from many years of industry experience. However, current industry climate somewhat restricts the sharing and dissemination of this knowledge by curtailing collaborative relationships between smaller companies. This largely occurs via the restrictive structuring of large-scale tender projects, which are becoming more common. This itself is driven by increases in the acquisition trend of smaller organisations by larger conglomerates, which began during the UKCS oil and gas downturn. The present trend is for such large-scale tender projects that drive smaller organisations to band together in a model of forced collaboration. At face-evaluation, this reactive practice appears to yield some positive results. Small-scale experts like CoAx appear amenable to linking together, to share knowledge, and to work together to provide high-standard solutions. Solutions are placed at specific areas of larger projects that such experts would not be able to place a stand-alone tender bid for. Thus, this process holds potential to realise an enhanced level of local expertise as a collaborative arrangement. However, in practice, this collaborative “chaining” is fraught with problems. Most significant of these are the natural divides within geographically displaced companies. These exist both as shortfalls in effective management, and as disparity in how to standardise process and procedures in order to realise effective collaboration. Notable also, is that through such natural processes of stratification, there is an increased chance of “chaining” practices leading to the development of “silo-ed”⁹ or individually focussed solutions. Workers may view their projects as separate entities removed from a wider whole. As discussed in examples from staff at SES, this may decrease the likelihood that such efforts can be effectively linked together as a complete project offering. This eventually can represent a failure in both collaboration and in agreed client solution delivery.

4.4 ‘Restrictive collaboration’ and local shifts in oil and gas identity

Drawing on analysis of data collected during ethnography of CoAx and SES, understandings of collaboration could also be conceptualised as belonging to a wider process of identity shift within Aberdeen-based organisations that develop UKCS sub-sea solutions. This was notable in discussions with many participants from both organisations. The most recurring motif for

⁹ This phrase was frequently used by engineers at both CoAx and SES to refer to “working in silos”. The implication was that on “chained” projects, each organisation was blinkered to the progress and development of solutions at other parties. Despite this, each organisation faced the eventual and collective goal of piecing such distanced solutions together at a stage of final project delivery.

understanding collaboration saw workers suggest that “moving to collaborative practices” was a necessity to survive in a changing industry. Salient within these narratives was the theme of a city and oil and gas commerce sector in significant flux.

The link between industry flux and a wider necessity to collaborate was defined in more detail by Robert, a junior engineer at CoAx. Robert had joined CoAx in the last few years from university. When I asked him about collaboration and industry climate, Robert gave the classical interpretation of collaboration as: “working together, effectively to achieve a common goal that benefits all parties”. He also suggested that “different, smaller companies working together [in order] to realise a bigger project is essential going forward”. The previous section discussed the definition and practice of ‘forced collaboration’ within smaller companies. Interesting, however, is that collaboration was also conceptualised by some younger engineers joining the industry as central to their institutional identity.

I asked Robert why he felt collaboration was essential. His narrative painted an acute awareness of the different stages of the downturn facing UKCS oil and gas. He reiterated a need for smaller organisations to work together, to realise both technology development, and sharing of skills to access scattered and marginal field developments. Robert suggested that without collaboration, such fields would remain untouched. He attributed this to the thinking that operators weathering the downturn are much less interested in marginal developments due to their comparably small profit potential. Instead, he ventured, such larger corporations are likely to invest in development and infrastructure of foreign fields far out with the UKCS.

Interestingly, Robert’s narrative emphasised an increased focus on collaboration during his university engineering education. He suggested that: “at [university], it was all about collaboration, the necessity to collaborate”. Going forward into industry, Robert expressed surprise that his academic learnings about the importance of collaboration were not mirrored by current practices of the Aberdeen sub-sea engineering sector. When I asked why he felt this was the case, he replied that while “everybody” wants to collaborative, few individuals knew how to engage in such practices effectively.

Following discussion with Robert, I spoke with Frances, a senior engineer at CoAx. He had been with the organisation for over five years. I asked him about themes Robert had raised. Frances first discussed examples of forced collaboration. He elaborated that while the “chaining” together of organisations was a necessary step to bid for larger contracts, he felt that collaborative ventures could be initiated in new and different ways. Prevalent in his narratives

was the need for operators interested in small pools to “match” small sub-sea organisations together, based on their interests and expertise. Frances felt that this practice would “very much mitigate” some of the key problems arising from collaboration as a reactive practice to allow smaller companies to bid for larger complete project tenders. He summarised by stating:

“The industry has completely changed...before, things were different. [There were] many small companies and lots of different work available. Now, most of the small organisations have been swallowed up, consumed by larger entities. We know, going forward we will likely have to collaborate to survive, but it’s collaborating effectively that’s the problem”

Frances went on to explain how he felt that it was essential in the current industry climate for smaller organisations to draw resources together to develop new technical solutions. However, as with many other participants, he stated that a recognised and collective lack of willingness to discuss openly different technologies and projects often led to a curtailing of any truly collaborative relationships. He explained:

“Yes, [to collaboration], but now, things are tighter than ever. I mean, for example, there is no way that we would openly discuss a technology that we’re developing with another organisation – not without all the required NDAs (Non-Disclosure Agreement) in place. That would only weaken our position in the long-term, not strengthen it”.

Important within such narratives is the recognition for local shifts in how engineering work is structured in Aberdeen, specific to the changes in industry vis-à-vis oil price and notions of competitiveness. Many workers at both CoAx and SES advised that the historical “boom time” oil and gas industry in Aberdeen had always been highly competitive. During this time, competition was enduringly framed as a positive – a facilitator of organisational growth that pushed small and large sub-sea organisations alike to “up their game” in skill and technology development. This “healthy” notion of competitiveness existed within a locally recognised knowledge bubble. This was defined by the collective belief that there was many, many decades worth of oil reserves within the UKCS, and that a peak in oil pricing was likely to 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 sharp fall in oil price. Respondents primarily viewed these changing understandings of competition as wholly negative. This view was driven by an increasing local trend of smaller organisations being acquired by larger entities. This development was coupled with the surprising and unexpected occurrence of several major, and well-established sub-sea solution providers, and

major oil and gas drilling and production organisations ceasing trading. Even more common was such providers diversifying into partial or complete acquisitions from larger global players. Following these occurrences, institutional norms surrounding intellectual property began to tighten. Reluctance to share information became linked to a new norm of perceiving competitiveness as negative, defined by the knowledge that competition had become a fundamental component of survival in the new UKCS energy sector. This notion is opposed to a healthy form of rivalry. The paradigm was recognised and raised by staff at both CoAx and SES regularly. The longitudinal presence of competition coupled with a more recent established norm of “necessary competition” was the primary barrier to fostering a collective notion of collaboration within the local sub-sea sector. This was despite numerous recognitions on an individual level that “collaborating together” was an equally essential practice for smaller companies to survive a future in the immediate local energy climate.

The local effects of these findings around a legacy of competitive collaboration practices was outlined by Peter, a senior pipeline engineer at SES. Peter asserted that local shifts in the perception of competitiveness as a survival mechanism operated at odds with the personal thinking of many engineers that collaboration was essential. He argued that it is well recognised in local sub-sea organisations that collaborating will in future become a key skill for economic survival and the division of small-pools engineering contracts. Despite this, he posited that a lack of knowledge about how to effectively collaborate in the local, competition-focussed climate was the most significant barrier to realising enactment in practice. Peter expressed concern about the industry-wide lack of acknowledgement for the competitive state of the industry within current collaboration advice and initiatives. He suggested that it was “all well and good” developing tools and initiatives to collaborate. However, if the competitive nature of the industry was not factored into such materials, he felt it unlikely such tools would reach local use. Others at SES echoed these sentiments. These workers often referred to specific collaboration materials, and linked their lack of use to a current industry stalemate. This was characterised by many recognising a collective need for both small and large organisations to collaborate, yet being prevented from doing so by the current industry climate of competitiveness. Importantly, such findings link about to our earlier comments regarding the many uses of the term collaboration within The Wood Report and related local survey and toolkit packages. While such materials focus heavily on ‘collaborating’ and ‘instilling collaborative practices’, these documents contain little references to how the presence of a competitive local climate may curtail such practices. Nor does literature explore how

collaboration may hold different contextual meanings within and between different organisations operating in the various sectors of the UKCS oil and gas market.

In evaluating notions of ‘restrictive collaboration’, both small and large organisations alike demonstrate a willingness and a recognition for collaboration. Of some significance is that all staff interviewed at the smaller organisation, CoAx, located this need as existing within a wider energy bubble, as opposed to simply sub-sea oil and gas solution delivery. Notably, many staff acknowledged the limited time and resources pertaining to Aberdeen’s oil economy. Some staff voiced their interests in diversifying into renewables engineering work. However, while these workers recognised that collaboration would likely represent a fundamental component of achieving diversification, they acknowledged that it was presently unclear what such collaborative principles may look like in practice.

This was different to the larger organisation, SES. SES already had well-established internal diversification divisions involving renewables technology and ongoing projects. Notably, they had already allocated 20% of existing organisational resources to growing their global renewables projects.

While SES highlighted similar issues in relation to their external relationships relating to competition and cultural climate, they were much less affected by these factors. This is due in large part to their divisional organisational design, and larger size. The propensity of SES to diversify into new technology and experimental sectors highlighted a fundamental difference between small and large organisations. While CoAx also had several successful experimental projects, these were constructed during time away from ongoing “billable hours”. Due to the small size of CoAx, internal collaboration on such projects involved individuals working together who were already positioned in proximity, and were already familiar. Conversely, such projects at SES saw a wide variety of workers brought together who had never previously met, worked together, or understood each other’s specialities. This suggests that an increased requirement for internal collaboration may shape the attitudes and values of workers towards external collaboration. While workers at SES recognised a problematic industry climate of competitiveness, they often circumvented such cultural restrictions by focussing on external collaboration as a skill-set and communicative tool. The impact of this finding regarding links between internal and external collaboration is discussed in detail in the following section.

Often local collaboration is attempted in a myriad of different ways. However, such efforts, while significant and effortful within the smaller sub-sea engineering sector are frequently

constrained by an underlying competitive norm that exists as a by-product of an industry latterly structured around rivalry. While this norm effects both small and large organisations, smaller solution providers are more vulnerable to any negative constraints preventing collaboration. This is because they are at greater risk of acquisition by larger organisation, less inherently financially stable, owing to their smaller operating margins, and have less free time to ‘trial’ collaborative approaches out with their primary day-to-day working.

4.5 Collaboration as a strategy

This section discusses collaboration as a strategy. Strategic collaboration was observed primarily at SES, the larger sub-sea engineering organisation. The process largely consisted of SES, as a large and renowned engineering house historically acquiring much smaller sub-sea engineering organisations, technology, and key peoples. This allowed SES to retain the benefit of being a much bigger and more financially stable organisation than most, while also offering a similar bespoke and expert engineering service that the staff at CoAx associated solely with smaller organisations.

Staff at SES explained that as the organisation had grown increasingly larger through the acquisitions of different companies, it had begun to be “more segmented and divided”. During my time at SES, there were four broad departments engaged in different activities, in addition to some seemingly external organisations that were owned and funded by SES. The opinions, of larger organisations, expressed by CoAx staff were of particular interest. Whilst at CoAx, many senior engineers defined the larger sub-sea engineering houses as large, anonymous entities. The suggestion was often that individual personalities and skills would become lost in a much larger and wider organisational machine. To this end, staff suggested that a “smaller, more bespoke and expert consultancy” would naturally be more adept at providing better communications, monitoring, and trust in external relationships defined as collaborations. However, this was a point of uncertainty, given the propensity for such smaller organisations to be forced into “chained collaboration”. Importantly, ethnography of SES found the opposite of this to be true. Findings indicated the structure and capabilities of SES, in tandem with a refined process of internal collaboration, had enduringly positive effect on external relationships and collaborative practices.

Notable first was the planned structuring of labour across different departments at SES. As outlined previously, SES had four broad departments. Communications and negotiations between such departments were often approached as if these resembled external communications. In the practical sense, the design and layout of the SES headquarters functionally located these teams in stratified workspaces. This promoted the use of digital message tools such as Skype and online messengers, as well as internal conference calls and video project meetings. At SES, “close but distanced” communications were made necessary by the secure nature of the building. Workers from some disciplines had limited access to workspaces beyond those required by their immediate remit. To this end, distanced communication methods were common.

The business structure of SES is also relevant. As discussed in the introduction to this document, SES comprised of input-output business relationships with both suppliers and contractors and external clients. That is; SES are supplied materials, skills, and knowledge from external companies for which they purchase. They then use these commodities to construct bespoke solutions for large-scale global clients. To this end, SES operate in a large-scale ‘middle’ position requiring communications and negotiations from a perspective of both the receiver or products, but also as the supplier of products. Figure 1, demonstrates this relationship.

Figure 1. Diagram showing SES business model



Important in both the organisational structure of SES and their input-output driven relationship is a familiarity with effective internal collaboration that arose from these ongoing interactions.

For example, the dedicated department of communications and marketing at SES often engaged in communications with supply-chain. The supply chain department was responsible for all negotiations and acquisitions of equipment and resource from the ‘input’ driven side of SES. That is, a responsibility for all incoming products and services sourced to fulfil client needs. The establishment and clarification of these needs came in part from the sales and marketing department. They were the primary communication link between both external suppliers, supplying SES, and external clients receiving deliveries from SES. In tandem to these observations, any potential scoped project required the input of engineers belonging to relevant

divisions within SES, for example, the technology department, or the overarching engineering division. These staff evaluated potential projects and approaches, and they scoped initial design of possible solutions and how these could be approached. As a result, communications were passed back to sales and marketing, all department managers, and supply chain. This was to ensure costing while factoring the acquisition and time-frame for necessary materials.

While this model may appear convoluted, its practical execution represented a well-practiced and smoothly flowing communication strategy. The end result was a clear output of negotiations and records covering internal departments, external suppliers, and external clients.

Notably, internal collaboration practices at SES positively influenced external collaboration. Almost all staff interviewed and observed discussed how “regularly doing collaboration internally” lead to improvements in external collaboration practices. Most salient was that the attitudes and values of staff across all four departments positioned collaboration as a “necessary tool” for conducting business within the current local energy sector. This was represented in different ways. For example, within supply chain, many workers suggested that effective communication, openness and transparency were the keys to collaborative practice. Examples of this involved direct information sharing and a predication for honesty in client dealings. When asked why these practices were so important, staff suggested the cultural values at SES promoted these practices internally. As staff had “gotten so used to working this way” in their internal practices, the exercise of such behaviours as external strategy was perceived as less effortful. This was also true of engineering, technology, and sales and marketing divisions. Numerous workers across all these divisions suggested that “the way in which collaboration is done internally” led to an enhanced focus on strong external communications and negotiations.

However, even in such internal practices collaboration held different definitions. While 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. When asked for examples, sales and marketing suggested that “good collaboration” was best defined by “suppliers being on time, and being open with their problems and shortcomings in the delivery or 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 collaborative factors in forming effective business relationships.

Such disparate understandings reveal insights into why smaller companies like CoAx may struggle to collaborate with larger organisations. Smaller engineering organisations prioritise protecting information of the above types, as this represents significant IP. To organisations like CoAx, collaboration is understood as a transactional practice where information that may destabilise their current market position is protected through an absence of direct sharing. For example, a reluctance to discuss detailed knowledge of specific future products that represent unique sub-sea engineering solutions not currently at market. However, for larger, more financially stable and commodity-diverse organisations like SES, successful external collaboration is most commonly defined by the extent an external collaborator can share such information in an open and transparent way. The resultant discordance of such a mismatch in perceptions leads to a problematic foundation upon which to build organisational interactions. Further, while the internal values at SES prioritise a culture of open communications and transparency, this is only possible because of their strong market position. Large organisations such as SES are unlikely to be destabilised within the current market by sharing such information about their business practices. However, such sharing at an organisation such as CoAx represents a significant vulnerability in market position. This is because their position as expert consultants is defined by a holding back of information. The knowledge to “do” specific plans and projects is the commodity by which such smaller consultancies retain the ability to remain profitable. As such, their internal culture is different, predicated less on the wider transparency and communication values present at SES. Thus, for such smaller organisations, the cultural values of internal and external collaboration are less ingrained when compared with larger organisations. This is because such organisations are structured in fundamentally different ways. Each organisation operates and reacts to the current local industry climate using different behaviours, attitudes and values.

In summary, larger, more financially stable and diverse organisations such as SES react to a threatening industry climate by attempting to acquire and integrate smaller organisations with bespoke skills, technology and experience. Smaller, and more locally fragile consultancies like CoAx react by resisting such acquisition and increasing the protection of their intellectual and technological assets. While such organisational behaviours are undoubtedly driven by a financially challenging local climate, findings reveal that organisations of different specifics and size react to this by perceiving and practicing collaboration in different ways.

4.6 Rejection of the term ‘collaboration’

Notable within both ethnography of CoAx and SES was rejection for the term collaboration. Some workers in both organisations overtly distanced themselves from any use of the term as having positive, or meaningful connotations. Predominantly, workers characterised this reluctance or rejection as a perception of “collaboration fatigue” or “collaboration exhaustion”. This was resultant from previously heavy, yet ill-defined use of the term in many existing industry documentation, proposals, and strategies for dealing with the local industry downturn.

While this section is brief compared to other sections contained within this document, it highlights a necessary observation regarding industry use and understanding of the term.

“Collaboration fatigue” was present equally across both organisations. Workers at both CoAx and SES defined this term primarily by the repeated use of “collaboration” to mean different things per different time and place, and per situation. Examples of this are evident in existing industry materials. For example, earlier in this document The Wood Review report is discussed as having forty-eight separate notions of collaboration attached to different circumstance and industry occurrences, yet a defined meaning of the term is lacking.

Jacob, a senior engineer at SES discussed the disparity in how the term is used. Jacob had worked at SES for ten years. Prior to this he had worked a several smaller consultancies in and around Aberdeen City. He defined collaboration as a “buzzword” for which use was prevalent within all local workplaces. Jacob stated how engineers such as himself “were sick of” hearing the term. When I asked Jacob why, he stated: “[Collaboration] never means the same thing. I mean, honestly, it’s just a word that gets slotted into conversation. It always had done, like ‘significant opportunity’. We play bullshit bingo¹⁰ with this all the time”.

Jack, a graduate engineer from CoAx had a similar impression. He advised that the term was employed primarily as a “catch all phrase” used to describe “something intangible”. When I asked him for an example, he advised of a recent meeting where senior management had used the term to define the relationship between a potential, long-standing client. I then asked Jacob how and why this relationship was defined as “collaborative”. He suggested that, instead of the relationship representing “collaboration in any significant part”, this business association

¹⁰ This term was used by several other employees at SES. The term refers to the amount of times buzzwords with unclear meanings are employed to punctuate discussions regarding industry strategy. The colloquial understanding is that the use of such words is meaningless, as their further context is unclear. As such, these phrases can mean anything in any given context.

instead represented a “run of the mill, yet longstanding” business arrangement that was “no different from any other existing partnership”.

Such sentiments were echoed frequently by other workers. In assessing such observations and interviews collectively, there appears to be a significant level of distrust for use of the term to define local business relationships. This notion appears to be linked less to any local downturn or industry climate. Instead, a recurrence of the term as used frequently, but with little clear attached meaning or significance had led to a devaluing of the phrase. This finding exemplifies the need for more nuanced definitions to those used in existing industry guidance, literature, and strategy reports, as opposed to the present, and generally more ambiguous uses of the term.

Notable also is that many workers asked about collaboration during observations often initially rolled their eyes and imparted a “not this again” stance towards discussions. However, on learning of the project goals to define and investigate use of the term, such workers were more than willing to share their perceptions and understandings of the term as used to defined external behaviours and relationships.

Findings suggest that significant efforts should be placed to define the meaning of collaboration where possible. The detailed findings of this report represent a positive starting point from which to do this. Definitions should extend to inclusion within industry materials, so as to reverse any negative connotations attached to the use of the term as meaningless or ambiguous within Aberdeen’s local oil and gas industry. At present, local understandings of the term may detract engagement in true collaborative practice, due to the existing negative perception of the phrase as a “buzzword”, absent of tangible meaning or definition. Looking forward, the development of new industry language to define effective shared working, communications, and information and technology sharing may be useful.

4.7 Summary

The above sections represent a typology of collaboration in relevant academic and industry literature, in wider UKCS oil and gas operations, and within local sub-sea engineering organisations. We find that the term collaboration holds different meanings in different contexts. Such meanings are often incompatible and linked to wider specifics and contexts of industry work, such as local financial climate, organisational size and internal culture and processes. The following section outlines the implications of ethnographic findings within the specific context of local collaborations in Aberdeen City.

5. Key overview of findings relating to marginal developments

This section presents a key overview of the research findings relevant to understanding relationships between notions of collaboration as linked to marginal field developments. Possible outcomes and future directions regarding organisational collaboration and marginal fields are discussed.

5.1 Barriers to collaboration

In developing a typography of collaboration from ethnography of both CoAx and SES, several barriers to effective external collaborations between organisations were made visible. Within this sub-section, the most salient barriers to organisations collaborating, to realise marginal development extraction projects are evaluated.

5.1.1 Forms of collaboration and relationships to risk exposure

One of the most significant barriers to different organisations working together was the disparate perceptions of financial risks arising from collaboration that differently sized organisations hold.

Notably, smaller organisations are much more exposed to any negative outcomes resulting from collaboration than larger organisations. This is the product of a changed industry landscape where local propensity for larger organisations to acquire smaller organisations has become common. In tandem with this industry norm, bids for large-scale client projects are structured in ways that “edge out” smaller organisations from bidding. As a reaction to this, smaller sub-sea engineering houses pull together into a “chain” of organisations to deliver an end-to-end solution. This allows them ostensibly to deliver a compacted ‘complete solution’ that a single larger sub-sea entity would be able to produce as a complete in-house project. However, this chained solution leads to delivery occurring via stratified means.

Such an arrangement resulted in failures in effective collaboration practices. Risk exposure was the primary problem smaller organisations face. While larger organisations hold the financial resources to make their work-flow, supplier arrangements, and parts of their other existing projects transparent to clients, this is less possible for smaller engineering houses ‘collaborating together’. This is because revealing internal processes, current projects and resource-

management risks such as smaller organisations' internal IP. As such, 'chained' organisations often appear deadlocked in an information security stalemate. Whilst these smaller organisations may define such chained relationships as collaboration, these interactions lack the fundamental trust and communicative practices many participants highlighted as characterising collaborative practices. As such, use of the term collaboration within smaller organisations largely defines a transactional and somewhat restrictive organisational relationship.

This overarching relationship was summarised by one CoAx participant as a "poker game" where "all the smaller organisations are holding their cards close to their chest". Restrictions in transparency have implications for encouraging collaboration. While at CoAx, social communications between organisations were often seen to be effective, cordial, and encouraging of collaboration, a lack of insights into financial, technical, and procedural components of working together sometimes appeared to fragment these opportunities.

Uncertainties regarding the intentions and abilities of different chained organisations appear characteristic of smaller UKCS organisations. This finding was supported by numerous observations and accounts during ethnography at SES.

Importantly, whilst smaller organisations defined chained relationships as collaborative, larger organisations such as SES, saw these as transactional. This mismatch in perception is driven by several factors. Smaller organisations such as CoAx have limited experience of wider internal collaboration. Due to their size, collaboration is practiced solely as an external practice when attempting to locate a new project or work-stream with an attached financial incentive. This leads to an intertwining of the term collaboration with notions of financial gain. As such, collaboration represents transactional relations yielding immediate financial successes. For this reason, collaboration in smaller companies may be understood as defining a 'one-sided win' for the smaller organisation only. This is opposite to the classical meaning of the term collaboration. This is defined in our earlier academic literature review, where the prevalent, wider implication of the term is conceived as groups effectively working together to realise a mutually beneficial project outcome.

This definition is also opposite to SES, where effective internal collaboration, as the use of electronic collaborative tools and the use of collaborative social methods, are daily practices. Such behaviours represent effective cross-department communications, negotiations, and information transfer occurring by an array of technically distanced, and in-person interactions.

Unlike smaller organisations such as CoAx, definitions of collaboration that included such practices were often stratified from any financial gain. Instead, these practices often included concern for how to support smaller organisations, supply-chain providers, and prospective clients. While notions of financial importance were present, these were often removed from practices of collaboration and relegated to a transactional phase of negotiation at the beginning of a project. As such, workers were free to practice collaboration in the classical sense, without assuming the burden of attributing successful collaboration to financial success. Drawing on analysis of participant data at SES, this is likely because of the inherent financial stability SES holds within the sub-sea engineering market. While smaller companies like CoAx *wanted* to enact effective collaboration, the competitive market climate forced them to consider financial stability and remuneration as priority. This led to enacting of a different definition of collaboration to that at SES, where transactional co-working between different organisations was defined as “collaboration”.

Findings have significant implications for smaller and larger organisations collaborating vis-à-vis marginal fields. As market position and stability dictated by size effects organisational perception of collaboration, it makes sense for larger, more financially stable organisations to lead collaborative efforts. Importantly, such larger organisations appear to recognise collaboration in a definition wider than immediate financial successes, in part largely because of their inherent financial stability, internal dispersion of resources, and well-practiced internal communication, negotiation, and information sharing practices. These factors all lead to an enhanced level of external collaboration.

A possible future model towards marginal fields collaboration could see larger organisations ‘twinned’ with smaller sub-sea providers. While such smaller organisations would likely insist on significant IP protection clauses - which currently operate as barriers to collaboration - larger organisations may be able to negotiate such requirements using their established supportive strategies and experience. Such a collaborative relationship would be defined by the key principles of information sharing, mutual technology benefits, and shared outcomes. Such principles are opposed to the contemporary focus for smaller organisations on financial gain. Likewise, the larger organisations must be mindful that the focus of the collaboration is not to acquire or “buy-out” the organisations or technology to retain sole ownership of outcomes, but instead to foster a climate of collaboration without competitiveness. This may serve as a positive model for the wider sector that may begin to dilute the current accepted industry climate of restrictive transactional relationships and inherent competition.

5.1.2 Industry climate of competitiveness

As introduced in the previous section, a significant barrier to collaboration is the contemporary UKCS climate of competitiveness.

While participants defined this climate as “always being present”, the specifics and meanings of competitiveness have changed. Historically, competitiveness was defined as a “healthy competition”. This was linked to notions of inherent North Sea financial stability and a secure price of oil. However, following the sharp fall in oil price in the mid-2010s, the definition of competitiveness is now interlinked with themes of “survival at all costs”.

Like transactional collaboration, this definition was characterised by notions of financial remuneration. While concerns for financial stability naturally impact smaller organisations to a larger degree, larger organisations are also effected.

Within the smaller organisation CoAx, collaboration was at times perceived as a “death sentence”. This was twinned with earlier themes of transparency and information sharing leading to a devaluing of IP, and a lack of ability to maintain a stable finance stream through marketing bespoke services, technology, and skills. When a transactional definition of collaboration was enacted, concerns were evident for what information could be shared, how Non-Disclosure Agreements (NDAs) would be developed, and the financial benefits that would be received by CoAx. Such notions naturally fragment the classical definition of collaboration as representing a much wider, and altruistic mutual arrangement than these factors allow definition for.

The larger organisation SES enacted collaboration successfully as per this classical definition. However, they were not immune to problems from competitive climate. Notably, many participants discussed negotiations with major organisations, providers and operators in terms of collaboration success factors such as of transparency, mutual benefits, support, openness and clear communications. However, despite such understandings, competitive climate was sometimes seen to override and destabilise seemingly ‘perfect’ collaborative relations.

For example, one such case involved a longitudinally established client of SES renegotiating over price for an engineering contract which has already been informally established. The prospective client had approached SES to scope a wide body of oilfield pipeline work. SES had developed the scope and shared with the client how this work could be done. Despite recognising the value of the work to the client, SES shared this information per their established

and positive transparency-focussed collaborative cultural norms. However, the client immediately made this work public, after removing SES's name and identity from the documents. The client offered the work out for open tender, asking subsea engineering organisations to bid for the completion of the project, using the pre-provided guidelines scoped by SES. As such, SES – having spent significant time and effort – were faced with having to bid for a project of their own design, against others who had not currently exerted any previous efforts or involvement.

Following such occurrences, organisations have begun to introduce measures to prevent information sharing. For example, at SES certain areas of the local workspace required enhanced access to visit (i.e. approval linked to an electronic ID card). Client workers, who were invited to the SES campus had previously been located in staff and contractor work-teams. However, these workers were increasingly segregated to a specific area where they were unlikely to overhear or be exposed to sensitive materials regarding technology, client costings and pricing, or services availability. Such notions normalise, as opposed to break-down the culture of competitiveness that currently dominates the local North Sea oil and gas trading climate.

A key finding from the previous section is a recommendation for a model where openness and transparency plays a paramount role in fostering collaborative relationships between smaller and larger sub-sea engineering organisations. However, a further consideration in approaching such a relationship is the natural pitfalls of transparency that befall “open and honest” communication practices. As the above example illustrates, the current UKCS sub-sea climate of competitiveness does not lend wholeheartedly to the formation of truly open collaborative relationships. Findings suggest that concerns for IP raised at both CoAx and SES are legitimate concerns.

When considering collaborative efforts for marginal fields projects, and taking the existing local climate into account, it may be prudent to factor at least some level of IP into future collaborative efforts. IP vis-à-vis collaboration is frequently perceived as a barrier that constrains effective communications. This is true for transactional relationships between smaller organisations. However, the complete absence of IP in favour of practicing total transparency is also problematic, and does not represent a realistic position in the current industry climate. Even larger, more stable sub-sea engineering houses can be financially damaged by adopting a total policy of transparency. While existing industry materials suggest

“being more open” and “being open to collaboration”, necessary protections for IP must be factored into such suggestions to make these ideas realistic for the current climate. As such, it appears reasonable to suggest that in approaching collaborative partnerships between small and large organisations to develop marginal fields, communications between such organisations might be defined by transparency. However external communications and information sharing must have some form of overarching protection and limitation on information sharing so as to avoid negative financial outcomes, and curtail the ongoing promotion of a negative competitive industry culture.

5.1.3 Building trust

Considering the above findings of stratified views of collaboration and competitive industry climate, the building of trust is central to overcome such barriers towards effective collaboration. Our earlier literature review of academic materials highlight the importance of trust in building interpersonal and business relationships. However, a gap within the literature is exploring how local cultural climate may detract from the building of trust-based relationships between otherwise well-matched organisations that require collaboration to reach a common goal (i.e. working together to develop marginal fields extraction projects). Our research concludes that the primary stalemate preventing immediate progress in this area is a lack of efforts to clarify how such trust-focussed relationships can be developed within the presence of a normalised and competitive local climate.

This was a significant point of discussion with participants at both workplaces. In evaluating all collected data, the resounding conclusion was that building trust within UKCS sub-sea operations is a more difficult undertaking than ever.

Notably, a variety of participants suggested that the combination of competitive climate and stratified understandings of collaboration had led to a lack of interest in developing trust-based relationships. This was evidenced most clearly in narratives that suggested operators had a complete lack of interest in building collaborative relationships aiming to extract natural resourced from marginal fields. Reasons given included speculations that operators do not want to share technology, share locations of fields, or have their bespoke technology and assets utilised by third-party organisations. Further speculation suggested operations were increasingly diversifying into non-UK fields and recovery practices. While these operations still focussed on hydrocarbons, it was felt that UKCS extraction was becoming too expensive

relative to the financial remunerations from recovered oil and gas. As such, a majority perception was that these fields were “not worth it”.

This was a somewhat paradoxical position. Significant interest has been shown in UKCS operators for many years regarding the recovery of such fields. Such fields are also numerous in number, with over eighty confirmed within the UKCS. As such, their profitability is not only well-established, but represents a significant position of untapped natural resource within a sector that is arguably reaching a concluding life-cycle stage. Thus, such attitudes were surprising.

However, on further questioning of participants, it was revealed that most marginal fields are co-owned or co-developed projects. Even these stranded pool assets may have multiple owners and holders of interest. In evaluating existing materials on such fields, an oft-under considered factor is how such multiple-owned developments would conceptualise or understand collaborative practices. Traditionally, operators contract drillers and service organisations to develop solutions for the extraction of hydrocarbons. This communicative process may contain disparate conceptions of transactual or collaborative interactions. Understandings may be further distanced from the sub-sea notions of collaboration explored within this report. Despite this consideration, almost no information exists or acknowledges how a collaborative work-share may be conceptualised that factors a triadic relationship between sub-sea organisations, operators, and drilling contractors. This is likely an important, yet underexplored avenue of knowledge in establishing how functional collaborative relationships can be constructed to aid the extraction of UKCS marginal field pools.

To this end, suggestions of a lack of interest may be mistakenly attributed to a lack of trust. There is clearly an absence of trust within relationships between different sub-sea engineering organisations. Where trust does exist - as evidenced at SES - this is largely constructed by positive organisational culture. However, such trust may rapidly be taken advantage of, resulting in negative outcomes. The outcome is such organisations becoming wary of exercising “over-trust” and modify their values and practices according. This process directly contributes to the current competitive UKCS climate and operates as a cyclical model.

It is presently unclear if trust is the primary barrier to engaging operators into triadic relationships with multiple sub-sea engineering organisations. This uncertainty stems from the lack of empirical data exploring operator perceptions, cultural attitudes and existing collaborative practices with multiple sub-sea operators vis-à-vis marginal field projects. This

area represents a significant research gap, where more research should be undertaken to explore any linkages between trust and collaboration. Research should also prioritise exploring any tangible barriers to marginal field extractions, as this is an area of industry speculation where confirmed reasons and understandings for an absence of progress are lacking.

5.2 Facilitators to collaboration

This section summarises facilitators to effective collaboration within different sub-sea engineering organisations of different size and structure.

As evidenced at SES, the most significant facilitator of external collaboration is effective internal collaboration. This is best defined as the routine interactions between different, physically stratified departments with different purposes and responsibilities. At SES, such interactions were underpinned by established cultural values of trust, transparency, openness, and courtesy. Due to the size and structure of the organisation, a downplaying of financial focus was present within interactions. The positive cultural effects of such values were evident on processes of information sharing, collaborative negotiating over contracts, and the common presence of multi-disciplinary teams to deal with external client and supply-chain needs. The ingrained nature of such values caused workers to prioritise collaborative practices through interactions with external clients. This was the case for organisations that serve SES, and clients served by SES.

While effective collaboration was noted in these relationships, the current industry climate does not overall support open collaboration practices. Instead of such behaviours being rewarded, practices can leave even larger organisations open to vulnerabilities in the form of IP leaks and “oversharing” of information to the point of contract loss. Such factors may discourage the use of otherwise strong collaborative practices necessary for organisational relationships approaching marginal field extraction work. While academic literature frequently cites trust as a key facilitator of collaboration, it is unclear how trust-based collaborations may be achieved in such a competitive local industry climate.

Within smaller sub-sea organisations effective collaborative relationships might be hindered by the need for smaller providers to engage in ‘forced collaboration’ through the chaining together of many smaller organisations. This practice itself breeds a lack of trust driven by restrictive information sharing to protect intellectual property. Further, as chained organisations ostensibly represent a singular larger entity to a bigger client organisation, a

domino effect is present. A failure point within one organisation may result in a failure to deliver the overarching agreed solution. Resultant fines and sanctions may be sufficient as to dissolve any or all organisations party to this chain. However, it is reasonable to suggest, following analysis of observational data, that trust-based relationships may be formed between smaller sub-sea organisations. The formation of these may be easier than between larger and smaller companies. This is because smaller organisations have commonality in their financial, IP, and technology concerns. Therefore “short-chaining” of smaller organisations may be an effective strategy for some marginal fields projects, provided this relationship is overseen by a larger entity that may offer collaborative support with full knowledge of the chained relationship. Short-chaining may be effective due to the smaller nature of work required for such small-pools fields, and the differing nature of collaboration within this bubble, when contrasted with the large-scale context of organisational chaining in the wider UKCS competitive climate.

5.3 Potential effects of collaborations

This section summarises the varied effects of collaboration on the two organisations analysed.

In existing industry literature, collaboration is used as a multi-faceted term that lacks a clear definition. Despite this, the term is universally employed as a marker of positive effect and often operates as a benchmark for successful organisational behaviours within Aberdeen’s local oil and gas bubble.

However, findings of this research study reveal that the effects of collaboration, as enacted via different understandings and practices, are not always positive.

For example, examples from SES demonstrate that enacting collaborative practices of transparency, fluid information sharing, and openness sometimes have the positive effects of generating new business. This occurs via reputation manufacture. Organisations that value such organisational traits and cultures prioritise dealing with SES for these reasons. However, when SES encounter a mismatch with client firms that do not hold similar cultural values to their own, they become vulnerable to financial loss. This is despite being protected by their size and market stability. Most notably, mismatches occur when (typically) larger UKCS operators take advantage of this transparency as a mode of extracting free labour and project scoping. This is then used to make such work public through a process of either open or invited bidding. While the likelihood of this happening is low enough to allow SES to continue their positive

collaborative practices, it does detract from collaboration working positively, given that such collaborative practices are situated within an industry culture wholeheartedly defined by competitiveness.

Comparing practices with CoAx, the smaller operational structure of this organisation prohibits enactment of collaboration in similar ways to SES. To do so would result in “certain death” for CoAx. This is because enacting transparent collaborative practices undermines and works against their primary trading position of offering bespoke, expert client solutions that are unique to this organisation. As such, to engage in collaboration in the classical sense for CoAx, within the current industry climate of competitiveness is to invite the dilution of all that holds value for the organisation. Understandably, their reaction is to redefine collaboration in a manner favourable to their current, marginal position within a wider competitive climate. This definition represents a transactional characterisation that prioritises financial stability.

Given stratified definitions and practices, and revelations regarding how these sit within a wider competitive local climate, more information is required about how relationships between differently sized organisations may be married with operator collaborations. This knowledge is key to approaching any collaborative interlinking between small and large engineering houses, and operator organisations governing marginal field extractions.

6. Collaborating forward: from marginal developments to renewables

This section explores the various narratives and statements around the renewables sector. Our analysis focus on significant concerns from informants about how their skills would transfer and translate to a local future in Aberdeen City “after oil”.

Participants at both CoAx and SES held concerns for how a ‘future after oil’ will impact their working lives. Despite the presence of concerns at both organisations, each company held different understandings of how this could occur, and carried a different level of preparedness for possible future outcomes.

Almost all participants at SES recognised that Aberdeen’s future as the oil capital of Europe was nearing an end. However, most of these workers speculated about transferring their sub-sea skills into new renewables fields. Importantly, SES already had several programmes and solution-development initiatives regarding renewable energy. SES had also acquired organisations in the past that specialise in developing renewables solutions as part of existing oil and gas extraction projects. These were referred to as “extension of life projects” due to their ability to extend the life of existing hydrocarbon assets by maximising recovery, whilst running assets partially on renewables resources. In addition to this, SES have already committed 20% of their resource time within at least one division to the development of renewables-focussed solutions. This allowed a range of workers to gain experience within this sector, making their skill-set more diversifiable and translatable to eventualities of a renewables-led local future.

However, despite such opportunities, a prevalent theme from interviews with workers was the question of how their skills could be translated. While needs were clearly identified by engineers, skill-transition and collaboration were prevalent factors of discussion. This was situated within the uncertain context of how existing hydrocarbon engineers may collaborate with established renewables engineers to learn and grow their skill-set, to prepare for a new future of Aberdeen as a renewables capital.

This was mentioned by Lloyd, an engineer at SES in his mid-30’s. Lloyd had worked at SES for seven years and raised the issue of renewables almost immediately when we spoke. When we moved to the topic of skill transition, Lloyd recognised that, for him, “direct transfer” of skills was an unrealistic assumption. He revealed that he felt many of his colleagues and friends

working in Aberdeen engineering assumed either that “the oil would last forever”, or that “they would just simply start working in renewables”.

I asked about this later perception first. Lloyd suggested that many local engineers felt that a transition would be “easy”. However, he argued that an equal number felt that this notion was driven by a longitudinal culture of “high contractor rates” and a historical focus within local culture as visualising “oil and gas work as some kind of status symbol”. Lloyd posited that those expecting an “easy transition” were in for a large shock. He suggested, following a revelation that he had worked on one renewables project outside of the UK, that such work was entirely different and required vastly different skills from hydrocarbon engineering.

This point was raised also by Sandy. Sandy had worked at SES for a year. Prior to this he had worked for a smaller organisation, and before that for a firm outside of the UK. Sandy, like many others, recognised that local sub-sea engineering work would “dry-up in a near future”. He attributed this understanding to the nature of the UKCS downturn, lack of an established financial upswing to the industry, and what he described as a reluctance of operators to “cling on” to ageing North Sea assets. Sandy was pro-renewables. He pointed out that this was a field he would rather work in, as opposed to his established background in hydrocarbon extraction.

Sandy used the notable phrase of “downturn deniers”. to refer to the same workers Lloyd mentioned as perceiving North Sea oil to be largely limitless. Sandy defined these workers continuing to focus on niche areas of hydrocarbon engineering, and who “scoffed” the possibility of a future in renewables. Such workers were characterised by both Lloyd and Sandy as financially-focussed. Like those who imagined an easy transition to renewables, workers were defined by propensities to seek a high-salary, define their work as of key importance to an already mature and declining oil and gas sector, and their personal practices of spending money widely. Sandy characterised these workers as perceiving the possibility of skill translation between the two sectors as impossible. We had similar discussions with many workers from both CoAx and SES.

These findings position some North Sea workers at two polar positions, yet characterised by similar behaviours. Our data suggests that, despite a well-established downturn that changed local practices, the presence of an ever more competitive local trading climate, and a current failure to develop effective collaboration practices regarding marginal fields, industry specific skills may still be perceived by some as in demand. This perception fuels a controversial position of such engineering skills having intrinsic high-value within Aberdeen’s local oil and

gas bubble, yet being of lesser value to non-oil and gas sectors, and in locales disparate from Aberdeen. Similarly, the sector itself may be conceptualised by some as stable and longitudinal, in spite of recent dips in oil price and numerous redundancies. This position suggests some local cultural values native to Aberdeen may play a role in shaping this “stable” perception as an industry norm.

Sarah, a senior engineer at SES elaborated on these points. Sarah explained that Aberdeen as a city is built on an oil and gas culture. She perceived these attached norms and values as constructing an “industry bubble”. It is within this sphere that workers’ opinions of industry importance, perception of skills as indispensable, and importantly, the notion that oil is “everlasting” are shaped. Sarah felt that, following the downturn, many workers remaining in the industry chose to also remain as existing within this cultural bubble. To this extent – and whilst engaged in current employment – such workers may comfortably resist any wider social notion of an industry in change, or crisis.

Some of this thinking was replicated in interviews and observations. Some workers at both organisations expressed some surprise at the mention of an industry in decline, instead suggesting a model of industry flux where profits and workforce vary. Several workers within this demographic suggested that a further upturn was possible. However, when this point was discussed, such workers speculated that they felt a further large-field discovery coupled with a significant rise in oil price would be necessary to achieve this at a local level. Others positioned a lack of interest in moving towards renewables as not within their interests, or simply something they had no clear understandings of. Others still expressed that, should Aberdeen be successful in becoming a new European renewables capital, they would travel further afield to continue to work in hydrocarbon extraction. However, on closer examination of these narratives, such workers revealed that they would be interested in renewables in principle, but felt the cultural entrenchment of oil and gas ‘culture’ saw Aberdeen as an unlikely location for representing a future renewables hub.

Despite the presence of such findings, most engineering workers interviewed at CoAx and SES showed a keen interest in skill-transition projects toward renewables. For the engineers working at SES, numerous opportunities were available to explore and learn about renewables projects, apply for cross-departmental training, and to engage in open discussions with internal teams working in renewables. In addition, the organisation had a renewables-supportive culture that encompassed an overall acknowledgement for the limits of hydrocarbon futures.

However, this was different at CoAx. Engineers at this smaller consultancy has much less experience working in renewables. When management engineers were interviewed, all showed enthusiasm and interest in developing into this sector. Comments such as “it’s essential we diversify at an early stage, in order to survive a future in Aberdeen” and “I’d be delighted to work in renewables, prefer that even – it would be better to tell my kids I’m working in renewables rather than hydrocarbons” demonstrated a clear willingness to traverse into new areas of engineering outside of oil and gas.

Despite this, the most significant barrier facing workers at CoAx was how to “break into” a renewables sector. This was a point raised by all managers and senior engineers within the organisation. Some managers suggested a willingness to engage in “free” and “pro bono” engineering work on renewables projects, as a means to gain experience for staff and spearhead a renewables division within CoAx. However, when asked about how they might go about finding such work, CoAx were unclear about how this could occur, nor how such collaborative relationships in developing renewables skill-share projects may be achieved, in ways that resist the established barriers facing external collaboration in existing hydrocarbon markets.

This is a significant point worth further exploration. One of the most salient barriers to establishing collaborative local relationships vis-à-vis small pools extract projects is current local competitive climate. However, it is unlikely that an emerging local renewables sector is plagued with the same entrenched norms of competition. This is due both to the recency of the sector, and a subsequent lack of financial imprinting with the high-spending norms and values plaguing hydrocarbon culture. As such, collaborative relationships may be much more likely within a renewables-led market than the current local trading focus on oil and gas commodities.

Given the current industry life-span and projected current end-of-life attached to existing recovery fields, there is a clear need to investigate how skill-transitions may occur that allow engineers currently working in oil and gas engineering to begin resituating their skills within a renewables context. In evaluating research findings, more than sixty percent of workers interviewed demonstrated a future interest in remaining in Aberdeen and switching sectors as the oil and gas economy reaches a financial close-out. Despite recurrent reports of Aberdeen as tipped to be a future renewables hub, and some local perceptions that this will simply “take over from the oil”, there currently exist little knowledge and research into how a skill-transfer programme may be established. Nor is there any existing evidence for how a further downturn in local hydrocarbon extraction could be recovered by a comparable upturn in renewables

technology installations in UKCS waters. While many participants highlighted perceptions that engineering skills developed within hydrocarbon contexts were or could be transferable, the validities of this thinking, and an approach for how such transfer could occur must be evaluated.

Given these findings, there is significant scope for a future ethnographic research study focussing solely on conceptions of skill-transfer and how this could occur. Examining the understandings and notions of hydrocarbon engineering skills, and understanding facilitators and barriers to skill-transfer is a necessary step, given the planned future of Aberdeen as a prospective European renewables capital. However, at present there is a most significant research gap.

7. Recommendations

This section summarises important points made earlier in this report. We present several recommendations drawing on the most salient of research findings.

7.1 Clear requirements for further research: Examining marginal fields owners and operators

Drawing on existing research findings generated through ethnography of CoAx and SES, we find a clear requirement for further research exploring collaboration in UKCS focussed organisations operating with the local North Sea hydrocarbon extraction sector.

This report has drawn several important conclusions regarding notions of collaboration and how these are enacted as practices at two sub-sea engineering organisations. Importantly, findings suggest each organisation contains cultures with different perceptions of collaboration. Our research developed a typology that distinguished themes such as transparency, information and IP protection, clear and effective communication, transactional relationships, and an overall rejection of the term ‘collaboration’ among others. We make clear how these notions are actualised into practices, and how these behaviours facilitate and deny collaborative practices. However, an overriding theme within all data collected is that regulatory involvement is paramount for bringing large and small sub-sea organisations together to engage in collaborative relationships with mutually beneficial effects. This was discussed by participants as holding particular relevance to marginal field extraction initiatives. Clearest within the data is that larger, and more financially market stable organisations such as SES may play a fundamental future role in brokering such marginal collaborative partnerships, due to their strong understandings and established successful practices of internal and external collaboration. This must be approached with both initiative buy-in and blessing from regulatory bodies and major operators. To date, regulatory bodies have approached a number of guidelines, recommendations, and tool-kits.

However, most significant of these approaches is that the overarching UKCS oil and gas sector is conceptualised universally to exist as a single homogenous entity for which collaboration is required to ensure future success and stability. Given the multifaceted definitions within this report - which only explores two sub-sea organisations, yet finds over six unique sub-sea definitions and understandings of collaboration - this may represent a reductionist approach to

conceptualising the sector and how collaboration within Aberdeen's local oil and gas economy may be understood and actualised in practice.

Currently a 'one-size-fits' all approach to conceptualising collaboration appears to be attempted within available industry documents regarding collaboration. The Wood Report (2019), The HSE Health and Safety Report exploring collaborative governance literature (2019), and OGUK's compendium of industry-specific collaborative literature, all discuss collaboration within the context of an overarching local hydrocarbons market specific to Aberdeen and the UKCS. However, looking forward to new, necessary research opportunities, future studies and investigation must acknowledge the differences between collaborative understandings within and between organisations located within different internal oil and gas sectors. The findings of this research strongly suggest that sub-sea engineering organisations of different sizes, operators, field owners, supply organisations, and drilling contractors all likely hold disparate and possible incompatible understandings of the term collaboration, and notions for how this may be successfully enacted in practice. Such distanced understandings are likely constructed by the specific position of each sub-sector within Aberdeen's local oil and gas economy and Aberdeen's cultural (and highly competitive) energy bubble. Perceptions of collaboration and collaborative enactment – as positives and negatives – are also most likely shaped by each different sector's position regarding industry climate, and how this restricts some definitions and practices of collaboration while encouraging others. For this reason, a suitable spread of different organisations belonging to different components of Aberdeen's local oil and gas industry must be the focus of the next phase of this research.

Important also is that a local collaborative need vis-à-vis marginal fields is both recognised and established in existing industry literature. Despite this, as numerous participants noted, no local collaborative research has been conducted solely to understand how marginal field operators may conceptualise collaborative relations and any attached barriers and facilitators. Examining the perceptions, norms and understandings of such organisations is the next natural step to progressing the likelihood of approaching recovery projects in practice. This is because owners and operators were highlighted by many participants within this study as the natural 'lynchpin' or 'foundation' to forming a collaborative relationship with other sub-sector organisations, such as sub-sea engineering companies. Such a research undertaking resembles the most salient further point upon which new studies should focus. Research investigations should work towards understanding how triadic collaborative partnerships could be formed in practice from the perspective of marginal fields owners and operators. Such approaches may involve

established large-scale and stable sub-sea engineering consultancies, smaller partnerships with bespoke skills and expert knowledge, and larger-scale owners and operators of marginal development fields, with a vested interest in maximising resource recovery.

Regulatory bodies may play a pivotal role in matching such organisations together. This may be based on market stability and size, availability of local resources and skills, and shared interests with regards to technology development and implementation for stranded fields.

Future research focussing on regulatory perceptions and positions should investigate - in tandem with operators - how such a collaborative partnership may be approached in practice. Findings should be fed-back to local regulatory bodies, to inform tangible, and evidence-based advice for the design success of such an initiative.

7.2 Clear requirements for further research: Renewables skill-transfer

As discussed in Section 5, more research should be funded to enable skills transfers from subsea oil and gas into renewables. The UKCS oil and gas downturn is a key factor presently facing local industry. Perceptions for the severity of this downturn varied between participants of this research, as do perceptions for the “ease” of established oil and gas professionals making the transition into a future renewables climate in Aberdeen. However, a commonality in most of the research findings was a clear desire for many participants to translate their sub-sea engineering skills into new local renewables projects and future opportunities. At present, no existing research focusses on how such a local skill-transfer may take place, nor how notions of collaboration may be an important part of making skill-transitions a reality. As governmental climate goals increasingly bring hydrocarbon emission targets into focus, and the requirement for Aberdeen to rebrand as a European renewables capital gains media attention, conducting more research into how such a just transition may take place is of most salient importance for city, place, and peoples. This is not least to realise present and future climate change targets that will be inevitably prioritised in the immediate future, and to secure an economic future within Aberdeen beyond a reliance on hydrocarbon recovery.

Most important for future research regarding renewables skill-transfer is that studies acknowledge that Aberdeen hosts a unique culture of competitiveness. In this report, we demonstrate that such a climate of competition lends to the fracturing of collaborative relationships via throttling knowledge-sharing and curtailing information transfer. This is

founded on fears for sub-sea organisations losing IP leverage and profitability. Of legitimate concern is that such norms may ‘spill-over’ into new initiatives focussing on renewables. While skill-transfers from hydrocarbons to renewables realise a possible new financial opportunity for the city, collaboration may be similarly hampered within this sector by the presence of engrained local cultural values established in the recent local hydrocarbons market. This may result in a similar separate typography of distanced understandings of collaboration within the different developing sub-sectors of a renewables industry. Future research exploring skill-transfer much acknowledge the multifaceted definitions of collaboration that exist presently within Aberdeen’s local oil and gas sector and sub-sectors, and recognise how such understandings are shaped by a contemporary local competitive culture. The challenge for future research is to investigate and examine successful skill-transfers processes in a manner that realises the positive potentials of moving existing hydrocarbon expertise into a renewables market, yet also engineers leaving behind any negative notions of competitiveness that may hamper collaborative working in this new sector.

7.3 Multi-disciplinary steering committee on collaboration between large and small organisations.

The final recommendation is that a multi-disciplinary, marginal fields steering committee be constructed to approach the problem of how to foster collaboration between operators, and large and small sub-sea engineering organisations.

Such a committee should consist of several representatives from all levels of organisations, from grass-roots engineering graduates to senior management. Importantly, representation must factor participants from operators and marginal fields owners, as well as interested parties from smaller independent and larger corporate engineering organisations. In addition, academics with leading research interests in collaboration, organisational behaviours and marginal fields research should be included to advise of existing research findings and the most salient gaps in understandings how to facilitate group collaboration between parties. Representatives from regulators with locally-focussed interests should also attend.

The goal of such a committee should be to engage in “brain storming” sessions regarding collaboration and conflict. Facilitators and barriers to cross-organisations collaboration should be an immediately salient topic of initial discussions, as should any barriers to future interest

in UKCS small pools development that factor local infrastructure, competitive climate, uses of technology, and availability of assets.

Such a committee may be established in advance of a further phase of research focussing on operator understandings of collaborative behaviours. However, future research examining this area may represent a pivotal method of regenerating interest in marginal fields developments, and interlinking small and large organisations under study together. As such, future research may serve a dual-function: a method of collecting necessary data regarding how regulators may understand and perceive collaboration, and establishing how such conceptions are compatible or incompatible with existing definitions established. In addition, such a process itself should promote the interlinking of studied organisations together, provided appropriate interest is forthcoming from operators and such organisations are approached anonymously to seek prior consent. Such a committee may be held at Robert Gordon University to establish a neutral platform for discussion, and to ensure parties benefit from the existing links between academic and industry developed during the course of this research study.

8. Conclusion

This report provides a detailed review of both existing academic and industry literature surrounding collaboration, as well as the findings from a six-month research project. Using ethnographic methods, deployed within two distinct sub-sea organisations of different size and structure, collaboration was investigated to examine how these practices may be approached to bring different sub-sea organisations together to work with marginal field extraction projects.

Findings conclude that collaboration is understood by different organisations in different ways. While positive forms of collaboration are enacted, these do not always have positive results. This occurrence is largely resultant of an industry climate of competitiveness that drives competition and throttles information transfer and transparency practices. This frequently results in a stagnation in collaborative practices, and a mismatch in ideologies when bringing sub-sea, and organisations with wider remits together. While numerous positive examples of collaboration were uncovered, larger organisations find it easier to collaborate than smaller entities. This is because of their diverse operational structure that ingrains positive internal collaborative practice as an institutional norm. Despite this, such positive practices exercised in the current local competitive climate often hamper even larger organisations' progress towards establishing collaboration.

With regards to collaboration and marginal field developments, further research is clearly required to explore how operators and marginal field owners conceptualise collaborations. This is a significant research gap presently and further study is a necessary undertaking to develop appropriate solutions. In addition, the issue of Aberdeen's future as a renewables capital was a highly prevalent concern for research participants. An immediate need for further research on skills transfer is evident. This should focus on establishing how such engineering skills established in hydrocarbon contexts may be transitioned to a local renewables future and economy.

Presently, much has been learned about local UKCS collaboration within sub-sea engineering contexts from this study. Findings are clearly outlined in this report. Drawing on these findings, and in addition to further research, a salient next step is to establish a steering group to approach the development of collaborative solutions. Such a group should be interdisciplinary and contain both industry and academic partners. While the group should be solution-focussed, a required step to develop solutions is further research of collaboration as understood by

operators with marginal fields interests. As such, suitable academics researching within these areas should function as a component of such a group, in tandem with operator, sub-sea, drilling, and other organisational representatives.

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