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Abstract

Community Operational Research (Community OR) has been an explicit sub-domain of OR for more than 30 years. In this paper, we briefly introduce its history and development before tackling the controversial issue of how it can be differentiated from other forms of OR. While it has been persuasively argued that Community OR cannot be defined by its clients, practitioners or methods, we argue that the common concern of all Community OR practice is the *meaningful engagement of communities*, whatever form that may take – and the legitimacy of different forms of engagement may be open to contestation. We then move on to discuss four other controversies that have implications for the future development of Community OR and its relationship with its parent discipline: the desire for Community OR to be more explicitly political; claims that it should be explicitly grounded in the theory, methodology and practice of systems thinking; the similarities and differences between the UK and US traditions; and the extent to which Community OR offers an enhanced understanding of practice that could be useful to OR more generally. Our positions on these controversies all follow from our identification of 'meaningful engagement' as a central feature of Community OR.

1. Introduction

Community operational research (OR) is a child of the wider OR movement (Mar Molinero, 1992). While it can be defined very broadly as "OR… for community development" (Midgley and Ochoa-Arias, 2004a, p.3), more detailed definitions can attract controversy due to the diversity of practitioners, clients and methods involved (Bryant et al, 1994; Ritchie and Taket, 1994; Ritchie et al, 1994a,b). Most Community OR practitioners value participating in an inclusive research network, embracing a variety of traditions, and overly restrictive definitions can create unwelcome exclusions (Midgley and Ochoa-Arias, 2004a). We will, however, revisit the possibility of a consensual definition of Community OR in this paper.

The term 'Community OR' was first coined in the mid-1980s (Rosenhead, 1986; Ritchie and Taket, 1994), but it is important to acknowledge that a good deal of work applying OR to community development had already been done prior to that. In the United States (US), OR practitioners had been working with community groups since the late 1960s (e.g., Ackoff, 1970) and in the United Kingdom (UK) since the mid-1970s (e.g., Noad and King, 1977; Trist and Burgess, 1978; Jones and Eden, 1981). Nevertheless, creating the label 'Community OR' in the 1980s facilitated the emergence of a new, relatively coherent research community in the UK; and, as a result, the number of community-based interventions significantly expanded (Ritchie and Taket, 1994). It would be some years later that the same burgeoning interest would manifest in the USA, under the label of 'Community-Based Operations Research' (Johnson, 2012a), and the similarities and differences between the UK and US traditions will be commented upon in due course. While Community OR is much more widely international than this (for examples of practice elsewhere in the world, see Ochoa-Arias, 2004; Waltner-Toews et al, 2004; White et al, 2011; Foote et al, 2007, 2016; Ufua et al, 2017), it is nevertheless the UK and US traditions that have been most influential to date.

This paper has three interlinked objectives. First, we will explain a little more about the history and development of Community OR for those coming to the field for the first time. In particular, we will examine the motivations of Community OR practitioners in comparison with those working in other OR traditions. Second, we will revisit a question that is frequently avoided due to the controversies it can raise (Ritchie et al, 1994a; Midgley and Ochoa-Arias, 2004a): is there something that differentiates Community OR from other forms of OR? We will argue that the answer is 'yes': it is the *meaningful engagement of communities* that matters, although there is no consensus on what counts as 'meaningful' (Ufua et al, 2017) or even what constitutes a

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'community' (Midgley and Ochoa-Arias, 1999). However, disagreements on these things are not a problem for Community OR because they provide useful stimuli for deliberation and learning. Indeed, there are other disagreements in our research community, and the third objective of the paper is to discuss four more controversies that have implications for the future development of Community OR and its relationship with its parent discipline. Our positions on these controversies all follow from our identification of 'meaningful engagement' as a central feature of Community OR.

2. The Emergence of Community OR

To understand how and why Community OR came into being, it is necessary to begin the story with the birth of OR in the 2nd World War. In both the UK and USA, scientists from a wide variety of disciplinary backgrounds came together during the war to support the planning of military operations (Trefethen, 1954). They mainly applied mathematical modeling techniques to find optimal solutions to complicated problems.

After the war, some OR practitioners continued to work in defense, but most went into civilian positions in the public and private sectors. In the UK, they had a large part to play in the development of the newly nationalized industries—most notably, coal and steel (e.g., Jones, 1992). Right from the early days, many people entered the OR profession because they saw it as a means to generate social improvement—to do something useful in society. Indeed, Rosenhead (1986) points out that a lot of the early OR practitioners who joined the UK profession in the 1940s and 1950s had strong and overtly socialist ideals.

The desire to do something socially useful has also been a motivator for the vast majority of Community OR practitioners since its inception (Wong and Mingers, 1994), and some have framed this in terms of an explicitly political agenda (Rosenhead and Thunhurst, 1982; Rosenhead, 1986; Midgley and Ochoa-Arias, 1999). While in Community OR the desires to 'do good' and promote social change beyond the boundaries of private and public sector organizations have always been important motivators for its practitioners, it is questionable whether this is still the case for much of the rest of the OR movement. In our view, three major factors in post-war years combined to alter or suppress this normative and/or political orientation in the OR movement more generally. Below, we explain how and why mainstream OR became more and more technocratic, before returning to discuss Community OR and its recovery of a more explicitly normative orientation.

First, OR came to be seen as largely synonymous with 'management science'. As Rosenhead (1986) points out, a great deal of management science supports the aims of the managers of industry within the confines of the political status quo, regardless of the consequences for other stakeholders. There are, of course, exceptions to this generalization (see, for example, the work of the 'critical management science' movement, as represented by Mingers, 1992). However, by the 1970s, most OR was embedded in industrial organizations and simply offered a problem solving service to management. We note that, in the USA, there was a public sector OR movement in the 1950s and 1960s, where people had an aim to 'do good' (but without any explicit political motivations), and this had the potential to open out into Community OR practice, but the results of projects did not live up to expectations at that time, so disenchantment followed (Johnson 2012b).

The second significant factor that affected the political awareness of practitioners was the increasing focus of a new generation of OR academics on teaching the rigors of mathematical modeling. This focus was reinforced by a prevalent belief in the 1950s and 1960s that nothing generalizable can be written about the human processes involved in conducting OR projects because each project is unique, so mathematical methods and techniques have to be the primary concern of the practitioner (Stansfield, 1981). Over the years, a number of high-profile writers in OR (e.g., Churchman, 1970; Ackoff, 1979a,b; Jackson and Keys, 1984; Friend and Hickling, 1987; Rosenhead, 1989; Checkland, 1981, 1985; Eden and Ackerman, 1998; Rosenhead and Mingers, 2001) have stood out against this view, yet most efforts in educating the next generation of OR practitioners were still channeled into teaching applied mathematics. Only a small minority of modules on university degree programs offered alternative methodologies. The result was that most of the next generation of OR practitioners saw themselves as technical experts rather than as agents of social improvement. As Midgley and Ochoa-Arias (2004a) note, many new practitioners left University with a good training in analytical methods and techniques, but an inadequate understanding of the social systems they needed to engage with. Most significantly, the degree courses that many students took offered little or no opportunity to reflect on the social and political roles that it is possible for OR practitioners to assume.

As we see it, the third factor affecting people's understandings of OR was the massive closure of industrial OR departments in the 1970s and 1980s, especially in the UK (Fildes and Ranyard, 1997). This was partly due to the over-concentration of many OR groups on solving tactical problems using mathematical modeling techniques, despite the fact that strong arguments have been made for OR to be used in strategy (e.g., Eden and Ackermann, 1998; Dyson, 2000), and

partly because of major changes in the business, economic and political environments of organizations employing operational researchers (Fildes and Ranyard, 1997). Many struggling OR groups were forced to justify their work to their employers in terms of the contributions they made to profitability, and this was hard for them to do because of the difficulty of disentangling their contributions from those made by other parts of their organizations. Organizations function as whole systems rather than as aggregations of departments (Ackoff, 1981), and the desire to make departments commercially accountable as if they were independent entities decimated OR groups in industry. Of course, many of the activities of these OR departments were later reinvented using new labels (quality management, knowledge management, data analytics, etc.), but this did not avert a major crisis in OR and a massive decline in the number of people describing themselves as 'operational researchers' (Fildes and Ranyard, 1997). The crisis in OR therefore intensified the pressure for its practitioners to portray themselves as simply offering a technical problem solving service to managers—any wider ideals had to be set to one side. Perhaps there wasn't the same level of disillusionment in the US as there was in the UK, but then there had never been such a strong belief in that country in the potential for OR to be a force for social good.

It is perhaps ironic that this crisis in the 1970s and 1980s not only had the effect of making the mainstream OR movement more business-focused than ever, but also led to the birth of Community OR. With the decline of its traditional base in industry, the Operational Research Society in the UK (and to a lesser extent its counterparts in other countries) cast around for new areas in which OR could be applied. Jonathan Rosenhead made an important intervention at this time: when he was President of the UK Operational Research Society in 1986, he realized that the timing was perfect for launching a new initiative, taking OR into the arena of community development. Rosenhead created a synergy between two different forces, both pushing for change: the Operational Research Society, which wanted to find new areas of application for the expertise of its members, and a significant minority of OR practitioners who still saw OR as a means to generate social improvement beyond the boundaries of single client organizations. Importantly, this latter group brought together several older practitioners with a relatively high profile in the OR community and a new wave of younger people who mostly came into OR from other disciplines and were influenced by, amongst other things, action research (e.g., Thunhurst and Ritchie, 1992), systems thinking (e.g., Midgley, 2000) and the humanities (e.g., Cohen, 1994). All these people were united in wanting to create an OR practice that was more participative, personally reflective and socially aware than the practices usually promoted under the banner of OR. The irony is that the birth of Community OR in the UK was a reaction against the mainstream

with its primarily managerial and mathematical foci, yet simultaneously was a result of the action of the Society that was *representing* this mainstream in looking for new 'markets' for OR. More detailed histories of the early institutional development and later expansion of the Community OR movement can be found elsewhere (e.g., Carter et al, 1987; Parry and Mingers, 1991; Mar Molinero, 1992; Ritchie, 1994; Ritchie et al, 1994c; Midgley and Ochoa-Arias, 2004a; Johnson, 2012b).

3. Defining Community OR

So far, there have been four edited books on Community OR (Ritchie et al, 1994c; Bowen, 1995; Midgley and Ochoa-Arias, 2004b; Johnson, 2012a), and all four use general phrases like "OR… for community development" (Midgley and Ochoa-Arias, 2004a, p.3), but they stop short of offering a formal definition of our field. Ritchie et al (1994a, p.1) say:

> "Let's admit it, we're going to cop out here and not offer a precise, neat and tidy definition of either Operational Research (OR) or community Operational Research (Community OR). The OR profession has struggled for many years to reach a succinct statement of OR which achieves broad agreement across OR practitioners and has any meaning to a wider audience. It hasn't got there yet (some would argue it never will)…. The view we take here is that precise definitions don't really matter, or more positively: 'the proof of the pudding is in the eating'".

Midgley and Ochoa-Arias (2004a, p.1) argue that over-defining the field can result in marginalizing the concerns of some members of our research community. As a result, they portray Community OR "as a label used by a variety of people engaged in a debate and on-going learning about their own and other people's community development practices". However, Midgley and Ochoa-Arias (2004a) go on to say that all Community OR practitioners have two things in common: "a desire to make a contribution to change in communities" (p.2) and "a concern with the design of methodologies, processes of engagement, methods and techniques" (p.2). Of course, the latter is common across all branches of OR.

Bryant et al (1994) offer a really useful clarification of what *can't* be used to define Community OR. First, it can't be defined by the characteristics of its practitioners. While some have formal training in operations research or decision sciences, others come to it from a wide range of other disciplines and practices, such as mathematics, systems science, and multiple areas of the social sciences. Also, community OR practitioners reflect a wide range of motivations, including "social,

religious, personal, career development, research and other reasons" (Bryant et al, 1994, p. 232). See also Wong and Mingers (1994).

Community OR can't be defined by a set of methods either: an extraordinary variety of methodologies, methods and techniques have been deployed (Bryant et al, 1994). There is certainly more of an emphasis on the use of problem structuring methods than is found in the rest of the OR literature, and some writers claim this is because community contexts entail greater complexity and pluralism of perspectives than most industrial and public sector contexts (e.g., Jackson, 1987a, 1988), but for these methods to be a defining characteristic of Community OR, they would have to be used by everyone in all projects, and they are clearly not: there have been a number of uses of quantitative methods reported in the UK literature (e.g., Thunhurst and Ritchie, 1992; Thunhurst et al, 1992; Cohen and Midgley, 1994; Mason, 1994; Pepper, 1994; Ritchie and Townley, 1994; Ritchie, 2004), and these constitute the *majority* of applications in the USA (Johnson, 2012a). Bryant et al (1994) hint that there may be something that is common across all Community OR projects concerning the *process of application* of OR techniques. We will return to this insight later in the paper, not to suggest that it is a defining feature of Community OR, but to point to what OR more generally can learn from the *critical attitude* that is commonly found in Community OR theory, methodology and practice.

Finally, Bryant et al (1994) argue that Community OR cannot be defined by its clients. This is arguably their most important observation, as it is very tempting, when we are asked what Community OR is, to simply say that it is OR with grass-roots community groups and voluntary organizations. This is arguably how the field started out (e.g., Thunhurst et al, 1992; Gregory and Jackson, 1992a,b; Thunhurst and Ritchie, 1992), but it rapidly went beyond serving these more 'obvious' clients: the literature reveals applications with business organizations (e.g., Mason, 1994; Ufua et al, 2017), the public sector (e.g., Pindar, 1994; Midgley et al, 1998; Grubesic and Murray 2010; Foote et al, 2016), voluntary organizations providing services with statutory funding (e.g., Cohen and Midgley, 1994), multi-agency teams (e.g., Gregory and Midgley, 2000) and networks spanning the public and voluntary sectors (e.g., Vahl, 1994; Midgley and Milne, 1995; Gregory and Midgley, 2000; Johnson et al, 2005; Boyd et al, 2007; Hare et al, 2009; Johnson et al, 2015), as well as many projects with the more 'obvious' clients mentioned above. See also Johnson and Smilowitz (2007) and Johnson (2012b) for many other examples of applications stretching beyond community groups and voluntary organizations. Of course it could be argued that these applications are not actually Community OR and have been mislabeled, but in our view this would be a retrograde step because it would impose an artificial boundary on practice that is

both counter-intuitive and anti-systemic: in most countries, to address the complex needs and desires of grass-roots communities, there is often a need for collaboration across the 'traditional' boundaries of business, public and third sector organizations in order to achieve change (Midgley et al, 1997; Gregory and Midgley, 2000; Taket and White, 2000). Some forms of OR assume the existence of a single problem owner, whereas many complex issues have multiple 'owners' (Taket and White, 2000), or indeed they may have no owners at all, as nobody yet has a mandate to deal with them (e.g., Boyd et al, 2004).

Bryant et al (1994) speculate that maybe it is the type of issue being dealt with rather than the category of client that defines Community OR, but we believe this is also incorrect: a very wide range of issues have been addressed in Community OR projects, and arguably the only thing they have in common is that the authors writing about them have claimed that addressing them is a 'good thing to do'. We suggest that belief in the value of 'doing good' (whatever that might mean in local contexts) *is* common to all Community OR practitioners, but it is not restricted to Community OR – for instance, some people still go into Public Sector OR to do good, and they discuss values (e.g., Johnson et al, 2015), even though that field has become increasingly technocratic over the years. Indeed, 'doing good with good OR' has been adopted by INFORMS in the US as the name of a student paper competition intended to highlight innovative public-sector applications (INFORMS 2016a), and INFORMS has recently started a nonprofit voluntary consulting initiative called 'Pro Bono Analytics' modeled after a similar UK project called 'Pro Bono OR' (INFORMS 2016b).

So, should we give up on finding a definitive characteristic of Community OR? We say 'no'. Below, we offer what we believe distinguishes Community OR from other forms of OR, including those forms that are motivated by the desire to 'do good' in society but nobody would claim are Community OR.

The critical characteristic we identify as being necessary for a project to be described as Community OR is the *meaningful engagement of a community* (or communities). Now, let us first of all make clear that this does not presuppose a particular theory of community or methodology of engagement; there are numerous theories that can help us make sense of what a community is (Midgley and Ochoa-Arias, 1999) and there are even more methodologies that offer principles and methods for structuring engagement (Jackson, 1988, 1991; Midgley, 2000). However, it *does* presuppose that, for every project that someone claims is an example of Community OR, it should be possible to explain what constitutes 'the community'. This might be residents in a geographical

locale, the members of a self-help group, a sub-category of the population with particular needs or desires, an under-served or marginalized section of the population, an interest group, or even a geographically dispersed set of people interacting online. It should also be possible to say what makes the engagement meaningful rather than tokenistic or absent.

Importantly, we claim that this way of distinguishing our field does not impose radically new boundaries, thus excluding projects that have previously been accepted as Community OR. This is therefore not a move to marginalize participants in our research community. Rather, we believe we are making explicit a value or 'principle of practice' that has always tacitly been there, informing people's intuitive judgments on what is and isn't Community OR. Let us explore the terms 'engagement' and 'community' a little more, to add clarity.

We have chosen the word 'engagement' because it is broader than other possible terms like 'participation'. For example, there is a question mark over whether 'consultation' is a form of participation, given that the former excludes the consulted from being part of the final decision that people are being consulted on: some people define consultation as a type of participation, and others treat participation and consultation as completely different, or even opposed concepts (Arnstein, 1969; Richardson, 1983). However, consultation is clearly a form of *engagement*, as is full participation in decision making.

The more interesting question is whether any particular form of engagement can be justified as *meaningful*, and answering this usually requires a judgment in context. Whether a particular form of engagement is meaningful or not might depend on the expectations of citizens in the community, whether their representatives have the respect of the wider community and the authority to speak on their behalf, whether the agenda is set by an organization but can be influenced by community representatives, whether there is actually a need for the community to set the agenda that organizations then respond to, etc. Ufua et al (2017) explore this notion in detail, emphasizing the need to prevent the co-option of community-based organizations (also see Ochoa-Arias, 2004), and conclude that "*meaningful* community engagement involves enabling people from local communities to have a substantial input into framing both the issues to be discussed and potential actions to address them, whether the issues are first raised as a concern by the community itself or by a private or public sector organization wanting that community's involvement".

We see the latter as a reasonable heuristic to employ when considering whether an engagement is meaningful or not: are communities, and/or their legitimate representatives, able "to have a

substantial input into framing both the issues to be discussed and potential actions to address them"? If the answer is 'yes', then the project qualifies as Community OR. If the answer is debatable, some justification might be needed. For example, Midgley et al (1998) discuss a project on housing for older people where older people themselves were engaged in a wide-ranging exercise of systemic service design, but were then excluded by the statutory authorities from a workshop that was going to determine the latter's organizational response to the OR report that had been produced. The Community OR practitioners made the judgment that they could design the workshop to ensure that the older people's concerns were strongly represented – indeed, they turned the vision of the housing service that the older people wanted into evaluation criteria to test the adequacy of the statutory agencies' plans (and also used other techniques to ensure the ideas of the older people were respected in the development of those plans). In this case, Midgley et al (1998) argued that the meaningfulness of the engagement was preserved.

The other term of interest here is 'community'. What constitutes a 'community' that ought to be meaningfully engaged? Midgley and Ochoa-Arias (1999) have addressed this question, arguing that different political traditions define 'community' in different ways, so the explicit or tacit political assumptions of Community OR practitioners (and those made by influential stakeholders) end up framing both who comes to be engaged in projects and indeed what Community OR as a practice should be. Examples of political theories of community include welfare and radical liberalism; classical Marxism and neo-Marxism; and participative-democratic, historical, religious and green communitarianism. Indeed, we do not have to be limited to the political theories already in the literature, as it is perfectly possible for reflections on Community OR theory, methodology and practice to give rise to new perspectives on how communities should be viewed.

There is the possibility of a tension in Community OR regarding the role of privilege in defining 'community'; surely not all communities are equal in terms of needs/deprivation, or orientation towards social improvement? The question of whether one might place extra emphasis on some types of community rather than others on the basis of relative deprivation or marginalization,

and the issue of whether some definitions of community make these things less visible, are things that Community OR practitioners could usefully reflect on. Critically, Midgley and Ochoa-Arias (1999) argue that, if Community OR practitioners fail to reflect on their own assumptions about what communities are, they are likely to default to the understanding of community that is dominant in their wider society. Many may be content with this, but if they are not, they need to ensure that their practice supports the vision of community that they want to see being developed.

It would be possible for us to identify our own preferred theory (or theories) of community, but in the context of the current paper, this is not the point: as a spur to learning, research communities need a degree of heterogeneity, so we simply ask practitioners to think about and explain their assumptions about community and how these have informed their practice, if and when this arises in debate. Also, our research network needs to reflect more generally on the 'who, what, why and how' of community engagement, and what kinds of pragmatic compromises on meaningful engagement can be accepted as legitimate in what contexts – and conversely, what might constitute 'one compromise too far'.

We said earlier that we could point to the difference between Community OR and other domains of OR practice (e.g., public sector OR). The criterion of 'meaningful engagement of communities' helps in this regard. Examples of perfectly legitimate interventions that do not include any aspect of community engagement include some of the application-orientated chapters in Pollock et al's (1994) important survey of public sector OR: for instance, Odoni et al (1994), on modeling urban and air transportation; and Weyant (1994), on energy policy applications. Note that there are also examples of public sector OR where there was actually community engagement that could be described as meaningful (e.g., Gregory et al, 1994; Walsh, 1995; Gregory and Romm, 2001; Foote et al, 2016; Lee et al., 2009, Jehu-Appiah et al., 2008; Ewing and Baker, 2009), and *we would argue that these are also Community OR*. There can be overlaps between Community OR and other branches of the discipline too: Mason's (1994) and Ufua et al's (2017) projects working with businesses in a community-engaged manner are also examples. Bryant et al (1994) are absolutely right to say that Community OR is not defined by the nature of its clients: it is the meaningful engagement of communities, with the latter having a substantial input into framing the issues to be tackled and how they are to be addressed, that matters.

4. Addressing Controversies

This definition of Community OR can now be taken forward to help us address some abiding controversies in our field. We should acknowledge that some of these controversies have been discussed in the literature, but others represent tensions that bubble beneath the surface; they may be the subject of informal conversations at meetings and conferences, but do not always get an airing in papers and formal conference presentations. However, they are no less important because of this. We have selected four particular controversies as foci, partly because they have been significant in relation to the positioning our own practice, and partly because revealing the defining feature of Community OR as the meaningful engagement of communities helps us throw

new light on them. The four controversies are whether Community OR should be more explicitly political; whether it should be grounded in systems thinking; what the consequences are of the similarities and differences between the US and UK traditions; and whether Community OR offers an enhanced understanding of practice that could be useful to OR more generally. There are no doubt other controversies that could have been tackled, but these will have to wait for another day.

4.1 Should Community OR be more explicitly political?

The above question has been a subject of considerable debate, with strong points being made by those answering both 'yes' and 'no', although only those saying 'yes' have written up their views in academic papers (Rosenhead and Thunhurst, 1982; Rosenhead, 1986; Midgley and Ochoa-Arias, 1999).

There have been two different reasons advanced for taking an explicitly political stance. The first was explained earlier when we discussed the history of OR: our parent discipline has largely become a problem solving service for managers, supporting the interests of industrial owners and managers, often without regard for the often very different interests of shop floor workers and their broader communities (Rosenhead and Thunhurst, 1982; Rosenhead, 1986). The second argument comes from Midgley and Ochoa-Arias (1999) who, as we saw in the previous section, point out that the term 'community' means something quite distinct in the various different political traditions, so if we want to avoid supporting the political status quo through our Community OR practice, we should reflect on the kind of community we want to build.

In contrast, those against thinking of Community OR as politically engaged point to the fact that 'doing good', for them, means doing something of value in a particular local context, usually for community groups or voluntary organizations whose mission is dear to their hearts. The survey of practitioners undertaken by Wong and Mingers (1994) makes it clear that the majority think like this. Thus, they have strong and explicitly declared value-based commitments to their practice, but not necessarily any desire to change wider society. From this perspective, the origins of Community OR in the Marxist position of Rosenhead and Thunhurst (1982) are either an irrelevance or something they would prefer to distance themselves from, as they wouldn't want the groups and organizations they support to think that their OR practice has ulterior political motives.

In our view, both sides in this debate have valid concerns, and Community OR needs to be broad enough to include both those who do and those who do not have political motivations. That said, we believe that viewing 'meaningful engagement of the community' as the defining characteristic of Community OR has significant implications: while the majority of people in our research network may not be interested in having their politics explicitly influence their practice, we argue that assumptions about what constitutes both a 'community' and 'meaningful engagement' *are always present*. This means that learning focused on explicating the assumptions made in Community OR practice should be very useful for advancing our field, whether or not these assumptions are labeled as 'political'.

It is also possible to develop new methodologies and methods based on learning about what constitutes good practice in the meaningful engagement of communities. There are already some examples of this happening. For instance, Christakis and Bausch (2006) define meaningful engagement in terms of *participatory democracy*, and they offer a methodology that is consciously designed to facilitate the fair participation of everybody involved. This has been used in Community OR by Laouris and Michaelides (2017).

Likewise, Walsh (1995) and Gregory and Romm (2001) have developed a Community OR methodology to enable more of a 'level playing field' in dialogue between organizational stakeholders and community participants, and this was explicitly based on Habermas's (1984a,b) theory that the systemic exercise of power by professionals can be countered through the engagement of communities in normative public discourse. They provide an example of a project that enabled blind and partially sighted users of a hospital, as well as professionals from various hospital-based disciplines, to challenge taken for granted understandings of 'service quality'. Their methodology also makes the practitioner accountable for their decision making during an intervention (also see Romm, 2001), and we suggest that this sort of issue is vital to building our understanding of 'meaningful engagement'.

A final example is use of Critical Systems Heuristics (Ulrich, 1983) in several Community OR projects (e.g., Cohen and Midgley, 1994; Midgley, 1997a; Midgley et al, 1997, 1998; Boyd et al, 2004), as this provides a list of 12 questions that stakeholders of any service system can use to formulate their views on what it currently is and what it ought to be. A distinguishing characteristic of these questions (when re-worded into plain English) is that they can be answered equally well by professionals, service users and community members with no previous experience of planning and management (Midgley, 1997b, 2000). Indeed, service users often produce more detailed and

far-reaching plans than professionals, as the former are less constrained in their thinking by what current organizations will allow. A finding that has been repeated several times is that the professionals welcome the user vision of what their service ought to be doing (Midgley, 2000). This again addresses the question of what constitutes meaningful participation, and how it can be practiced in Community OR.

4.2 Does Community OR need systems thinking?

The place of systems thinking in relation to Community OR has also been contentious, and the debate has a history that goes back long before the advent of Community OR (Keys, 1991). Therefore, a brief exploration of the more general issue around the relationship between systems and OR is worthwhile to place the debate in Community OR in some historical context.

The proponents of OR and systems thinking are both concerned with modeling for intervention, and every so often disagreements erupt between them as to which is the sub-domain of the other (Keys, 1991). Stainton (1983) declares, with some conviction, that systems is a part of OR, and this makes intuitive sense because there are methodologies for intervention that are explicitly systemic and others that are not. Conversely, Checkland (1981, 1985) says that the large majority of problematic situations are complex and characterized by a plurality of perspectives, so a systems approach is needed to address them, but there is a sub-set of problems that are clearly defined and merely complicated (rather than complex), where quantitative, optimizing OR techniques come into their own (also see Jackson and Keys, 1984). This likewise makes intuitive sense once we appreciate what is meant by 'problematic situations' as opposed to 'problems': Checkland advocates continuous learning about the evolving situations in our on-going experience, rather than just a focus on discrete, clearly defined 'problems'.

One approach to resolving this recurring disagreement is to try to distinguish OR and systems thinking more clearly, so they can be separated. To this end, Hirschheim (1983) says that systems approaches are concerned with the synthesis of hitherto fragmentary knowledge to facilitate the emergence of new, synergistic, widely shared understandings and actions, and they are therefore useful in the context of high levels of complexity and multiple perspectives. In contrast, he says that OR is reductionist (breaking things down into parts) and analytical (as opposed to emergent), and therefore is useful for more manageable problems where mathematical analysis can optimize policies and performance without controversy. However, we need to say straight away that this division between systems and OR is no longer accurate or credible (if indeed it ever was), because we have had problem structuring methods in OR since the 1970s (e.g., Rosenhead,

1989; Rosenhead and Mingers, 2001), including some that are not based on systems thinking (e.g., Keeney 1992; Eden and Ackermann, 2001; Friend, 2001; Rosenhead, 2001) yet are equally capable of addressing situations characterized by complexity and a plurality of viewpoints. There are also some systems approaches that enable quantification and/or optimization (e.g., Forrester, 1961; Hall, 1962; Quade and Boucher, 1968; Jenkins, 1969; Optner, 1973; Quade et al, 1978; Miser and Quade, 1985, 1988). The fields of OR and systems thinking are much more entangled than Hirscheim's (1983) analysis would suggest.

In spite of this entanglement, we believe that there *is* a way to understand the difference between OR and systems thinking, and this can allow us to demonstrate that moves to subsume one field within the other are fruitless. We will make two observations. First, the 'transdisciplines' of systems thinking and systems science include a wide range of theories and practices that are applied to phenomena well beyond the purview of operational researchers, such as biological organisms, families and galaxies, to name but three (Midgley, 2003). Second, this gives us a clue as to what is really going on: OR and systems are best thought of, not as fields of practice, but as *overlapping but differentiated research communities* (Midgley and Ochoa-Arias, 2004a). It is far preferable to reframe the overlap between systems and OR as *an opportunity for learning across research community boundaries where there are common interests*. Also see Midgley and Richardson (2007) for a similar argument for learning across the boundaries of systems thinking, cybernetics and complexity science.

We have discussed the historical tensions between OR and systems because they explain why, when the place of systems thinking within Community OR was discussed in an edited book (Midgley and Ochoa-Arias, 2004b), it was quite a sensitive issue for some participants. Nevertheless, we believe that the dialogue on this quickly transcended early fears of disciplinary imperialism, and it unfolded in the spirit of mutual learning that we advocated in the previous paragraph. Hence, new arguments for and against a systems approach emerged that are potentially of wider value to the OR community:

It is very clear, just by looking at the sheer number of Community OR papers discussing the benefits of systems thinking, that the latter has been highly influential: we found 46 in our literature search, and some examples with different emphases are Jackson (1987a, 1991), Keys (1987), Midgley (1989, 1990, 2000), Gregory and Jackson (1992a,b), Midgley et al (2007), Ochoa-Arias (1994, 1996, 1998, 2000), Midgley and Reynolds (2001, 2004a), White (2003), Córdoba and Midgley (2006), Walsh and Hostick (2005), Walsh et al (2008), Thunhurst (2013) and Sommer

and Mabin (2016). It may be that systems thinking has been so influential because most of the problems surfacing in community contexts are characterized by complexity, multiple perspectives and power relationships, and many systems approaches come into their own in these contexts (Jackson, 1988). However, it could simply be that systems thinkers and problem structuring researchers gravitated to Community OR in the 1980s because it was then a relatively undefined field that offered them opportunities to practice that were less available in more 'mainstream' OR contexts where uses of quantitative optimization methods were the norm (Bryant et al, 1994).

In the face of this influence of systems thinking, John Friend (one of the leading early practitioners of both problem structuring methods and Community OR) raises two concerns. First, he accuses the advocates of systems approaches of being overly interested in comprehensive modeling. He argues that comprehensiveness is never actually achievable, so it is more productive to learn to work with selectivity (Friend and Hickling, 1997). We agree that, if building a comprehensive model of the problematic situation is a primary goal of practice, then this can lead to 'paralysis by analysis' because any amount of detail could potentially be included. Indeed, there is strong evidence from the 1960s and early 1970s that systems thinkers fell into the trap of building 'super models' that could answer very few policy questions because they were not designed with more *selective* foci in mind (Lee, 1973).

Second, Friend (2004) criticizes systems thinkers for viewing organizations as relatively stable systems evolving over time. He says this introduces a limiting assumption into Community OR practice: that we should be working with formal organizations in relatively long term projects instead of building transitory alliances to address social issues that might cut across organizational and community boundaries. Working with stable organizations often makes sense in public or private sector OR, where the effectiveness and efficiency of organizations are the focus, but we agree with Friend that many Community OR projects address an issue of concern to a community rather than managers of an organization; may involve representatives of multiple organizations and informal groups; may only be in existence for a limited period of time; and only sometimes set out to improve just one organization.

Midgley and Ochoa-Arias (2004a) answers the first of these critiques, and they identify a particular systems approach that does not make the above assumption about comprehensiveness. They do not tackle the second critique, but we will argue that the same systems approach that Midgley and Ochoa-Arias identify also avoids a focus on organizations-as-systems. This is therefore of particular relevance to Community OR.

In answer to the accusation that systems approaches are preoccupied with comprehensive analysis instead of working with selectivity, which is to the detriment of practice (Friend and Hickling, 1997), Midgley and Ochoa-Arias (2004a) point to how two different understandings of comprehensiveness have been developed in the systems community. The first emerged in the early days of systems science (e.g., von Bertalanffy, 1956; Boulding, 1956) when the priority was to transcend the arbitrary limitations of disciplinary boundaries by developing a general system theory (GST) that can describe the generic properties of all systems (e.g., cells, organs, organisms, families, organizations, communities, ecosystems, planets, solar systems and galaxies). In GST, a systems view (understanding the properties of systems *in general* and analysing *particular* systems with reference to these) is said to be the most comprehensive view that it is possible to attain.

However, two decades later, a second, very different perspective on systems emerged, and this was associated with the work of Churchman (1970, 1979) and especially Ulrich (1983, 1987): for these authors, to be systemic does not mean to build a general theory; it means to *reflect on the boundaries of inclusion and exclusion* in systems/OR analyses. Their view is that the systems idea highlights the bounded nature of all understandings, and hence the inevitable *lack* of comprehensiveness in any OR project. Midgley and Ochoa-Arias say it is the latter view of comprehensiveness that is useful in Community OR, and it is the *same thing* as learning to work with selectivity:

> "So, let us return to the work of Friend and Hickling (1997) who argue that striving to be comprehensive in analyses is problematic because, in "difficult and complex planning problems the norms of linearity, objectivity, certainty and comprehensiveness keep on breaking down" (p.22). If one defines comprehensiveness as conformity to the saying "don't do things by halves" (Friend and Hickling, 1997, p.21), then we couldn't agree more. However, if we follow Churchman and subsequent writers in the systems domain, we need to recognise a crucial paradox. By viewing the pursuit of comprehensiveness as *dealing with its inevitable absence*, and by making this explicit in the form of boundary judgements that can be explored and critiqued, we are likely to be *more* comprehensive than if we simply take our boundary judgements for granted. It is our contention that this is actually quite similar to Friend and Hickling's (1997) prescription, "learn to work with selectivity" (p.22). Being selective essentially means, to use systems terminology, making boundary judgments" (Midgley and Ochoa-Arias, 2004a, p.11).

With regard to Friend's (2004) other criticism of systems thinking, that seeing organizations as systems encourages a focus on the longer term support of the management of single organizations instead of building transitory alliances to address community concerns, we suggest that the above approach likewise avoids this problem. While in the early days of systems thinking, organizations were indeed seen as real-world systems (e.g., Kast and Rosenzweig, 1972) and the focus was on supporting their management (e.g., Emery, 1993), in the work of Churchman (1970) and particularly Ulrich (1983), the focus shifted away from organizations as such to the boundary judgments made in OR projects that determine who will participate and what will be the focus, mostly beyond single organizational agendas (Córdoba and Midgley, 2008). A boundary is a conceptual marker of the inclusion and exclusion of both participants and the issues that concern them, and there are usually multiple possibilities for setting boundaries (Midgley, 2000). Indeed, more recent work using this systems approach has highlighted the importance of considering *time boundaries* as well as boundaries that establish the extent of participation in framing the issues to be addressed (Midgley and Shen, 2007; Hodgson, 2013, 2016). Hence, the idea of transitory strategic alliances that Friend (2004) advocates can be easily understood using this systems theory, as well as the idea of longer-term projects taking community-led change management through to implementation. Which should be the focus is a matter for the practitioner and stakeholders to choose, based on the needs of the project and any pragmatic constraints (including the time of the participants) that need to be respected.

Our own view is that Friend's understanding of transitory "negotiated project engagement" (Friend, 2004, p.177) is very useful, and so is the systems theory of boundaries (known as 'boundary critique') as it has been applied in Community OR (see especially Midgley et al, 1998; Midgley, 2000, 2016; Boyd et al, 2004; Foote et al, 2007; and Helfgott, 2017). Indeed, these two ways of understanding practice are *pointing in the same direction*: Friend (2004) explains the nature and importance of temporary community-engaged alliances, and Midgley (2000) and his collaborators provide the theory and methodology of boundary critique to deepen our understanding of how these alliances can take account of multiple perspectives, value conflicts and marginalization. The latter can all be understood in terms of how stakeholders make and defend boundary judgments (Midgley and Pinzón, 2011).

We are now in a position to tie this discussion back to the definition of Community OR offered earlier. If the meaningful engagement of communities is a characteristic of all Community OR projects, then we have to recognize that what counts as a legitimate 'community' to engage with actually depends on a boundary judgment. This boundary judgment may already be decided in

the mind of the practitioner if they are following a given political theory of community, or what counts as a community may be explored as part of the project without any pre-judged boundaries. In this situation, it is possible that a vision of community will be emergent, but it will still be dependent on an implicit or explicit boundary judgment made sometime during the project.

Understanding 'meaningful engagement' also relies on boundary judgments, in the sense that the practitioner may believe it is necessary to involve everyone in the community concerned with the issue in focus, or they may make the case that it is acceptable to involve a smaller number of representatives. These are both boundary judgments. Given that there may be marginalization in the community, and this can be understood in terms of boundaries of inclusion and exclusion (Midgley, 1992; Midgley and Pinzón, 2011), what counts as 'meaningful' engagement can become quite important: projects that fail to identify and address marginalization risk entrenching it (Midgley, 2000), and to be called 'meaningful', an engagement process has to give space for marginalized groups to express themselves in a safe environment (Midgley and Milne, 1995; Midgley, 1997b; Midgley and Pinzón, 2013).

So our perspective is that systems thinking can indeed be useful to Community OR, both in terms of offering theory, methodology and methods of value to practice (as in the 46 papers taking a systems approach that were mentioned earlier), *and also to understand how practitioners may take different perspectives on what is and is not legitimate Community OR*. Indeed, the systems theory of boundary critique potentially offers a way to understand explorations of these issues of legitimacy *in the context of practice*, as practitioners come into dialogue with participants and stakeholders who may have different views on their project than themselves (see Adams and McCullough, 2003, and Boyd et al, 2003, for an example of precisely this kind of dialogue taking place following a Community OR project).

However, having argued for the value of systems thinking, we wish to end this section by re-affirming the point that we made earlier: this does not imply any 'take-over' by the systems community. We strongly believe that Community OR needs to be a broad church, and where there are common interests across the OR and systems communities (and indeed other communities), the strengths and weaknesses of all perspectives can be discussed in a spirit of mutual learning.

4.3 What are the similarities and differences between the US and UK traditions of Community OR?

The title of this subsection should not be interpreted as implying that there are only two nationalities of interest; as mentioned earlier, Community OR is much more widely international, but the US and UK traditions have been particularly influential. To understand the differences between them, it is first necessary to provide some wider context, as the understanding of OR as a whole has diverged in the two nations.

The 'US tradition' is one that focuses almost exclusively on quantitative modeling. Certainly, it has long embraced applications in the public sector. Examples include public service OR initiatives such as the Operations Research in Public Affairs program held at MIT in 1966; and the Science and Technology Task Force of 1967, which initiated the quantitative analysis of criminal justice problems and influenced the set of methods used in the prosecution of the Vietnam war (Johnson, 2012b). A seminal compendium of public-sector OR applications in 1994 included chapters on health care, energy, natural resources, criminal justice and others (Pollock et al, 1994). In addition, INFORMS has been strongly promoting public sector OR (Kaplan 2016).

However, in 2009, 49 prominent UK-based scholars wrote a letter (Ackerman et al. 2009) to the editor of the INFORMS professional magazine, *OR/MS Today*, advocating for the increased visibility of problem structuring methods (sometimes called 'soft OR') and other non-traditional (from the US perspective) analytic approaches. This generated a response from the editor of the INFORMS flagship journal, *Operations Research*, asserting that "Our objective is to serve the community by publishing high quality papers that are based on rigorous mathematical models and demonstrate potential impact on practice", and when OR applications "are not based on rigorous mathematical models, *Operations Research* is not the appropriate outlet for such papers" (Simchi-Levi, 2009, p.21). Although Mingers (2011a) presented an introduction to problem structuring methods for a US audience, this kind of practice is still barely visible within the US branch of the profession (and in other areas of the world that follow the lead of the US in defining our discipline). The perspective of Simchi-Levi still represents the contemporary understanding of OR in the US, despite the fact that INFORMS has inaugurated journals addressing diverse application areas (e.g., strategy, organizational development, service science and marketing) and OR is extending its embrace to 'analytics', which is not solely focused on prescriptive decision modeling (e.g., Liberatore and Luo, 2010; Mortenson et al, 2014).

In contrast, since the late 1970s, the UK OR community has broadened its understanding of the discipline to include problem structuring methods (Rosenhead 1989), Soft OR (Ackerman 2012) and Community OR, as documented earlier in this paper. A typical motivation for this broadening is given by Ackoff (1979a,b), a US OR researcher who argued that "the future of operational research is past" (Ackoff, 1979a, p.93) if it would not embrace change. He made the case that we increasingly need to deal with issues characterized by complexity and stakeholder disagreement, and participative, design-orientated systems approaches are better able to deal with these than mathematical modeling techniques. However, his call for change fell on deaf ears in the USA, and he therefore abandoned the OR community.

It was in the context of the much more constrained US definition of OR that one of us (Michael Johnson) sought, in 2007, to put a name to some then-recent public sector OR applications that seemed to have a focus on research with and in the community, inspired by Ackoff's (1970) seminal paper on community-engaged OR in an inner city neighborhood of Philadelphia. Johnson wanted a new emphasis on OR applications for neighborhood revitalization and social change. The paper that resulted used a phrase, "Community-Based Operations Research", that Johnson thought would communicate that this work lay within the US OR tradition, while nevertheless broadening its scope in terms of both methodology and application (Johnson and Smilowitz, 2007, p.102). This paper did not reflect any substantive awareness of the then already mature UK tradition of Community OR (perhaps because US practitioners tend to assume that American OR *is* OR). This attempt at branding continued with Johnson's (2012a) edited volume, *Community-Based Operations Research*, and by that time he had become aware of UK Community OR. Indeed, scholarship within the latter tradition was amply cited in the introductory chapter (Johnson 2012b). However, he kept the 'Community-Based Operations Research' brand, rather than adopting 'Community OR', because of his determination to avoid marginalization by US OR practitioners who might object to the explicitly Marxist and other 'progressive' and 'critical' perspectives that were highly visible in the UK Community OR literature (as well as many other academic domains within the European humanities and social sciences). One of us (Gerald Midgley) has had personal experience with US-based OR researchers who have acknowledged a disdain within the profession for conceptions of OR that do not reflect Simchi-Levi's (2009) insistence on the centrality of mathematical modeling, the implicit valuing of 'expert' insights over community perspectives, and the privileging of theoretical developments divorced from practice over real world applications.

Acknowledging that histories of scholarship may not always convey the messiness of new thought, it is useful to note that the conception of Community-Based Operations Research may be better understood through the lens of Jackson's conception of 'enhanced OR' (Jackson, 1987a, 1988), which enlarges the notion of OR as a rigorous, analytically-focused problem-solving discipline to address notions of critical thinking and stakeholder/community engagement via action research and a deeper understanding of the diversity of problem contexts within which OR may be deployed. While Community-Based Operations Research allows for diverse understandings of problem identification, formulation, solution and implementation to enable a more inductive, critical, iterative and community-engaged notion of OR (in a sense, a superset of traditional US-style OR), Community OR as we explore it in this paper proposes something even more fundamental: an awareness that engagement drives the choice of problem-solving approach and methods, and cannot be seen as an 'optional extra'. In this sense, we cannot accept that a Community OR practitioner has the right to unilaterally diagnose a problem context that clearly arises from a community need without at least some degree of engagement with relevant community members or representatives. The researcher may conclude that people's understandings of the context are inadequate, and be able to justify this, but refusing to engage at all is not legitimate if an application is to be labeled 'Community OR'.

Having discussed 'enhanced OR', we should acknowledge that it can be seen to imply that other forms of OR are simplistic. Clearly this is not, and cannot be, the case. Instead, we argue that a new conception of OR can add real value to addressing many difficult problems of public interest when at least one of three conditions are manifest (and of course whether they are manifest is open to contestation):

1. Stakeholder and/or community engagement is essential to understanding and/or addressing the problem in focus;
2. A modeling perspective that embraces methodological pluralism (multi-methodology or mixed methods) can productively deal with the complexities at hand better than a single method design; and
3. Marginalization and power relations make the need for a critical approach (including boundary critique) necessary, either to sweep in diverse voices and/or to focus the attention of decision makers on the need for change.

We may call this *engaged OR* rather than enhanced OR – and, when there is direct engagement with local communities, this is, in addition, *Community OR*. In the section to follow we examine what Community OR can offer to the broader OR community and discipline.

4.4 What can Community OR offer to OR more generally?

Our short answer to the question 'what can Community OR offer to OR more generally?' is a deeper understanding of what could constitute the theory and practice of 'engaged OR'. While the community of practitioners who have been developing problem structuring methods over the past four decades have also made a significant contribution we can draw upon (e.g., Rosenhead, 1979; Rosenhead and Mingers, 2001), and so has the systems thinking research community (e.g., Jackson, 1991, 2000, 2003; Midgley, 2000, 2003; Reynolds and Holwell, 2010), Community OR has arguably been a significant focus of practical application for both these communities, and therefore represents a fascinating 'melting pot' of theories, methodologies, methods and practices to inform a more general understanding of what 'engaged OR' might mean.

However, we recognize that this is a controversial assertion. You don't have to walk very far to meet a large number of OR practitioners who are perfectly happy to stick with the sole use of quantitative methods and provide a problem solving service to clients without any significant stakeholder and/or community engagement. These practitioners would no doubt say that their practice *is* engaged, because they take seriously the idea that the purpose of their work is to serve clients who want to make more informed decisions, and this requires *very strong* engagement with these clients. From our own perspective, however, this is only partial engagement: as discussed in Section 3 of this paper, we argue that complex issues may have multiple problem owners, or even none at all if no agencies have yet picked them up.

The idea of 'serving a client' also assumes that the client's framing of the issue is adequate, which may well not be the case if there are stakeholders with different perspectives and no learning across those perspectives has yet been attempted. Indeed, the client's perspective may be part of the problem! This is why Midgley (2000) always explains to those who are paying for a project on a complex issue that they will not be treated as 'clients' in the traditional manner: the framing of the issue has to emerge from engagement with relevant stakeholders (the client's view should not be taken as given), and these stakeholders also need to participate in developing plans for action, which will enhance legitimacy, buy-in and the likelihood of implementation across organizational boundaries.

At this point in the argument it is worth stepping back to ask why it is that so many OR practitioners are satisfied with a practice that is only client-engaged, and not engaged in any wider sense. There are arguably three reasons. The first two assume that it is necessary for OR to be more engaged in this wider sense, but there are cultural and psychological barriers to it. The third reason raises the possibility that the majority of OR practitioners are actually *right* to resist stakeholder and community engagement.

First, as we saw in the previous section, OR in the USA is still defined very narrowly in terms of the use of mathematical techniques (Simchi-Levi, 2006, 2009; Ackermann et al, 2009; Mingers, 2011a,b); and in most of the rest of the world OR is broader, but the majority of practitioners are still only interested in quantification (Ackermann, 2012). If all the focus is on mathematical techniques, concerns with stakeholder and community engagement will inevitably be neglected or marginalized, and Mingers (2011b) demonstrates through a causal loop diagram how 'traditional' understandings of OR are continually being reinforced.

Second, there is clearly an element of personal comfort involved: for those who have spent decades in OR and have been wedded to the dominant paradigm, it is a daunting prospect to accept that there is now a need to learn a whole new set of theories, methodologies and practices (Brocklesby, 1995, 1997; Mingers and Brocklesby, 1996, 1997; Midgley, 2000; Midgley et al, 2016). It means the possibility of senior OR practitioners being seen as novices in some respects, and this can make them feel vulnerable.

However, what if the majority of practitioners are actually *right* to resist learning about the theory and practice of engagement coming from Community OR? The third possible reason why many practitioners are satisfied with the status-quo of client-only engagement and the sole use of quantitative methods is that *this works for them*. We have to consider the possibility that the contexts of much 'mainstream' OR and Community OR are so dissimilar that they require different skill sets.

As we saw in Section 2 of this paper, the historical place of much OR has been within public and private sector organizations, with practitioners offering a problem solving service to managers. Even though OR was decimated by the anti-systemic trend in the 1990s of making all departments account for their contribution to the financial bottom lines of their organizations (Fildes and Ranyard, 1997), it is still the case that the majority of practitioners are employed in industry or government. Could it be that, in such roles, if OR practitioners were to insist on stakeholder engagement, they would risk being perceived by their clients as further problematizing already

problematic issues? Or could it be that, in larger organizations with substantial human capital, other departments are already engaging with stakeholders, so the OR practitioners can assume that their clients are already well informed about other perspectives? If the answer to either of these questions is 'yes', then it would be entirely reasonable for OR practitioners to want to maintain client-only engagement, even if it's just for their own self-preservation!

Perhaps Community OR practitioners have more influence over problem framing and methodology choice than their colleagues in industry and government. This might be because they are mostly external to their commissioning organizations and act in the role of consultant-researcher; or because, when they are actually employed by third sector organizations, the latter are more likely to give them leeway to choose their preferred approach. Alternatively, the situation may be as Jackson (1987a, 1988) claims: the issues that Community OR practitioners address are inherently more likely to require multi-stakeholder and community engagement to resolve them. If it is indeed the case that Community and other OR practices are substantially different, then perhaps it is too much to ask for OR practitioners more generally to learn from Community OR.

While there may be some truth in the observation that there are differences between Community OR and other OR foci, we nevertheless want to stress that business and government are by no means immune to facing highly complex issues characterized by multiple perspectives and the need for action beyond the boundaries of a single client organization. Indeed, scholarship in public sector management emphasizes that citizen engagement is crucial to the better delivery of services (Ahn and Bretschneider 2011). Thus, it is certainly possible for many government employees to do Community OR in a credible way. It is also quite interesting to note that, in research to see how OR would have to be transformed to meet the emerging challenge of environmental management, business leaders actually expressed *more* interest in managing stakeholder relationships than people in the public and third sectors (Midgley and Reynolds, 2001, 2004b). In the context of complexity and multiple perspectives, engaged OR is clearly more effective than its less-engaged predecessor: this has been argued extensively in the literature (e.g., Jackson and Keys, 1984; Jackson, 1987b; Rosenhead, 1989; Mingers and Rosenhead, 2001; Ackermann, 2012) and the value of engaged OR (especially using problem structuring methods) has been demonstrated in multiple case studies over four decades (Mingers and Rosenhead, 2004). It is also the case that even large organizations with substantial human capital can have 'blind spots' and suffer 'groupthink' (Janis, 1982), so taking the client's perspective for granted and failing to engage more widely can be problematic (Munday, 2015).

In some ways, this whole issue of whether 'mainstream' OR can learn from Community OR boils down to our normative vision of OR: do we just see ourselves as offering a research service to management, primarily tackling 'tame' (complicated but uncontroversial) problems, or should we be able to address the full range of issues facing organizations, communities and societies, including the 'wicked' (complex, multi-stakeholder, difficult to resolve) problems identified by Rittel and Webber (1973)? If we want a more multi-talented OR, and we suggest this is essential if our discipline is to have a future in an increasingly complex and interconnected world, then we need the theories, methodologies, methods and practices of engaged OR, and Community OR practitioners can help the wider discipline understand what this might involve.

Perhaps the clinching argument, for us, is that understanding whether a particular focal issue for an OR project requires stakeholder engagement is not a simple matter. To find out whether an issue requires engaged OR *actually requires engagement*! Let us explain. Early arguments for the complementarity of different kinds of OR techniques focused on the alignment of different types of method with different contexts of application: optimization and other mathematical techniques were said to be appropriate for relatively simple problems where there is agreement on what the problem is, while problem structuring methods are more appropriate for complex problems characterized by disagreement between stakeholders (Jackson and Keys, 1984; Jackson, 1987b, 1990, 1991; Keys, 1988). We suggest that there is an element of truth to this way of thinking, but on its own it is inadequate: how do we know if the problem is a relatively simple one that is agreed between stakeholders *if we don't ask them*? Thus, any framework that is designed to support practitioners in choosing OR methods, regardless of all the caveats built around it to encourage critical thinking (e.g., Jackson, 1990), *are only as good as the exploratory approach adopted to diagnose the context* (Ulrich, 1993; Midgley, 2000). Simply asking the client is not enough, as he or she may have blind spots. Thus, an initial period of stakeholder-engaged investigation is needed prior to choosing the main problem solving or problem structuring methods to be used. This is precisely what the theory and practice of boundary critique is all about, as discussed in Section 4.2 (and also see the following references, which include those before 1998 when the term 'boundary critique' was first used as a label for this body of work: Ulrich, 1983, 1987; Midgley, 1992, 2000; Midgley et al., 1998; Foote et al., 2007; Midgley and Pinzón, 2011). It involves "probing" the features of the issue in focus (Ufua et al, 2017) and revisiting exploration periodically throughout an intervention if/when new dimensions of this issue are uncovered (Córdoba and Midgley, 2006). The extent of boundary critique prior to the choice of methods will depend on the time and resources available, but at least a modicum of stakeholder and/or

community engagement is always required if the blind spots of those initially constructing the remit of a project are to be exposed.

Hence our conclusion is that the kind of engaged OR that has been developed as part of Community OR theory, methodology and practice is really necessary *for all forms of OR*, although once an initial probing of the context has been completed, and this shows that there really isn't a need for further stakeholder engagement, the researcher can legitimately revert to a more 'traditional' mode of inquiry with a primary focus on the perspective of the client. Arguably, the only exceptions to this are when other projects with stakeholder engagement are already being done on the problem in question, and/or there are other parts of the organization organization that are working with stakeholders, and the knowledge being generated can be drawn upon to frame the new work without having to repeat a previous engagement process.

5. Conclusion

In this paper, we have sought to address the often-avoided question of how to define Community OR by arguing that it involves *meaningful engagement with the community* (or communities). This definition leaves open what 'meaningful' and 'community' might mean, both generally (different theories and methodologies take a view on these things) and in specific projects. Thus, there is space for contestation and therefore learning in the Community OR research community.

The above definition allows us to differentiate between Community OR and other forms of OR that do not involve community engagement, but without tying the former to a narrowly defined sector (e.g., grass-roots community groups and/or voluntary organizations): Community OR can be cross-sector when necessary, and indeed community-engaged practice can take place *within* public, private and third sector OR.

Importantly, this new definition does not marginalize any papers or projects that have previously been described as Community OR, thus alienating sections of our research community: we argue that the meaningful engagement of communities is a principle of practice that has been tacitly present all along. However, making it explicit has implications for addressing some of the controversies in our research community that have been discussed over the years. We have taken positions on these as follows:

With regard to whether Community OR should be more explicitly political, we have claimed that it needs to remain a broad church, embracing those with and without political motivations. That said, Community OR practice cannot avoid making implicit or explicit assumptions about what

constitutes legitimate communities to engage with, and what 'meaningful' engagement means. These assumptions are seen by some as political, but even if this insight is resisted and practitioners prefer to frame their work in apolitical terms, reflection upon these assumptions is nevertheless necessary and useful.

We have tackled the question of whether Community OR needs systems thinking, acknowledging that there have been concerns amongst some practitioners that systems theory carries unwelcome assumptions about the need to work with single organizations in long-term projects in which we should strive for comprehensive analysis. We clarified that the type of systems theory that is most relevant for Community OR (boundary critique) acknowledges the inevitable *lack* of comprehensiveness in any project, and emphasizes the exploration of boundaries beyond single organizations. Time boundaries can also be explored, so transitory, multi-stakeholder projects are perfectly explicable through this perspective.

We also examined the similarities and differences between US and UK Community OR in the context of the fact that, in the UK, the definition of OR as a whole is inclusive of a wider range of approaches than in the USA, where problem structuring methods are excluded from legitimate practice. In the latter context, Michael Johnson coined the term Community-Based Operations Research, thus deliberately avoiding an association with 'progressive' and 'critical' ideas from the UK which could result in US practitioners shunning the new specialism before it had become properly established. Community-Based Operations Research is still largely quantitative, in line with the norm in the USA, but also embraces mixed method designs as well as community and stakeholder engagement. This has been called 'enhanced OR' in the UK. However, we have been critical of the latter term because it implies that 'mainstream' OR is simplistic, when this cannot be the case. Rather, we prefer calling it 'engaged OR' – and engagement means going beyond the client to involve stakeholders and (if it is Community OR) community members or representatives.

Finally, we discussed what Community OR can offer to OR more generally. We suggested that it can offer a deeper understanding of what constitutes 'engaged OR'. Community OR is uniquely placed for this because it has been a focus of application for problem structuring researchers, systems thinkers and action researchers as well as more traditional quantitative OR practitioners, and thus it represents a 'melting pot' of theories, methodologies, methods and practices from which new understandings of engaged OR can emerge.

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