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‘Frame conflicts’ in natural resource use: exploring framings around Arctic offshore petroleum using Q-method

Abstract

Environmental and natural resource issues are often framed in multiple ways by different stakeholders. Given their complexity, how these issues are framed can diverge significantly, leading to ‘frame conflicts’. Frame conflicts have implications for decision-makers when addressing socio-ecological problems; this is especially the case for Arctic offshore petroleum. Q-method is used to explore framings found across a group of stakeholders on the issue of Arctic offshore petroleum development, to empirically demonstrate the extent of frame conflicts and to explore possible bridges for consensus between these framings. The issue was framed in various ways: as a global sustainability concern; a development panacea for Arctic communities; an issue where economic reality clashes with environmental idealism; and an issue centred on local sustainability concerns. Despite significant divergence across framings, some potential bridges of consensus were evident, centring on ideas of traditional livelihoods, the importance of emphasising ‘human’ aspects of the debate and the inherent risks involved in Arctic offshore petroleum. The implications and challenges of frame conflicts around Arctic offshore petroleum are discussed.

Keywords

Frame conflicts, Arctic offshore petroleum, Q-method, Arctic stakeholders

1. Introduction

Environmental and natural resource issues are often framed in multiple ways by multiple stakeholders (Dewulf et al., 2005, Lewicki et al., 2003). Given their complexity, how these issues are framed can diverge significantly, leading to 'frame conflicts'. For many, the central challenge in tackling socio-ecological problems centres on these conflicting perspectives: from how problems are initially defined to what are appropriate solutions, these issues are social and political constructs and arenas for deep disagreement (Hisschemöller et al., 2001, Norton, 2012). As the requirement to further involve stakeholders becomes embedded in environmental policy (Reed et al., 2009, Bulkeley and Mol, 2003), choosing a course of action amidst seemingly incommensurable worldviews can prove a near-impossible task. This becomes harder still when the issue is regional, transboundary or global in scope (Susskind, 1994).

This is especially the case in relation to Arctic offshore petroleum development (hereafter Arctic offshore): a deeply-contested issue that has received much global attention in recent years (Keil, 2014). The extent of contention over the issue is perhaps best symbolised by incidences in 2010 and 2013 when environmental protesters attempted to occupy offshore rigs in both Greenlandic and Russian waters respectively; events that brought stakeholders vehemently opposed with those in favour[1]. The issue is complex, bearing the hallmarks of 'wickedness' that typifies modern sustainability challenges (Kämpf and Haley, 2014; Xiang, 2103, p2) offering fertile ground for frame conflicts to emerge.

In practice, sustainable development often translates as 'negotiations in which workable compromises are found that address the environmental, economic and human development objectives of competing interest groups' (Kates et al., 2005, p19). How issues are framed, and the negotiation between these framings, lies at the heart of sustainability challenges, especially for an issue as deeply contested as Arctic offshore. As such, a better understanding of framings and the bridges between conflicting frames is vital, as this aids 'progress in developing and implementing sustainability and resource management policies' (Curry et al., 2013, p624). This paper contributes to this understanding by using Q-methodology to investigate frames within a group of 'stakeholders' around the issue of Arctic offshore. Increasingly used in the

[1] http://www.bbc.co.uk/news/world-europe-24170129

environmental social sciences (Doody et al., 2009, Sandbrook et al., 2010, Albizua and Zografos, 2014), Q-methodology aims to capture subjective opinions through 'inverting' the factor analysis procedure often used in conventional survey and questionnaire methods (Watts and Stenner, 2005). As opposed to establishing patterns across traits (such as age, gender etc), it seeks to establish patterns 'within and across individuals' (Barry and Proops, 1999, p339). From a combination of statistical analysis and subjective interpretation, social perspectives surrounding a certain theme or subject are deciphered. Unlike other more discourse-inspired approaches towards policy frames that are qualitative in nature, Q-methodology combines statistical techniques and subjective interpretation to empirically explore 'frames' (or 'viewpoints') in a structured and organised manner (Cairns and Stirling, 2014, Franzti et al., 2008, Barry and Proops, 1999). This systematic methodological approach gives Q-methodology particular value when investigating framings around controversial environmental and resource issues (Cotton and Mahroos-Alsaiari, 2015).

The study's aims are as follows: to explore and detail framings around the subject of Arctic offshore; to empirically demonstrate the extent of 'frame conflicts'; and finally to explore possible bridges for consensus between these framings. The paper takes the following format. Firstly, there is a brief outline of the literature on frame conflicts in natural resource use and Arctic offshore. The methodology section details each stage of the Q-method process used in this study. The results section presents five frames before detailing potential bridges for common-ground between these frames. Implications of these findings are discussed before concluding remarks.

2. Literature review

2.1 Frame conflicts around natural resource use

The complexity of socio-ecological problems, such as those related to natural resource use, is well-documented (Ostrom et al., 2009). They possess an inherent complexity that makes them difficult to define and distinguish from other problems (Chuenpagdee and Jentoft, 2009). As such, they involve a situation where 'different participants in public discourse, acting on very different interests and diverse values, will not only differ about the ends and the means toward

social improvement, they will also differ regarding how to formulate, or "frame" what is the real problem to be addressed' (Norton, 2012, p5). 'Framings' (or 'frames', used interchangeably here) serve as a useful means in which to articulate the various ways such complex, multifaceted issues are perceived into something more coherent and meaningful (Gamson et al., 1992, Cairns and Stirling, 2014). As 'underlying structures of belief, perception and appreciation' (Schön and Rein, 1994, p23), frames put emphasis on certain aspects of an issue and in doing so shape problem and solution definitions (Entman, 1993).The way in which an issue is framed can diverge significantly; diverse and conflicting frames around natural resource use are commonly found (Dewulf et al., 2005, Lewicki et al., 2003), prioritising different socio-economic and environmental aspects, ascribing differing values or placing importance at different scales (Cairns and Stirling, 2014, Leach, 2008, Van Lieshout et al., 2011).

These frame conflicts have policy implications for decision-makers when addressing socio-ecological problems, especially in light of the shift in environmental policy towards '[t]he inclusion of a wider range of stakeholders and publics and for open and more deliberative policy-making forums' (Bulkeley and Mol, 2003, p144). Ultimately, the greater the number of stakeholders involved, the greater the possibility for conflict (Zhang and Fung, 2013). As the ways in which socio-ecological systems are interconnected in an increasingly globalised world becomes better understood, the net identifying 'relevant stakeholders' must be cast wider, adding further complexity to stakeholder definition (Thompson and Whyte, 2012, Waddock, 2011).

Whether consensus between irreducible worldviews is near-impossible or indeed desirable (Nie, 2003, Cairns et al., 2014), there is growing understanding that effective policy requires some degree of unavoidable coordination between these conflicting perspectives (van den Hove, 2006, Reed et al., 2009). Some argue that differences in belief can converge if stakeholders are better informed about the issue and that an optimal policy solution is attainable (Small et al., 2014). However, generally there is a belief that socio-ecological problems have 'no single best solution, [therefore] decision makers must seek management policies and processes that are "satisficing"—that is, potentially broadly acceptable and implementable—rather than optimal' (Balint et al., 2011, p2). As such, trade-offs and compromise are inevitable (Cairns et al., 2014, Norton, 2005).

2.2 Arctic offshore petroleum and 'Arctic stakeholders'

The Arctic is commonly cited as representing a complex socio-ecological system facing an array of unique challenges (Roberts et al., 2010). The Arctic has received considerable attention in recent years, commonly attributed to pronounced sea-ice loss from rapid climate change and the subsequent increased accessibility to the region's abundant natural resources, especially offshore petroleum (Humrich, 2013). The issue is complex, comprising of myriad, interrelated elements at various scales: climate change's relationship with fossil-fuel use and the Arctic in particular; a warming, ice-free Arctic's role in various global and climatic processes and feedback mechanisms (Kelmelis, 2011); the risk of a large oil spill where the socio-ecological impacts are often predicted as devastating (Huntington, 2009), with what constitutes adequate safety measures and appropriate liability fiercely debated; the tensions of negotiating economic security for Arctic communities and nations with concerns of environmental protection under the spotlight of global NGO campaigns; and globalisation and its implications for traditional livelihoods (Exner-Pirot, 2012).

Research on Arctic offshore which explicitly focuses upon stakeholder perspectives is relatively sparse; one research gap this paper aims to address. Work includes Mikkelsen and Langhelle (2008) who explored the sustainability implications of Arctic oil and gas by undertaking a pan-Arctic discourse analysis, which reiterated the fundamental tensions between economic, environment and indigenous rights around the issue. Similarly, McDowell and Ford's (2014) work looking at community perspectives around offshore in Northwest Greenland observed a mixture of nuanced perspectives with an acute awareness that trade-offs were inevitable. In contrast, Jensen (2007) finds a more simplistic dualism in Norwegian media discourse, one where pro- and anti- stances are clearly defined. In its use of Q-method to uncover framings around Arctic offshore and examine disagreement and consensus, this study expands upon this previous research.

Regarding Arctic offshore it is worth noting Avango et al. (2013) when they ask, 'But when and how do these hydrocarbons become a resource, and for whom? Who are the actors that articulate Arctic oil and gas as a resource?' (p439). The literature often makes reference to 'Arctic stakeholders' (Exner-Pirot, 2012), or the region's 'main actors' (Keil, 2014) but rarely specifies who fits into this category or where the line is drawn. Indeed, often when stakeholders are the focus, legitimacy is assigned to some without any explanation as to why others are deemed illegitimate (Reed et al., 2009, Friedman and Miles, 2002). In the case of offshore, the

lines are especially blurred given the association with global processes like climate change and energy markets as well as more ground-level concerns such as oil spill pollution and Arctic indigenous communities. As such, this study's approach to defining stakeholders around the issue echoes Young (2012) when he claims 'both non-Arctic states and non-state actors have legitimate interests in what happens in the new Arctic' (p405). In light of the 'geography of voices' changing in the Arctic (Heininen et al., 2013, Avango et al., 2013), the net on what constitutes a stakeholder is cast wide for this study to reflect the issue's wide-reaching and multi-scalar nature.

3. Methodology

Whilst there is flexibility and creativity in the Q-methodology process, it often follows five distinct stages (Eden et al., 2005, Cairns et al., 2014). Firstly, a 'concourse' is developed. The concourse represents the 'volume of discussion on any topic' (Dryzek and Berejikian, 1993, p50); its development involving the collection of statements that are broadly representative of opinions surrounding a particular issue. Once completed, the concourse is then refined into a 'Q-set': a smaller, more manageable, collection of opinion statements that maintains as much coverage and balance of the broader concourse as possible. The Q-set is then given to a purposively-selected group of participants. Participants are strategically chosen who are knowledgeable and have well-informed opinions on the subject area (Frantzi et al., 2009). Conventionally, they are asked to sort these statements within a quasi-normal distribution. This is done not out of necessity, for the statistical technique does not require it, but to encourage participants to think more carefully about their rankings (Barry and Proops, 1999). During the Q-sorts, it is recommended the researcher asks participants about why they are ranking certain statements and allowing for open-ended comments at the end to add depth to insights gathered from the sort (Webler et al., 2009). Once participants have completed the sorting process, correlation and factor analysis is then applied to the collated dataset. This analysis uncovers patterns across participants' responses, distilling 'particular combinations or configurations of themes which are preferred by the group' (Watts and Stenner, 2005, p70). The final stage involves the researcher verbally interpreting these emergent patterns and what they represent.

In this study, the topic of focus was defined as 'the debate surrounding offshore petroleum development in the Arctic'. A semi-naturalistic approach (Cairns, 2012) was taken to concourse development. Statements were collected from a range of primary and secondary sources between September 2013 and February 2014. Sources included: informal interviews during a field visit to Nuuk, Greenland in October 2013 and amongst delegates at various Arctic themed conferences; Arctic-related policy publications (e.g. Arctic Council documents); NGO campaign literature; media and academic publications. In total, 311 statements were collected before reaching 'saturation': a point where it was felt the addition of further statements no longer contributed to the concourse's diversity (Eden et al., 2005).

As this study was not testing a particular theory, an 'unstructured approach' was taken (Cairns 2012) in refining the concourse into a Q-set. Key themes were identified within the concourse and statements categorised in order for the Q-set to be as representative of the concourse as possible, with efforts made to ensure there was a balance of pro and anti-offshore statements. The categories and number of statements within each were as follows: Environmental and socio-economic impacts (14); Governance issues (18); Climate change and fossil-fuel use (14); Arctic characteristics (8); Technical challenges and oil spills (14). In total, the Q-set comprised of 41 statements (presented in Table 4.1). Whilst a Q-set that perfectly captures every aspect of a topic is in reality not possible, not too much concern should be placed on achieving a 'perfect Q-set', for it is how participants engage with the statements that Q-method is interested in. As Stainton Rogers (1995) writes, 'even a less than ideal [Q-set], because it invites active configuration by participants ("effort after meaning"), may still produce useful results' (p183). It is believed the Q-set devised here is sufficiently representative of the debate surrounding Arctic offshore to explore framings of the issue.

Unlike conventional R-statistics, participants are the 'variables' in Q-method studies, the items (in this instance, the statements) are the sample. Therefore it is important that participants are carefully chosen in the same fashion that irrelevant or poorly-thought variables in an R-statistical survey are not desirable (Watts and Stenner, 2012). Here, participants were strategically chosen on the basis that they were likely to have expressed views on Arctic offshore and would represent a diversity of opinion on the subject. Whilst the aim of this study is not to conduct a comprehensive stakeholder analysis per se (for example Wilkes-Allemann et al. (2015)), participant sampling was undertaken with the intention of achieving as diverse a pool of stakeholders as possible. This involved community members of Aasiaat, Greenland, a town that served as a base for oil exploration in 2010 as well as delegates of various Arctic-

themed conferences[2] that took place in late-2014/early-2015, where discussions around oil have featured prominently in recent years. In total 38 participants were recruited, a number within the range of 20-40 found in most Q-studies (Brown, 1980). Participants included public sector workers, high-school teachers, fishers, tourist operators in Aasiaat and representatives from large oil companies, environmental NGOs, Arctic Council groups, media and academic institutions amongst the Arctic conference delegates.

Participants completed the Q-sort using the software package FlashQ between August 2014 and February 2015. Participants were initially asked to read statements and place them into three categories: Agree, Disagree and Uncertain. Next, they were asked to rank statements in a forced quasi-normal distribution from -4 to +4 depending on how representative or not they are of their views, with -4 being 'most disagree' and +4 being 'most agree' (see Figure 3.1). Once the sort was completed, they were interviewed about their statement rankings. Q-sort interviews in Aasiaat took place in-person, whilst interviews with Arctic conference delegates took place online through the use of Skype. For Aasiaat-based participants, the statements were translated into Danish[3] by a professional translator and an interpreter was on-hand during follow-up interviews. Not all participants partook in follow-up interviews due to time constraints, although the vast majority did (36 of 38).

Once data was collected, all 38 Q-sorts were inter-correlated with one another to form a correlation matrix. Using PQMethod software, principal component analysis (PCA), a factor analysis technique, was performed on this matrix to extract 'factors', a factor representing 'patterns or clusters of similarity' within the correlation matrix (Watts and Stenner, 2012). Statistical criteria were used to determine the number of factors extracted (detailed in the following section)[4]. The extracted factors were then rotated using Varimax orthogonal rotation technique in order to 'maximise the amount of study variance explained' (ibid, p125). Ultimately, the use of PCA and Varimax are the more objective and 'mathematically-correct' statistical techniques available to identify patterns amongst the Q-sorts. Factors are represented by 'factor arrays', essentially an 'idealised Q-sort' calculated by averaging sorts that

[2] Arctic Circle Assembly (www.arcticcircle.com) and Arctic Frontiers (www.arcticfrontiers.com)

[3] Statements were not translated into Kalaallisut (Greenlandic) on the advice of scholars based at Ilisimatusarfik (University of Greenland). Unlike English and Danish which are similar languages with a shared linguistic ancestry and are easily translatable from one another, Kalaalissut is so linguistically different that ensuring the meaning of statements would be translated was not possible.

[4] It should be noted, however, that the use of such statistical criteria is not wholly objective and whilst such criteria helpfully guides the factor extraction process, it ultimately a subjective process (Watts and Stenner, 2012).

significantly loaded on a particular factor (Watts and Stenner, 2005). These arrays represent approximations of the frames expressed by extracted factors, what Cairns et al. (2014) describe as 'hypothetical constructs' (p16). These constructs were then interpreted subjectively, facilitated by both the use of z-scores (which allowed for inter-factor comparison) as well as extensive reference to follow-up interview transcripts and notes (Frantzi et al., 2009).

4. Frames

Four factors were extracted from the collated Q-sort matrix. This number was determined using a variety of statistical criteria commonly-used in PCA extraction (Kaiser-Guttman, two-or-more significantly loading Q-sorts and Humphrey's rule (Watts and Stenner, 2012)), all of which were satisfied through a four factor solution (upward of a four factor solution, only a few participants loaded on additional factors, with these factors significantly correlating with one another). In total, these four factors accounted for 51% of cumulative variance, above the 35-40% Watts and Stenner (2012) describe as 'ordinarily considered a sound solution on the basis of common factors' (p105). Once extracted, estimated 'factor arrays' were created by averaging the sorts that significantly loaded onto a particular component ($P<0.01$)[5]. Participants who significantly loaded onto more than one factor were deemed 'confounded'; these sorts were not used to estimate arrays (Watts and Stenner, 2005). Where participants significantly loaded negatively onto a factor, a mirror-image of the factor array was used for analysis (Watts and Stenner, 2005). Factor arrays are presented in Table 4.1 and participant loadings for each factor presented in Table 4.2. Verbal interpretations of the frames uncovered are now discussed.

<u>Frame A: Unsustainable development: from global climate to local communities</u>

Arctic offshore is an environmentally and socially damaging activity at various scales: ranging from its global environmental impact through association with climate change (#24,+4;

[5] This significance is calculated, according to Brown (1980), by the equation $2.58(1\sqrt{N})$ with N equalling the number of statements in the Q-set.

#28,+3) to the social impacts of vulnerably-placed local communities (#22,-3; #36,+4; #41,+3). Arctic offshore's association with climate change is a big concern and deserving greater attention in the debate (ARC10: *"I don't* think there is enough discussion, especially at these Arctic con*ferences. There seems to be a huge disjuncture or some cognitive dissonance"*). Furthermore, offshore is unnecessary either as an economic imperative or as a commodity to the global market (#37,-3; #29,-4; #31,-4) (ARC11: *"I am not sure we have a need for* petroleum, we have a need for energy for sure, but maybe we would just leave this kind of *development behind"*). There is a feeling the activity is too risky, especially in the Arctic (#20,+3; #26,+2; #8,-4; #4,-2). Every aspect of the activity is not opposed: there is acceptance fossil-fuel dependent societies cannot completely forgo oil extraction (#27,-2) and there is no strong belief that oil companies are particularly reckless (#40,-1). Nevertheless, offshore drilling in the Arctic is an activity antithetic to notions of sustainable development at all levels.

Frame B: 'Development panacea' for Arctic communities

Arctic offshore serves as a 'development panacea' for Arctic communities. Positives associated with activity are manifold: local communities will benefit immensely, with Arctic nations receiving a considerable economic boost, money that can fund better healthcare, education and greater independence (#9,+4; #13,+4; #6,+3). Furthermore, local communities are included in these projects, their livelihoods unthreatened (#22,+2; #21,+3; #18,-2; #38,-3) (ARC1: *"I think* that might have been a risk many years ago, but I think local communities are incredibly vocal *and I think very powerful"*). The benefits are not just locally or nationally based: Arctic petroleum is essential in providing an invaluable commodity to a global market (#31,+3; #27,-4). As such the notion of the Arctic being a conservation area with zero drilling is strongly rejected (#39,-4). Responsible offshore development with minimal environmental impact in the Arctic is possible, with a feeling too much emphasis has been placed on the environmental aspects of the issue (#4,+3; #5,-3; #20,-3; #40,-4; #25,+4), especially from people unfamiliar with the Arctic region (#23,+1; #30,-3) (ARC6: *"I think it is easy* when you are far away from a place, it is easy to make some predetermined judgement on what should happen there based *on your values, you end up building it out of ignorance"*). Climate change is an unimportant aspect of the discussion (#1,+1; #7,0; #10,-1; #24,0; #28,0) (AAS6*: "Global warmi*ng and offshore oil are not related*"*).

Frame C: 'Economic reality' > 'environmental idealism'

Ideally petroleum would stay underground and the Arctic environment kept pristine. However, in reality the economic opportunities are too great and the world requires petroleum with Arctic reserves likely to play an important role (#37,+4; #27,-2; #29,+3; #31,+2) (AAS1: *"It would* look good in an idealistic vision, but the *money would be too great, you cannot ignore it"*). Arctic offshore brings many positive opportunities, most notably economic ones for Arctic nations and communities (#9,+2; #13,+3), and can take place without impeding traditional livelihoods or excluding local people (#4,+4; #20,-3; #18,-2; #41,-3). Whilst importance is placed on the relationship between climate change and fossil fuel use (#28), Arctic communities should not feel guilty taking advantage (#1,+2 #10,+1), as there is a belief that little can stop climate change from happening (#32,+4). There is a tension between what is realistically possible with what is ideally preferred. This is reflected in uncertainty and indecision around certain aspects of the issue; for example the extent in which local communities are involved in projects (#41,-3; #22,-3) or how much concerns surrounding climate change should affect development (#28,+3 #10,+1).

Frame Cii (bi-polar): Uncertainty, wary of exaggerated environmental risks

The issue is complex and though there are some arguments in favour of Arctic offshore, in reality it is not environmentally-safe (#5,+4; #39,+4; #20,+3; #4,-4) nor economically-beneficial (#37,-4; #29,-3; #13,-3; #31,-2) enough to justify. Nevertheless, the environmental risks are often overstated, especially by environmental groups (#23,+4; #8,+2; #17,+3). The complexity of socio-economic and environmental factors involved in the issue entails contradictory attitudes around certain aspects are inevitable (#41,+3; #22,-3; #28,-3; #10,-1).

Frame D: Local sustainability at risk

Environmentally-responsible offshore drilling in the Arctic that provides significant economic development to local communities is illusory. Oil drilling without deleterious environmental impacts is not possible (#34,+2; #19,+2; #40,+2; #38,+1) and local communities are unlikely to receive much of any economic benefits, income which is anyway not imperative (#13,-4; #6,-3; #37,-2) (ARC16: *"I mean all the b*enefits they are talking about, that the oil and gas industry can bring to a particular region is just not like that. Yes it creates jobs for places but *not for the locals"*). As such, there is too much global attention surrounding the issue, when in

reality minimal activity is actually taking place and won't for decades (#33,+2; #17,+3). Issues related to impact on local communities should stand at the forefront of the debate, with the effects of offshore development on people around the globe less of a concern (#30,-2): whether it is the role of Arctic petroleum in global commodities markets (#29,-4; #31,-3) or wider environmental concerns around climate change (#24,-2; #32,+3; #10,-2).

5. Disagreement and consensus statements

By analysing variance across z-scores it is possible to observe consensus statements as well as the most contentious statements across factors. Statements that most polarised opinion are of interest as they represent aspects of the debate likely to lead to confrontation and conflict. The five most contentious statements are presented below.

1. Arctic reserves could hold enough oil and gas to meet global demand for several years. The world has a need for petroleum and so it is important this resource is exploited (31)
2. The Arctic has responsibility to provide some of the commodities the world is going to need (29)
3. There is a risk that local communities will become mere 'spectators' amid the oil rush (41)
4. Arctic nations such as Greenland need the money oil brings for education and health (13)
5. It is regrettable that the Arctic will not be kept pristine but the economic opportunities from Arctic offshore petroleum are too great to ignore (37)

The two most contended statements revolve around the importance of petroleum and resource exploitation in general. A clear divide exists between those who perceive Arctic offshore as necessary in the context of an oil-dependent world and those who believe the opposite: that a shift in the world's relationship is required, if not abruptly at least as part of a longer-term vision. Other highly-contested statements centre on the economic imperative for Arctic nations and communities and the extent in which these communities are likely to be excluded, either in the decision-making process or from any economic windfall.

PQMethod presents statements that did not distinguish between any factors at a non-significance of both $P<0.01$ and $P<0.05$. No statements met this statistical criterion for

'consensus', often used in Q studies (see Sandbrook et al., 2010, Cotton, 2015, Cairns et al., 2014). This indicates the extent of frame conflicts amongst the sampled Arctic stakeholders. However, factor analytical techniques such PCA and Varimax are not the only means in which to analyse data collected by the Q-method process. There is potential to interpret the dataset via alternative means to explore possible avenues for consensus (Cotton & Mahroos-Alsaiari, 2015). Firstly, by analysing follow-up interview transcripts where participants were asked to expand upon their feelings towards the statements and secondly, by examining closely how participants initially categorised and then ranked statements.

Possible areas for consensus emerged, with several statements of particular interest: 18, 36, 25, 15, and 8. Statement 18 (Offshore drilling directly infringes on the ability of Arctic indigenous communities to continue with their traditional livelihoods) was generally ranked low by participants, standing as seventh in terms of consensus across discourses. Given frames B and C's emphasis on local benefits from offshore development, a low placement might seem unsurprising. However, for the more critical frames A and D, there were also a relatively low placement for A (0) and a notably low score of -3 for D. Follow-up interviews provided various insights as to why this statement was generally disagreed with. The term 'traditional livelihoods' is significant here, as even participants who emphasised how oil development could have detrimental societal impacts still tended to disagree traditional livelihoods would be impeded. For some, this was because the notion of traditional livelihoods did not tally with the modern reality; they no longer existed or were disappearing already. Some referred to past experience of oil companies working in the town and saw no reason why such activity would infringe on traditional livelihoods. Then there is the belief co-existence between modern industry and tradition is a viable possibility, that strength of traditional culture is too strong for it to disappear and that an ability to adapt is a fundamental part of the indigenous identity. It is clear that what constitutes traditional livelihoods and subsequently how they could be affected by offshore is subject to debate.

For statement 36 (Most Arctic indigenous communities are in a vulnerable position regarding private companies, lacking the resources and capacity to represent themselves adequately in relationship with industries like the oil sector), participants generally agreed with this sentiment, the statement ranking the fourth-highest average score (1.34) and only 5% placing the statement in the negative category during initial sorting. For many, this power disparity is obvious, inevitable and just the reality of the situation. Arctic communities will always be vulnerable when faced against the power of oil companies, due to their small

population sizes and limited education opportunities. One participant explained how these communities are already in a vulnerable position due to their dependency on the state, with oil companies likely to simply replace the state if offshore projects came into fruition. Ultimately, it seemed generally accepted amongst participants that underrepresentation in some form was inevitable given the circumstance.

Statement 25 (There should be more focus on emphasising 'a human dimension' to the debate about offshore oil drilling in the Arctic, not just the environmental one) ranked eighth in terms of consensus across frames and was received favourably by participants (73% agreed with the statement). Only one participant initially placed the statement in the 'disagree' category. The statement bridged the gap between frames, the 'human dimension' component interpreted in various ways. For those with a more positive inclination towards Arctic offshore, the need to emphasise the 'human' stemmed from a concern the Arctic was perceived as 'a pristine environment that needs to be locked up and saved for the rest of humanity' and 'ignores the fact that people live there and subsist from, work within and play in this area'. Those with an inclination to oppose offshore felt an overemphasis on environmental aspects of the debate risked relegating Arctic peoples' desires and concerns out of consideration. There were also those who felt there was a false dichotomy in talking about offshore in separating environment and human as they were inherently intertwined. That there was more to the Arctic offshore debate than just environmental concerns was reiterated throughout by participants.

Statement 15 (What is needed for Northern territories across the Arctic is not only hope that petroleum will provide everything they need but to have longer term strategies in place that do not depend so much on petroleum development) was the highest-ranked statement across the participants, no-one initially disagreed and only four were uncertain. The statement emphasised the importance of thinking longer-term, reflecting participants' points of view that there was too much short-termism surrounding the Arctic offshore debate, be it in discussions around economic prosperity for Arctic communities, becoming heavily-dependent on single resource or how important Arctic resources would be to global society in the long-run.

Lastly, the frames presented in this study generally support a divergence between support and opposition for offshore activity (supportive frames B and Ci correlated very low with opposing frames A and D). However, responses to statement 8 (The risks of an oil spill in Arctic waters are exaggerated) offered an interesting bridge across this divergence. Whilst a few participants strongly agreed this assertion reflected their point of view, the majority reacted

negatively to the idea that risks from oil spills were exaggerated, as such it was the statement most placed in the negative category during the initial sorting phase (54%) as well as possessing the lowest average score, -1.89. It is noteworthy that most participants who loaded significantly onto frame B, despite advocating Arctic offshore as technically-possible and environmentally-safe, did not strongly believe that oil spill risks were exaggerated.

6. Discussion

Whilst factor arrays can only be approximations and that ranking statements is clearly not intended to replicate the exact structure in which people think, the production of factor arrays, derived as they are from participants' active configuration of statements, offers useful insight on how an issue is framed. Q method may be unable to offer 'perfect representation' of discourses, but its strengths lie in observing how participants engage with various aspects of the debate, both in how they rank statements against each other and what meaning they ascribe to statements when asked for their interpretation. These Q-sorts when combined with follow-up interviews provide a helpful tool to explore ways in which the issue is framed.

Several frames emerged across the participant group, which varied in their framing of developmental priorities, environmental consequences, social impacts, economic outlooks and at what 'scale' the issue is approached from. Broadly-speaking, the frames fall into two categories: those that question Arctic offshore in the context of sustainable development, either multi-scalar in focus (A, Cii) or specifically a local-level focus (D), with those questioning what alternative development possibilities are, both for Arctic communities and the wider globe (B, Ci). Relating these frames to Dryzek's (1997) typology of global environmental discourses (in a similar fashion to Cotton (2015)), the former category resonates with elements of 'survivalism' and 'sustainable development', worldviews concerned with resource depletion and 'stresses imposed on global ecosystems' (p129); the latter echoing 'Promethean' and 'economic rationalism' sentiments in its belief that development and economic growth are paramount and if pursued will mitigate environmental concerns, especially in the case of frame B. Whilst there was a clear divergence in attitude towards Arctic offshore, between support for and opposition against, the simplistic polarisation of 'environmentalist' versus 'industrialist' sometimes associated with environmental issues was not really evident here (Dayton, 2000).

That a diversity of frames emerged across the participant group was unsurprising, due to the highly-contested nature of the debate played out in the public realm and the diversity of stakeholders chosen to participate. As such, it reaffirms the extent of contentiousness surrounding this controversial issue, one that seemingly pits economic development so directly against environmental preservation and ecological responsibility (Jensen, 2007, Mikkelsen and Langhelle, 2008, Exner-Piort, 2012).

The scalar dynamics found in the uncovered frames highlight the challenges of ever-widening stakeholder inclusiveness. If, as in frame A, Arctic offshore is framed with a large onus on climate change and its global implications, the onus becomes one of 'global sustainability' with the world's population all considered legitimate stakeholders. Of course these concerns do not necessarily tally with frames centred on national or more local level (frames B and D). Emphasis on different scalar aspects influences priorities and policy direction. In relation to Arctic offshore, positive and negative impacts of this development are experienced differently at different scales, both spatially and temporally. Ultimately, what could be construed as beneficial for Arctic communities and nations in the short-term (e.g. economic windfall) could stand in opposition to what is beneficial in the long-term for the globe (e.g. climate change mitigation). Clearly this is huge simplification of complex issue but serves to highlight a fundamental 'scale tension' found at the core of Arctic offshore, one that is exemplified by events such as Greenpeace activists occupying an oil rig to dissuade Greenland from pursuing the offshore development path.

Whilst frame conflicts evoke sustainability challenges by raising the likelihood of confrontation, this is not necessarily an undesirable situation. As Nie (2003) writes, 'conflict is to be expected and is often a sign that democracy is working' (p333). Indeed, calls for consensus can risk creating a hegemony that drowns out any alternative voices in the debate (Cairns et al., 2014). Nevertheless, if sustainable development principles of inclusivity are embraced, environmental and natural resource management must find means to negotiate frame conflicts. By identifying frames and explicitly outlining consensus and conflict around an issue (Curry et al. 2013; Cotton and Devine-Wright, 2011) Q-method certainly serves as a useful starting point. In terms of practical implications for Arctic offshore, there is particular utility of research of this kind for Arctic governance bodies run on a consensus basis and characterised by diverse stakeholder involvement, such as those affiliated with the Arctic Council (an intergovernmental forum and a prominent feature within the governance constellation surrounding Arctic issues (Young, 2012)).

In relation to potential bridges identified in this study, it is possible to see how a governance body like the Arctic Council can act as a useful negotiator between frame conflicts around Arctic offshore. For statement 18, we saw a greater need to understand Arctic indigenous peoples and the meaning behind 'traditional livelihoods'. Likewise in statement 36, there is an acknowledgement that the power differential between Arctic communities and large oil companies requires more balance. Making indigenous groups 'permanent participants' and bolstering their prominence in the region's governance is certainly a step towards addressing such concerns. Statements 15 and 25 both emphasised the importance of the 'human aspects' of the debate and for longer-term vision for Arctic communities. Freely-available research such as the Arctic Human Development Report[6], through the council's Sustainable Development Working Group, can provide important insights around these issues. Statement 8 suggests that although offshore critics and enthusiasts might share little in common, there is an understanding of the high-risk involved with Arctic offshore. The council's motivation to create Arctic-wide standards such as 2013's Oil Spill Response Agreement and the continuing work of the Emergency Prevention, Preparedness and Response Working Group can be seen as a way of trying to ensure there are regulations and processes in place to manage the risks at an acceptable level. These examples are just some of the ways in which the Arctic Council has the potential to act as a useful negotiator of frame conflicts around Arctic offshore. This is not to imply the council is the optimal policy mechanism or that the examples mentioned above are particularly effective but merely to reflect upon the potential a body like the Arctic Council has.

As this study did not take an R-method statistical approach, it cannot make representative claims for the extent of revealed frames within the population or account for the number of different frames that exist, as the sample size is too small and participant selection non-random. Furthermore, with only one 'local population' sampled, representation of local communities Arctic-wide is not possible. Nonetheless, as with other Q-studies, a brief discussion on how stakeholders aligned with different frames is worthwhile as a 'point of reflection' (Cotton, 2015) and a 'working hypothesis' (Ockwell, 2008, p278) for further research. Whilst loadings towards B (*Development panacea' for Arctic communities*) were spread fairly evenly across participants, A (Unsustainable development: from global climate to local communities) was affiliated strongly with Arctic conference delegates and D (Local

[6] See http://www.svs.is/en/ahdr-ii-en

sustainability at risk) with Aasiaat community members. That Aasiaat community members might place greater onus on local aspects of the debate is perhaps unsurprising. Likewise, that Arctic conference delegates might place a greater emphasis on climate change given the issue's prevalence at Arctic-focused conferences.

7. Concluding remarks

The study has empirically shown the extent of frame conflicts around the issue of Arctic offshore, in-line with the highly-contested debate found in the public realm. Frame conflicts around natural resource use are seemingly inevitable. As has been discussed, this isn't necessarily an undesirable situation but does raise challenges. Whilst seeking a shared vision over the issue of Arctic offshore was not this paper's goal, exploring potential bridges of consensus across different framings emphasises that despite differences, frames do not exist mutually exclusive from one another. Here bridges centred on ideas of traditional livelihoods, the importance of emphasising 'human' aspects of the debate and the inherent risks involved in Arctic offshore. Given the complexity of natural resource issues, negotiating the mosaic of frames surrounding them can never be a simple process. With its systematic approach and flexible use of quantitative and qualitative techniques, Q-method offers a useful, replicable tool for practitioners and policymakers to explore frames, how they contrast with one another and bridges between them. This is undoubtedly an essential step towards tackling some of the sustainability challenges inherent with natural resource use.

8. References

Albizua A, Zografos C. 2014. A Values-Based Approach to Vulnerability and Adaptation to Climate Change. Applying Q methodology in the Ebro Delta, Spain. Environmental Policy and Governance **24**: 405–422. DOI: 10.1002/wcc.30.

Avango D, Nilsson AE, Roberts P. 2013. Assessing Arctic futures: voices, resources and governance. The Polar Journal **3**: 431–446. DOI:10.1080/2154896X.2013.790197.

Balint P J, Stewart RE, Desai A, Walters LC. 2011. Wicked environmental problems: managing uncertainty and conflict. Island Press: Washington, DC.

Barry J, Proops J. 1999. Seeking sustainability discourses with Q methodology. Ecological Economics **28**: 337-345. DOI: 10.1016/S0921-8009(98)00053-6.

Brown SR. 1980. Political subjectivity: Applications of Q methodology in political science. Yale University Press: New Haven, CT.

Bulkeley H, Mol AP. 2003. Participation and environmental governance: consensus, ambivalence and debate. Environmental Values **12**: 143–154. DOI: 10.3197/096327103129341261.

Cairns R. 2012. Understanding Science in Conservation: A Q Method Approach on the Galápagos Islands. Conservation and Society **10**(3): 217-231. DOI: 10.4103/0972-4923.101835.

Cairns R, Sallu SM, Goodman S. 2014. Questioning calls to consensus in conservation: a Q study of conservation discourses on Galápagos. Environmental Conservation **41**: 13–26. DOI: 10.1017/S0376892913000131.

Cairns R, Stirling A. 2014. 'Maintaining planetary systems' or 'concentrating global power?' High stakes in frame conflicts of climate geoengineering. Global Environmental Change **28**: 25–38. DOI: doi:10.1016/j.gloenvcha.2014.04.005.

Chuenpagdee R, Jentoft, S. 2009. Governability assessment for fisheries and coastal systems: A reality check. Human Ecology **37**: 109–120. DOI: 10.1007/s10745-008-9212-3.

Cotton M, Devine-Wright P. 2011. Discourses of energy infrastructure development: a Q-method study of electricity transmission line siting in the UK. Environment and Planning A **43**: 942-960. DOI: 10.1068/a43401.

Cotton MD, Mahroos-Alsaiari, AA. 2015. Key actor perspectives on stakeholder engagement in Omani Environmental Impact Assessment: an application of Q-Methodology. Journal of Environmental Planning and Management **58**: 91–112. DOI: 10.1080/09640568.2013.847822.

Cotton M. 2015. Stakeholder perspectives on shale gas fracking: a Q-method study of environmental discourses. Environment and Planning A **47**(9): 1944-1962. DOI: 10.1177/0308518X15597134.

Curry R, Barry J, McClenaghan A. 2013. Northern Visions? Applying Q methodology to understand stakeholder views on the environmental and resource dimensions of

sustainability. Journal of Environmental Planning and Management **56**: 624–649. DOI: 10.1080/09640568.2012.693453.

Dayton B. 2000. Policy frames, policy making and the global climate change discourse, In Social discourse and environmental policy: an application of Q methodology, Addams H, Proops J (eds). Edward Elgar: Cheltenham, pp71–99.

Dewulf A, Craps M, Bouwen R, Taillieu T, Pahl-Wostl C. 2005. Integrated management of natural resources: dealing with ambiguous issues, multiple actors and diverging frames. Water Science and Technology **52**: 115–124.

Doody DG, Kearny P, Barry J, Moles R, O'Regan B. 2009. Evaluation of the Q-method as a method of public participation in the selection of sustainable development indicators. Ecological Indicators **9**: 1129-1137. DOI: 10.1016/j.ecolind.2008.12.011.

Dryzek JS, Berejikian J. 1993. Reconstructive Democratic Theory. The American Political Science Review **87**: 48-60. DOI: 10.2307/2938955.

Dryzek, J. 1997. The Politics of the Earth. Oxford University Press: Oxford.

Eden S, Donaldson A, Walker RG. 2005. Structuring subjectivities? Using Q methodology in human geography. Area **37**: 413-422. DOI: 10.1111/j.1475-4762.2005.00641.x.

Entman RM. 1993. Framing: Toward clarification of a fractured paradigm. Journal of Communications **43**: 51–58. DOI: 10.1111/j.1460-2466.1993.tb01304.x.

Exner-Pirot H. 2012. New directions for governance in the Arctic region. The Arctic Yearbook 225–246.

Frantzi S, Carter N, Lovett J. 2009. Exploring discourses on international environmental regime effectiveness with Q methodology: A case study of the Mediterranean Action Plan. Journal of Environmental Management **90**(1): 177-186. DOI: 10.1016/j.jenvman.2007.08.013.

Friedman al., Miles S. 2002. Developing stakeholder theory. Journal of Management Studies **39**: 1–21.

Gamson WA, Croteau D, Hoynes W, Sasson T. 1992. Media images and the social construction of reality. Annual Review of Sociology **18**: 373–393.

Heininen L, Exner-Pirot H, Plouffe J. 2013. From Regional Transition to Global Change: Dualism in the Arctic. The Arctic Yearbook 24–31.

Hisschemöller M, Hoppe R, Dunn WN, Ravetz J R. 2001. Knowledge, power, and participation in environmental policy analysis. Transaction Publishers: New Brunswick, NJ.

Humrich C. 2013. Fragmented International Governance of Arctic Offshore Oil: Governance Challenges and Institutional Improvement. Global Environmental Politics **13**: 79–99. DOI: 10.1162/GLEP_a_00184.

Huntington HP. 2009. A preliminary assessment of threats to arctic marine mammals and their conservation in the coming decades. Marine Policy **33**: 77-82. DOI: 10.1016/j.marpol.2008.04.003.

Jensen LC. 2007. Oil discourse in the European Arctic: the Norwegian case. Polar Record **43**: 247–254. DOI: 10.1017/S0032247407006559.

Kates RW, Parris TM, Leiserowitz AA. 2005. What is sustainable development? Goals, indicators, values, and practice. Environment: Science and Policy for Sustainable Development **47**: 8–21. DOI: 10.1080/00139157.2005.10524444.

Kämpf, M, Haley, S. 2014. Risk management in the Alaska Arctic offshore: wicked problems require new paradigms. The Polar Journal **4**: 150–169. DOI: 10.1080/2154896X.2014.913921.

Keil K. 2014. The Arctic: A new region of conflict? The case of oil and gas. Cooperation and Conflict **49**: 162–190. DOI: 10.1177/0010836713482555.

Kelmelis JA. 2011. Arctic Warming Ripples through Eurasia. Eurasian Geography and Economics **52**(1): 56–78. DOI: 10.2747/1539-7216.52.1.56.

Lewicki R, Gray B, Elliott M. 2003. Making sense of intractable environmental disputes. Island Press: Washington, DC.

Leach, M. 2008. Pathways to Sustainability in the forest? Misunderstood dynamics and the negotiation of knowledge, power, and policy. Environment and Planning A **40**: 1783-1795. DOI: 10.1068/a40215.

McDowell G, Ford, JD. 2014. The socio-ecological dimensions of hydrocarbon development in the Disko Bay region of Greenland: Opportunities, risks, and tradeoffs. Applied Geography **46**: 98–110. DOI: 10.1016/j.apgeog.2013.11.006.

Mikkelsen A, Langhelle O. 2008. Arctic oil and gas: sustainability at risk? Routledge: London.

Nie M. 2003. Drivers of natural resource-based political conflict. Policy Sciences **36**: 307–341. DOI: 10.1023/B:OLIC.0000017484.35981.b6.

Norton BG. 2005. Sustainability: A philosophy of adaptive ecosystem management. University of Chicago Press: Chicago, IL.

Norton BG. 2012. The ways of wickedness: Analyzing messiness with messy tools. Journal of agricultural and environmental ethics **25**: 447–465. DOI: 10.1007/s10806-011-9333-3.

Ockwell DG. 2008. “Opening up” policy to reflexive appraisal: a role for Q Methodology? A case study of fire management in Cape York, Australia. Policy Sciences **41**: 263–292. DOI: 10.1007/s11077-008-9066-y

Ostrom E. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. Science **325**: 419-422. DOI: 10.1126/science.1172133.

Reed MS, Graves A, Dandy N, Posthumus H, Hubacek K, Morris J, Prell C, Quinn CH, Stringer LC. 2009. Who’s in and why? A typology of stakeholder analysis methods for natural resource management. Journal of Environmental Management **90**: 1933–1949. DOI: 10.1016/j.jenvman.2009.01.001.

Roberts A, Cassano J, Döscher R, Hinzman L, Holland M, Mitsudera H, Sumi A, Walsh JE. 2010. A Science Plan for Regional Arctic System Modeling. International Arctic Research Center, http://www.iarc.uaf.edu/sites/default/files/publications/reports/IARCTP10-0001.pdf.

Sandbrook C, Scales IR, Vira B, Adams WM. 2010. Value Plurality among Conservation Professionals. Conservation Biology **25**(2): 285–294. DOI: 10.1111/j.1523-1739.2010.01592.x.

Schön DA, Rein M. 1994. Frame reflection: Toward the resolution of intractable policy controversies. Basic Books: New York.

Small MJ, Güvenç Ü, DeKay ML. 2014. When can scientific studies promote consensus among conflicting stakeholders? Risk Analysis **34**: 1978–1994. DOI: 10.1111/risa.12237.

Stainton Rogers R. 1995. Q methodology. In Rethinking Methods in Psychology, Smith JA, Harré R, Van Langenhove L (eds). Sage: London, pp 178–192.

Susskind LE. 1994. Environmental diplomacy: Negotiating more effective environmental agreements. Oxford University Press: New York.

Thompson, PB, Whyte, KP. 2012. What Happens to Environmental Philosophy in a Wicked World? Journal of agricultural and environmental ethics **25**: 485–498. DOI: 10.1007/s10806-011-9344-0.

Van Den Hove S. 2006. Between consensus and compromise: acknowledging the negotiation dimension in participatory approaches. Land Use Policy **23**: 10–17. DOI: 10.1016/j.landusepol.2004.09.001.

Van Lieshout M, Dewulf A, Aarts N, Termeer C. 2011. Do Scale Frames Matter? Scale Frame Mismatches in the Decision Making Process of a “Mega Farm” in a Small Dutch Village. Ecology and Society **16**(1): 38.

Waddock S. 2011. We are all stakeholders of Gaia: A normative perspective on stakeholder thinking. Organization and Environment **24**: 192–212. DOI: 10.1177/1086026611413933.

Watts S, Stenner P. 2005. Doing Q methodology: theory, method and interpretation. Qualitative Research in Psychology **2**: 67-91. DOI: 10.1191/1478088705qp022oa.

Watts S, Stenner P. 2012. Doing Q methodological research: theory, method & interpretation. Sage: London.

Webler, T, Danielson, S, Tuler, S. 2009. Using Q method to reveal social perspectives in environmental research. Greenfield MA: Social and Environmental Research Institute.

Wilkes-Allemann, J, Pütz, M, Hirschi, C. 2015. Governance of Forest Recreation in Urban Areas: Analysing the role of stakeholders and institutions using the institutional analysis and development framework. Environmental Policy and Governance **25**: 139–156. DOI: 10.1002/eet.1668

Young OR. 2012. Building an international regime complex for the Arctic: current status and next steps. The Polar Journal **2**(2): 391-407. DOI: 10.1080/2154896X.2012.735047.

Xiang, WN. 2013. Working with wicked problems in socio-ecological systems: Awareness, acceptance, and adaptation. Landscape and Urban Planning **110**: 1–4. DOI: 10.1016/j.landurbplan.2012.11.006.

Zhang Y, Fung T. 2013. A model of conflict resolution in public participation GIS for land-use planning. Environment and Planning B **40**: 550–568. DOI: 10.1068/b37033.

Tables

Table 4.1

Statements	Frame A	Frame B	Frame C	Frame D
1. The world's guilt about climate change should not prevent Arctic communities from the potential benefits of offshore petroleum development	0	+1	+2	-1
2. Offshore petroleum drilling activity poses a threat to several endangered species of marine mammals as it releases harmful chemicals into the fragile Arctic waters	+1	-1	-1	0
3. The influx of foreign workers from offshore petroleum development will bring devastating impacts on already fragile Arctic cultures	0	-1	-3	-4
4. The Arctic is ecologically sensitive but it is possible to have responsible offshore petroleum drilling	-2	+3	+4	0
5. The 'coexistence' of oil, fisheries and fragile ecosystem is not possible in the Arctic	-1	-3	-4	-1
6. The money from offshore petroleum development is important as it can fund independence for countries such as Greenland	0	+3	+1	-3
7. There are potential benefits from global warming in the Arctic	+1	0	+1	0
8. The risks of an oil spill in Arctic waters are exaggerated	-4	0	-2	-3
9. Local communities will benefit greatly from infrastructure investment resulting from offshore petroleum drilling in Arctic waters	-3	+4	+2	-1
10. Pursuing offshore petroleum development weakens Arctic communities' position in climate change discussions	-1	-1	+1	-2
11. Greater involvement of stakeholders 'external' to the Arctic is a good thing regarding offshore petroleum development	-2	0	0	+1
12. The work of oil companies during offshore petroleum development can offer scientific benefits for local communities, e.g. information on migratory patterns of whales	-1	+2	+1	0
13. Arctic nations such as Greenland need the money oil brings for education and health	0	+4	+3	-4
14. Within the Arctic offshore petroleum debate, more needs to be done to emphasise the Arctic is not a single region but many regions, each with their unique interests and concerns	+2	+3	-1	+4
15. What is needed for Northern territories across the Arctic is not only hope that petroleum will provide everything they need but to have longer term strategies in place that do not depend so much on petroleum development	+4	+1	+1	+4
16. Offshore petroleum development can bring back young people to Arctic communities	-1	+2	0	-1
17. Politicians are rushing the decisions regarding Arctic offshore petroleum development as they want the money now	0	-1	+3	+3
18. Offshore drilling directly infringes on the ability of Arctic indigenous communities to continue with their traditional livelihoods	0	-2	-2	-3
19. It is impossible to clean up after an oil spill in the Arctic	0	-1	0	+2
20. Even the experts don't know the true risks involved in Arctic offshore petroleum drilling	+3	-3	-3	-1
21. Traditional Ecological Knowledge has a role to play in ensuring ecologically safe Arctic offshore petroleum development	+3	+2	-2	0
22. Local communities have a direct voice and involvement with offshore petroleum projects	-3	+2	-3	+1
23. Environmentalist groups have been using indigenous groups to push their agenda on the Arctic offshore petroleum issue	-3	+1	-4	0
24. Climate change from fossil-fuel use is the biggest threat to the Arctic environment	+4	0	0	-2
25. There should be more focus on emphasising 'a human dimension' to the debate about offshore oil drilling in the Arctic, not just the environmental one	+2	+4	0	+1

26. Oil spill accidents in the Arctic are more devastating than elsewhere in the world	+2	-2	-1	0
27. We are really better off leaving fossil-fuels in the ground and I don't think anybody can really disagree	-2	-4	-2	+3
28. There should be more discussion about the 'elephant in the room': that fossil fuel extraction means more climate change	+3	0	+3	+1
29. The Arctic has responsibility to provide some of the commodities the world is going to need	-4	0	+3	-4
30. Oil drilling in Arctic waters should be a concern for people across the globe	+2	-3	+2	-2
31. Arctic reserves could hold enough oil and gas to meet global demand for several years. The world has a need for petroleum and so it is important this resource is exploited	-4	+3	+2	-3
32. Since climate change is going to happen anyway, we should explore how to take advantage of it in the Arctic	-2	-2	+4	+3
33. There is no 'rush' for the Arctic offshore petroleum, in reality production is decades from happening	+1	0	+1	+3
34. Like it or not, history shows that offshore petroleum has never been developed anywhere without spills	+1	-1	-1	+2
35. NGOs have a role to play in ensuring oil companies undertake best practice exploration in the Arctic	+1	+1	0	+2
36. Most Arctic indigenous communities are in a vulnerable position regarding private companies, lacking the resources and capacity to represent themselves adequately in relationship with industries like the oil sector	+4	+1	0	+1
37. It is regrettable that the Arctic will not be kept pristine but the economic opportunities from Arctic offshore petroleum are too great to ignore	-3	+1	+4	-2
38. The ones who will suffer most from oil drilling in Arctic waters will be the fishermen and the people living from the oceans	-1	-3	-1	+1
39. The Arctic should be a conservation zone with zero offshore petroleum drilling	+1	-4	-4	-1
40. In the Arctic, the oil industry is recklessly putting profit before the environment	-1	-4	-1	+2
41. There is a risk that local communities will become mere 'spectators' amid the oil rush	+3	-2	-3	+4

Table 4.1. Statement scores for each frame (‘factor array’)

Table 4.2

	Frame			
Participant	A	B	C	D
1. AAS1	0.0496	0.0335	**0.5654X**	0.3647
2. AAS2	0.2545	-0.2538	**-0.5997X**	0.2138
3. AAS3	0.1482	0.2299	0.0921	**0.7094X**
4. AAS4	0.2386	0.1965	**0.4878X**	0.108
5. AAS5*	0.4914	-0.0124	0.0005	0.6127
6. AAS6	-0.1936	**0.4496X**	-0.1596	0.1388
7. AAS7	**0.5753X**	-0.2795	0.3932	0.1291
8. AAS8	0.2828	-0.3355	-0.1067	**0.6862X**
9. AAS9	0.2409	0.0855	0.2754	**0.4195X**
10. AAS10	0.0127	**0.5358X**	-0.2771	-0.0582
11. AAS11	0.0547	-0.2071	-0.0174	**0.6243X**
12. AAS12**	0.3358	-0.1041	0.0688	-0.2355
13. AAS13*	-0.0604	0.2824	**0.4216X**	0.3375
14. AAS14	0.1259	**0.6236X**	0.3436	-0.13
15. AAS15	0.1268	0.1982	**0.5998X**	-0.131
16. AAS16	0.0455	**0.6398X**	-0.2826	0.0102
17. AAS17*	0.5753	-0.0793	0.4056	0.0889
18. AAS18	-0.001	**0.5721X**	0.1995	0.1535
19. AAS19	0.1014	-0.0831	-0.0622	**0.6762X**
20. ARC1	-0.0588	**0.8156X**	0.2612	-0.2845
21. ARC2*	0.6827	0.1128	-0.0223	0.4252
22. ARC3	**0.7444X**	-0.2951	-0.213	0.0425
23. ARC4*	0.583	-0.3558	-0.2355	0.4123
24. ARC5	**0.7223X**	0.0515	-0.2239	0.2155
25. ARC6	0.0385	**0.8273X**	0.2113	-0.1178
26. ARC7	**0.6011X**	0.2079	0.2019	0.2061
27. ARC8	-0.2214	**0.7032X**	0.163	-0.0811
28. ARC9*	0.5179	-0.4488	-0.3753	0.1255
29. ARC10*	0.5602	-0.1079	-0.4874	0.3187
30. ARC11	**0.7171X**	-0.0069	0.1182	0.0635
31. ARC12	-0.0747	**0.6921X**	0.3272	0.0577
32. ARC13*	0.4531	0.4462	0.1866	0.019
33. ARC14	**0.7869X**	0.2438	-0.2783	0.0218
34. ARC15	**0.6646X**	-0.0391	0.1216	0.2686
35. ARC16	0.2025	0.2055	-0.0806	**0.4847X**
36. ARC17	0.2671	0.0313	**-0.5036X**	0.1482
37. ARC18	-0.049	**0.674X**	0.1238	0.1725
38. ARC19	**0.632X**	-0.2178	-0.1002	0.2128
AAS: Aasiaat resident				
ARC: Arctic conference delegate				
Eigenvalues	6.46	5.7	3.42	3.8
% study variance	17	15	9	10
% culumative variance	51			
Significantly loading sorts				
Frame A	7, 22, 24, 26, 30, 33, 34, 38			
Frame B	6, 10, 14, 16, 18, 20, 25, 27, 31, 37			
Frame C	1, 2 (-ve), 4, 13, 15, 36 (-ve)			
Frame D	3, 8, 9, 11, 19, 35			
*Confounded sorts	5, 17, 21, 23, 28, 29, 32			
**Non-significant sorts	12			

Table 4.2. Participant loading for each factor. Bold text with an ‘X’ indicates that participant significantly loaded on this factor (P<0.01)

Figures

Figure 3.1

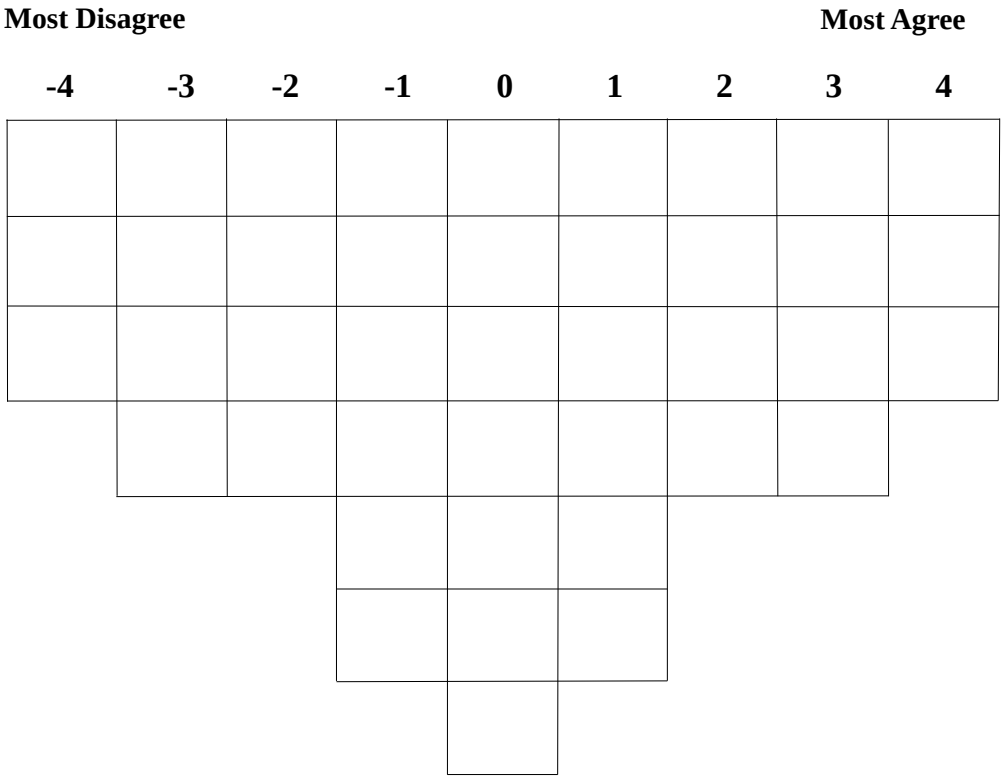

Figure 3.1. The Q-sort grid