



Contents lists available at ScienceDirect

## European Journal of Operational Research

journal homepage: [www.elsevier.com/locate/ejor](http://www.elsevier.com/locate/ejor)

## Emerging trends and new frontiers in community operational research

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## ARTICLE INFO

## Article history:

Received 4 January 2017

Accepted 15 November 2017

Available online xxx

## Keywords:

Community operational research  
Community-based operations research  
Analytics  
Developing countries  
Systems thinking

## ABSTRACT

Community Operational Research (Community OR), and its disciplinary relation, Community-Based Operations Research, has an increasingly high profile within multiple domains that benefit from empirical and analytical approaches to problem solving. These domains are primarily concentrated within non-profit services and local development. However, there are many other disciplines and application areas for which novel applications and extensions of Community OR could generate valuable insights. This paper identifies a number of these, distinguishing between 'emerging trends' (mostly in well-studied areas of operational research, management science and analytics) and 'new frontiers', which can be found in traditions not commonly oriented towards empirical and analytical methods for problem solving, where community-engaged decision modeling represents new ways of generating knowledge, policies and prescriptions. This paper will show how the exploration of emerging trends and new frontiers in Community OR can provide a basis for the development of innovative research agendas that can broaden the scope and impact of the decision sciences.

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## 1. Introduction

Community Operational Research (Community OR), and its disciplinary relation, Community-Based Operations Research (CBOR), has an increasingly high profile within multiple domains that benefit from empirical and analytical approaches to problem solving. Many of these areas are concentrated in human services, community and economic development, education and other non-profit services, and the nature of inquiry tends to be influenced by action research and systems thinking as much as traditional decision modeling. However, there are many other areas of inquiry in which Community OR has had only a modest presence to date.

The goal of this paper is to explain how Community OR can help identify problem opportunities, novel analytical methods, theory-building and contributions to practice in a variety of domains, some closely identified with operational research, management science and analytics (henceforth referred to generally as the 'decision sciences'), and others more firmly rooted in disciplinary

traditions not conventionally associated with decision science. By doing so, we hope to provide encouragement and resources for researchers and practitioners who seek new applications for Community OR that support frequently-pursued Community OR values, such as community engagement, equity and social justice.

We start by providing a short introduction to Community OR, and in so doing we clarify distinctions between this and other areas of decision science. Elsewhere (Midgley, Johnson, & Chichirau, 2018), we argue that the definitive feature of Community OR is "the meaningful engagement of communities", which leaves open questions about what counts as 'meaningful' (see Ufua, Papadopoulos, & Midgley, 2018, for a discussion of this) and what constitutes a 'community' (e.g. Midgley & Ochoa-Arias, 1999). Importantly, defining Community OR in this way draws out a principle of practice (meaningful community engagement) that is present in all previously published examples of Community OR, so this is not an imposition on our discipline. However, it also proposes a normative standard for future practice and publications, to limit the possibility of 'drift' into less community-engaged forms of OR.

Note that a consequence of this definition is that there are overlaps between Community OR and other well established traditions, such as public sector OR and even OR in the private sec-

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tor (see Midgley et al., 2018, for examples). For instance, perfectly good public sector OR can be client-engaged, but not community-engaged. However, when the community actually has meaningful input, the project may be both public sector and Community OR. Below, we use public sector OR as an example to compare Community OR with, although we should provide a caveat here: many of the things we discuss below are *general characteristics* of Community OR compared with public sector OR, and the term ‘general characteristics’ refers to things that are commonly found in applications. This is different from saying they are *defining features* of Community OR. In our view, only the ‘meaningful engagement of communities’ can be considered definitional (in addition, of course, to things that are definitional of all forms of OR, like modeling).

Public sector OR has traditionally addressed three areas of decision modeling impacts: efficiency, effectiveness and equity (Savas, 1969, 1978). Bardach and Patashnik (2016) express efficiency as maximizing the sum of individual utilities, and Stokey and Zeckhauser (1978) characterize efficient solutions as lying on a Pareto frontier of possible allocations of goods and services among members of a population. Effectiveness, in contrast to efficiency, seeks to identify policies or interventions that best achieve socially desirable outcomes, especially when markets diverge greatly from the common neoclassical assumption of perfect competition, or when there are no easily identifiable markets for the goods or services of interest (LeClerc, McLay, & Mayorga, 2012). Finally, notions of equity, fairness or justice address concerns that a just society may take steps to ensure that certain groups receive benefits from policies or interventions roughly commensurate to their needs (LeClerc et al., 2012). Commonly used introductions to management science, such as Winston and Albright (2016), tend not to address efficiency directly, rather concentrating on objectives most salient to private sector operations, such as minimizing cost or maximizing yield or profit. Mainstream introductions to management science are equally silent on issues related to effectiveness and equity. Even standard reviews of public sector OR (see e.g. Pollock et al., 1994) have relatively little to say about issues of equity and social justice as compared with more traditional emphases on technical modeling.

Community OR is distinguished from client-but-not-community-engaged public sector operational research in a number of ways. First, Community OR places great emphasis on *intervention*, or “purposeful action by an agent to create change” (Midgley, 2000, p.9), as opposed to observational science alone or methodological innovations outside the context of interventions. Effective Community OR interventions require a deep understanding of the problem context, a commitment to empiricism, engagements with stakeholders, and primary data collection to reflect the lived experiences of those who are engaged with the problem to be solved (e.g. Friend, 2004). Many public sector projects also involve interventions, but the majority of the publications discussing them are framed in terms of novel modeling techniques and the findings from data analyses, with the engagement of clients and stakeholders that is required for effective intervention taking a back seat. Publications about Community OR projects, in contrast, tend to emphasize the latter alongside the reporting of methodological innovations (e.g. Johnson 2012a; Midgley & Ochoa-Arias, 2004a; Ritchie et al., 1994).

Next, in line with the focus on intervention, Community OR generally has a central concern for *local engagement and impact*. This arises from a belief that many problems of greatest immediate concern to citizens (such as education, crime, housing and economic development) have a local character, and that giving local residents a say in problem identification, formulation, solution and the implementation of new prescriptions or guidelines may result in significant and/or rapid improvements in (perceived) quality of life.

Community OR also usually has a concern for *disadvantaged, underrepresented and underserved populations*. This is about social justice, which involves efforts to promote “...a just society by challenging injustice and valuing diversity” (National Federation for Catholic Youth Ministry 2008) or ensuring “equal access to liberties, rights, and opportunities, as well as taking care of the least advantaged members of society” (Robinson, 2016). Social justice was a concern of those who first founded Community OR (e.g. Jackson, 1987; Rosenhead, 1986).

Community OR focuses on *problem solving processes as well as outcomes* (Midgley and Ochoa-Arias 2004b); in particular, designing interventions that are intended to improve the understanding of decision opportunities, data and solutions as much as to produce specific prescriptions or strategies (e.g. Ritchie, 2004). Johnson (2012b) argues that Community-Based Operations Research (CBOR), a domain closely aligned with Community OR, derives a great deal of value from

- Identifying problems which may not, at first glance, appear amenable to conventional OR methods;
- Formulating those problems in such a way as to prioritize diverse conceptions of values, evidence of beneficial social impacts and equity;
- Solving them (or addressing/managing them when no immediate resolution is possible) through multiple research frameworks and analytical methods that yield understanding as much as prescriptions; and
- Implementing solutions to enable capacity building and social change, with theory development being a possible outcome too.

Community OR embodies a *critical approach* and a *concern for ethics*. By ‘critical approach’, we mean a desire to

- Interrogate assumptions about whose conceptions of a problem count (e.g. Foote et al., 2007; Midgley & Pinzón, 2011; Ulrich, 1987, 1994, 1996);
- Explore the implications of power relationships between ‘experts’ who address problems, ‘clients’ who present problems to be solved, and communities who are the potential beneficiaries or victims of new policies or prescriptions (e.g. Córdoba & Midgley, 2006; Midgley & Milne, 1995);
- Understand the inevitably non-neutral role of the practitioner, and perceptions among stakeholders of his/her identity, which bring the need to link self-reflection with stakeholder dialogue, empirical-analytic inquiry and ideology critique (Gregory, 1992, 2000; Midgley, 1995); and
- Take seriously alternative research philosophies and methodologies, such as post-positivism, constructivism, transformative research, emancipatory inquiry and pragmatism (e.g. Creswell, 2014; Jackson, 1985; Metcalfe, 2008; Midgley, 2004; Ormerod, 2006; Taket & White, 1993).

‘Ethics’ refers to

- Concerns about the probity of engagements by researchers (e.g. issues of independence and honesty when there is a fee paying client and other stakeholders may suffer);
- The integrity of relationships between researchers, clients and participants, so exploitation of various kinds is avoided; and
- The consequences of decisions on those affected but not involved (Córdoba, 2009; Ormerod & Ulrich, 2013; Taket, 1994; Ulrich, 1994; Wenstop & Koppang, 2009).

Moral inquiry can shed light on the possible rights and responsibilities of stakeholders, especially in problematic situations (Mingers, 2011a). Likewise, Midgley, Munlo, and Brown (1998) follow Ulrich (1987, 1994, 1996) in arguing that every boundary judgment made in a Community OR project (about whose views and what issues to include, exclude or marginalize) is also

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