Conflict and collaboration in oil and gas:
a social science perspective

In-depth report – Phase I

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INTRODUCTION

This project was created as a collaboration between the University of Manchester, Robert Gordon University Aberdeen and the Oil and Gas Technology Centre, in response to the Marginal Developments Plug & Play Call for Ideas.

The idea of this project was to consider the human and organisational element in adopting new technologies and processes and identify a best course of action to start to shift mindsets and action towards a circular economy. A circular economy in the oil and gas industry can include built in modules of subsea infrastructure that can be redeployed, designed in a way that is aimed for disassembly, not decommissioning. This can be achieved by standardising processes and technologies across the sector.

Experience from industries such as computing and automotive suggests that making a step towards Plug-and-Play technology has the potential to significantly reduce lifecycle costs. However, such efforts must be conducted collaboratively between companies, which is a difficult task in an industry that is characterised by bespoke equipment and processes.

Our project has investigated industrial culture and organisational behaviour to identify barriers to collaboration within the oil and gas industry, using a range of social science methods.

This report refers to phase 1 of our project. Phase 2 of the study, involving participant observation research, is still to be completed.

1.0 AIMS AND METHODOLOGY

The aims of this research were to identify the barriers to adopting a plug and play approach to marginal field developments in the UKCS and to examine industrial and organisational culture in relation to collaboration. We developed this study in response to a call for research by the Oil and Gas Technology Centre (OGTC) to shift mindsets and action towards a circular economy. A circular economy in the oil and gas industry can include built-in modules of subsea infrastructure, which can be redeployed, designed in a way that is aimed for disassembly, not decommissioning. This can be achieved by standardising processes and technologies across the sector.[1] Experience from industries such as computing, electronics, and automotive suggests that making a step towards Plug-and-Play technology has the potential to significantly reduce lifecycle costs. However, such efforts must be conducted collaboratively between companies, which is a difficult task in the oil and gas industry, an industry that is characterised by bespoke equipment and processes. In response to this challenge, our project has investigated industrial culture and organisational behaviour to identify barriers to collaboration within the oil and gas industry.

This report summarises our findings from Phase 1 of the project. Phase 2 of the study, consisting of participant observation research in selected organisations, is yet to be completed. Phase 1 involved semi-structured interviews with a diverse range of senior professionals in the oil and gas industry in Aberdeen. The interviews are used to capture in-depth views, understandings, and reflections of experiences of collaboration and standardisation in the oil and gas industry. The qualitative methodology adopted in this study differs significantly from existing non-academic and survey-based publications on collaboration in the UKCS.[2] The value added from a qualitative methodology is that it allows the collection of in-depth data, drawing on respondents' own definitions and perspectives, rather than pre-defined categories or themes.

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[1] See the OGUK Efficiency Task Force Case Studies for some recent example of cost savings: https://oilandgasuk.co.uk/subsea-standardisation/

[2] See for example the Deloitte/OGUK UKCS upstream supply chain collaboration survey 2018, and previous OGUK collaboration surveys. https://oilandgasuk.co.uk/wp-content/uploads/2018/08/Deloitte-UKCS-upstream-supply-chain-collaboration-survey-2018.pdf
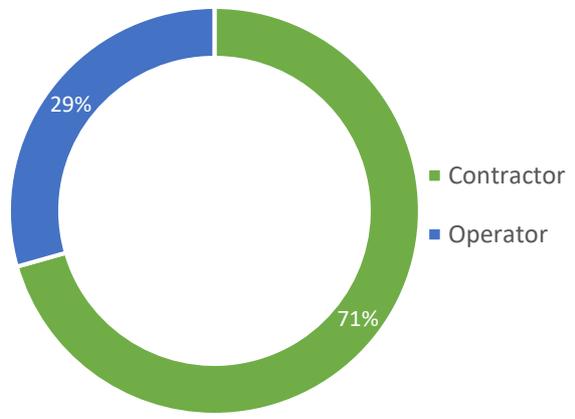
Interviews lasted between 40 and 60 minutes. They covered a number of themes, but also allowed participants to raise concerns and issues around the question of collaboration and standardisation in the UKCS in an open-ended manner. Interview themes included: respondents' own backgrounds expertise and priorities; collaboration values and practices in organisations; understandings of standardisation; existing infrastructures, processes and technologies; organisational cultural dynamics; and the value and role of Aberdeen in fostering or hindering collaboration. Interviewees spanned a diverse range of roles and companies, including engineers, project managers, commercial directors, and CEOs, employed by large and SME operators and contractors.

We conducted 18 interviews from January to July 2019. The number of interviewees have been adequate in providing valuable insights to the research based on the information-rich characteristic of interviewees. Academics have argued that having a small number of information-rich, hard-to-access participants such as senior professionals (compared to a large sample size with easy-to-access professionals) is much more valuable in providing adequate insights into a social phenomenon. As such, interviewees have been careful chosen based on their professional insights into the issues of collaboration and standardisation in the UKCS. In the recruitment of interviewees, the research team has paid attention to their seniority level in their respective firms as well as their years of industrial experiences to capture issues central to this research. The demographics of the interviewees are presented in figure 1.
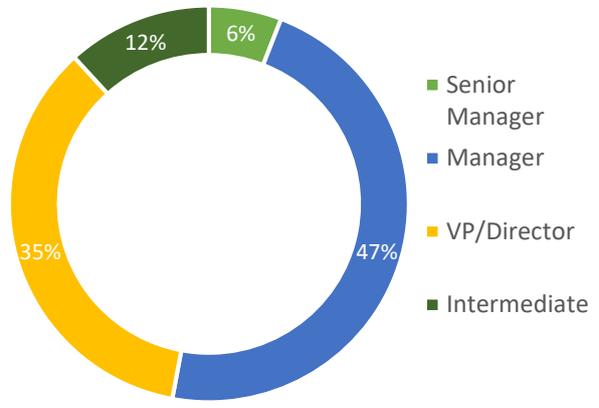
In the discussion of this study's findings, quotes taken verbatim from interviews have been used to strengthen the discussion of findings. Specific case studies have also been used for a similar effect. The interviewees will be identified using the coding of: "*Type of firm – Role of interviewee*", for example, "*Operator – Manager*".

Figure 1: Interviewee Demographics

Type of Firm

- Contractor
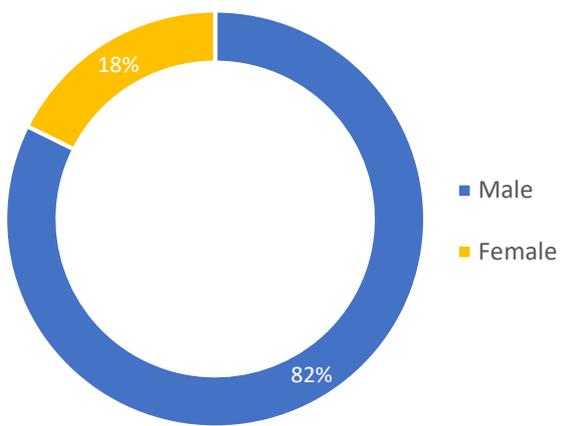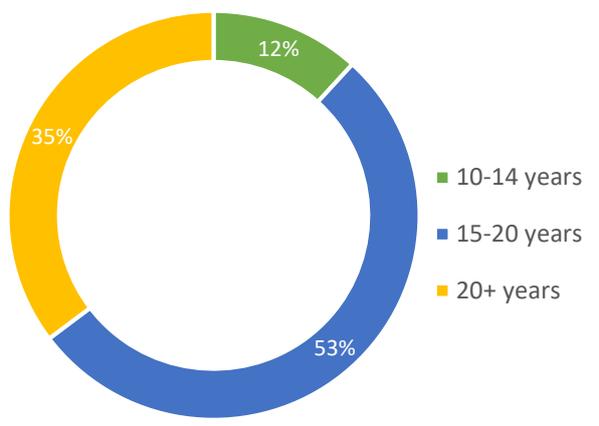- Operator

29%, 71%

Seniority Level

- Senior Manager
- Manager
- VP/Director
- Intermediate

6%, 47%, 35%, 12%

Gender

- Male
- Female

18%, 82%

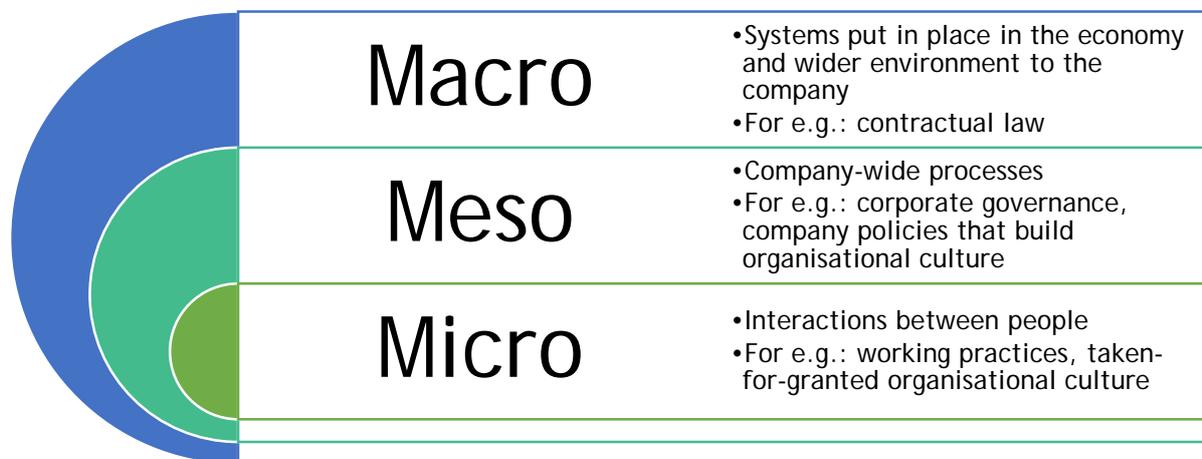**Years in the Industry**

- 10-14 years
- 15-20 years
- 20+ years

12%, 35%, 53%

2.0 WHY COLLABORATION?

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, 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 develop what it calls a 'culture of collaboration'.[3] The most recent downturn in the industry, and the need to improve efficiency, has once again made discussions around the necessity for collaboration more urgent.

Figure 2: Different Levels of Collaboration

Macro	• Systems put in place in the economy and wider environment to the company • For e.g.: contractual law
Meso	• Company-wide processes • For e.g.: corporate governance, company policies that build organisational culture
Micro	• Interactions between people • For e.g.: working practices, taken-for-granted organisational culture

The existing literature on collaboration for innovation distinguishes between three levels of collaboration (see figure 2). 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

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[3] Oil and Gas Authority, Stewardship Expectations, March 2017.

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.

While an industry survey of collaborative attitudes in the UKCS finds that 98 per cent of respondents see collaboration as an important part of the future success of their business, it was generally stated by participants in our study that collaboration is not something the industry in the UKCS has been 'particularly good at'.[4] Professionals we interviewed mostly were not able to give positive examples of effective collaboration, although there is some best practice sharing from bodies such as the OGUK. Study participants also expressed that that collaboration was something their company valued and did well, 'but not in the UK'. This different status of the UKCS was variously attributed to the mature nature of the basin, the highly commoditised and competitive nature of services and relatively weak regulatory drivers. These factors will be unpacked in greater detail throughout this report.

It is noteworthy, on the outset, that the term "collaboration" was frequently used by respondents in our research to describe relationships that might more properly be called a client-contractor relationship, in which the contractor provides a service to the client for which they pay. This conflation of shallow forms of working together with deeper partnerships that involve collaborative working practices indicates collaboration is still in its infancy in UKCS companies.

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[4] Deloitte/OGUK, 2018

3.0 BARRIERS TO COLLABORATION

Our study identified a range of barriers to collaboration in marginal fields' development in the UKCS. They included: competition, financing, low levels of trust, temporalities of collaboration, leadership and culture, regulation and measurement and a "culture of bespokeness".

3.1 Competition

Competition was the most frequently identified barrier to collaboration in this study. Concerns that competitiveness would be affected by collaboration and standardisation were strongly present in the data set. This can be summed up in one professional's statement that "commercial agreements can get in the way of good collaboration" (Operator – Project Manager). Competitiveness is both past and future-focused. On one hand, having invested in developments and particular technologies, operator firms want to maximise them for their own use, seeing these investments as a competitive advantage. On the other hand, standardisation of systems and technologies can be seen as a threat to some contractor firms, especially SMEs, as bespokeness in design is what constitutes their competitive advance.

Interviewees reflected on the conundrum of companies needing to collaborate in the UKCS, while simultaneously having to maintain a competitive element to maximise commercial and financial value. As one interviewee put it, "both parties looking to maximise their own share of what they're going to get out of this […] can certainly inhibit getting the best out of something," (Contractor – Lead Engineer). However, for a collaboration to work, companies need to have a mature understanding of partnerships that recognises that it is unlikely that every company in a collaboration manages to meet their absolute highest expectations on commercial and financial value. Rather, as one professional put it, partnerships need to hit the "sweet spot" across all the companies "where everyone gets the majority of what they want" (Operator – Senior Manager). In practice, the needs of their own company would typically be prioritised over other actor's in a collaboration, as a majority of interviewees reflected.

Existing industry reports on collaboration have tended to conceive of organisations as relatively homogenous entities, with operators and contractors seen as two poles of the

industry whose respective position is shaping propensity to collaboration.[5] In addition, however, respondents identified differences in collaborative value orientation between engineering and commercial sides of any company: "I think engineers in general want to work together and find the best solution. But obviously the commercial people are the ones that have to maximise the value for their company and that's perhaps often where relationships fall down, you know," (Operator - Engineer).

3.2 Over-focusing on Financial Performance

All interviewees mentioned that the competitive nature, which had caused a barrier to collaboration in the oil and gas industry, is related to the industry's culture of over-focusing on financial performance. The focus on financial performance can be understood from a company perspective and from an individual perspective. Firstly, from a company perspective, interviewees have likened the oil and gas industry to the "stock market," (Contractor – Engineering Director) whereby the value of a project is justified by the amount of "profit margins and turnover targets" (Contractor – Project Engineer). The focus on shareholder value, in this case defined as company's positive financial metrics, has assisted in the oil and gas industry reaching its unprecedented wealth in the past. Nonetheless, this focus on finance also has resulted in the industry's culture of competitiveness. Companies are constantly looking at maximising their short-term financial returns, which sometimes impedes the positive outcomes of longer-term projects.

A case study can be used to explain this effect. An interviewee with 20 years of industry experience explained that financial target pressures constantly affect collaborative projects, sometimes causing long-term risks despite having short-term financial benefits:

> "This week, we are supplying a piece of equipment for a current project
> and also supplying the installation tooling for it, as well. And then, when
> I advised the manager of the cost of it, I was then told, we don't have that
> in the budget, can you go back, and can you cut down the number of

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[5] Deloitte/OGUK 2018.

people that you're going to put offshore. And I said, well, that's putting, that's unnecessary pressure needed, you know, especially when […] I mean, my worry is that we're going to, the industry is going to cut away too much, and then it'll have another incident on its hands " (Contractor – Head of Development Solutions).

Interviewees pointed out that senior management often conduct risk assessments on projects and are sometimes reluctant to engage in collaborative projects that are uncertain in nature. This could be true in the case of collaborative projects that are related to innovative technologies, which are unattractive to senior management due to their highly unpredictable nature. This has resulted in the industry's image as being risk averse when it comes to approaching innovative technologies. As an interviewee claimed: "the industry faces the problem of rather than racing to be the first, it is racing to be the second," (Contractor – Director).

From an individual perspective, the focus on finance is related to the company's salary and benefits structure. The interviews were used to explore whether individuals have felt pressured to consider financial performances in their collaborations. Many of them told us that they have done so, with their personal bonuses often tied to the financial performances of the projects and/or departments they are working in. Looking at the trends of salary and bonuses in the UK, it is evident that the oil and gas industry is very much reliant on bonuses.[6] Around 43 per cent of employees in the industry claim to have received bonuses in comparison to other types of benefits, such as tax assistance, pensions, and health plans, among others. Interviewees felt that the focus on individual bonuses have resulted in an industry-wide culture which prioritises financial performance above all else. Such culture proves to be a barrier in collaborations as parties involved are more focused on the financial performance of their company and/or their project, bearing in mind the significance of their bonuses, which is linked to these financial performances. The over-focus on financial

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[6] See for example, HAYS (2016). *Oil & Gas Global Salary Guide*, March 2019: https://www.hays.de/documents/10192/1770028/hays-oil-gas-salary-guide-2016.pdf and Society for Petroleum Engineers (2018). *SPE Membership Salary Survey*, May 2019: https://www.spe.org/industry/docs/2018-Salary-Survey-Highlight-Report.pdf.

performances makes it difficult for members of a collaboration to agree on its mutual benefits, as each party prioritises the financial value of the project to their respective companies and/or personal gains.

3.3 Low Levels of Trust

Social scientists demonstrate that trust increases the efficiency and effectiveness of organisational cooperation and collaboration and of different dimensions of organisational innovativeness.[7] Conversely, it has been shown that institutional (or inter-firm) trust is generated by adherence to the social norms of the industry/business environment, which are set up over time. 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.[8]

Trust emerged as very important to most of our respondents when it came to thinking about what fosters collaborations. The ability to trust collaborators is shaped by competition and the perception that information cannot be shared if a competitive advantage is to be retained. A number of respondents spoke about collaborations failing "because there isn't any trust". While trustworthiness is clearly a personal quality, the openness and transparency of senior managers' leadership styles informed people's perceptions of certain companies as having a high-trust organisational culture or, of many others, a low-trust organisational culture.

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[7] Ellonen, R., Blomqvist, K., & Puumalainen, K. (2008). The role of trust in organisational innovativeness. *European Journal of Innovation Management*, 11(2), 160-181.
[8] Crabtree, E., Jane Bower, D. and Keogh, W., (1997). Conflict or collaboration: The changing nature of inter-firm relationships in the UK oil and gas industry. *Technology Analysis & Strategic Management*, 9(2), 179-192.

As an interdisciplinary team of researchers, we each approach trust from a different angle. These different conceptions have allowed us to grapple with the data in interesting ways.

According to Luhmann (1979), trust can be of two kinds: personal trust and institutional or inter-firm trust). In long-standing relationships between firms with stable workforces, both types of trust can develop.

According to Ellonen (2008) organisational trust can be split into interpersonal trust and impersonal (or institutional) trust, with interpersonal trust having two dimensions: lateral trust, which refers to trust within employees, and vertical trust, which refers to trust between employees and leaders.
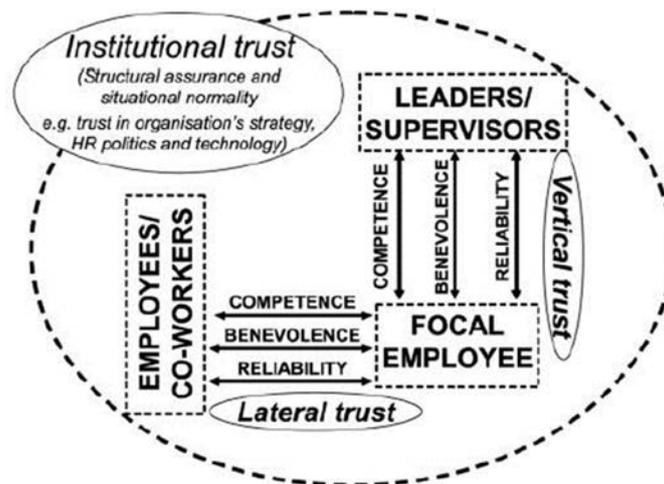
Existing surveys on collaboration in the UKCS have highlighted the importance of trust in collaborations (for example, see the Collaboration Review, Deloitte/OGUK 2018, which identifies trusted relationships as the most important reasons for successful collaboration in the UKCS). Our qualitative study allowed us to understand in greater depth and complexity understandings of trust as they relate to practices and experiences of collaboration. For example, respondents sometimes linked their thinking around trust to Aberdeen as a location with specific social and cultural dynamics. Aberdeen's small size was understood to be conducive to collaboration as people often knew one another quite well (also see figure 3 on

ideas around personal and institutional trust). Conversely, the same fact was said to hinder collaboration, as being able to gather information about others with ease makes it possible to develop distrust quickly. Employee competition over senior roles was also identified as a hindrance to true collaboration.

Professionals articulated various conceptions of trust that operate at different levels of the organisation. At the executive level, the general tone for a partnership can be set and mutual understanding needs to be reached about drivers for the collaboration, alignment of motivations, whether each company has the capability to work towards delivering agreed outcomes, and so on. However, trust cannot be established in a top-down fashion at this highest level; rather, it needs to be built through working practices by teams, whether in engineering or services, in organisations over time. Respondents identified a range of practices that help to increase trust at the level of teams: working together to generate an integrated plan that allows to set clear objectives and assign clear roles and accountabilities; open and honest communication, which includes transparency about where additional support might be needed; adequate time to have regular meetings and updates; and continuity of staffing.

3.4 Temporalities of Collaboration

The academic literature on collaboration and cooperation demonstrates that collaboration most frequently occurs in situations of extreme difficulty. In the case of the UKCS, the economic downturn was considered to have produced innovative and potentially collaborative approaches as operators sought to collaborate to be able to continue supporting early technology readiness level projects or participate in joint ventures. But with a renewed rise in the price of oil, older and more risk-advise ways of working resurfaced again. As one interviewee put it, "then your oil price goes back up again, you think, well, actually, my margins are fine, I'll go and do what I've done before because actually it's easier than doing something different" (Contractor – Head of Development). Timing is therefore of central importance in terms of changing mindsets and behaviours in relation to collaboration. However, in the case of marginal pools, the lower the oil price, the harder it becomes to

develop those sources, making pricing a further barrier to developing circular economy approaches in relation to small pools in the UKCS.

Short-term thinking was a particular concern raised by interviewees as shaping attitudes to collaboration in Aberdeen's oil companies. Short-termism partly is an outcome of employment practices such as contracting. Contracting is also likely to impact on levels of trust, the development of which in part depends on the longevity of relationships. [9] Conversely, positive experiences of collaboration and cooperation were credited by some as a result of continuity of staffing: "when I've worked on projects that have gone well, I've had continuity with the people I'm dealing with and those have gone on for several years. They've been there from the start, they're there at the end and then they understand everything that you've gone through," (Contractor – Engineering Director).

Timing and the temporalities of collaboration are also crucial when it comes to negotiating contracts and agreements for joint ventures. The length of time taken to negotiate a contract can threaten the commercial viability of the outcome of the collaboration:

> "You tend to find in the commercial and legal arena that everyone is looking to get the absolute best deal for their company, but the stress that that can bring, it can draw out the final drafting and sign off of these agreements because everyone's just looking for a little bit more and a little bit more and a little bit more. Where in effect a lot of the value from projects is moving quickly" (Contractor – Managing Director).

Collaboration can be fostered, at the macro-level, at the very start of a project by transparency about timelines. However, once collaborative agreements have been put into place, companies can differ significantly in terms of their temporal cultures, as some professionals reflected on. For example:

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[9] Crabtree et al 1997

"That's two cultures that have come together, maybe [we] were a bit more structured, whereas [one of the collaborators] was a bit more agile and a bit quicker on the move and I guess you're hoping to get a bit of cross pollination between them. But then it's difficult as well because people are set in certain ways of working now" (Contractor – Head of Development Solutions).

Macro-level collaboration then needs to be replicated by micro-level collaboration, such as fostering common working practices, which include temporal as well as spatial and cultural practices.

3.5 Leadership and Culture

The academic psychological literature has identified the most important personal attributes for effective collaboration to be: strategically minded; team-orientated; good communicator; open to sharing; creative/innovative; empathetic; believing in collaboration; good listener; behaving ethically.[10]

There was acknowledgement by the majority of participants that individual personality traits, attitudes and behaviours of senior managers play a significant role in fostering or hindering collaboration in the Aberdeen oil and gas sector: "I think leadership is absolutely key to that. Somebody who has the will to do things differently will lead the way and somebody who's maybe more risk-averse might go, well, collaboration would be good, but we've got our own ways of doing things and I don't really want to rock the boat" (project engineer - research organisation). The demographic profile of decision-makers in organisations and a resultant risk-adverse attitude were understood as an important individual barrier to collaboration. As one interviewee put it:

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[10] Institute for Collaborative Working, Understanding the Psychology of Collaboration: What Makes an Effective Collaborator? March 2017.
https://www.instituteforcollaborativeworking.com/resources/documents/research_report_2017.pdf

"There's a lot of people who are not far away from being retired so they're not really invested in the decisions that are being made and they've got no real desire to do things quickly because it actually works in their favour. They can have an easy life for the next few years and then they don't care." (Operator – Engineer)

Nevertheless, risk-adversity in relation to collaboration is also linked to competition and finance, as individuals will have been responsible for large spends on particular technologies they have been promoting for a long time.

One view was that leadership in the sector had changed away from the "big egos" of earlier times and towards people who are "behaviourally different":

"The sector is in a different stage in its evolution so maybe the kind of leaders that were needed before are a different kind of leader to the type of leader that we need now and maybe the people who are being promoted are the kind of people who are actually displaying collaborative type behaviours whereas before it was very much about elbowing anybody aside so that you could climb the career ladder" (Other – Organisational Development Manager).

This statement, and the perceptions of people at the end of their careers being more risk-adverse discussed above, might suggest that collaborative behaviours might organically evolve as personnel and leadership in the sector changes over time.

However, most participants felt that, rather than a generational issue, propensity towards collaborative behaviour was shaped by people's exposure to different company cultures and whether there was high or low trust. Just as individual risk adversity might be considered a barrier to collaboration, organisations overall can be more or less risk adverse, with operators often said to be particular risk adverse because of their histories of major accidents.

Organisational culture is also shaped by national culture and how national governments drive collaborative behaviours (or hinder them, by incentivising competition over collaboration). When describing the wider socio-economic and political context within which companies operate in the UKCS, our respondents frequently evoked comparisons with Norway. While involving the same continental shelf and many of the same contractors, there are many differences. While some professionals saw Norway as a positive example for standardisation and regulatory powers, for example through tax incentives that foster collaboration, others viewed this negatively as stifling competition. Positively, Norway was associated with "management by consensus": "You know, you get a big group of people together and everybody will eventually get to a decision. Versus the UK… is a bit more like the American sector, you know, I'll set my own way up. I know best" (Operator – Development Manager). While it was acknowledged that this consensual culture could mean that it might take longer to make decisions, the bespoke culture prevalent in the UKCS is costly and "limits the future" by not allowing to expand the system, as one participant put it.

Beyond the macro-level of collaboration, there was also a perception of Norwegian firms being more collaborative at the micro-level: "Norwegians do tend to be more collaborative, so I do believe it comes from an organisational level, and I'm not talking about *senior* senior, I'm talking all the way through" (Operator – Development Manager). Another interviewee reported "having some problems culturally between Brits and Norwegians" (Contractor – Senior Manager).

Others were less positive about the Norwegian approach, describing it as ''more hierarchical' or "driven more by the quality, the safety, but it doesn't have the same energy attached to it […] to deliver something," (Contractor – Executive Director). "The Norwegian attitude is very straight, very square, very blocked off" (Contractor – CEO).

3.6 Regulation and Measurement

The question of the role of national culture in fostering or hindering collaboration is interlinked with the issue of incentivising collaborative behaviour. The academic literature shows that regulation is an important factor in driving in innovation in industry, which in turn

is aided by collaboration. There was also an acknowledgement by our respondents that regulatory and mandatory processes drive collaborative behaviour in organisations. Again, professionals compared the UK with other countries where the regulatory environment was seen to better support inter-firm collaboration:

> "When you look at projects around the world, they're generally more successful in different areas. For example, in Norway they are more successful. It's the exact same water, it's the same areas, the same contractors. And often times, it just comes down to they just follow the rules." (Operator – Development Manager)

Recent regulatory efforts have centred around the establishment of the Oil and Gas Authority, which regulates exploration and development of oil and gas resources in the UKCS. A central part of its mandate centres on fostering a culture of collaboration in order to maximise economic recovery and reduce costs. To this end, processes at the OGA have included Supply Chain Action Plans (SCAPs) to ensure all projects – whether new field developments or decommissioning – put partnering with the service sector at the very heart of good project delivery. The OGA also developed an assessment tool for reviewing operators' collaborative behaviour. Their Collaborative Behaviour Quantification Tool identifies a set of behaviours that are seen as essential for the success of collaborative projects.[11] They are: to negotiate without taking advantage ('reasonable'); to establish joint needs and outcomes and deliver objectives, acting in the best interests of the joint effort ('aligned'); to learn from and share experience ('learning'); to consider the future implications of current issues ('strategic'); to evidence a constructive and flexible attitude to change ('change'); to demonstrate respect for all partners ('respect'); to accommodate needs of all stakeholders in order to deliver shared goals ('accommodating'); and to share information, and display constructive questioning, open and honest feedback, hold people to account for their unacceptable behaviour ('openness').

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[11] See https://www.ogauthority.co.uk/news-publications/publications/2017/collaborative-behaviour-quantification-tool/

> **Figure 4: Monitoring and Evaluation (M&E)**
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> *Monitoring* refers to the routine and continuous tracking of information about a project, often with a focus on outputs and collected for management and decision-making purposes. *Evaluation* consists of a periodic assessment of the outcomes, efficiency and impact of a project and is undertaken with a view to drawing lessons that may be more widely applicable. Ideally, the two should overlap significantly.
>
> In relation to collaborations, M&E can be used to assess how well teams and organisations work together in terms of resources (human, financial, technical), leadership and vision, management (aims, objectives, roles & responsibility; adaptability), cost effectiveness and sustainability (finance).

Participants, on the whole, spoke positively about the OGA's remit around stewardship and collaboration, although questions were raised about how effective it can really be in terms of driving behaviour change. It is especially noteworthy that use of the Collaborative Behaviour Quantification Tool was only mentioned by one of our interviewees. This is an important finding as it suggests that the regulator might need to engage in different ways with firms in order to foster changes in mindset in relation to collaborative behaviours.

Oil & Gas UK has developed a collaboration index, through which 22 operators and 20 suppliers in the UKCS rate one another on openness, incentives and business processes.[12] The annual survey's latest results, from 2018, indicate that a decrease in operators' overall scores as compared to suppliers. However, there were significant increases for individual operators who have implemented wide-reaching changes in their supplier engagement model, for example including the development of multi-year contracts to avoid tendering and foster collaboration, transparent open-book contracts, and incentive schemes for the supply chain.

In order to measure whether collaboration is effective, companies should monitor and evaluate collaboration continuously (see figure 4). Effective monitoring and evaluation (M&E) relies on collecting appropriate data, sharing this data across the partnership and ensuring

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[12] Deloitte/OGUK UKCS Upstream supply chain collaboration survey 2018. https://oilandgasuk.co.uk/wp-content/uploads/2018/08/Deloitte-UKCS-upstream-supply-chain-collaboration-survey-2018.pdf

that all collaborators feed into evaluations. This is a very commonplace practice in other industries that rely on inter-organisational collaborations, for example the international development or education sectors. However, as already noted, existing initiatives and tools in the industry are currently underused and ideas around collaborative behaviour are not widely employed.

When asked how they measured the success of collaborations their organisation was involved it, it became apparent that professionals did not measure rigorously and were mostly unaware of any practices or tools. The following kind of statement was common across the data set: "No, not rigorously or formally. It's more on a feel. Where I felt pretty bad or I felt pretty good" (Contractor – Managing Director). Others had indirect and arguably narrow ways of assessing collaboration: "I don't think we actually measure. I think the success of good collaboration usually shows up in schedule and cost, I would say" (Operator – Project Engineer).

At the same time, there was a perception that companies would seek to publicise the fact of collaboration even if they did not measure its effectiveness at all: "They tend to shout about it quite a bit when they do collaborate. At the conferences and that, kind of, stuff, you know, they tend to be quite pleased" (Other – Head of Development Solutions). There is then a disjuncture between companies wanting to be seen as good collaborators and implementing the kind of tools and practices that would allow them to find out whether they really are.

The responses from professionals cited in this section clearly indicate that measuring, if conducted at all, is in its infancy, and that insights and experiences from other industries about monitoring and evaluation collaborations need to be adopted if a collaborative culture is to be established.

3.7 Lack of standardisation and the "culture of bespokeness"

The question of standardising processes and equipment for marginal field development was at the heart of this research project. A report by the Oil & Gas Efficiency Task Force found that a standardised approach to subsea developments could create a sustainable cost saving of 25

per cent. Experience from industries such as computing and automotive suggests that making a step towards so-called Plug-and-Play technology – interconnective and interoperable – has the potential to significantly reduce lifecycle costs and supports the opportunity to change industry economic models. In the oil and gas sector, having standard components cuts manufacturing costs, reduces timelines for project delivery, and allows re-use and redeployment.

The subsea architecture in the UKCS has historically been bespoke. This has been an outcome of the expertise of operators and the particular characteristics of the basin. Operators have developed their own equipment standards based on their internal engineering knowledge, their experience of operations and the failures the company has experienced. In interviews, professionals talked about the difficulties of generalising oilfields, the importance of bespoke equipment for efficient and safe production, and the particular technical difficulties of challenging smaller pools as barriers to standardisation.

A reluctance towards standardisation is clearly an outcome of organisational expertise, knowledge and capacity, which smaller companies do not necessarily have. As one interviewee put it:

> "They're quite happy to go to the supply chain and ask for a standard component that meets these kind of high level requirements. It's got the benefit of standardisation, so low cost, faster delivery times, et cetera, but there may be a technical risk that they haven't understood because they don't have some of the history, maybe longer history that some of the bigger companies have. So you're obviously trying to strike a balance." (Operator – Project Manager)

However, our data shows that, beyond the geological requirements for specific equipment, there is a reluctance to shift away from what we have called a "culture of bespokeness" – a mindset and associated behaviours in UKCS operators of 'just wanting it a certain way'. This is well illustrated by a story one of our respondents shared about a client that asked for the system to be painted a specific shade of one colour. As he put it, "it's frightening how people

in organisations have somehow got themselves to a position where the colour of the system is important" (Contractor – Head of Department).

This culture could flourish because of the historical wealth of the sector. Oil prices of over US$100 per barrel gave rise to very high levels of bespoke engineering that would not be possible today. Despite a changed economic context, the "culture of bespokeness" has persisted and continues to shape organisations' ability and willingness to collaborate. This is because non-standardisation assists in creating competition for the oil and gas industry in the UK. Standardising creates a contradiction to this economic system that requires too much of a change for existing players. Nonetheless, standards and their resultant materials can also be understood as cultural products that express companies' histories, experiences, successes and failures, rather than purely the results of particular functional and technical requirements. Such a material culture perspective provides a deeper understanding of the continuing pull of the culture of bespokeness.

4.0 THE IMPORTANCE OF PLACE IN COLLABORATIVE ARRANGEMENTS: LOCAL CULTURAL DYNAMICS IN ABERDEEN

In contrast to industry reports on collaboration in the oil and gas sector, our study set out to examine the ways in which Aberdeen as a distinct place with particular social and cultural dynamics shaped understandings and practices of collaboration. We have already set out some of these dynamics as they relate to the cultivation of trust above. In contexts of relatively low institutional or inter-firm trust, personal relationships are relatively more important for the development of trust, and the size of Aberdeen and geographical proximity of firms appears to be conducive to such personal relationships.

All respondents spoke about Aberdeen as an oil and has hub as having particular characteristics. Size is one of the factors that makes the Aberdeen-based sector unique:

> "People are quite attached to [the industry] compared with other
> countries and regions of the world where there is oil and gas is, it's almost
> like a big village as opposed to the other main oil and gas centres of the

world like Houston where I worked before […] I would say that people want to try and look out for each other and look after each other a bit more here." (Contractor – Manager)

Many interviewees saw this small size as conducive to collaboration: "everybody knows everybody, you know, there's the six degrees of separation thing, you'll come across the same faces over and over again. So I think being a small place definitely gives more of an opportunity for collaboration" (Other – Project Engineer). It is common to work with the same people repeatedly in different companies, which makes it imperative to foster good and positive working relationships and "not to burn bridges", as one interviewee put it (Contractor – Manager).

These arguments are not so much about a particular Scottish (or Aberdonian) culture – though two respondents specifically commented on such a mindset – but rather about the diversity of people in a relative small area:

> "I think from a collaboration perspective we should be really good at that because actually, it's such a mix of people that have come in for whatever time horizon. They come in for five years, come in for three years, come in for 30 years. So, we should be good at collaborating because we are a big mix of people. It's not about the indigenous people versus the rest of the world, but it's actually about a lot of people from diverse backgrounds and skillsets coming together." (Operator – Project Engineer).

Beyond these place-based dynamics fostering particular relationship behaviours, Aberdeen, because of its long history and variety of projects, continues to be regarded as a centre of excellence for the energy business, respondents described it as a good place for people to train and develop and for companies to support their global projects from. The fact that there is history of engineering that goes back further than the emergence of the oil and gas sector, to shipbuilding, was highlighted as producing a particular mindset and work ethic of employees:

"I think we've got more people here who have come through the ranks in terms of… I'm talking about particularly technically. So they've done an apprenticeship, they understand how things work and then they've either gone down the technical leadership role or the business leadership role so they can talk with confidence and credibility. Whereas some places I go people have maybe gone and done an MBA and then they're the leader of the company. It's like they don't actually understand what's going on and I think here in the north-east of Scotland I think there's that legacy of engineering, there used to be so many shipyards and engineering." (Other – Organisational Development Manager)

At the same time, respondents reflected on the limitations of Aberdeen as a market. A lack of maturity in the supply chain was associated with accepting lesser quality work. As there are few contractors who can do all the work on any project, "basically people keep going back to a company, they say, well they never do a good job but we just go back to them, because they're the only one in the market," (Operator – Development Manager). Another respondent, when asked about negative examples of collaborations, stated that "Aberdeen's too small to say that we'll never work with anybody ever again. So, we chalk that down to experience, it's a lesson learnt" (Contractor – Managing Director). The Aberdeen oil industry's size and composition then also means that there is little incentive to increase collaborative behaviours within organisations.

In summary, while survey-based collaboration study often treat place as unimportant or neutral. Aberdeen's specific social and cultural characteristics are central to understanding what fosters or hinders collaboration.

RECOMMENDATIONS

- Develop initiatives to encourage micro-level collaboration
  - How can companies' cultural, spatial and temporal working practices become more collaborative? This might involve building in time for discussions, workshops, trainings, and other relevant micro-collaboration activities.

- Develop appropriate monitoring and evaluation processes for collaboration
  - Insights and experiences from other industries about monitoring and evaluation collaborations need to be adopted if a collaborative culture is to be established
  - This also includes increased publicising and training on existing processes so that they can become behaviour changing tools

- Use collaboration as a key performance indicator

- Fund an initiative to move collaboration from a buzzword to action

- Score all organisations on collaborative behaviours

- Follow the Norwegian example of collaboration in creating industrial standards

- Trial a Super Joint Venture to create a new organisation targeting efficiencies in marginal developments

- incentivise innovative organisational structures
  - This would particularly involve flat organisational structures which facilitate collaboration and reduce resistance to change

CONCLUSION

A transition towards a model such as the circular economy currently seems to be the only way we can continue to use the resources of this planet symbiotically, and not in a way that leads to the planet's and ultimately humanity's destruction.

A circular economy in the oil and gas industry can include built-in modules of subsea infrastructure, which can be redeployed, designed in a way that is aimed for disassembly, not decommissioning. This can be achieved by standardising processes and technologies across the sector. Experience from industries such as computing, electronics, and automotive suggests that making a step towards Plug-and-Play technology has the potential to significantly reduce lifecycle costs. However, such efforts must be conducted collaboratively between companies, which is a difficult task in an industry that is characterised by bespoke equipment and processes. In response to this challenge, our project investigated industrial culture and organisational behaviour to identify barriers to collaboration within the oil and gas industry.

Our study identified a range of barriers to collaboration in marginal fields' development in the UKCS. They included: competition, financing, low levels of trust, temporalities of collaboration, leadership and culture, regulation and measurement and a "culture of bespokeness".

We also find that Aberdeen as a distinct place with particular social and cultural dynamics shaped understandings and practices of collaboration, for example in relation to the cultivation of trust, which is a key driver of (or barrier to) trust. While survey-based collaboration studies often treat place as unimportant or neutral, Aberdeen's specific social and cultural characteristics are central to understanding what fosters or hinders collaboration.

Finally, we have provided relevant and actionable recommendations and this research now stands as a call to action for the industry.