Sustainability Assessment: the state of the art

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Abstract

Sustainability assessment is a recent framing of impact assessment that places emphasis on delivering positive net sustainability gains now and into the future. It can be directed to any type of decision-making, can take many forms and is fundamentally pluralistic. Drawing mainly on theoretical papers along with the few case study examples published to date (from England, Western Australia, South Africa and Canada), this paper outlines what might be considered state-of-the-art sustainability assessment. Such processes must: (i) address sustainability imperatives with positive progress towards sustainability; (ii) establish a workable concept of sustainability in the context of individual decisions/assessments; (iii) adopt formal mechanisms for managing unavoidable trade-offs in an open, participative and accountable manner; (iv) embrace the pluralistic inevitabilities of sustainability assessment, and (v) engender learning throughout. We postulate that sustainability assessment may be at the beginning of a phase of expansion not seen since environmental impact assessment was adopted worldwide.

Keywords: sustainability assessment, theory, practice, process, effectiveness, pluralism

1. Introduction

Sustainability assessment can be simply defined as any process that directs decision-making towards sustainability (Bond and Morrison-Saunders 2011, derived from Hacking and Guthrie, 2008). This definition encompasses many potential forms of decision-making from choices of individuals in everyday life through to projects, plans, programmes or policies more familiarly addressed in the fields of impact assessment. The diversity of sustainability assessment practice is reflected in the explosion in recent years of published works employing the terminology 'sustainability assessment', not all of it from traditional impact assessment writers. Much relevant literature also employs alternative terminology such as sustainability appraisal (particularly in the UK), integrated assessment, sustainability impact assessment, or similar.

Sustainability assessment has been called the third generation of impact assessment, following environmental impact assessment (EIA) and strategic environmental assessment (SEA) (Sadler 1999), although it is also true that it has emerged simultaneously from other fields such as planning and natural resource management (Gibson et al. 2005). Sustainability assessment thinking and techniques can equally be applied in ways that fall well outside the traditional domain of impact assessment, including evaluations of existing practices (see for example Gaudreau and Gibson 2010); to international trade agreements (Lee and Kirkpatrick 2001); or to internal project planning activities conducted by a proponent in advance of formal impact assessment (Pope 2006).

Arguably, the point has not yet been reached at which there is universal consensus as to what sustainability assessment is or how it should be applied. International practice varies considerably depending upon the legal and governance structures in place and the form of decision-making, as well as the conceptualisation of sustainability that is embodied in the process. However, we do believe that the key characteristics of best practice sustainability assessment are now available, and we take the opportunity in this paper to bring these components from the seminal literature together to present our view of what constitutes the leading edge of sustainability assessment theory and practice. The primary purpose of this paper is, thus, to reflect upon the emergence of sustainability assessment in its many forms over the past 10-15 years as a distinct form of impact assessment, and to critically appraise the current state-of-the-art to identify its strengths and weaknesses, and the opportunities and threats to its continuing practice. In doing so, the authors draw on over 50 years of collective experience of impact assessment research and practice, including 30 years of collective experience specific to sustainability assessment.

2. The emergence of sustainability assessment

This issue of *Impact Assessment and Project Appraisal* also considers the state of other forms of impact assessment, including Health Impact Assessment (HIA)(Harris-Roxas et al. 2012), Social Impact Assessment (SIA)(Esteves et al. 2012) and SEA (Fundingsland Tetlow and Hanusch 2012). The prevalence of these other forms of impact assessment suggests inadequacies (perceived at least in some quarters) in EIA practice, and a need to balance *ex ante* assessment by covering the three pillars of sustainable development. This, we would suggest, is one of the drivers for the emergence of sustainability assessment practice. At the same time, sustainability assessment is emerging around the world as a key decision-making tool, coinciding with the establishment of national sustainable development strategies (which have proliferated since the Earth Summit in Rio de Janeiro in 1992).

Hacking and Guthrie (2008) take the view that sustainability assessment is best considered an umbrella term encompassing a range of impact assessment practice. They usefully designed a framework, based around strategicness, comprehensiveness and integratedeness, which helps to classify the characteristics of an assessment and the extent to which it can be said to

contribute to sustainability. Strategicness refers to the degree of emphasis on strategy (i.e. the extent to which the focus is broad, considers cumulative effects, is forward-looking, and incorporates intergenerational timescales); integratedness refers to the extent to which the various assessment techniques used are combined/aligned; and comprehensiveness refers to the coverage of issues which, for sustainability assessment, needs to include the three categories or pillars of environmental, social and economic effects as well as indirect effects.

Applying the Hacking and Guthrie (2008) framework it can be argued, for example, that SEA that reflects the three pillars of sustainable development, for example SEA in England under the EU Directive (Feldmann et al. 2001), in Canada (with variable commitment to sustainability principles) (Noble 2009) and in South Africa (Govender et al. 2006) is equivalent to sustainability assessment. One key point of distinction is that unlike SEA, sustainability assessment can be equally applied to projects as well as strategic decision-making (Pope 2006, Hacking and Guthrie 2008). Environmental, social and health impact assessments (ESHIAs), such as those required by financial institutions operating in accordance with the Equator Principles (Esteves et al. 2012) could also be considered forms of sustainability assessment, and what Hacking and Guthrie (2008) term 'para assessments' such as Impact Benefit Agreements in Canada and Integrated Development Plans in South Africa (DEAT 2002, Galbraith and Bradshaw 2005), could be considered to be components of sustainability assessment. Furthermore even biophysically-oriented EIA could be considered a rudimentary form of sustainability assessment but only where there is effective incorporation of the results in deliberations and decisions that also consider social and economic considerations.

A search for the term 'sustainability assessment' in January 2012 on the Scopus database found that growth in publications on sustainability assessment has been exponential in the period 1994 to 2010 inclusive (figures are not complete, at the time of writing, for 2011 and 2012)(See figure 1). This suggests that interest in sustainability assessment is going to continue to grow, and therefore we might hope to see significantly increased levels of practice in the future. The majority of the practice identified in these papers relates to very specific applications, sometimes to a product line (for example, Zhou et al. 2012, for fuels), an organization (for example, Waheed et al. 2011, for a University), the development of new tools (for example, Deng et al. 2012) or a sector (for example, Shields et al. 2011, for the minerals sector). That is, the majority of publications on sustainability assessment relate to specific, one-off, case studies and not to general practice or to the conceptual advancement of the field. Examples of practice applied in the same way as EIA or SEA, to influence decision-making within particular jurisdictions, seem to be much rarer, and theoretical contributions rarer still. Notable exceptions to this include work by Sadler (1999); Pope et al. (2004); Gibson et al. (2005); Pope and Grace (2006); Gibson (2006); Hacking and Guthrie (2008); Bond *et al.* (2012c). We explore these and other contributions to sustainability assessment theory in the following section; however, it is also worthwhile to briefly mention here the ever-expanding work focusing on tools and techniques for sustainability assessment.

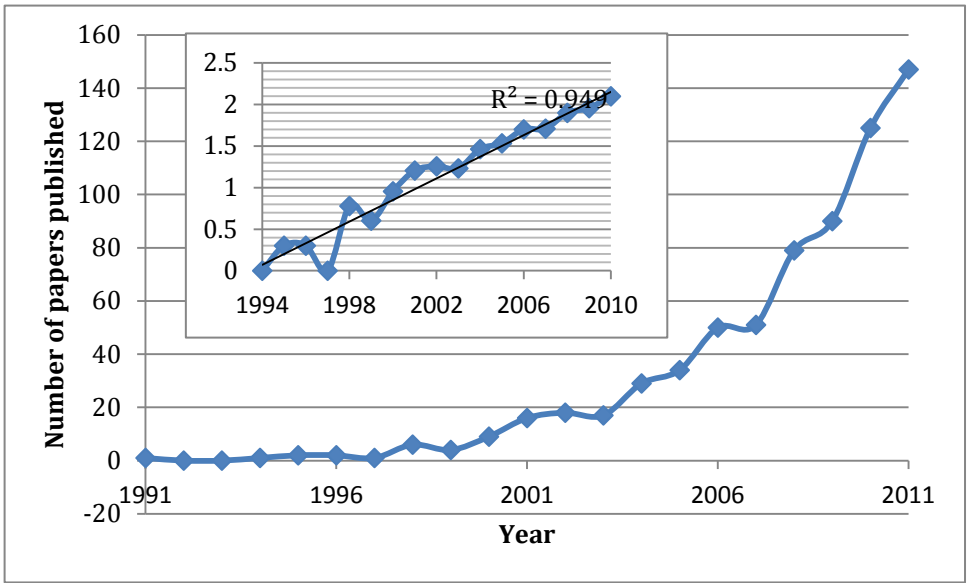

Figure 1 Number of papers published with the phrase 'sustainability assessment' in the article title, abstract or keywords, based on the Scopus database, January 26th 2012. Insert shows log10 transformation to end of 2010 to demonstrate exponential trend.

It has been noted in the literature that there are many tools and techniques that can support sustainability assessment processes, particularly in terms of integrating considerations reflecting the three pillars of sustainable development (Bebbington et al. 2007). Some approaches commonly used by proponents to evaluate the sustainability of a proposal include sustainability-oriented multi-criteria analysis (MCA) (Kain and Söderberg 2008) or forms of cost-benefit analysis (CBA) (Ekins and Vanner 2007). The potential limitations of these quantitative and somewhat reductionist approaches to sustainability assessment have also been recognised, and more inclusive, deliberative techniques proposed (Gasparatos et al. 2008). Other authors have expanded their consideration of tools and techniques to encompass approaches such as life cycle assessment, indicators, and scenario planning to name just a few (Ness et al. 2007).

Analytical tools and techniques are important and can greatly add to the rigour of sustainability assessments conducted primarily to select between alternative options. However, we suggest that they play a less significant role in sustainability assessments conducted to inform decision making, which tend to be far more qualitative and normative.

3. The state of the art of sustainability assessment

It has been pointed out by Sheate (2009, p.19) that all of the 'environmental assessment' tools (and he identifies 17 of them including EIA, SEA and sustainability assessment) have sustainability as an underlying purpose even if a particular tool was not explicitly developed in that context. However the ability

of specific impact assessment tools to contribute to sustainability is determined by their design and application. There are procedural and outcome based aspects to consider here and we distinguish between these in our discussion of sustainability assessment with respect to sustainability imperatives, addressing sustainability, handling trade-offs, pluralism and learning.

3.1 Sustainability imperatives

Impact assessment is predictive. It is based around procedural steps to be followed that are intended to provide inputs to decision-making on new development-related activities. Gibson (2012a) argues that a number of sustainability imperatives have not been met by traditional approaches to impact assessment; in other words sustainable outcomes matter and any sustainability assessment process must be explicitly designed to deliver these. In particular, Gibson (2012a) highlights that existing trends are towards deeper unsustainability, and that a focus on mitigation that serves to slow down progress towards unsustainability is an inadequate response, since it gives insufficient attention to the interaction of effects (particularly between social, economic and environmental effects) and fails to deliver the reverse in direction that is needed. He argues that humankind is involved in a vicious cycle of ecological degradation and resource depletion, which creates a spiral of continuing degradation as livelihoods are undermined.

Therefore, "(m)inimization of negative effects is not enough; assessment requirements must encourage positive steps towards greater community and ecological sustainability, towards a future that is more viable, pleasant and secure" (Gibson 2006, p172). From this perspective, it is also clear that merely considering the three pillars of sustainable development is inappropriate as it encourages trade-offs between the pillars. Therefore, best practice sustainability assessment, reflecting state of the art thinking, would take a systems, rather than a three pillars approach, seeking to deliver net sustainability gains (Gibson 2006, Gibson et al. 2005) through greater system health and resilience over the long term (Grace 2010). The ineffectiveness of current models of mitigation which emphasise avoidance and minimisation of impacts warrants a rethink of the existing hierarchy of mitigation, such that 'enhance' is placed firmly onto the top (Bond and Morrison-Saunders 2012b).

3.2 Addressing sustainability

The concept of 'sustainability' is normative and cannot be defined singularly or categorically. What constitutes sustainability in the context of an individual sustainability assessment needs to be determined on a case-by-case basis as the context differs and, for example, the definition of sustainability is contested and subject to value judgements (for example, Barrett and Grizzle 1999, Bond and Morrison-Saunders 2011). This necessitates some kind of stakeholder engagement near the outset of the sustainability assessment process and ideally this would involve a visioning process of some kind (e.g. what a sustainable outcome for the decision at hand might look like) and the establishment of principles and objectives that will deliver that vision (Pope et al. 2004, Pope and Grace 2006). Hacking and Guthrie (2006) suggest that establishing objectives by

which sustainability can be defined is one of the greatest challenges in the development of a robust sustainability assessment process.

Worked examples of sustainability assessments making a contribution to sustainability in specific contexts can be found in Gaudreau and Gibson (2010) and Gibson (2011) for a small biodiesel project and a major gas infrastructure development program respectively. Sustainability is a moving target and there is 'no state to be reached' (Gibson et al. 2005) and the nature of the concept combined with complexity of issues means much uncertainty prevails. Therefore we argue that sustainability assessment processes need to accommodate precaution and adaptation based upon being flexible, expecting to learn and to anticipate surprises (Gibson 2006).

3.3 Managing trade-offs

The management of trade-offs in sustainability assessment requires good processes that are focussed on optimising sustainability outcomes. Trade-offs are matters of choice. Traditional EIA decision-making permits these choices to be made by decision-makers at the approval stage and traditionally these decisions are taken behind 'closed doors' (Sadler 1996). There has long been concern in such impact assessment practice that it is the environment that typically gets traded off for socio-economic benefit in these cases (Morrison-Saunders and Fischer 2006, Sadler 1996). Gibson *et al.* (2005, p.130-141) and Gibson (2006) have put forward trade-off decision rules designed to ensure that sustainability assessment processes better deal with and account for any sustainability trade-offs:

1. *Net gains:* Any acceptable trade-off must deliver net sustainability gains (over the long-term);
2. *Burden of argument:* The proponent of the trade-off must be required to provide justification;
3. *Avoidance of significant adverse effects:* no trade-off involving significant adverse effect is acceptable unless all alternatives are worse;
4. *Protection of the future:* No displacement of significant adverse impact from present to future can be justified unless all alternatives are worse;
5. *Explicit justification:* All trade-offs must be explicitly justified (including a context specific account of priorities and sustainability decision criteria); and
6. *Open process:* Stakeholders must be involved in trade-off making through open and effective participatory processes.

Importantly the implementation of these rules places responsibility on proponents, regulators and public stakeholders to operate transparently to justify actions and decisions taken. Accountability for the decisions taken is also important, and is a well established principle of any form of impact assessment (see, for example, International Association for Impact Assessment and Institute of Environmental Assessment 1999).

3.4 Pluralism

Unlike other forms of impact assessment, which have been well entrenched in prescriptive or well defined processes to be followed, the specific context of any sustainability assessment matters (e.g., Gibson et al. 2005) and thus the notion

emerges that pluralism is central to good sustainability assessment (Bond et al. 2012b). Each sustainability assessment process should be tailor made for context. Bond and Morrison-Saunders (2012b) establish pluralism as a principle for an effective process advocating that pluralism must be accommodated throughout the sustainability assessment.

3.5 Learning

In light of the need to take a precautionary and adaptive approach to sustainability, learning is critical for future improvement of sustainability assessment (Bond and Morrison-Saunders 2012a). Such learning will occur at all levels ranging from individuals in a single sustainability assessment (e.g., Sinclair et al. 2008), organisations involved in multiple assessments (e.g., Sánchez and Morrison-Saunders 2011) through to social learning (e.g., Berkes 2009) and policy learning (e.g., Pope and Grace 2006). A lot of experience with sustainability assessment to date can be framed as 'learning by doing' (e.g., Gibson 2006, Pope and Grace 2006, Bond et al. 2011) and Gibson *et al.* (2005, p.89-91) further suggest that a robust sustainability assessment process will facilitate 'learning from mistakes' in recognition that decisions and actions cannot be expected to be perfect in the first instance. Two primary mechanisms for enabling learning that can be embedded in sustainability assessment processes are public engagement, which should take place at all major steps in any process if not continuously, and follow-up provisions to monitor and report back on implementation success (Bond and Morrison-Saunders 2012a). Examples of each can be found in Sinclair and Diduck (2001) and Morrison-Saunders and Arts (2004) respectively.

4. International sustainability assessment practice

To properly compare the effectiveness of practice, a consistent framework needs to be applied. Bond et al. (2012a) developed such a framework for evaluating practice based on consideration of effectiveness of decision-making processes, drawn from the literature. This framework incorporates some of the issues introduced already in this paper, along with others (Table 1). The authors make clear that other frameworks could be derived, but argue that it does incorporate current thinking and does allow consistent comparison. Indeed, the framework could equally be applied to other forms of impact assessment.

Sustainability assessment practice varies considerably depending upon the form of decision-making to which it is applied and the legal and governance structures of a particular jurisdiction. Some examples of practice are detailed in Bond *et al.* (2012c), although it is made clear that these examples are unlikely to represent all practice. Bond *et al.* (2012c) consider the situation in England, where there is a legal requirement for SA, in Western Australia, where SA practice is developing on a voluntary basis, in South Africa, where the relevant legislation is interpreted as having sustainability goals, and in Canada, where practice varies from one territory to the next, as well as from one project to the next in the case of Joint Review Panels (Gibson et al 2005).

Table 1 Framework for comparison of sustainability assessment processes (Source: Bond et al. 2012a)

Framework Criterion	Question asked
Procedural effectiveness	Have appropriate processes been followed that reflect institutional and professional standards and procedures?
Substantive effectiveness	In what ways, and to what extent does sustainability assessment lead to changes in process, actions, or outcomes?
Transactive effectiveness	To what extent, and by whom is the outcome of conducting sustainability assessment considered to be worth the time and cost involved?
Normative effectiveness	In what ways, and to what extent does the sustainability assessment satisfy the following imperatives: • reverse prevailing (unsustainable) trends? • integrate all the key intertwined factors affecting sustainability? • seek mutually reinforcing gains • minimise trade-offs? • respect contexts in which sustainability assessment takes place? • is open and broadly engaging?
Pluralism	How, and to what extent are affected and concerned parties accommodated into and satisfied by the sustainability assessment process?
Knowledge and learning	How, and to what extent does the sustainability assessment process facilitate instrumental and conceptual learning?

Table 2 summarises practice based on the effectiveness framework outlined in Table 1. A key point of distinction between different examples of sustainability assessment in practice is the conceptualisation of sustainability embedded into each process. It is also apparent that sustainability has been applied in practice to different tiers of decision-making in different contexts, although we have applied the same framework as we would argue that these effectiveness principles are independent of the tier of decision making.

England was one of the first jurisdictions to require sustainability assessment (which they call sustainability appraisal), which developed from environmental appraisal applied to development plans, to encompass social and economic issues based on Government guidance produced in 1999 (Thérivel and Minas 2002). This approach culminated in a legal requirement to conduct sustainability appraisal of development plans in the Planning and Compulsory Purchase Act 2004 (Thérivel et al. 2009). This places obligations on all local authorities to conduct sustainability appraisals which have to be compliant with the European Union, Strategic Environmental Assessment Directive (European Parliament and the Council of the European Union 2001). The English approach to sustainability appraisal builds on well established approaches to SEA (e.g., Thérivel 2004)

whereby sustainability objectives are established early in the assessment process; all subsequent activities are directed towards maximising the achievement of these objectives with performance of alternatives and options being compared in terms of the net benefits they would deliver. Research indicates, however, that the environment tends to be traded-off against socio-economic gains and loses out (Thérivel et al. 2009).

Western Australia has been developing sustainability assessment since 2002 when the Government of Western Australia published the draft Western Australian State Sustainability Strategy, followed by the final strategy in the following year (Morrison-Saunders and Pope 2012). The final strategy included a commitment to undertake sustainability assessments of complex and strategic projects, and this was honoured in relation to some high profile projects including, in particular, the Gorgon Gas Development on Barrow Island and the South West Yarragadee water development project (south of Perth) (Pope and Grace 2006, Pope et al. 2005) before sustainability fell from the Government's agenda. During this period the sustainability goals evolved from minimisation of negative impacts coupled with appropriate offsets to a goal of preserving critical thresholds and delivering positive gains across the three pillars of sustainable development. It is worthwhile noting that for the South West Yarragadee assessment the proponent made an explicit attempt to apply the Gibson decision-making trade-off rules to their proposed development and to demonstrating a net contribution to sustainability devoting a chapter of their 'sustainability impact statement' to this task (Strategen 2006). Since government-led sustainability assessment disappeared from the political agenda in 2006, sustainability assessment practice has shifted towards proponent-driven forms where the emphasis is on minimising negative impacts and therefore reducing corporate risk, as well as maintaining a social licence to operate.

Retief (2012) makes it clear that 'sustainability assessment' does not exist as a concept in South Africa, however, it is argued that sustainability assessment is mandated in the environmental assessment legislation in the country (Sowman et al. 1995), and that there have been two decades of practice of such assessments in the country (Govender et al. 2006). In particular, Retief (2012) argues that the National Environmental Management Act (NEMA) 1998, provides definitions for the terms 'environment' and 'sustainable development', which are principles to be considered by all organs of state when taking decisions in terms of NEMA; and when considered together with the 'environmental rights' enshrined in the Constitution of South Africa, along with the National Framework for Sustainable Development, it is clear that a strong sustainable development goal underpins the environmental assessment undertaken.

Gibson (2011, 2012b) has documented the evolution of sustainability assessment in Canada which, like in South Africa, does not have a formalised process of that name, and Gibson refers to sustainability assessment being a *de facto* process in Canada (Gibson 2012b). As a federal country, Canada's governance structure related to decision-making can be complex, and is shared amongst federal, provincial, territorial, Aboriginal, and municipal authorities. As

a result, particular assessment processes tend to be rather unique as the context varies so much from one project to another but, rather than being a barrier to good sustainability assessment, Gibson finds that it facilitates innovation by drawing on inter-jurisdictional collaboration which often requires the combination of existing processes and/or the establishment of new joint mechanisms (Gibson 2012b).

5. Strengths and weaknesses of sustainability assessment practice

This section highlights what we consider to be strengths and weaknesses of sustainability assessment as currently practiced. It is worth highlighting that the categorisation reflects our views as authors, and we acknowledge that opinions may differ.

Sustainability assessment is currently designed to fit into the relevant decision context in that it is evolving very differently in each jurisdiction where practice has been recognised (see Table 2). This is a strength because it acknowledges the importance of context and pluralism, which acknowledge the varying foci and effects of denial and resistance. Sustainability assessment promises more direct, effective and efficient attention to interacting social, economic and ecological factors and to the longer term legacies of important undertakings. In addition, whilst far from perfect, the broad scope of the assessments means that a more holistic (i.e. less reductionist) view is taken of potential actions, which should reduce the need for trade-off decisions. In Canada, the likelihood of unacceptable trade-offs has led to the rejection of development proposals (see Table 2). A further strength is the exponential growth in academic interest illustrated in Figure 1; this interest implies that there is significant reflection on both theory and practice along with a certain amount of excitement and willingness to develop and improve practice.

In some respects, the normative nature of sustainability might be considered a weakness in that it requires potentially expensive engagement strategies in order to fully accommodate the necessary level of pluralism. Indeed, the US National Research Council of the National Academies (2011, p.55-56), currently examining the possibility of introducing sustainability assessment into the USA, recognise that *"the formal Sustainability Assessment and Management process can be quite involved and may require EPA to devote significant staff time and resources to the task. A formal sustainability analysis could also take an extended time period to complete".* Whilst the rhetoric of engagement would support the investment, the financial reality can mean engagement is not inclusive (O'Faircheallaigh 2009, O'Faircheallaigh 2010).

With or without suitable engagement, sustainability assessment timeframes rarely accommodate long-term impacts and so consideration of intergenerational equity is weak. This is a critical component of any definition of sustainable development, but practice is driven either by the timescales of policy and plan making (generally 10 to 20 years), or by timescales set by some stakeholders in the process (Bond and Morrison-Saunders 2011, Stoffle et al.

2008). Stoffle *et al.* (2008) emphasise the differences in cultural commitments to long-term thinking, with disempowered communities (like indigenous populations) having too little voice over considerations of timescale. A significant weakness associated with efforts to improve sustainability assessment is lack of attention to follow-up and a failure to embed learning into practice. The result is that, as with other forms of assessment, there is no experience on which to draw that can facilitate useful reflection and redesign of practice.

6. Opportunities and threats to sustainability assessment practice

A current and significant threat to all forms of impact assessment is the economic recession and this undermines environmental and social goals, one example, being the United Kingdom where the Chancellor of the Exchequer has presented a speech to Parliament highlighting the threat to British business of environmental and social goals (Harvey 2011). There is some evidence that this threat recurs as countries go through cycles of prosperity and recession, Garner and O'Riordan (1982) cite the UK Government's attempts to avoid statutory application of EIA to some sectors, despite the authors' arguments that EIAs are not to blame for stopping capital investments. Poor adherence to Gibson's trade-off rules will realise this threat (Gibson 2006, Gibson et al. 2005) which will exacerbate existing biases identified in sustainability assessment in some jurisdictions (Thérivel et al. 2009). Another threat relates to the use of sustainability assessment as a symbolic process (one of the models of decision making identified for EIA by Bartlett and Kurian (1999)) whereby "*current practice is for sustainable development to be disenfranchised through the interpretation of sustainability, whereby the best alternative is good enough even when unsustainable*" (Bond and Morrison-Saunders 2009). This means that an inappropriate goal of sustainability assessment, in practice, is seen to be making proposals less unsustainable (than the initial proposal), rather than ensure the most positive contribution to sustainability while avoiding significant adverse effects.

One opportunity for sustainability assessment is the emerging framing of sustainability in terms of the resilience of socio-ecological systems. While in early days it is a promising shift in terms of establishing agreement on the goal of the sustainability assessment, as well as providing some methodological guidance based upon the work of the Resilience Alliance (Gaudreau and Gibson 2010, Slootweg and Jones 2011). Such work needs to recognise the value of systems-based methods for depicting and evaluating interactive effects as a means of building resilience. It should also recognise that resilience of some systems is in doubt, given drivers like climate change, and there is a further opportunity to focus on transition and transformation as well as resilience.

Another opportunity comes from the influence exerted by lending agencies, which, by defining assessment processes for projects they fund, make global statements about assessment expectations. There is currently an increasing emphasis on environmental and social outcomes by lending agencies; a good

example being the Equator Principles (see http://www.equator-principles.com/index.php/about-the-equator-principles) which provide a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions and appear to be gaining uptake and traction worldwide (Esteves et al. 2012).

7. The future for sustainability assessment

The apparent dramatic increase in the practice of sustainability assessment in many countries reflects the early days of EIA inasmuch as suggesting an evolution of methods and practice. Wathern's (1988) review of the use of EIA methods in four federal agencies in the USA found that most methods had never been heard of by the agencies, or were inappropriate in a different context from which they were designed. The majority of methods which were applied in practice, fell into a category of 'other' which "*reflects how often those involved in EIA develop their own approaches rather than rely upon the methods produced on more theoretical considerations*" (Wathern 1988, p.16). We would suggest that sustainability assessment is currently in this initial phase of development, where early practice is being adapted to fit new situations and new contexts as practice has not yet reached a situation where particular methods or approaches are proven to work well. Further development is important because the imposition of assessment processes in contexts for which they were not designed has been found to be problematic in the past (Cherp 2001). A key issue with deciding what works well may hinge on the agreement of a framework for measuring effectiveness in different contexts, without which, appropriate methods cannot be selected.

Sustainability assessment practice is likely to be much broader than is depicted in Table 2, depending on how observers might define existing impact assessment practice. However, it is clear that practice already includes different levels of decision-making, very different contexts, and very different approaches. A common point to draw from current practice is that the potential of forms of sustainability assessment to direct decision-making towards sustainability is clear, but that there is a long way to go before we can really say that sustainable outcomes are being achieved. A significant barrier to progress in any jurisdiction where sustainability assessment is practiced is a lack of appreciation of the need to embed learning into the process, and to accommodate the views of all affected and interested parties not just into a consideration of the outcomes of the assessment, but into the initial framing of the assessment.

The role or scope of impact assessment, in general, might be interpreted differently by governments in recession, which potentially threatens the ecological underpinning of anthropogenic activities in the future. Where policy decisions prioritise development, the role of tools like sustainability assessment is marginalised. This is a significant threat to the emergence of an assessment process which functions effectively (as might be measured using Table 1); meaning that a whole series of case studies might be established with extremely limited substantive outcomes. It is imperative that ineffective sustainability

assessment is not a consequence of the current threats, as the evidence-base for its success as a decision tool would be undermined.

Finally, given the extent to which NEPA has spread around the world such that EIA is currently practiced in at least 191 countries (Morgan 2012), it is interesting to note that the US Environmental Protection Agency is considering the adoption of a 'sustainability assessment and management' process which would follow all the classic steps in the existing impact assessment process (e.g. screening, scoping, analysis, stakeholder involvement, approval decision-making etc) but with an emphasis on the following three key features (National Research Council of the National Academies 2011, p.55):

- "*Comprehensive and systems-based: Analysis of alternative options should include an integrated evaluation of the social, environmental, and economic consequences.*
- *Intergenerational: The long-term consequences of alternatives should be evaluated in addition to the more immediate consequences.*
- *Stakeholder involvement and collaboration: Stakeholders should be involved throughout the process*."

This may suggest the beginning of a new phase of assessment, designed specifically to achieve sustainable development as understood through seminal texts and events which have taken place since NEPA was enacted in 1970, like the publication of the Bruntdland report (World Commission on Environment and Development 1987), and the Rio Earth summit in 1992. Time will tell.

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Table 2 Summary of current strengths and weaknesses of sustainability assessment practice

Framework Criterion	England (based on Thérivel 2012)	Western Australia (based on Morrison-Saunders and Pope 2012)	Canada (based on Gibson 2012b)	South Africa (based on Retief 2012)
Procedural effectiveness	English sustainability appraisals generally meet legal requirements. Consideration of plan alternatives is often poor.	Sustainability assessment processes have developed on a case-by-case basis reflecting context and evolving expertise.	Practice varies widely. Most regimes cover the basic procedural steps, but are weak in some key areas. Strategic level assessments are typically ad hoc.	Characterised by procedural inflexibility which flexibility and creativity in decision making.
Substantive effectiveness	Generally lead to some minor changes in plans, and not changes in overall objectives or broad approaches.	Some evidence of improved development proposals and evolution of sustainability assessment practice.	Has set a much higher test (positive contribution to sustainability rather than mitigation of adverse effects) and has led to rejection of some major projects and had substantial effects on the nature of approved undertakings.	No evidence of changes to decisions or content of plans. Evidence of substantial 'indirect' effect beyond specific projects.
Transactive effectiveness	English sustainability appraisals are quite expensive, reflecting the detailed and demanding requirements of the SEA Directive.	Voluntary nature of assessments strongly implies that the cost and time investment is seen as worthwhile.	Some applications have been very lengthy, in part due to their complex nature and need to develop bespoke processes. Greater efficiencies may depend on introduction of linked strategic and project level assessments.	Assessment has come under severe criticism from politicians and developers for taking too long and costing too much, despite cost and efficiency of EA being within acceptable local and international standards.
Normative effectiveness	Sustainability appraisals help to 'rebalance' plans from a socio-economic bias to a *more* overall sustainable position, but do not ensure sustainability. English plan-making process itself is typically open and broadly engaging, but sustainability appraisal process is	Challenges remain with integration, dealing with trade-offs and demonstrating that mutually reinforcing gains will be delivered by development activity that will reverse prevailing unsustainable trends.	The most advanced assessments adopt comprehensive sustainability-based criteria and specify them for the case and context, with consideration of interactive effects and trade-offs. This remains rare, however.	Decision makers have recently started to develop sustainability criteria to apply to assessment, but there is uncertainty as to how to give effect to them.

	not so actively engaging.			
Pluralism	Expert environmental authorities must be consulted at several stages in the sustainability appraisal process, and their views are taken seriously. The general public's level of engagement in the sustainability appraisal process is low.	Communities are increasingly demanding to be involved and to have influence in sustainability assessment. However community engagement still needs to develop from 'consult and comment' approaches to active engagement and empowerment.	Stakeholder engagement is generally well established in Canadian assessment processes, sometimes with intervenor funding. Major sustainability-based processes with public hearings are very participative.	Extensive provision is made for public participation, access to information and *locus standi*. Anecdotal evidence suggests that in general interested and affected parties are satisfied with opportunities provided for participation and consultation.
Knowledge and learning	English planners cite a range of indirect benefits of sustainability appraisal, including greater understanding of their plans, greater understanding of sustainability, and ideas for future rounds of planning. English academics and consultants are very active in researching sustainability appraisal practice and promoting new approaches to sustainability appraisal.	There is clear evidence of learning, where sustainability assessment has directly influenced the development of proposals, and has also led to organisational learning with respect to future application of sustainability assessment.	Sustainability assessments facilitate more open public deliberation on desirable futures and how best to reach them. Participant learning about substantive issues and means of exerting influence has been evident. Institutional learning has been slowed by resistance to assessment results that challenge conventional assumptions and practices.	Learning by all role players involved in the assessment process happens in an incremental and muddled fashion. However, debates have shifted away from the application of EA to serious questions about added value and effectiveness.