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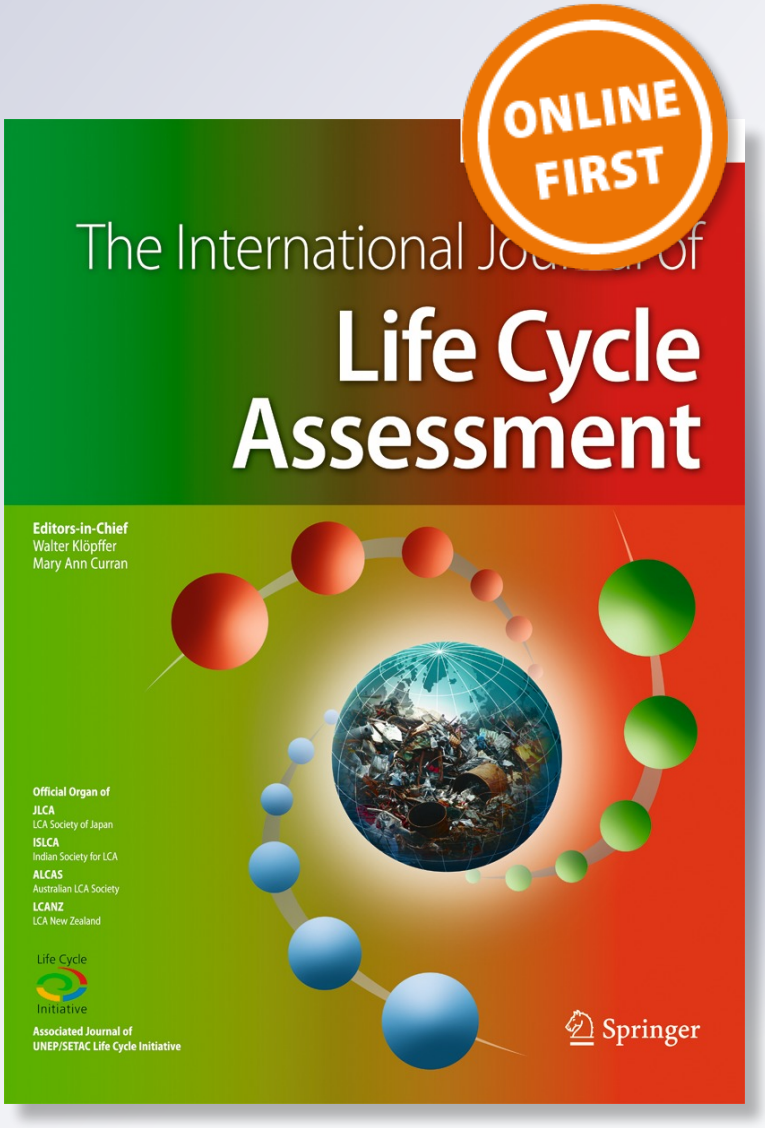

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From behind the curtain: talking about values in LCA

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Abstract
Purpose Practitioners of life cycle assessment (LCA) acknowledge that more input from social scientists can help advance the cause of life cycle management (LCM). This commentary offers a social science perspective on a long-running question within LCA, namely, how the field should manage not only stakeholders' values but also those of practitioners themselves.
Methods More than 60 interviews were conducted with LCA practitioners and their industry clients. Qualitative data were also collected through participant observation at several LCA and LCM conferences, a study of the field's history, and extensive content and discourse analysis of LCA publications and online forums.
Results and discussion Results show that LCA practitioners' values are informed partly by the knowledge acquired through their LCA work. At the same time, LCA standards and professional norms implicitly advise practitioners to keep those values out of their work as much as possible, so as not to compromise its apparent objectivity. By contrast, many social scientists contend openly that value-based judgments, based on "situated knowledge," can actually enhance the rigor, accountability, and credibility of scientific assessments.
Conclusions LCA practitioners' own situated knowledge justifies not only the value choices required by LCA but also their evaluative judgments of contemporary life cycle-based sustainability initiatives. This more critical voice could advance the goals of LCM while also boosting the credibility of LCA more generally.

Keywords Critique · Life cycle management · Objectivity · Social science · Values

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1 Introduction

How should life cycle assessment (LCA) manage values? Debates around this question date back to the founding issues of this journal, if not before (Baumann and Rydberg 1994; Finnveden 1997; Volkwein and Klöpffer 1996). Most have focused on how LCA as a technique can best incorporate value choices in a scientific and credible fashion. With LCA's more recent expansion into sustainability assessment, practitioners have recognized values as not just influences on methodological choices (Hofstetter et al. 2000; Steen 2006) but as important (though not easily measured) attributes of societal and professional cultures (Pizzirani et al. 2014; Satterfield et al. 2013; Zamagni et al. 2013).

This commentary considers LCA as both a technique and an epistemic community, defined by shared values as well as by related knowledge and practices (Haas 1992; Meyer and Molyneux-Hodgson 2010). It draws on several years of qualitative social science research conducted within this community (Freidberg 2014b) and aims to contribute to the ongoing discussion about how practitioners can increase the role of life cycle approaches in both industry and policy—the goal, in other words, of life cycle management (LCM). Proponents of LCM have already called for more social science input, mainly to help LCA practitioners better navigate the political, social, and cultural contexts in which they work (Fullana i Palmer et al. 2011). This commentary takes a different angle, turning the social lens on the practitioner community. It also

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makes a rather unorthodox proposal about how the practitioners' own values, long viewed as potential contaminants of an otherwise scientific tool, could in fact serve as powerful tools in their own right, thus advancing the cause of LCM.

The study on which this commentary draws began around 2008, when the "fashion" of carbon footprinting was among the forces driving fresh interest in LCA (Finkbeiner 2009; Freidberg 2014a). Much has happened since then. Many companies and governments have moved beyond the singular focus on greenhouse gas emissions and embraced LCA's commitment to multi-criteria assessment. The European Commission Product Environmental Footprint (PEF) initiative is just one (admittedly controversial) example of this trend (Finkbeiner 2014b); corporate participation in the making of the World LCA Food Database is another (Nemecek et al. 2014). In both industry and policymaking, LCA has become an increasingly common and useful decision support tool.

With the mainstreaming of LCA has come at least two major challenges for the practitioner community. First, to increase the technique's rigor and assure its ongoing credibility, LCA practitioners need to make progress on a long list of methodological research questions (Finkbeiner et al. 2014). The second and perhaps more daunting task is to assure that LCA research drives significant action (Potting et al. 2010). "Significant" here means something more than incremental supply chain improvements in supply chain eco-efficiency. It has become increasingly apparent that mitigating climate change alone, not to mention the many other environmental threats to humanity's survival, will require more dramatic changes in infrastructure, energy supply, consumption patterns, and ultimately societal norms (Arvesen et al. 2011; Dauvergne and Lister 2012). Indeed, this latter point comes up so often in conversations with LCA practitioners that it seems redundant to make it again here. But this in itself hints at widely (if not universally) held values within the LCA community. It also raises an important question: how might these values help bring about the changes that so many practitioners believe to be necessary?

2 A typology and brief history

Values of course take many forms. The "values debate" in LCA has mostly concerned the relationship between what philosophers of science call *constitutive* and *contextual* values. Constitutive (or methodological) values are "the source of the rules determining what constitutes acceptable scientific practice" (Longino 1990: 4); in LCA, many of these have been codified as principles in ISO 14040/44, the international standards aptly described as LCA's "constitution" (Finkbeiner 2014a; ISO 2006a). By contrast, contextual values "belong to the social and cultural environment" in which scientific research and assessment work occurs and influence the many types of judgments this work involves (Longino 1990: 4). Such values may, for instance, shape the framing (and funding) of research questions, the choice of data, and the communication of results.

In LCA, the debate has never been about *whether* its methods should account for contextual values—in particular, the values that influence stakeholders' preferences and decisions—but rather *how* to do so. The controversy centers on two related premises, both documented in 14040/44, that "decisions within an LCA are preferably based on natural science" (ISO 2006a: 7) and that value choices, such as those used in weighting, are "not scientifically based" (ISO 2006b: 22). Challenges to these premises emerged during the drafting of the standards, when some participants argued that science was neither value-free nor the only valid basis for assessing environmental impacts (Hertwich and Pease 1998; Hertwich et al. 2000). In other words, they questioned whether the "scientification" of LCA was either possible or desirable (Heiskanen 1997). Today, most practitioners accept that certain basic LCA decisions, such as those concerning the functional unit and allocation method, inevitably depend on value choices (Finkbeiner et al. 2014). But the question of how to accommodate values without compromising scientific rigor (and associated principles, such as transparency and completeness) runs throughout many "unresolved problems" in LCA (Reap et al. 2008b).

The fact that this question has endured for so long reflects at least three tensions that the LCA community faces regularly. First is the tension inherent in LCA's aim to (as Mark Goedkoop puts it) "be a tool that can model 'everything mankind does' and assess the impacts on 'everything we find important'" (Goedkoop 2014). ISO 14040 frames LCA's expected scope only somewhat more modestly as "the *entire* life cycle of a product and…*all* attributes or aspects of natural environment, human health and resources" (ISO 2006a; emphasis added). For practitioners, such a comprehensive perspective entails a constant struggle to determine in a scientifically credible way what part of "everything" is most important—what measures, in other words, most matter.

Second is the tension between past experiences and present demands. Early LCA proved all too useful as a "greenwashing machine" (Finkbeiner 2014a) and its reputation suffered the consequences. A quarter century and a family of international standards later, LCA enjoys renown as the "best tool currently available" (European Commission 2014) to assess products' environmental impacts. But in recent years, the practitioner community has faced demands to adapt this tool to ambitious new uses, such as the creation of indicators that would enable consumers and other non-experts to assess products' impacts themselves (Dooley 2014; European Commission 2013). The doubts practitioners express about such uses of LCA (often privately and occasionally in print) go well beyond

technical objections (though see Finkbeiner 2014b). These doubts reflect a history no one wants to repeat.

The third tension, closely related to the second, is one that practitioners face in relations with industry clients. On one hand, clients expect an LCA study to be scientific, independent, and therefore credible; on the other, they let it be known that they want the study to yield clear-cut and preferably marketable results. A truly independent assessment can potentially deliver such results but obviously cannot promise them. Unrealistic client expectations are perhaps not as common a problem as they once were, now that more companies have more experience with LCA. But practitioners mention this tension between independence and accommodation often enough to suggest that it remains a familiar if not ubiquitous concern.

Due to these tensions, value choices remain a source of angst in LCA. Characterization factors may allow for the modeling of a few broad categories of societal values (Hofstetter et al. 2000), but they can neither guide nor justify the many value choices required in a typical assessment. In addition to those already mentioned (regarding functional unit and allocation method), a few examples include choices made about a study's goal and scope, the quantity, quality and source of data, impact assessment categories, and how to handle and express uncertainty (Steen 2006; Lloyd and Ries 2007; De Schryver et al. 2013). While such choices are now recognized as "unavoidable" (De Schryver et al. 2013; Huppes et al. 2012), they are hardly boasted about. This is understandable. In LCA, as in other assessment professions, practitioners' value judgments need not introduce bias; indeed, they can be the only way to avoid it. But non-experts do not necessarily see that. Thus, when the practitioner community acknowledges that certain choices are value-based rather than purely scientific, those choices become potentially more vulnerable to questioning and doubt. Language that officially minimizes value choices in LCA (as in ISO 14040/44) might not describe how a typical assessment really works. It has, however, served to defend LCA's credibility as a science-based tool and has thereby encouraged its adoption.

3 In defense of partiality

But should LCA continue to portray itself as *only* a tool, however robust? In other words, must the credibility of LCA as a technique rest on the invisibility of its practitioners' own values? At least some social scientists would argue otherwise, drawing on two schools of thought. The first holds that the most objective and accountable knowledge is necessarily partial, while the second contends that values, often assumed to be instinctive or inherited beliefs, can in fact be eminently rational. These ideas may seem peripheral to the methodological debates that otherwise fill these pages. Nonetheless, they deserve attention because they point to other ways—beyond the use and refining of the tool—that the practitioner community might enhance the status and overall impact of life cycle approaches.

The first idea comes from scholars in science and technology studies (STS) who question both the traditional scientific claim to objectivity and postmodern social constructionism. The problem with the former, they argue, is that it presumes a "view from nowhere"; the view of a machine (Porter 1994). It is a "Wizard-of-Oz" view, seemingly omniscient but unidentifiable, at least as long as the wizard stays behind the curtain. For many routine scientific and technical procedures, of course, no one cares about the views of whoever performs them. This argument applies more to research and assessment conducted under conditions of high uncertainty, high stakes, and no hope of arriving at a single provable truth (Turnpenny et al. 2011). In the face of these types of "wicked" problems—hardly foreign to LCA practitioners (Reap et al. 2008a)—the view from nowhere can appear one for which nobody bears responsibility. Results arrived at from behind the curtain, however rigorously, may ultimately generate more doubt than confidence.

The alternative to this traditional notion of objectivity is the view from somewhere, or "situated knowledge" (Haraway 1988; Rose 1997). It means to acknowledge that one's perspective as a researcher is partial—in the sense of incomplete, not biased—and thus in need of other perspectives, expert and otherwise. It also implies that researchers bear responsibility for reflecting on the situations (social, political, technical) in which their knowledge is produced and applied. Up to a point, the idea of situated knowledge simply reinforces familiar methodological principles. ISO 14040/44, like the basic norms of scientific scholarship, already expects practitioners to document the assumptions and limitations of their research. And the field of LCM already assumes that any successful application of life cycle approaches must start with stakeholder input (Fullana i Palmer et al. 2011).

The key point here, though, is that to acknowledge a view "from somewhere" is not simply more rational and honest than to claim a wizard's eye view; it is also more credible. Recall the LCM principle that "trust beats certainty" (Ibid). Fullana i Palmer et al. observe that the public tends to trust NGOs more than scientists on environmental matters and that since "trust implies emotions," LCA practitioners need to improve their emotional intelligence—i.e., their capacity to listen, empathize, and communicate. This may be true, but trust in NGOs depends on more than their skills at manipulating public sentiment. It also owes to their values and their critical, value-based stances on matters of public concern. Several years ago, Bengt Steen (2006) noted that criticism—the analysis of data in relation to values—has traditionally belonged in the domain of social science, not natural science or engineering (and therefore not LCA). Yet this distinction is arguably no

longer tenable, if it ever was, given the wicked sustainability challenges that all these fields must now address. The point, in short, is that the LCA practitioner community not only has legitimate grounds for engaging in criticism but also that doing so could enhance the field's broader societal legitimacy. "Going public" with values is clearly no substitute for rigorous assessment work, whether in the scholarly or LCM context. But it could help build public trust in that work.

One common source of resistance to the open acknowledgement of one's values is the persistent assumption that values, like trust, are felt and therefore not reasoned. They might be unavoidable, according to this view, but to express them in reference to one's scientific work would be polemical and, in the interests of the profession, irresponsible. The sociologist Andrew Sayer challenges this notion in *Why Things Matter to People* (Sayer 2011). He argues that while values may provoke emotion, the latter can in fact be quite reasonable responses to empirical experiences and observations. More generally, values are "sedimented valuations," in that they derive from knowledge about the real world, including knowledge gained through work. "Sedimented" does not mean cast in stone; that would constitute dogma. It simply means that values, reflected upon, are not empirically groundless. Or as Walter Klöpffer put it many years ago, subjective is not arbitrary (Klöpffer 1998).

Sayer's book addresses primarily social scientists, whose own collective work on human well-being he sees as firm ground for critiquing conditions that undermine it, such as poverty and discrimination. But the same point applies equally well to the LCA community. After all, its work requires and generates an immense amount of knowledge, relevant to both planetary and human well-being. It's partial knowledge, of course, as is everybody's. But it seems more than sufficient to justify practitioners' weighing in (and speaking out) on the bigger issues. These issues include, for starters, both major threats to sustainability and the varied public and private sector responses to those threats, especially those that employ life cycle approaches. Who would know better than this community about whether governments and industry sustainability measures are moving in the right direction and fast enough? Coming out from behind the curtain has its risks, clearly. But the risks of staying silent are far greater.

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