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Stakeholder identification and engagement in problem structuring interventions

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ABSTRACT

This paper addresses the under-researched issue of stakeholder identification and engagement in problem structuring interventions. A concise framework is proposed to aid critical reflection in the design and reporting of stakeholder identification and engagement. This is grounded in a critical-systemic epistemology, and is informed by social identity theory. We illustrate the utility of the framework with an example of a problem structuring workshop, which was part of a green innovation project on the development of a technology for the recovery of rare metals from steel slag. The workshop was initially going to be designed to surface stakeholder views on the technology itself. However, it became apparent that a range of other strategic issues concerning the future of the site were going to impact on decision making about the use of steel slag. It therefore became important to evolve the agenda for the problem structuring, and this is where the critical-systemic approach made a difference. It enabled the workshop to be reframed as a community-based event looking at how the former steelworks site could be developed for new purposes. Evaluation of this problem structuring intervention revealed significant stakeholder learning about the issues needing to be accounted for, and a range of possible options for the development of the steelworks site were explored. The paper ends with a discussion of the utility of social identity theory for understanding the processes and outcomes of the workshop, and reflections are provided on its implications for operational research practice more generally.

1. Introduction

Much is made of the contribution of stakeholder theory to working with problem structuring methods (PSMs) (see, for example, Ackermann & Eden, 2011). However, we argue that, while stakeholder theory is necessary, it is not sufficient to deal with the complexities of multi-stakeholder operational research (OR) projects.

Much stakeholder theory has its roots in the need to adopt a strategic approach to 'managing' stakeholders in the interests of improving performance, productivity, competitiveness, profits, etc. (Freeman, 1994). However, it has also been suggested that there is a moral principle associated with stakeholder engagement: those who will be affected by decision making, but are not (initially) involved in it, ought to have a meaningful input into what is decided, not only because they have relevant knowledge, but also because it is empowering and combats alienation when people have a reasonable amount of collective control of what happens in their own lives and communities (Ulrich, 1983). Ulrich's work is informed by both systems theory about the boundaries of who counts as a stakeholder (building on Churchman, 1970, 1979) and a critical social theory of why the involvement of citizens in deliberative democracy is important (Habermas, 1976). The democratic rationale for stakeholder engagement has been influential in the social sciences (e.g., Cohen & Arato, 1992), has been taken up strongly in Community OR theory and methodology (e.g., Johnson, 2012; Midgley & Ochoa-Arias, 1999, 2004; Ritchie,

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Taket & Bryant, 1994), and is now very widely practiced and reflected upon in the contemporary Community OR literature (e.g., Brauer, 2018; Brocklesby & Beall, 2018; Burns, 2018; Gregory & Atkins, 2018; Helfgott, 2018; Herron & Mendiwelso-Bendek, 2018; Konsti-Laakso & Rantala, 2018; Laouris & Michaelides, 2018; Morgan & Fa'aui, 2018; Pinzon-Salcedo & Torres-Cuello, 2018; Ufua, Papadopoulos & Midgley, 2018).

Importantly, Córdoba and Midgley (2006, 2008), Ulrich (1983, 1996a) and others eschew an organisational focus (i.e., asking 'who are the stakeholders of my organisation?') for a broader, issue-based one ('who are the stakeholders of this issue?'). Such a focus is aligned with that of Laplume, Sonpar and Litz (2008), who suggest that the importance of stakeholder theory emanates from its focus on "the often overlooked sociological question of how organizations affect society (Hinings & Greenwood, 2003; Stern & Barley, 1995)" (p.1153). We suggest that this is a crucial question for OR practitioners to address in local contexts if they want their interventions to be widely beneficial, and therefore a (re)examination of the relevant theories and practices of stakeholder engagement is warranted, leading to a proposal for a more rigorous approach.

In advancing our argument, we recognise that the development of a framework to support rigour in stakeholder identification and engagement should be usable in an OR project design mode to shape the engagement effort. In this sense, OR is different from typical management research: the latter is commonly descriptive, so a theory of stakeholder identification and engagement merely has to do a good job in explaining what is done in management practice, without necessarily feeding back to influence that practice. In contrast, OR is concerned with *intervention* (Midgley, 2000, Midgley, Johnson & Chichirau, 2018), and the Operational Research Society in the UK emphasises this in defining OR as "a real world discipline with a focus on improving the complex systems and processes that underpin everybody's daily lives" (Operational Research Society, 2019). Hence, we argue for a critical-systemic approach to stakeholder identification and engagement, also informed by social identity theory, as this is fully consistent with an orientation to intervention. Furthermore, in agreement with Wang, Liu and Mingers (2015) that much stakeholder work "takes a fairly *ad hoc* approach" (p.562), we add that the *reporting* of this is also rather ad hoc, and we argue for a more rigorous approach to accounting for stakeholder engagement in case studies of OR intervention. In so doing, we follow work by Midgley (1998), Ormerod (1998, 2014, 2017), and Keys and Midgley (2002), who have previously made recommendations for improving case study writing in OR.

Having established the rationale for our paper, we can now set out its structure. First, in Section 2, we review and critique existing approaches to stakeholder identification and engagement. We explore what we mean by a 'critical-systemic epistemology', and we explicate the methodological implications of this. Subsequently, in Section 3, we propose a first-draft framework (grounded in the critical-systemic epistemology) to support decision making about, and reporting of, stakeholder identification and engagement in OR interventions. In Section 4, we demonstrate the utility of our first-draft framework by explaining its use in designing our approach to stakeholder identification and engagement in a multi-disciplinary green innovation project. We then further develop this framework through critical reflections on the same project, plus social identity theory (Section 5), leading to presentation of a final version that can be used in future OR projects. In Section 6, we draw conclusions about the wider applicability of the framework in OR interventions, both for informing stakeholder engagement (making it more rigorous) and writing this up in a manner that can better support cross-case-study learning.

We note that presenting the framework by unfolding it gradually throughout the paper (with further additions after we have detailed the practical application of a first draft) might seem unconventional, but it is an honest account of our learning process. Theory has informed methodology and practice, and reflections on that practice (and further theory) have fed back to improve the methodology. While multi-directional learning between theory, methodology and practice is often said to be vital for the development and refinement of systems/OR approaches (e.g., Checkland & Scholes, 1990), too often accounts of the theory-methodology-practice relationship are retrospectively reconstructed to make it look like the theory and methodology have been fully designed in advance, and then smoothly applied (Midgley, 2000). In our view, this does a disservice to OR practitioners who are very aware of the realities of the messy 'mangle of practice' (Ormerod, 2014; Pickering, 1995). It can be especially problematic for students who need to learn that not everything in OR projects can be pre-planned, and it is just as important to reflect on problems encountered in practice to inform theory and methodology as it is for the learning to go in the other direction (Midgley, 2000).

The green innovation project presented in this paper was funded by the UK Natural Environment Research Council (NERC), the Economic and Social Research Council (ESRC), and the Department for the Environment, Food and Rural Affairs (DEFRA, a Government Ministry). The project aimed to address the political, economic, social, technological, ecological and legal constraints to the adoption of an innovative approach to steel slag remediation (the making safe of a site or affected environmental media through the removal of pollution or contaminants). Rainwater falling on exposed slag heaps is known to release toxic metals into surrounding water bodies, and some of these metals are useful and rare. Hence the project potentially offered an increased rate of valuable metal recovery as well as improved remediation prospects.

The part of the project reported on in this paper involved a workshop at a former steelworks in the North East of England. The initial framing of the project, concerned with green innovation, seemed adequate before we started our community engagement, but evolving circumstances (see later for a full discussion), and a better understanding on our part of both the context and the desires of stakeholders, led to us rethinking the boundaries. In discussion with the principal investigator and other colleagues in our wider team, our part of the project was reframed to focus on future possible uses of the steelworks site, with the potential for rare metal recovery being just one element to be considered.

Consequently, stakeholders with different purposes, motivations and emphases were engaged in the research, making it a prime candidate for a problem structuring intervention. Numerous writers have discussed the value of problem structuring methods (and soft systems/OR) in contexts characterized by a plurality of stakeholder viewpoints (e.g., Ackermann, 2012; Flood & Jackson, 1991; Franco, 2006; Jackson, 1987, 1988, 1990, 1991; Jackson & Keys, 1984; Keys, 1988; Midgley, 1990, 2000; Mingers, 2011; Mingers & Rosenhead, 2004; Rosenhead, 1989; Rosenhead & Mingers, 2001).

2. Stakeholder approaches in OR and interventions with PSMs

In approaching stakeholder work, we recognise the importance of two similar and sometimes overlapping distinctions that have been made in the literature: some authors talk about an "instrumental" versus a "critical" approach, and others discuss a "narrow" versus a "broad" perspective. These are explained below.

2.1. The "Instrumental" versus "Critical" distinction

Instrumental approaches view stakeholder engagement as a means to an end, and they commonly focus on how stakeholders can be managed to support the achievement of traditional, usually corporate, objectives (e.g., profitability or growth) (Donaldson & Preston, 1995; Jones, 1995; Jones, Harrison & Felps, 2018). Such an

approach may be aligned with a single-objective view of the firm (often that of shareholders, who are taken to be a homogenous group), and this is based on the assumption that it is both possible and desirable to separate economic performance as a taken-for-granted good from its ethical consequences and the associated values that enable stakeholders to view those consequences in positive or negative terms. Freeman (1994) and Freeman, Wicks and Parmar (2004) suggest that this separation results in theory "that cannot possibly do justice to the panoply of human activity that is value creation and trade" (Freeman et al., 2004, p.364).

Consequently, a more critical view of stakeholder theory has been articulated that begins with the assumption that values need to be given explicit consideration in a "pragmatic and pluralistic" way (Freeman et al., 2004, p.365). Methodologically, this suggests some prior questions: whose values are currently being considered, and whose values ought to be considered? Also, what issues matter? In systems/OR, this process of questioning is commonly called 'boundary critique' because, once a new set of values is taken seriously, the boundaries demarcating the issues of relevance also have to be rethought. Boundary critique is often associated with the work of Midgley (2000, 2015), Midgley, Munlo and Brown (1998), Midgley and Pinzón (2011) and Ulrich (1983, 1987, 1988a, 1988b, 1993, 1996a, 1996b), among others.

2.2. The "Narrow" versus "Broad" distinction

Wang et al. (2015) make a distinction between a narrow and a broad view of who counts as a stakeholder. They suggest the narrow view is associated with the definition of the Stanford Research Institute (1963) and, as an example of a narrow perspective, refer to Näsi (1995, p.19), who defines stakeholders as individuals or groups who "interact with the firm and thus make its operations possible". As such, the instrumental and narrow views are often intertwined. In contrast, many people have proposed broader, more systemic understandings of who counts by including those who are actually or potentially *affected* by the operations, and not just those involved in them (again, such an approach is commonly associated with the work of Ulrich, 1983).

The distinction between narrow and broad is both important and problematic. For example, OR projects that engage a narrow range of stakeholders, but take into consideration a wide range of stakeholder views, might be classified as broad. However, we would classify these as narrow because taking those affected 'into consideration' could mean that significant assumptions are made about certain stakeholders' viewpoints in their absence. This does not mean that we are in agreement with Brauer (2018), who proposes the strongest possible view of community engagement – that *all* organisational decisions with potential impacts on communities require community assent to be considered legitimate. Rather, we recognise that:

- Broad engagement can be used by the more informed and astute to stall or manipulate decision making in order to progress their own objectives which, in effect, leads to a narrow group of the involved and a broad group of affected stakeholders;
- In some contexts, those affected may recognise that others have knowledge and understanding of the bigger picture that justifies the prioritisation of their concerns, and hence the broader group do not want engagement, particularly as their time may be a limited resource. They trust that others, the narrower group, will take decisions that are in their interests (Gregory & Atkins, 2018). Nevertheless, discovering that this is the case still requires a minimal amount of up-front community engagement (Midgley et al., 2018; Ufua et al., 2018).
- There are sometimes situations where politics, or mere convention, prevent the direct inclusion of the broader group in the final decision making. Nevertheless, at the very least, there are techniques that OR practitioners can use to ensure their views are given an appropriate level of consideration (see, for example, Gregory & Ronan, 2015; Midgley et al., 1998).

The above makes clear that we do not conflate a critical approach with a broad approach, as sometimes narrow boundaries of engagement are justifiable (Ulrich, 1983), and we recognise the need to be pragmatic. *Our approach is critical because it requires reflection and discussion on what constitutes both justifiable and pragmatic boundaries of engagement*. Also, our pragmatism is not the same as instrumentalism, because we do not assume that there is one single viewpoint from which stakeholders, and the issues that concern them, should be defined. Our approach is encapsulated in the term *critical-systemic* and, following Ulrich (1983), it entails explanation of the reasons for limitations on discussion as a minimum requirement for respectful, non-manipulative dialogue. This accords with Bäckstrand's (2003, p.35) argument that "subjugated, local and indigenous knowledge should not necessarily be regarded as better or truer…In the end, to find the appropriate balance between technical and communicative rationality is a pragmatic and context-dependant judgement".

Having defined what is meant by an instrumental approach to stakeholders, we believe that it is worth discussing in more detail what it involves, since it is often the default approach. An instrumental approach has traditionally focused on capturing a snap-shot of the dyadic relationships between the company and its external stakeholders, and a variety of methods have been employed to support this; for example, producing a stakeholder model or map (Donaldson & Preston, 1995). In recognition that such an approach neglects more dynamic considerations of possible interdependencies and relationships among multiple stakeholders, more creative visual approaches have been developed too (e.g., Bourne & Walker, 2005; Elias, 2017; Elias, Cavana & Jackson, 2002; Hester, 2015; Mitchell, Agle & Wood, 1997). Hence we eschew relatively static, instrumental approaches in favour of one that is grounded in boundary critique.

The importance of boundaries in OR intervention, with its focus on improvement, is by no means a new insight in our research community: Churchman wrote a seminal paper in 1970 arguing that understandings of 'the problem' and what constitutes an 'improvement' can change markedly when the boundaries of stakeholder participation are widened. Nevertheless, we suggest that this is a relatively overlooked area of OR research. A similar concern is expressed by Ackermann and Eden (2011), who lament a lack of conceptual clarity around stakeholders, their analysis and management. In addressing this lack of clarity, Ackermann and Eden focus on the "development of stakeholder theories through the cycles of theory into practice and practice into theory" (p.194). Their research spanned a 15-year time period, involved working with 16 top management teams, and included a critical review of the literature on stakeholder analysis. Ackerman and Eden's work may therefore be taken as a robust, leading example of a 'typical' problem structuring approach grounded in interpretivism. Hence, we initially looked to this for methodological guidance when planning our workshop. Ackerman and Eden (2011) identify three problematic issues for the strategic management of stakeholders:

- "Identifying who the stakeholders really are in the specific situation" (p.180) rather than relying on generic stakeholder lists or lists produced by managers, with a lot of questionable assumptions flowing into who counts as a stakeholder.
- "Exploring the impact of stakeholder dynamics, acknowledging the multiple and interdependant *interactions between stakeholders* (and potential stakeholders)" (p.180, emphasis in the original).

- "Developing stakeholder management strategies" (p.180), which involves "determining *when* and *how* it is appropriate to intervene to alter or develop the basis of an individual stakeholder's significance" (p.180, emphases in the original).

With the need to address these themes in mind, Ackermann and Eden (2011) explore the use of three techniques: the power-interest grid, the stakeholder-influence network, and the stakeholder management web.

2.3. Our approach

While appreciating the contribution of Ackermann and Eden to developing our understanding of how theoretical stakeholder management concepts can be applied in practice, we nevertheless came to identify a number of points of difference between our thinking and theirs. In summary, in our project, we did not seek to:

- Adopt an organisational focus and analyse stakeholders from the privileged position of one stakeholder group, such as the top management team (TMT). Had we done the latter, we might have worked solely with local government or the owners of the steelworks site to identify stakeholders. Instead, we sought to identify and engage stakeholders through much wider consultations in the belief that the weighting of stakeholders would be an emergent property of stakeholders' foci, how they saw the issues that mattered, and the interaction between stakeholders.
- Evaluate stakeholders' views of a strategy that had already been pre-designed and supported by the TMT. Ackermann and Eden (2011) suggest the reviewing of stakeholder dispositions to establish "whether stakeholders would be (generally) more inclined to support or to sabotage the organization's strategy" (p.184). Rather, we *sought to engage stakeholders in the generation of strategic options*, followed by their evaluation.
- Attribute viewpoints to particular stakeholders in advance of engagement, as this may inadvertently have involved stereotyping. Instead, we focussed on the creation of a constructive conversation in which values (defined as what matters to people in relation to the purposes they are pursuing) were explored.

In light of the above, we diagnose the root of the divergence between our own approach and that of Eden and Ackermann as the undesirable consequence of their interpretivism. Also see Jackson (2006) for a discussion of the interpretivist roots of most PSMs, and what a critical approach offers in contrast. Interpretivist approaches to stakeholder engagement certainly have the potential to bring to light different perspectives (indeed, they make a fundamental assumption that our social world is made up of multiple interpreted realities), but they are relatively weak when it comes to the boundary exploration that is necessary for thinking critically about whose perspectives might be made to count and how they can be surfaced (Midgley, 2000). Furthermore, while an interpretivist approach assumes that everybody should have the chance to question and challenge others in fair and open dialogue, in practice politics, power and processes of marginalization can serve to undermine this. As a consequence, instrumentalism often dominates. It is with such a concern in mind that some PSM practitioners (see, for example, Córdoba & Midgley, 2006, 2008; Foote et al., 2007; Gregory, Atkins, Burdon & Elliott, 2013; Midgley et al., 1998; Ufua et al., 2018) look to complement their practice with boundary critique. Midgley suggests that reflection on boundaries highlights options, not only for inclusion, but also the exclusion and marginalisation of both stakeholders and the issues that matter to them (Midgley, 1992, 2000; Midgley & Pinzón, 2011; Midgley et al., 2018). What is important, therefore, is to make boundary decisions transparent so that we can reflect critically on their limitations and be accountable for likely implications (Ulrich, 1983).

3. Developing a framework for multi-stakeholder settings

An almost inevitable implication of boundary critique is the need to adopt a multi-stakeholder perspective. We regard such a perspective as most appropriate to the theme of our project on the grounds that relevant knowledge and values may be expressed by stakeholders beyond the 'usual organizational suspects' involved in green innovation, such as universities, research institutions, private sector end users and legislators. Indeed, engaging with a wider set of stakeholders can have a significant positive effect on green innovation (Dangelico, Pontrandolfo & Pujari, 2013). Developing knowledge links with diverse stakeholders reflects the popular notion of the 'connected university' which, it has been suggested, "holds the key to further economic growth" (NESTA, 2009, p.4). But, to be clear, we do not merely look to advance a different dyadic relationship with the university at its centre rather than a company.

In adopting a multi-stakeholder view, it was important to make explicit the methodological implications. Based on a systematic review of the collaboration literature, Gray and Stites (2013) characterize multi-stakeholder settings as problem-centred social interaction processes among three or more affected actors. Conflicts of interest among affected actors are addressed, ideally, through procedures considered fair by all, while recognising that there may be no quick solution to the focal issue. Finally, participants in a multi-stakeholder setting usually define their own evaluation criteria regarding the outcomes of their engagement process.

While accepting Grey and Stites's characterisation, our concern to adequately address political and power relations in our project's multi-stakeholder setting caused us to recognise the importance of problematising the means by which understandings are constructed of the context, focal issues and stakeholder interactions. Fliaster and Kolloch (2017) suggest that "stakeholders are likely to orchestrate their activities and thus develop a much stronger bargaining power. Furthermore, some stakeholders do actively search for coalition partners that can help promote their particular agenda and exert additional impact" (p.698).

Pouloudi, Currie and Whitley (2016) point out that stakeholder power also affects the relational reach of alliances, as "different stakeholder groups exert their influence not only at the organizational level but also at the political (government-agency) level" (p.132). However, how such alliances may be made visible and captured is questionable. Fliaster and Kolloch (2017) recognize that "These informal information exchange and coordinating relationships among the stakeholders are only partly visible and thus non-transparent for the innovator; nevertheless, the hidden stakeholder ties appear to be highly influential on the implementation of the green innovation" (p.10). Hence, the problem of capturing complex political and power plays in innovation is acknowledged.

It is in the light of such problems that Pouloudi et al. (2016) derive a set of five principles (see Table 1) from their review of stakeholder theory in the management and information systems literatures, and they advance a theory-informed approach for identifying and analysing stakeholders. In drawing out the methodological implications of their proposed stakeholder principles, Pouloudi et al. are quite prescriptive. However, in line with our critical-systemic approach (and following Córdoba & Midgley, 2008, Midgley & Shen, 2007 and Ulrich, 1983, 1987, who have all developed sets of prompts to stimulate critical-systemic thinking by practitioners) we reframe their prescriptions as questions, and also add further questions of our own to aid critical reflection and decision making.

Given its foci on being critical about stakeholder identification, maintaining a dynamic orientation and understanding power relations, we take issue with Pouloudi et al.'s labelling of their approach as interpretivist, as it very much reflects

Table 1
Stakeholder principles and methodological implications (based on Pouloudi et al., 2016).

Stakeholder principles recognise that:	Questions for surfacing methodological implications for stakeholder identification and analysis
1. The set and number of stakeholders are context and time dependant	a. How is the stakeholder concept framed and contextualised? Are broad or narrow views of identification and engagement being adopted and practised? b. What is the source of the initial identification of stakeholder groups? c. What is the process for identifying additional stakeholders, and who is involved in this? d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?
2. Stakeholders may have multiple roles	a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? b. How are stakeholder relationships with the subject of study or matter of concern explored?
3. Different stakeholders, even within the same group, may have different values and perspectives, which may be explicit, implicit or hidden	a. How are stakeholder viewpoints elicited and presented? b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced?
4. Stakeholder roles, perspectives and alliances may change over time	a. Is a longitudinal approach adopted? b. Are stakeholders expected to explore how the subject of study, or matter of concern (and related perceptions), has evolved, and what do they anticipate the future to be?
5. Stakeholders' relations and power matter in the shifts in their roles, perceptions and alliances	a. Are stakeholders asked to identify other relevant stakeholders, and is there investigation of why they consider them as such, what role they play and how their involvements and perspectives may have changed over time? b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? c. Are alliances and histories considered? d. How is the prioritisation of particular stakeholder opinions and interests investigated?

Table 2
An additional stakeholder principle and methodological implications.

6. The definition of stakeholder groups for inclusion also represents boundaries of exclusion and marginalisation	a. Following the identification of stakeholder groups, is there critical reflection on implied boundaries and their consequences? b. Is the question addressed of whether any stakeholder groups have been excluded who ethically ought to be involved? c. Is the question addressed of whether there are any stakeholder groups relegated to a marginal position who ethically ought to be placed more centrally within the boundaries for inclusion? d. Are practical resource constraints on the process of stakeholder identification and analysis accounted for as well as the impact of such constraints on the ability of stakeholders to engage?

our own concerns about politics and power. However, following Córdoba and Midgley (2008), who define critical questions to enhance interpretivist information systems planning methodologies, we see the need to add a further principle (with associated methodological implications) to Table 1 to reflect our concern for boundary critique (see Table 2). Hence, it is an elaborated form of Pouloudi et al.'s principles that we adopted as a framework to inform our stakeholder engagement prior to and during our workshop.

Next, we need to describe the evolving context of our case, as this affected our approach too.

4. The case: From green innovation to industrial legacy

The disposal of industrial waste, such as steel slag, can be environmentally hazardous. However, given its high alkaline content, leaving it in situ can also be problematic, requiring ongoing monitoring and management. In contrast with both of these options, industrial symbiosis (re-use of one company's waste as an input to another's value production) is possible (e.g., Baldassarre et al., 2019). While this seems like a good alternative to disposal, full symbiosis can be difficult to achieve in the case of bulk waste such as steel slag. An alternative is to find and extract a high value material from a bulk waste without attempting complete reuse. Nevertheless, there can still be scientific and technical challenges, as well as socio-economic and governance complexities.

In the case of the project in question, early laboratory results indicated that vanadium recovery from steel slag leachates could be achieved by an existing technology (ion exchange resins) (Gomes et al., 2018). Interest in vanadium as a raw material stemmed from the expected rise in demand for new electronic technologies, particularly related to renewables (Zhang, Li, Chen, Guan & Zhang, 2014; Zhang, Yang, Sheng, Li & Wang, 2014). Vanadium is seen as critical to the European Union's (EU's) Strategic Energy Plan (Moss, Tzimas, Kara, Willis & Kooroshy, 2011), but it is not produced in the EU (EC, 2014). The heavy concentration of vanadium production in China, Russia and South Africa leads Moss, Tzimas, Kara, Willis and Kooroshy (2013) to categorise it as a medium security risk metal for United States and European markets. The need for secure sources of vanadium and other so-called 'hi-tech' metals has resulted in EU raw material policy considering the sourcing of them through recycling and recovery from waste (EC, 2008; Gregson, Crang, Fuller & Holmes, 2015; Gregson, Watkins & Calestani, 2013; Johansson, Krook & Eklund, 2014). Hence this three year research project, commencing June 2014, brought together an interdisciplinary team from the universities of Hull, Leeds, Newcastle and Oxford, alongside industrial partners, to address the issue of environmental protection and the efficient recovery of resources critical to green technologies (e-tech elements) from industrial waste in a complex policy and multi-stakeholder environment. The project was divided into two phases:

- The first phase addressed the extant scientific challenge of how to extract vanadium from steel slag, whilst enhancing stabilisation of the remaining deposit, which can contain toxic substances;

- The second phase focussed on the social acceptability and economic viability of the innovations from the first phase. This second phase was necessary, not only because economic benefit clearly mattered if the innovations were going to be adopted by industry, but also because technical feasibility and economic viability do not necessarily imply that the innovation will be considered socially desirable by stakeholders, and up-scaling may be constrained or halted by stakeholder resistance.

The longevity of the project meant that, by the time the second phase fully commenced, the UK steel industry was dealing with a previously unanticipated crisis: Chinese manufacturers were creating a massive over-supply of steel, a subsequent boom in cheap Chinese exports ensued, and this ultimately led to a collapse in the global steel price (The Guardian, 2016). Alongside this development, but unrelated to it, the scientists involved in our project reached the conclusion that their technology would probably not be commercially viable in the vanadium market, but extraction was still valuable in the context of site remediation (Deutz, Baxter, Gibbs, Mayes & Gomes, 2017). Therefore, this naturally led to thinking about, if such sites were remediated, what use could they be put to? There were also stakeholder pressures to refocus on this question, as discussed below.

4.1. The evolving context: Life after steel?

The place selected for phase 2 of the project was an approximately 800 hectare integrated steelworks in the North East of England. The local town has a population of about 65,000 and, for decades, the steelworks was the major local employer alongside other industries associated with the estuarine location, including petrochemicals and the port facilities. Like other heavy industries in the UK during the twentieth century, the steelworks had experienced mixed fortunes.

The site was founded just after the turn of the 20th century, and was in the ownership of a British-Dutch consortium up until the mid 2000s, when it was sold to a different overseas consortium. In the face of international overproduction, it was partially mothballed in 2010, and then sold to yet another overseas company. Low steel prices meant a return to profit was short-lived, and steel production was shut down in 2015 with significant job losses. After the start of the project, but prior to the workshop, the site transitioned from private ownership to, in part, being in the hands of the Official Receiver, and significant concerns were expressed in the press about whether the cost of securing the site and the remediation of waste were to be met from the public purse. Differences of perspective over who had responsibility for the site, given its contaminated state, attracted national press attention, and the local community found themselves at the centre of a growing controversy. Although Part 2A of the UK Environmental Protection Act (1990) provides statutory guidance on the management of contaminated land, it offered little help in this case as the contamination had occurred cumulatively over more than a century under the ownership of multiple public and private organisations.

The complexities of such industrial sites mean that there have been different degrees of success regarding their rehabilitation and the management of toxic waste, with consequent impacts on the communities in which the sites were located; e.g., Corby, in the Midlands of England, made legal history with a proven link between 19 children born with deformities and the clean-up of toxic waste on the former steelworks site (BBC News, 2010). Given such impacts and the mixed fortunes of former steelworks, there was great local community concern about decisions on the future of the site. Furthermore, the fact that former steelwork sites are often put into mixed use following remediation means that it was possible to identify an extended set of stakeholders. The identification of a variety of stakeholders who could glean an array of benefits or be concerned about potential harms (all of whom would necessarily bring in associated ecological, economic and social knowledge claims and concerns) challenged the idea that any one party could legitimately set the development agenda. Hence the forthcoming transition of the site and associated community concerns rendered a focus merely on the remediation of steel waste inappropriate. Our interest in and experience of Community OR afforded us the opportunity to reframe the engagement to address, rather than merely acknowledge, changes in the political, economic, social, technological, ecological and legal contexts. In this way we exhibited proactive agency, rather than just responding to client or end user requests (Ormerod, 2014).

After discussing this issue with the principal investigator and the other scientists involved in the project, and securing their agreement, we designed a workshop that would engage the community. We believed that a workshop format was important as it would provide an opportunity for stakeholders to come together to express and explore different perspectives and negotiate a desired future state. In this way, the workshop would respond to the new context while still meeting the objectives that were specified for our work package in our original grant application. This meant that the focus of the workshop expanded to include consideration of future possible uses of the site, with the desirability of vanadium recovery and remediation seen as sub-themes within this. Consequently, as Wang et al. (2015) advocate, we had to take a broad view of stakeholder engagement, rather than see it as merely a matter of corporate and university concern.

Planning of the workshop-based intervention took place over a period of 8 months and followed several phases (see Table 3, which also takes the reader through to post-workshop evaluation).

At this point, it is worth mentioning the academic backgrounds of the authors of this paper and the roles that we played in the project. Two of the authors and workshop facilitators (Gregory and Midgley) were experienced in both systems thinking and Community OR. One of the authors and the third facilitator (Atkins) was an economist experienced in both stakeholder engagement and eco-system services valuation. Two of the authors (Gregory and Atkins) undertook the initial literature review, interviews, stakeholder engagement activities and practical workshop organisation. The fourth author (Hodgson) was an expert in scenario planning who advised the facilitation team on this particular approach, but did not co-facilitate.

In the pre-workshop interviews and post-workshop stage, data was collected through (i) written notes; (ii) e-mails and an on-line survey; and (iii) on-line documentation and reports. In the workshop, the facilitators took notes, but the main form of data collection was through the production of materials by participants, and various examples of this are included later in the paper.

While Table 3 gives an overview of the project activities, we will provide a more detailed commentary on some of these below. Throughout our narrative, where there was an aspect of our practice that we believe demonstrates a methodological response to one of the principles or stakeholder engagement questions listed in Tables 1 and 2, we use italicised text in brackets. Thus, we demonstrate how the principles and questions informed our decision making, and at the same time we show how a narrative about stakeholder engagement can be written to demonstrate that key questions have been accounted for.

4.2. Planning meetings with the project principal investigator and the wider project team

Throughout the project, regular meetings were held involving the project's principal investigator (a scientist from the University of Hull) and members of the interdisciplinary team of researchers

Table 3
Research activities and outcomes.

Activity	Date	Outcome
Planning Meetings with the Project Principal Investigator and the Wider Project Team	05/14 – ongoing throughout the project	Development and broadening of the project/workshop plan and initial stakeholder identification
Stakeholder Identification: Literature Review	05/14 – ongoing throughout the project	Understanding of relevant processes, local issues and further stakeholder identification
Stakeholder Identification: Interviews and Group Meetings	06/16 – 11/16	Understanding of stakeholders' views of local and national issues, and further stakeholder identification and engagement
Stakeholder Identification: Boundary Critique	06/16 – 11/16	Clarification and confirmation of who is involved in decision making and who ought to be involved from the different perspectives surfaced to date Distribution of workshop invitations and confirmation of engagement
Stakeholder Engagement: Pre-workshop Survey	11/16	Initial understanding of individuals' views regarding what was important and uncertain
Stakeholder Engagement: The Workshop	23/11/16	Confirmation of what mattered, creation of strategic scenarios, and identification of preferred options for development
Stakeholder Engagement: Workshop Evaluation	23/11/16	Confirmation of stakeholders' assessments of the value of the workshop

from the universities of Hull, Leeds, Newcastle and Oxford. These meetings focussed on project management and the development and broadening of the project/workshop plan, so were one of the initial sources of stakeholder identification (*1b. What is the source of the initial identification of stakeholder groups?*).

4.3. Stakeholder identification: Literature review

We used the literature on steel manufacturing, green innovation and policy as anchor points to identify other initial stakeholder groups: i.e., we noted the stakeholder groups identified by relevant papers in our literature review and considered their pertinence in our empirical context (*1b. What is the source of the initial identification of stakeholder groups?*). In addition, news reports on the local area over a 20-year period were analysed for further stakeholder names, and it was noted how certain names and issues came to the foreground and then faded out over time (*1d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?*). As well as following the entry and exit of individuals and stakeholder groups, we noted changes in professional engagements, perspectives and alliances (*2b. How are stakeholder relationships with the subject of study or matter of concern explored? 4a. Is a longitudinal approach adopted?*).

4.4. Stakeholder identification: Interviews and group meetings

The literature review enabled us to identify broad categories of stakeholder (*1a. How is the stakeholder concept framed and contextualised? Are broad or narrow views of identification and engagement being adopted and practised?*), which were discussed with the project's principal investigator, who was engaged in research at the site and had local contacts (*1c. What is the process for identifying additional stakeholders, and who is involved in this?*). He was able to put names to the different categories of stakeholder that would be meaningful to local people. Named individuals were then contacted, and a number of informal telephone and face-to-face interviews were conducted so we could deepen our knowledge of the context, which would be useful for both further stakeholder identification and designing the workshop.

Interviewees were asked to identify further relevant stakeholder groups for our research, so we could move beyond the initial categories agreed with the principal investigator (*1c. What is the process for identifying additional stakeholders, and who is involved in this? 5a. Are stakeholders asked to identify other relevant stakeholders, and is there investigation of why they consider them as such, what role they play and how their involvements and perspectives may have changed over time?*). Hence, stakeholders 'entered the scene' when they were acknowledged as stakeholders by other stakeholders. The use of 'snowballing' – stakeholders recommending others until no new categories of people (or sub-categories with different perspectives) are mentioned (Goodman, 1961) – is a common technique used in management and social science research. This process essentially reinforced the network nature of the engagement, and stakeholders recommended others who could cover particular issues better than themselves, or introduced new stakeholders who could add weight to their own concerns or viewpoints.

Notably, one person was recommended by multiple stakeholders but, as he had changed role and moved from the area, he declined our invitation to attend the workshop (*6d. Are practical resource constraints on the process of stakeholder identification and analysis accounted for as well as the impact of such constraints on the ability of stakeholders to engage?*). While we noted that stakeholders sometimes 'exited the scene' when interest in an issue faded or was taken to be common and not particular to a stakeholder group (*1d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?*), the fact that there were indeed common concerns for a wide range of people in the community implied the need to reach out to more potential stakeholders who might be affected.

During the interviews, we invited stakeholders to talk about the history and the future, and how changes might affect stakeholder salience (*2a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? 3a. How are stakeholder viewpoints elicited and presented? 3b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced? 4a. Is a longitudinal approach adopted? 4b. Are stakeholders expected to explore how the subject of study, or matter of concern (and related perceptions), has evolved, and what do they anticipate the future to be? 5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? 5c. Are alliances and histories considered?*). In our interview notes, we recorded general attitudes of stakeholders towards environmental protection, and how they saw the drivers and barriers in the local context that affected how environmental protection was pursued (*2b. How are stakeholder relationships with the subject of study or matter of concern explored?*). Making personal contacts with stakeholders, and asking questions in interviews, minimised the likelihood of stereotypes informing the construction of the workshop. This might have been an issue if we had relied solely on the prin-

cipal investigator's perspective or that of his key contacts (not that stereotyping would ever have been deliberate – just that there is a risk of over-attenuating the diversity of perspectives if just one viewpoint is relied upon).

In the interviews, stakeholders who offered a perspective on waste remediation presented information about key debates and the positions that the participants took in them. Those key debates had typically attracted community interest given the public nature of the controversy over the closure of the site; they were therefore also prominently portrayed in secondary data sources, such as newspapers and other media reports (*5c. Are alliances and histories considered?*). Stakeholders who held strong views on an issue were often keen to share and justify them in the interview setting, perhaps viewing us as potential allies, or at least facilitators who could enable them to be heard (*5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? 5c. Are alliances and histories considered?*).

However, we recognised that, in the interviews and especially the workshop setting, not all stakeholders would necessarily be willing or able to reveal their actual views, and we had to remain alert to the possibility that hidden agendas might affect the nature of engagement (*2b. How are stakeholder relationships with the subject of study or matter of concern explored? 5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? 5c. Are alliances and histories considered?*). Our research focus included a concern for such hidden agendas, which were suggested to us in some of the interviews, but the veracity of such suggestions was difficult to substantiate (*2a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? 2b. How are stakeholder relationships with the subject of study or matter of concern explored? 3b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced?*). Nevertheless, claims about hidden agendas could not simply be dismissed because of this, and they added to the complexity of the situation. In addition, a comment that many of the stakeholders were not being fully informed about policy decisions was made by several interviewees (*3b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced?*).

Once saturation point had been reached, with no new names being suggested for interview, and being mindful of potential hidden agendas and political alliances, we decided to undertake a further process of critical reflection, as discussed below.

4.5. Stakeholder identification: Boundary critique

Analysis of the stakeholder interviews revealed a high level of concern about the future of the site, and it was often repeated that a lot of the decision making authority lay with the recently-appointed CEO of a development corporation that was in the early stages of being formed. Given his newly appointed status, we did not have the opportunity, at this point, to engage him in an interview. We were struck by the dynamic nature of the situation, and that such a key stakeholder should emerge at this point in the research. Hence, having established a base of knowledge from the literature review and interviews, and with awareness that the framing of the project had shifted and the context had evolved, we decided to go through an explicit process of boundary critique. This involved the three workshop facilitators reflecting on the interview data, taking account of the different stakeholder perspectives, in order to address two questions: 'who *is* involved in determining the future of the site?' and 'who *ought* to be involved in determining the future of the site?' (*1c. What is the process for identifying additional stakeholders, and who is involved in this? 2b. How are stakeholder relationships with the subject of study or matter of concern explored? 5c. Are alliances and histories considered? 6a. Following the identification of stakeholder groups, is there critical reflection on implied boundaries and their consequences? 6b. Is the question addressed of whether any stakeholder groups have been excluded who ethically ought to be involved? 6c. Is the question addressed of whether there are any stakeholder groups relegated to a marginal position who ethically ought to be placed more centrally within the boundaries for inclusion?*).

Addressing these questions did not lead to the identification of any new stakeholders, but it did reinforce the need to engage the new CEO of the proposed development corporation in the workshop. His acceptance of an invitation to join the day-long workshop at around midday to give a short presentation meant that this would be the first engagement with him for most of the stakeholders and a chance to represent their views to him on the development of the site.

We saw the workshop as an opportunity to pursue a process of principled negotiation (Keeney, 1994), which addresses "issues on their merits" and "shows you how to obtain what you are entitled to and still be decent" (p.35). The notion of different stakeholders being "entitled to" some form of consideration has significant methodological implications, and a focus on values "removes the anchor on narrowly defined alternatives and makes the search for new alternatives a creative and productive exercise" (p.39). Furthermore, Keeney (1994) suggests:

> "Decision opportunities can be very helpful when you do not have direct control over a decision that you care about. In an important class of such decisions, one stakeholder wishes to have a certain alternative selected, but a different stakeholder has the power to make the decision…Suppose you are the stakeholder who wants a particular alternative selected by another stakeholder, whom I will now refer to as the decision maker. You should recognize your opportunity to take control of the situation. Rather than simply allowing the decision maker to choose an alternative that may not be the one you desire, you should create alternatives that modify your desired alternative so that it maintains its essential features for you and is better than the existing alternatives for the decision maker" (p.40).

Making the most of the opportunity for stakeholder engagement with the newly appointed CEO of the development corporation, and being mindful of Keeney's notion of principled negotiation, led us to explicitly define the foci of the workshop as enabling stakeholders to:

1. Understand the opportunities for resource recovery and environmental improvement;
2. Clarify drivers and barriers to change;
3. Discuss the future of the former steelworks site;
4. Gain a greater appreciation of a range of stakeholder views; and
5. Be introduced to, and experience, scenario building and analysis (this last focus was introduced because it had become apparent from the stakeholder interviews that there were critically important uncertainties that would affect what options for the steelworks site would be feasible, making scenario planning a useful approach).

These foci were important: we saw them as defining the 'takeaways' that would encourage stakeholder engagement with the workshop. However, we later came to realise their role in defining the workshop as a one-off event (after it, the stakeholders wanted more).

As saturation point had been reached in terms of stakeholder identification, and we had developed the focus of the proposed workshop, 36 invitations were sent out. While we recognise that merely inviting stakeholders to engage in a workshop puts a cer-

Table 4
Workshop engagement.

Category	Accepted Workshop Invitation	Participated in Workshop
Borough Council/Combined Authority/Development Corporation	6	4
Other Public/Govt Agencies	7	4
NGO/Special Interest Group	3	2
Academia (excluding the workshop facilitators)	4	4
Business	8	7
Community/Residents	3	0*

*This category refers to representatives of local community and resident organisations. It became evident during the course of the workshop that almost all of the participants in the other categories were also local residents, and many saw themselves as representing and feeding back to this stakeholder group.

tain amount of pressure on them, there was an explicit agreement within our team as to how much pressure we were prepared to exert. The initial invitations were sent by e-mail, telephone or letter. If the first contact did not result in a confirmation of attendance, then a single follow-up contact was made. We hoped that focussing on how participation would give a voice to stakeholders in relation to issues that were important to their community would make the workshop sufficiently attractive to warrant voluntary engagement. We decided not to do a second follow-up with stakeholders who had still not said 'yes', as we regarded this as stepping over a line into disrespect for the privacy of potential participants.

See Table 4 for a summary of categories of stakeholder who accepted the invitation and who attended. It is perhaps worth an aside at this point that a researcher involved in an earlier stage of the project expressed an opinion that our proposed workshop would not be viable, as we would not be able to secure sufficient participation (local people would either be too busy or too disinterested). Clearly, this view was mistaken.

4.6. Stakeholder engagement: Pre-workshop survey

As has already been mentioned, a focus on values is critical to principled negotiation. Keeney (1994) sees values as

> "principles for evaluating the desirability of any possible alternatives or consequences. They define all that you care about in a specific decision situation. It is these values that are fundamentally important in any decision situation, more fundamental than alternatives, and they should be the driving force for our decision making" (p.33).

Active engagement in the workshop was always going to be critical to its success, and we were acutely aware that this would be affected by whether we, as facilitators, were judged to be credible. In the interviews, we had soaked up stories about the steelmaking process, how it affected local families and what a future without steel might be like. Given that we were not from the area, we were very concerned that we might be open to criticism for being academic outsiders, so we felt it was important to ground the workshop in the vernacular and views of the stakeholders. To ensure this grounding, we undertook a pre-workshop survey of those who had accepted the invitation to the event. The survey was designed to gather individuals' value statements; i.e., 'what should matter in determining the future of the former steelworks site?', expressed in their own terms. See Fig. 1 for a word cloud analysis of responses to this question.

The fact that responses to the pre-workshop survey were individual was important for establishing the focus of the workshop for the participants. We wanted to give them the opportunity to clarify and express their views prior to engagement in the workshop setting. Given that eliciting open communication in a workshop setting is often dependant on the level of trust between stakeholders, and it was entirely possible that some highly vocal participants would try to dominate, we judged that giving people private space to think through the issues first would make them more likely to engage in public. Eliciting responses prior to the workshop also enhanced our initial understanding of stakeholders' motives, enriched our thinking about stakeholder groupings and alliances, and ultimately provided us with the possibility to juxtapose responses from multiple stakeholders in an introductory presentation to the workshop (*1b. What is the source of the initial identification of stakeholder groups? 2a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? 3a. How are stakeholder viewpoints elicited and presented?*). However, undertaking an analysis of the survey results was not as simple as we had anticipated, primarily because of the 'dual' identities of many of the stakeholders in this research (their professional roles in addition to their roles as local residents). These dual identities became even more obvious during the workshop itself.

In summary, the information from the pre-workshop survey prompted us to look again at stakeholder groups for nuances in

Fig. 1. Word cloud of what should matter in determining the future of the former steelworks site.

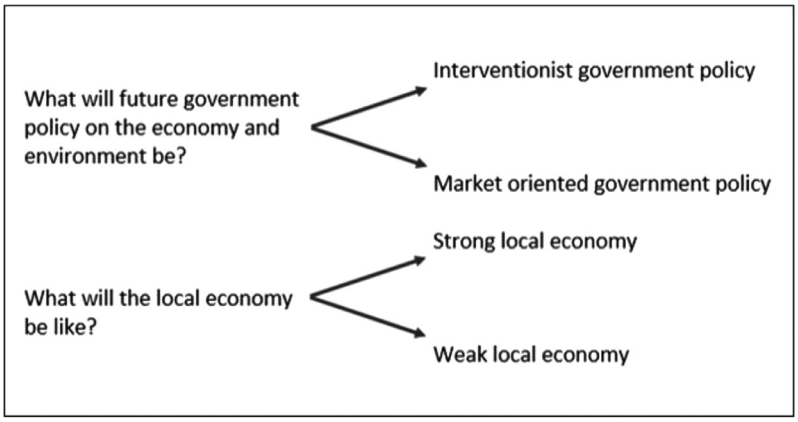

Fig. 2. The two most impactful and most uncertain factors.

opinions and agendas, and we ended up considering different types of roles and identities for each stakeholder (*2a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? 2b. How are stakeholder relationships with the subject of study or matter of concern explored?*).

4.7. Stakeholder engagement: The workshop

The workshop commenced with an introductory session that overviewed its aims and the process by which stakeholders had been identified and engaged in the project. Earlier we mentioned that many interviewees had named one particular individual as an important person to invite to the workshop, but he did not feel it appropriate for him to be involved because he had changed his location and role. Several of the workshop participants asked why he was not there, and whether we had invited him. We replied that we could not comment on how individuals had responded to our invitations, but said that we had been systematic and rigorous in our approach to identifying and engaging stakeholders, and clarified that we had followed up on all the leads we had been given (*1d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?*). In the case of this one particular individual, we felt quite uncomfortable because he had informed us that he had moved on, both professionally and geographically, and did not want to re-engage with an issue he had left behind. We had to preserve the confidentiality of these comments in the face of the strongly expressed belief held by a number of participants that he *must* have wanted to be involved. There also seemed to be an assumption in the room that there were other missing stakeholders who should somehow have been compelled to participate. Of course we made it clear that we had no powers of compulsion, and the process of invitation and follow-up had conformed to an agreed protocol. We also explained that we had said from the beginning that we could not guarantee that the stakeholders engaged in the workshop would be a 'complete' representation of interests and perspectives.

Following on from the survey work, and in preparation for the participation of the CEO of the development corporation that was in the process of being formed, the first part of the workshop was focussed on values-led thinking and scenario analysis (the latter being included as a PSM by Mingers & Rosenhead, 2004).

The design of workshop exercises was influenced by our background in Community OR and a commitment to approaches that are "not too complicated, transparent and of their time" (Gregory & Atkins, 2018, p.1115). The value of such approaches is that they can be handed over to participants (Gregory & Jackson, 1992a,1992b; Gregory & Ronan, 2015), thus bringing about capacity building at the local level. Hence the first exercise involved the clustering of the individual expressions of 'what matters' captured in the survey (*5d. How is the prioritisation of particular stakeholder opinions and interests investigated?*). Six higher-level statements of value emerged and were labelled as:

1. Economic opportunities and jobs
2. Long-term sustainable development
3. Local community voice
4. Health and well-being
5. Ecology and environment
6. Leisure opportunities

Following the clustering exercise, further information from the pre-workshop survey was revealed. This concerned the main drivers of, and barriers to, resource recovery and environmental improvement at the former steelworks site. The drivers and barriers had been ranked by the respondents in terms of 'impact' (low impact to high impact) and 'certainty' (uncertain to certain). We had plotted these rankings on a graph, which we presented. The two factors deemed most impactful and most uncertain by the respondents were 'future government policy' and 'the state of the local economy'. We were able to derive alternative outcomes for each of these factors (see Fig. 2).

Following established approaches to the creation of scenarios (Schoemaker, 1995; Shell, 2008; Wulf, Brands & Meissner, 2011), these two factors were combined to give a framework around which four different scenarios with a time-frame to the year 2025 were developed (see Fig. 3).

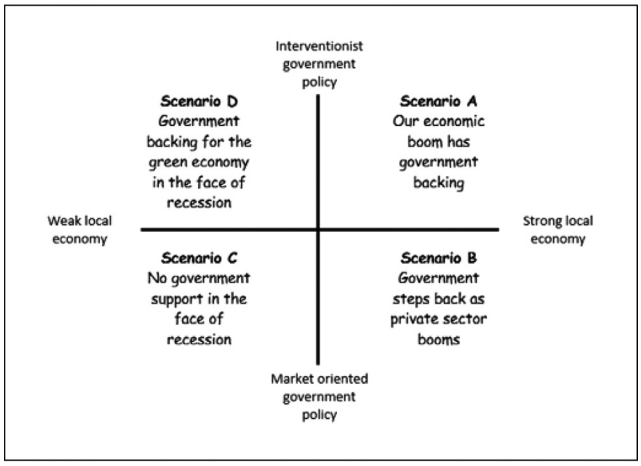

Fig. 3. The scenario framework.

Table 5
Options for development.

Option Clusters
1. Nature reserve - wet grasslands/extension of existing protected ecological areas / ecological recreational and education facilities/buffering/offsetting
2. Resource recovery - reclamation and carbon capture
3. Heavy industrial use
4. Extension of port facilities
5. Light industry and commerce - high tech manufacturing / innovation park / other commercial uses (warehousing, offices, workshops)
6. Renewable energy - solar farm/biofuel crop growth
7. Agriculture
8. Industrial heritage centre - tourism/leisure/education
9. Residential
10. Abandonment

Options for the development of the site, identified through the survey, were discussed and clustered (see Table 5). In these discussions, in line with Cronin, Midgley and Skuba Jackson's (2014) view that there is often a heterogeneity of perspectives within particular categories of stakeholders, divergence of perceptions about the viability of options within the same stakeholder group was something that became evident and was noted by the facilitators (*3. Different stakeholders, even within the same group, may have different values and perspectives, which may be explicit, implicit or hidden*).

The option clusters were discussed at the workshop with the CEO of the proposed development corporation, who confirmed his support for the stakeholders' views of what might be possible.

Thinking about four distinctly different scenarios in succession in some depth is very challenging, especially when time is limited (Hodgson & Sharpe, 2007). To compensate for this, participants were divided into four groups of 5 to 6 individuals, with mixed stakeholder profiles (group memberships were allocated in advance by the facilitators), and each group was given only one of the four scenarios to focus on. Each group was then asked to assess, within its scenario, how well the different options (framed in terms of the six high-level value statements discussed earlier) would deliver what matters (*5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed?*). This method is called 'wind-tunnelling' in the scenarios planning literature, as it is essentially about testing the options for how well they stand up to the 'wind' of strategic evaluation in the different scenario 'tunnels' (van der Heijden, 2005). See Table 6 for one group's output from this exercise.

The tables for all four scenarios were then assembled for a plenary review of the whole picture so it became visible which options were most robust (i.e., strategically promising across all or most of the scenarios) and least robust (not promising in any scenario, or only one). Following this assessment of the extent to which the different options delivered what mattered in the different scenarios, the plenary session continued by focusing on potential synergies; i.e., when two or more options could usefully be pursued in tandem (see Table 7). In this part of the workshop, participants' sense-making and anticipation of future changes added to the richness of the data and its interpretation (*5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed?*).

4.8. Stakeholder engagement: Workshop evaluation

Given our need to manage value claims in this multi-stakeholder context, we were concerned to assess whether participants felt that their voices had been heard in the workshop (*2b. How are stakeholder relationships with the subject of study or matter of concern explored?*). We also wanted to evaluate our methods to ensure that any subsequent papers making claims for them were based on evidence gathered from participants. See Eden (1995), White (2006), and Midgley et al. (2013) for discussions of the importance of formally evaluating OR methods rather than relying solely on researcher reflections. A post-workshop evaluation was therefore undertaken, focussed on matters of communication, consensus and commitment (Rouwette, 2011) (*3a. How are stakeholder viewpoints elicited and presented?*), with 14 of the 21 participants completing a questionnaire as the day ended (the other 7 had to rush away at the close of the discussions). See Table 8 for details. This information was included in the post-workshop summary report that was distributed to the workshop participants.

4.9. Summary

By way of drawing this section to a close and to demonstrate the utility of our approach, we relate the chronological stages of the account (as per Table 3) to the methodological questions for stakeholder identification and analysis (as per Tables 1 & 2) in Table 9.

5. Post-workshop reflection

As the workshop was some way from where we lived, the long journey home provided a space to reflect on the day and the facilitation experience. There was a sense of relief that we had actually delivered the long-anticipated workshop, and the participants had clearly enjoyed it. There was also some elation in our car because so many of the participants had said that they had found it beneficial, and we had satisfied the requirements of the project funders too. But there were a number of matters in particular that gave us pause for thought and stimulated further research.

5.1. Social identity theory

We were struck by the consensual nature of the discussion, and the workshop evaluation results (Table 8) suggested that the participants were also aware of the convergence of thinking in the room. The antagonisms that we had anticipated between stakeholders had not arisen; for example, we had expected a clash between economic and environmental values. Was the lack of conflict due to the workshop design, the facilitation process or some other factor? We had a sense that all the stakeholders had come in with a commitment to the economic regeneration of the area but, at the same time, respected the various different secondary priorities that people were espousing. There was a meaningful effort on the part of all the participants to find ways to integrate these priorities to create win-win options for the future of the steelworks site.

In light of this observation, we reflected on the question of stakeholder relationship quality and its impact on value creation in workshop contexts. Perhaps there had been role and identity issues that we had missed? Although we had considered different types of role and identity for each stakeholder, and had played with alternative stakeholder groupings when experimenting on a computer with different room layouts, this was very much from our own perspective when analysing the data from the pre-workshop survey. If the participants had done their own stakeholder analysis, would they have highlighted a common identity that facilitated value creation in the workshop to a degree that we, as outsiders, didn't anticipate? We cannot know for sure, but we returned to the literature to deepen our understanding.

Schneider and Sachs (2017) advance a social identity perspective to plug the research gap on the antecedents of stakeholder relationship quality and its impact on value creation in issue-based stakeholder networks. For an individual, a social identity gives him or her "knowledge that he [*sic*] belongs to a certain group together with some emotional and value significance to him of this group

Table 6
Options assessment with respect to values for the scenario labelled 'our economic boom has government backing'.

Group A		VALUES					
		Economic Opportunities and Jobs	Long Term Sustainable Development	Local Community Voice	Health and Well-being	Ecology and Environment	Leisure Opportunities
Options	Nature Reserve	Less important. Nice to have. Already in surrounding area.	N/A economically.	Important.	Important.	Very important.	Important. Already have these.
	Resource Recovery	More innovative. Greater risk. Good opportunity to "dabble". Failure is acceptable.	Allows start-up technologies/companies – developing into bigger players. Produces "next big thing".	NIMBY. Neutral. Possible negative impacts.	Neutral.	Very important.	N/A.
	Heavy Industry	Essential. Employs loads of people. Use local skilled workforce. Sponsorship of apprenticeships. Good for local economy. Is steel making economically viable?	Very important. At risk of world markets/economies. Island economy. Being self-sufficient. Not a must have to remain sustainable.	Important. Provide jobs. Local identity.	Neutral.	Negative.	Possible constraints. Possible benefits. Company benefits from local investment. Sports/social clubs/sponsorship.
	Port Facilities	Essential. Allows expansion. Complements Humber/Liverpool. Allow centre of excellence to develop.	Important. Help access and develop international markets and exports.	Important. Jobs. Sense of local identity.	Good.	Not so good.	Possible tourist development. Holidays!
	Light Industry and Commerce	Essential. Diversity. Allows specialisation. Centre of excellence.	Essential. Growth related. Better diversification. Respond quicker to changing environments.	Important. Jobs.	High quality jobs. Good.	Can drive local improvements.	Linked to opportunities for people.
	Renewable Energy	Complements other businesses. Good for jobs. Skilled workforce.	Essential. Helps deliver sustainable development.	Important. Jobs.	Jobs. Good.	Potential to be really good -carbon neutral -non-polluting. Synergy with all the above industries.	Linked to opportunities for people.
	Electric Arc Steel	Option – good for jobs if viable. At risk from world markets. Needs government commitment.	More flexible process. Use 2° steel sources. Sustainable. Subsidised if necessary. Provides materials for growth.	Important. Jobs.	Jobs. Good.	Potential to have some negative impacts. Maybe best option available.	Linked to opportunities for people by having income/well being.
	Industrial Heritage Centre	Small player. Not important. Nice to have.	N/A.	Important. Local identity. Can afford it.	OK.	Education opportunities.	Good for local community.
	Abandonment	Not an option!	Not an option.	Very important not to do this.	Important – do not do this.	Very important – do not do this.	N/A.

Table 7
Concluding reflections on options.

Trigger question	Responses
Are there any options that work across the scenarios and deliver what matters?	• Port (permanent feature). • Light industry and commerce and electric arc with renewables as enabler. • Need to diversify activity/employment. • Industrial heritage → coherent identity for region. • University provides outreach and generates skills/human capital. • Carbon capture not well identified by options but important role in future.
Are there any options that are incompatible?	• Anything except abandonment. Note: it was recognised that this was not an answer to the question; and, in discussion, it became clear that what was meant was that there were actually no fundamental incompatibilities, except abandonment was incompatible with all the other options.
Are there any options that work particularly well together?	• Renewables and light industry. • Ecology/natural reserves/biofuels. • Renewable energy/resource recovery. • Renewables/port/light industry. • Port works with all (pivotal). • Renewables with environment/ecology. • University/college academic research/training and workforce development and light industry in allied areas of activity.

membership" (Tajfel, 1972, p.292). Moreover, it enables individuals to locate themselves in relationship to others and the social environment (Turner, Hogg, Oakes, Reicher & Wetherell, 1987). Such a view is important because it suggests a definition of stakeholders that is plural, focussing on the group, which shifts the locus of identification from the identifier to the identified. Hence, Schneider and Sachs (2017) define a stakeholder group as a collective of two or more individuals who perceive and evaluate themselves on the basis of shared norms, values and goals in the context of a socio-economic issue. Furthermore, stakeholder identity is defined as individuals' knowledge of their affiliation to a stakeholder group, and the related value and emotional importance derived from this affiliation. Stakeholder groups and stakeholder identities are thus regarded as drivers of value creation in issue-based stakeholder networks. Regarding value, Garriga (2014, p.491) states that, if we want to determine "what is valuable and how value is perceived by the stakeholder, we should consider that value is a subjective concept, is not a single phenomenon, is multifaceted and can be different for each stakeholder group". Realization of this was important for understanding what had occurred within the workshop context, and we looked to Schneider and Sachs's (2017) commentary on two different identity-forming processes for further enlightenment:

- *Deductive Identity Salience Process* - A deductive identity salience process takes place if the individuals derive the prototypical attributes of stakeholder groups from pre-existing mental categories (e.g., Postmes, Spears, Lee & Novak, 2005; Turner, 1991). Deductive identity salience does not depend on an experience or a history of interpersonal interaction. Instead, the recognition of shared norms, values and goals, together with an emotional significance at the group level, leads the individuals to identify with a salient stakeholder group that gives meaning to its members (e.g., Postmes et al., 2005; Turner et al., 1987). The salience of specific stakeholder groups in the context of a socio-economic issue can give rise to intergroup effects such as negative stereotypes, prejudice and discrimination, resulting in decreased stakeholder relationship quality.
- *Inductive Identity Salience Process* - An inductive identity salience process is based on regular interactions and communications among members of stakeholder groups affected by a socio-economic issue (Postmes et al., 2005; Reicher & Hopkins, 2002). The regular interaction and communication of stakeholder representatives in a multi-stakeholder setting are central to the inductive development of shared norms, values and goals (e.g., Brewer & Kramer, 1986). A super-ordinate stakeholder identity may emerge through a process of inductive identity salience. Such a process depends on stakeholders recognising that no single actor can approach the focal issue on their own and that co-operation is necessary if value is to be created (e.g., Bridoux & Stoelhorst, 2016; Dyer & Singh, 1998; Gulati, 2007; Rowley, 1997). Hence stakeholders forgo competitive striving to take advantage of a co-operative opportunity to increase the amount of available resources (e.g., Andriof & Waddock, 2002; Freeman et al., 2004; Neville & Menguc, 2006).

In the context of the workshop, it seemed to us that the stakeholders had been through both types of identity formation process: the deductive process being associated with the participants' various organisational and professional affiliations, and the inductive process being associated with their identification with emergent socio-economic concerns affecting their town and local region. The latter was arguably super-ordinate to, and provided context for, the former. However, to be clear, while some members knew each other through professional and community groups, not all did. We had anticipated tensions based on professional identities between environmentalists and industry representatives. However, we believe such tensions were tempered by the emergence of a super-ordinate stakeholder identity, which not only recognised that concerns for both the environment and economic well-being (tied to the presence of industry) were important, but also suggested that acting on concerns for the environment would be contingent on economic prosperity. It seemed to us that, in terms of Maslow's (1943) hierarchy of needs, economic needs were being regarded as more fundamental, lower level needs than environmental ones. This was arguably the basis for the consensus. Of course, such a view fails to recognise that, if environmental needs are seriously neglected, then even the basic physiological needs of human beings for food and shelter can be compromised.

Recognising the above two distinct identity salience processes is important because they impact on trust, co-operation and value creation in an issue-based stakeholder network: identities developed through deductive processes need to be accounted for in stakeholder analyses leading up to problem structuring workshops – and, as discussed by Midgley et al. (2013), they should be considered in evaluations of PSM interventions too. In addition, one of the purposes of PSMs is to *facilitate inductive identity formation that can help overcome the negative effects of deductive identities* in order to enable value creation. The higher the level of intergroup trust in issue-based relationships, the more resources and capabilities are provided into a co-operative multi-stakeholder setting. The more stakeholder resources and capabilities are co-operatively shared, the greater is the potential for value creation through the development of innovative products and services in an issue-based stakeholder network. If such trust is not accounted for in PSM interventions, then beneficial outcomes might be falsely attributed to some other factor, such as the PSM approach, the quality of facilitation, etc. (Midgley et al., 2013).

Hence, to the principles and methodological implications we earlier drew from Pouloudi et al. (2016) (Table 1) and our initial additions (Table 2), we add a further principle with associated methodological implications (Table 10).

Table 8
Workshop evaluation results (respondents=14).

Focussing on the group option analysis session, to what extent do you agree or disagree with the following statements:						
		Strongly Disagree	Disagree	Agree	Strongly Agree	Neither Agree nor Disagree
Communication	a. There was a good exchange of ideas and viewpoints between participants			1	13	
	b. All participants contributed to the discussion			8	6	
	c. A shared language was being used		1	6	6	1
	d. Some participants dominated discussions which prevented some other participants from contributing	3	7	1		3
	e. Participants understood and were focussed on the options analysis task			8	6	
Consensus	a. Participants' opinions converged as they discussed options for their respective positions			6	5	3
	b. Participants became aware that there were more options than they originally thought			9	4	1
	c. Participants did not reach agreement on the analysis of the options	2	11			1
	d. The approach to analysing options helped participants communicate their ideas to others			9	2	3
Commitment	a. There was a strong belief and recognition of the value of the options analysis exercise			11		3
	b. Participants' level of engagement with the analysis exercise was low	5	9			
	c. There was a strong desire to achieve an analysis of the options which was both correct and complete through the exercise			8	4	2

Focussing on the workshop in its entirety, to what extent were the following delivered:					
		Fully	Partially	Not at all	Not sure
Take-Aways	a. Understanding of opportunities for resource recovery and environmental improvement	3	11		
	b. Clarification of drivers and barriers to change	7	7		
	c. An opportunity to engage in a discussion about the future of the former steelworks site	12	2		
	d. Greater appreciation of a range of stakeholder views	11	3		
	e. An introduction to and experience of scenario building and analysis	9	5		

Table 9
Relating the chronological stages of the account to the methodological questions for stakeholder identification and analysis.

Methodological questions \ Activity	Planning Meetings with the Project Principal Investigator and the Wider Project Team	Stakeholder Identification: Literature Review	Stakeholder Identification: Interviews and Group Meetings	Stakeholder Identification: Boundary Critique	Stakeholder Engagement: Pre-workshop Survey	Stakeholder Engagement: The Workshop	Stakeholder Engagement: Workshop Evaluation
1a. How is the stakeholder concept framed and contextualised? Are broad or narrow views of identification and engagement being adopted and practised? 1b. What is the source of the initial identification of stakeholder groups? 1c. What is the process for identifying additional stakeholders, and who is involved in this? 1d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?	1b	1b, 1d	1a, 1c, 1d	1c	1b	1d	
2a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? 2b. How are stakeholder relationships with the subject of study or matter of concern explored?		2b	2a, 2b	2b	2a, 2b		2b
3a. How are stakeholder viewpoints elicited and presented? 3b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced?			3a, 3b		3a	3a, 3b	3a
4a. Is a longitudinal approach adopted? 4b. Are stakeholders expected to explore how the subject of study, or matter of concern (and related perceptions), has evolved, and what do they anticipate the future to be?		4a	4a, 4b				
5a. Are stakeholders asked to identify other relevant stakeholders, and is there investigation of why they consider them as such, what role they play and how their involvements and perspectives may have changed over time? 5b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? 5c. Are alliances and histories considered? 5d. How is the prioritisation of particular stakeholder opinions and interests investigated?			5a, 5b, 5c	5c		5b, 5d	
6a. Following the identification of stakeholder groups, is there critical reflection on implied boundaries and their consequences? 6b. Is the question addressed of whether any stakeholder groups have been excluded who ethically ought to be involved? 6c. Is the question addressed of whether there are any stakeholder groups relegated to a marginal position who ethically ought to be placed more centrally within the boundaries for inclusion? 6d. Are practical resource constraints on the process of stakeholder identification and analysis accounted for as well as the impact of such constraints on the ability of stakeholders to engage?			6d	6a, 6b, 6c			

Table 10
An additional stakeholder principle and methodological implications.

7. Deductive and inductive identity salience processes differently affect trust, co-operation and value creation in an issue-based stakeholder network	a. Are stakeholders deriving the attributes of stakeholder groups from pre-existing mental categories, and do these reflect stereotypes that could introduce prejudice and/or discrimination? If so, how are such effects addressed? b. Is the question addressed of whether there is a superordinate stakeholder identity, and consideration given to how it might affect trust, co-operation, and value creation?

5.2. Our own role as stakeholders

During the workshop, several participants made recommendations to the facilitators of new stakeholders who 'should be involved'. As a consequence, it became evident to us that there was an expectation that the workshop was to be the first in a series of events, although we had never said it would be anything other than a one-off. We recognised that this expectation was a matter of wishful thinking, as stakeholders voiced their frustration that such events provide an opportunity to understand the views of others, and contribute to the development of their local community, but they do not happen routinely. This caused us to reflect on the fact that our engagement, albeit well intentioned, was more instrumental than we would have liked: our time and expenses were being paid for through a Research Councils UK grant, and we had simply not anticipated the possibility of an emergent, unfunded Community OR project. Every member of our team has undertaken pro bono Community OR projects on previous occasions, when funding was not available, and we considered whether it was feasible to continue our engagement. We concluded that it wasn't, partly because of other commitments in our diaries and the absence of further funding to free us from some of these, and partly because the community was such a long way away that every one day workshop would entail travelling on the days before and after.

Champion (2007) and Champion and Wilson (2010) suggest that it is important to consider the longer term consequences of any engagement, and they argue in favour of ongoing collaborative processes rather than single, one-off events (also see Herron & Mendiwelso-Bendek, 2018). In contrast, Córdoba and Midgley (2003) caution against inadvertently fostering dependency on OR

Table 11
Stakeholder principles and methodological implications (based on Pouloudi et al., 2016) with additional stakeholder principles and methodological implications.

Stakeholder principles recognise that:	Surfacing methodological implications for stakeholder identification and analysis
1. The set and number of stakeholders are context and time dependant	a. How is the stakeholder concept framed and contextualised? Are broad or narrow views of identification and engagement being adopted and practised? b. What is the source of the initial identification of stakeholder groups? c. What is the process for identifying additional stakeholders, and who is involved in this? d. How is the process of emergence or withdrawal of stakeholders recorded and made sense of?
2. Stakeholders may have multiple roles	a. How are stakeholder memberships of different (professional and social) groups accounted for? Likewise, conflicts and vested interests? b. How are stakeholder relationships with the subject of study or matter of concern explored?
3. Different stakeholders, even within the same group, may have different values and perspectives, which may be explicit, implicit or hidden	a. How are stakeholder viewpoints elicited and presented? b. Is how different stakeholder groups are represented explored, and are the views of different stakeholder groups cross-referenced?
4. Stakeholder roles, perspectives and alliances may change over time	a. Is a longitudinal approach adopted? b. Are stakeholders expected to explore how the subject of study, or matter of concern (and related perceptions), has evolved, and what do they anticipate the future to be?
5. Stakeholders' relations and power matter in the shifts in their roles, perceptions and alliances	a. Are stakeholders asked to identify other relevant stakeholders, and is there investigation of why they consider them as such, what role they play and how their involvements and perspectives may have changed over time? b. How are arguments for and against specific issues related to the subject of study or matter of concern surfaced and managed? c. Are alliances and histories considered? d. How is the prioritisation of particular stakeholder opinions and interests investigated?
6. The definition of stakeholder groups for inclusion also represents boundaries of exclusion and marginalisation	a. Following the identification of stakeholder groups, is there critical reflection on implied boundaries and their consequences? b. Is the question addressed of whether any stakeholder groups have been excluded who ethically ought to be involved? c. Is the question addressed of whether there are any stakeholder groups relegated to a marginal position who ethically ought to be placed more centrally within the boundaries for inclusion? d. Are practical resource constraints on the process of stakeholder identification and analysis accounted for as well as the impact of such constraints on the ability of stakeholders to engage?
7. Deductive and inductive identity salience processes differently affect trust, co-operation and value creation in an issue-based stakeholder network	a. Are stakeholders deriving the attributes of stakeholder groups from pre-existing mental categories, and do these reflect stereotypes that could introduce prejudice and/or discrimination? If so, how are such effects addressed? b. Is the question addressed of whether there is a superordinate stakeholder identity, and consideration given to how it might affect trust, co-operation, and value creation?
8. Researchers and funders are stakeholders too, and they may be surrounded by other stakeholder groups with associated interests	a. Are researchers and funders being included as stakeholders, and are their roles, resource constraints, social identities, values and interests being accounted for?

practitioners. The difference between these two stances arguably comes down to the role of the practitioner and the nature of his or her relationship with stakeholders and the community. When the practitioner is actually a member of the community in question, and is as much a participant as a facilitator (e.g., Herron & Mendiwelso-Bendek, 2018; Taket, 1994), 'dependency' isn't so much of an issue because everyone involved is (ideally) playing an open-ended, mutually supportive role. However, when the practitioner is coming in from outside for a time-limited intervention, it becomes more important to manage participant expectations, including those of the OR practitioner. Although we had not given voice to it, we had hoped that the workshop might be a kind of trigger event to stimulate community self-organisation. Yearworth and White (2018) propose a "new constitutive definition of Community OR as a self-initiating, self-organising community actor network emerging spontaneously in response to a triggering event and showing evidence of non-codified OR behaviours leading to action to improve the problem situation" (p.809). That said, we were aware of the role that the newly formed development corporation would play, and felt that it was sufficient that the workshop had helped stakeholders sharpen their views on future development options for the site. Indeed, since the workshop, the development corporation has published a master plan which focuses on the creation of skilled jobs, heavily orientated to innovation in manufacturing and advanced technologies within a high value, low carbon, diverse and circular economy. In addition, the master plan prioritises urban regeneration to meet the demand for shopping, leisure and non-ancillary office uses.

Although the one-off nature of our workshop had been made clear in our invitation to participants, the realization of a continuing need left us feeling that we had not paid sufficient attention to the fact that we ourselves (as well as the project funders, the principal investigator and our co-investigators) were stakeholders. Actually, it is well recognised in the literature on systems thinking that, as soon as practitioners first engage, they become active participants in the situations they are helping to transform (e.g., Checkland, 1981; Midgley, 2000). This made the fact that we had taken the temporary nature of our engagement for granted all the more concerning for us. Suddenly, our own identities, resource constraints and roles as academics had become much more visible! Indeed, Yearworth and White (2018) talk about a choice for Community OR practitioners: they can adopt a lead or support role. This distinction causes us to reflect on the interplay between role expectations and consequent decisions regarding exit. Due to resource constraints, we could not have continued in a lead role, and our acute awareness of this caused us to shy away from a discussion about continuity. The possibility of us moving into a support role was not thought through. That said, had the participants approached us for support after the workshop, depending on the extent of that support, we suspect we may well have found a way to enable our further engagement. Also see Brocklesby and Beall (2018), Midgley et al. (2007), Mwiti and Goulding (2018), Taket (1994), Taket and White (2000), and Väyrynen (1995) for further reflections on issues of practitioner identity.

Retrospectively extending the boundaries of our stakeholder analysis to ourselves now compels us to be transparent and accountable for the fact that we failed to be sufficiently reflective in this regard during our project. Hence, we add a final principle with associated methodological implications to those already articulated (Tables 1, 2 and 9), and present them in their entirety in Table 11 (the new principle is identified with the number 8).

6. Conclusions

We argue that taking stakeholders seriously implies more than merely giving attention to how stakeholders are identified and engaged. It also means giving appropriate consideration to how political/power relations and identities impact on the construction of understandings of the context, focal issues and stakeholder interactions. This paper has proposed a framework to support the design of more rigorous stakeholder identification and engagement in PSM work, and also in Community OR. We have illustrated our use of a first version of the framework through the case of a green innovation project that evolved into an industrial legacy community-based event, and we have presented this case chronologically to show the emergence of the methodological insights over time, with iterative learning between theory, methodology and practice. Addressing each of the questions in Tables 1 and 2 brought an element of critical-systemic insight to our stakeholder engagement, and led to further reflections on our practice and social identity theory, enabling us to enhance the list of questions for use in future projects.

While we argue that there is a real need for such a framework to inform complex PSM and Community OR interventions (and to inform the writing of accounts of such interventions), we believe the framework can also help bring rigour to the consideration of stakeholders in OR projects more generally.

Some might argue that a great deal of OR involves problem solving internally within organisations, where the immediate stakeholders and their relationships are obvious. To those who would say that this makes the kind of framework we have presented irrelevant, we have two replies:

1. Automatically assuming that only the most 'obvious' internal stakeholders matter can be dangerous, as there may be side-effects of the intervention, or side-effects of the organisation's activities that the intervention is supporting, and these may be outside the scope of attention of 'obvious' stakeholders. Broadening the boundaries of stakeholder engagement might reveal these side-effects. Thus, as Midgley et al. (2018) have argued, finding out if stakeholder engagement is relevant or not *requires some stakeholder engagement*!
2. When interventions are written up by authors for publication, their readers might need to be persuaded that wider contexts really can be legitimately ignored – especially in today's world, where the impacts of 'business as usual' on, for example, issues of social justice and environmental sustainability are increasingly coming under scrutiny.

If our framework is adopted by others in developing their accounts of OR interventions, then this might introduce a level of rigour that would enable cases to be compared and patterns of stakeholder identification and engagement to be discerned. Here, it is the rigorous consideration and explicit accounting for decisions about engagement that matters, utilising a common frame of reference and set of questions. There have been several calls in the past for cross case study learning (e.g., Checkland, 1981; McAllister, 1999; Midgley et al., 2013; White, 2006; Yearley, 2006), but the continuing ad hoc approach to writing up single case studies of stakeholder engagement is a barrier to this. We have therefore provided a framework that, if widely used, can enable researchers to compare and contrast approaches to stakeholder engagement and derive learning about what works where, how and why.

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