**On legitimacy in Impact Assessment: an epistemologically-based conceptualisation**

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**Abstract**

Impact assessment (IA) is carried out as an *ex ante* process to inform decision-making. It includes requirements for engagement with stakeholders (including the public) regarding actions proposed by a proponent. A key issue with the various stakeholders involved is the perceived legitimacy of the IA, which can have implications both for the reputation of the proponent, and the likelihood of conflict over the decision. But the understanding of legitimacy in the IA literature has changed over time in line with an ontological shift from positivism (that scientifically generated information leads to better informed decisions) to the post-positivist acknowledgement of the limitations of scientific method whereby assumptions must be subject to transparency, deliberation and openness. This has led to an epistemological shift towards greater subjectivism which, we suggest, has created new opportunities (which have been realised in political decision-making) to subvert knowledge through the increased use of the Internet and social media. To address the potential for such subversion of legitimacy, we seek to conceptualise legitimacy in the IA context through framing IA around a critical realist ontology and a reliabilist virtue epistemology. This allows us to identify 'knowledge legitimacy' as an equally important component of IA legitimacy along with organisational legitimacy. We conceptualise knowledge legitimacy through literature review drawing on rich understandings of knowledge from IA and other fields of research in order to develop a four-dimensional typology. This includes the dimensions of: knowledge accuracy; knowledge restriction; knowledge diffusion; and knowledge spectrum. This is the first theoretically grounded attempt to understand legitimacy in IA. It is hoped that it will provoke discussion in the IA community to further advance theoretical understandings of IA and legitimacy of practice.

**Keywords**

## 1. Introduction

The legitimacy of IA processes is a key consideration when examining the potential for conflict, or the management of risk from a developer's perspective, for example when hoping to gain a 'social license to operate' (Jijelava and Vanclay, 2017). The legitimacy of an IA process has been defined recently as "*one which all stakeholders agree is fair and which delivers an acceptable outcome for all parties*" (Bond *et al.*, 2016, p.188). This reflects a more modern view in the academic literature of the evolution of IA from a process which focussed on the provision of objective and scientifically-derived evidence for rational decision-making, to a process with increasing levels of public participation (Salomons and Hoberg, 2014) which is more frequently evaluated "*against the expectations of deliberative democracy or collaborative participation*" (Morgan, 2012, p.10). While a realisation of IA along these lines was foreshadowed in early reflections on theory and practice (e.g. O'Riordan and Sewell, 1981), especially in well-developed democracies, this contemporary view in the academic literature reflects an evolution from the roots of EIA (Environmental Impact Assessment) which, as Glasson *et al.* (2012, p.20) put it, had "*origins in a climate of a rational approach to decision-making in the USA in the 1960s … the focus was on the systematic process, objectivity*" and "*it is now realistic to place the current evolution of EIA somewhere between the rational and behavioural approaches – reflecting elements of both*".  This in turn mirrors what Healey (1993) termed the communicative turn in planning (a transition that also occurred in policy theory, see for example, Fischer and Forester, 1993; Hajer and Wagenaar, 2003). This stressed the need to move away from decisions being made based on the rationality of the elite (in the context of IA this means accepting the worldview of scientific experts and not of other stakeholders, including members of the public) and being based additionally on broader dialogue to engage additional knowledge. Such arguments are based on the work of Habermas (see Palerm, 2000, for example).

However, whilst this evolution in IA has seemingly resolved legitimacy issues associated with the rationality of the elite, we propose that the shift has created new problems.  The acknowledgement of the validity of plural claims for knowledge legitimacy lose sight of the decision context in which IA sits and potentially accommodate false claims and untruths, thereby undermining the validity of decision-making. We argue that this stems from a lack of epistemological consideration in IA practice, which means that what constitutes legitimate knowledge is not clarified. We further suggest that the increasing use of Information and Communication Technology (ICT) exacerbates the potential for legitimacy issues.

Our aim in this paper is therefore to develop a conceptualisation of knowledge legitimacy to fill a current gap in understanding within IA theory and practice. This necessarily involves us adopting a particular ontological and epistemological position which we acknowledge can easily be contested by others. Nevertheless our conceptualisation serves to illustrate that there are legitimacy consequences of ignoring theoretical reflection and positioning of IA. To achieve our aim we begin, in section 2, by briefly setting the context in terms of the evolution of IA theory and the implications for understandings of IA legitimacy. We also present evidence that the increasing use of ICT is already having legitimacy consequences. In section 3 we introduce ontology and epistemology in general and specifically with respect to IA. This section explains why it is important to take an epistemological position in particular with respect to legitimacy, and introduces our theoretical positioning of IA. Section 4 then sets out our method for deriving a conceptualisation of knowledge

legitimacy. In Section 5 we explain the conceptualisation, introducing four different dimensions of knowledge legitimacy in IA. Conclusions are presented in section 6.

## 2. The evolution of IA theory and links to legitimacy

Legitimacy is usually associated with the activities of an organisation or institution, and much of the available literature discusses legitimacy in this context. Here we focus in the main on studies concerning legitimacy in environment-related decision-making. Cashmore and Wejs (2014, p.204), for example, conceptualise institutional legitimacy to include regulative, normative and cultural cognitive categories. We consider that these are analogous to the organisational legitimacy forms identified by Suchman (1995) of pragmatic, moral and cognitive. The basis for these is, respectively, legally sanctioned (regulative); morally governed (normative); and comprehensible, recognizable and culturally supported (cultural cognitive), which incorporates expectations for transparency, accountability and participation (Cashmore and Wejs, 2014). Different forms of organisational legitimacy have also been identified by Demuijnck and Fasterling (2016), whilst (Gross, 2007) has demonstrated empirically that legitimacy is affected both by the values and attitudes of stakeholders and by their perceptions of the fairness of the decision process, and therefore includes normative elements. Further complexity is introduced by Owens *et al.* (2004) who find that legitimacy is compromised by contested judgments or frames; indeed, legitimacy is especially an issue in conflict situations (Karjalainen and Järvikoski, 2010). So it is clear that legitimacy is complex, and Suchman (1995) highlights the considerable diversity of types of legitimacy that have been identified in the literature beyond organisational legitimacy.

For IA specifically, the literature does not contain a conceptualisation of legitimacy. There is some discussion of 'process legitimacy' which appear to tally with the cultural cognitive forms of organisational and institutional legitimacy. We argue here that IA legitimacy is typically (implicitly) understood as being equivalent to the cultural cognitive legitimacy expectations of transparency, accountability and participation. Others forms of organisational legitimacy may be associated with those conducting, and financing, the IAs. Thus, for the purposes of this paper we consider that organisational legitimacy as described here is relevant to IA and captures the understanding that relates to how the process is conducted.

There is a known link between epistemology (the study of knowledge) and legitimacy (Mizrachi, 2002) which we believe calls into question the extent to which prevailing understandings of legitimacy fully encompass epistemological considerations. This is important because if understanding of legitimacy is incomplete within the IA community, then even what are considered to be best practice IA processes could still face challenges of legitimacy. Consequently, in this paper we place epistemology centrally in defining the legitimacy of IA. In so doing we aim to redefine legitimacy to not only accommodate the expectations of deliberative democracy (encompassed within understandings of organisational legitimacy), but also the shortcomings in the way knowledge is understood to be valid that enhancements in stakeholder participation alone cannot resolve. To simplify the explanation, we define here two different types of legitimacy as having relevance to IA:

- *organisational legitimacy* as already understood in the literature (for example, Suchman, 1995; Cashmore and Wejs, 2014), with a particular focus on the cognitive legitimacy expectations for openness (accommodating deliberation) and transparency; and

- *knowledge legitimacy*, which we define as an epistemologically-based understanding that places knowledge centrally.

Thus IA legitimacy requires both organisational legitimacy and knowledge legitimacy. Our focus in this paper is to conceptualise knowledge legitimacy only to complement the existing literature on organisational legitimacy. Thus, we argue that IA, at least as described in academic literature, has transitioned to a process that is currently biased towards the delivery of organisational legitimacy.

The assumption that evidence is reliable is challenged by modern ICT. Almost universal access to the Internet and social media has subverted decision processes as recent high profile political events have demonstrated in which the validity of the arguments made has been highly questionable. For example, the referendum vote that will lead to the United Kingdom leaving the European Union ('Brexit') was characterised by a campaign by those in favour of leaving the European Union that was focussed on making emotional connections with people – which does not rely on accurate facts underpinning knowledge – such that many of the claims made by the 'Leave' camp were subsequently admitted to be false, after the referendum (Viner, 2016). This process was repeated in the US Presidential election campaign in 2016/7 leading to increasing media interest in 'fake news', that is, news which is not true but helps to meet someone's political ambitions (Hunt, 2016; Carson, 2017). And despite the unparalleled access to objective evidence that supports knowledge, Internet users experience knowledge which reflects their existing views and biases. This occurs through the restricted nature of discussion on the social media they interact with (i.e. with like-minded individuals), and through filter engines providing attenuated sources for users; a phenomenon known as the 'filter bubble' (Pariser, 2011). Anyone has the potential to influence populations through the Internet (see example of Christina Chan in Hong Kong described in Sinclair *et al.*, 2017, p. 150); and anyone can interpret, or introduce apparent 'facts' or 'evidence'. The Internet has created new spaces for knowledge to be manipulated and we argue that this has created the need to reconsider understandings of legitimacy in IA by the community of practitioners, moving away from a major focus on process and rebalancing it with a complementary focus on knowledge.

This research is timely because information is communicated in a different way than in the past; with Hanna *et al.* (2016) highlighting the role ICT now plays in changing the form of protest related to unwelcome project interventions. Publishing fake news prior to the Internet was "*nearly impossible*" (Carson, 2017), but now is open to everyone. The advent of social media has created opportunities and problems that were unknown when IA was first imagined, developed and practiced. Considerations of the implications of megatrends affecting the global socio-ecological system "*show that in future further development in communication technology, increased interconnectedness and rapid urbanization can be expected and collectively these have important implications for communication and participation in EA*" (Retief *et al.*, 2016, p.57). In short, access to information and media is unparalleled in the history of human kind, will probably continue to increase, and we suggest that this will require continual re-evaluation of what this means for knowledge generation and legitimacy in the context of IA.

### 3. Understanding ontology and epistemology and their relevance to IA legitimacy

Ontologies set out the concepts and assumptions that underpin any theories. Ontology is closely

aligned with the term 'theoretical perspectives' and can be understood and misunderstood in different ways (Crotty, 1998). Moon and Blackman (2014, p.1169) explain ontology as a position on "*what exists in the human world that we can acquire knowledge about?*", and they illustrate a range of ontologies on a spectrum from naïve realism (which assumes there is one reality that exists independently of the experiences and views of people) through to relativism (which assumes that reality exists in the mind and there are therefore many valid realities).

Epistemology "*is concerned with all aspects of the validity, scope, and methods of acquiring knowledge, such as, with what constitutes a knowledge claim; how knowledge can be produced or acquired; and how the extent of its applicability can be determined*" (Moon and Blackman, 2014, p.1171). Moon and Blackman (2014) provide a spectrum of epistemologies ranging from objectivism (where reality exists in objects independently of the subject) through to subjectivism (where reality is what is perceived by the viewer, i.e. human minds). Constructionism lies centrally in this spectrum recognising there is interplay between objects and subjects in determining meaning. In decision-making contexts this is critical given that it is the knowledge of the decision makers that is brought to bear in their decision. Likewise the knowledge of stakeholders is brought to bear in their considerations of the legitimacy of the IA. Where IA is involved, the rationale is that evidence is brought to bear (to the decision maker via the IA) which influences that knowledge; this process is equivalent to 'instrumental learning' in IA, which has been identified by a number of authors (for example, Sinclair *et al.*, 2008; Jha-Thakur *et al.*, 2009).

Thus an ontological position for IA is a conceptualisation of how IA works, and an epistemological position sets out what counts as valid knowledge. As such, epistemological considerations are key to understanding legitimacy given that decisions are presumed to be made based on knowledge.

### 3.1 Ontology

Ontologies are rarely explicitly mentioned in the IA literature. Nevertheless it is clear that the roots of IA are embedded in a positivist philosophy which it is argued "*still dominates institutionalized EIA in many countries*" (Morgan, 2012, p.8), whereby facts and value judgements are distinguished (and values dismissed). This reflects a naïve realism ontology, at least within the IA process itself and before decision-makers become involved. More recently there has been a move towards what Owens *et al.* (2004) call post-positivist theories, acknowledging that values are important and not everything can be measured precisely and analysed statistically. Post-positivist ontologies (or theoretical perspectives) argued to have relevance for IA include critical realism (as espoused by Haigh *et al.* (2012) for Health Impact Assessment, HIA), and constructivism (proposed by Sheate (2012) and Jalava *et al.* (2013) for EIA) to reflect the realities of decision makers constructing their own realities based on their perceptions. These post-positivist ontologies call for "*more transparent, deliberative, and inclusive processes for informing policy and decisions*" (Owens *et al.*, 2004, p.1944). Post-positivist ontologies demand increased emphasis on procedural fairness, justice and transparency as the basis for understanding IA legitimacy; recognising values are important encourages public participation as a means of obtaining the different values. This ontological shift that exists in the academic literature therefore underpins the current understanding of organisational legitimacy in which the emphasis is very much on the way the IA is conducted and the range of evidence considered.

Haigh *et al.* (2012) stand out in the IA literature in adopting a particular theoretical position; arguing that 'critical realism' is an appropriate ontology for HIA. Critical realism accepts the validity of science and social science (and therefore both positivism and constructivism) in explaining observations of the world. We agree with Haigh *et al.* (2012) that critical realism is an appropriate ontological position for IA as it recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence.

## 3.2 Epistemology

Prior to 1963, it was generally believed that propositional knowledge (a form of knowledge well suited for use in IA, being based on facts and true propositions) is epistemically justified true belief. Basically this means it can be rationally considered to be correct and so is believed. So evidence (E) provides the justification for the true belief, or knowledge (K). This is sometimes written as an equation: E = K. Then in 1963 Edmund Gettier published a paper (Gettier, 1963) calling this position into question through the advancement of scenarios whereby deductions produced an understanding rather by accident, which were believed to be true based on some false assumptions (Pritchard, 2006; Lemos, 2007). In addition, tacit knowledge, as explained by Polanyi (1966), includes knowledge that the subject cannot articulate and which therefore does not fit the definition of justification for true belief.

Basically, if someone achieves some knowledge by luck, or possess knowledge they don't know they have, it doesn't count as 'knowledge' according to this argument as it is not justified true belief, as knowledge should be considered as a form of cognitive achievement (Pritchard, 2006). As a result, and to overcome the 'Gettier problem', reliabilism developed as an epistemological position which stipulates that knowledge must be true belief that is gained in a reliable way, that is, using a method which can be trusted to deliver the truth. This brings in the notion of epistemic virtue, which is a character trait akin to conscientiousness that makes someone a good investigator. Taken together, reliabilism and epistemic virtue lead to a reliabilist virtue epistemology (Pritchard, 2005). Reliabilism acknowledges the validity of objectivism and subjectivism as epistemological positions.

Reliabilist virtue epistemology is not universally accepted, and we will present the key arguments of the detractors here along with our justification for accepting this epistemological position. Stone (2015, p.474) writes that "*some knowledge is without virtue, therefore knowledge cannot be identified with virtuous true belief. Reliabilist virtue epistemology is mistaken*". The lack of virtue referenced in this argument refer to 'false beliefs' (Rizzieri, 2011), or 'knowledge from falsehood' (Arnold, 2013) being introduced into the evidence base, such that knowledge is not based on truth; i.e. akin to 'fake news'. Nevertheless, we do not consider that this invalidates our epistemological position; rather the notion of virtue needs refining with a better understanding of the evidence base and associated knowledge. That is: how does a practitioner know how to act virtuously in the context of knowledge acquisition, where the possibility of knowledge from falsehood and false beliefs exists? In conceptualising knowledge legitimacy in this paper we endeavour to understand what constitutes reliable knowledge so that epistemic virtue delivers reliability.

Literature relating IA to epistemological positions is almost as rare as literature dealing with ontology; Haigh *et al.* (2012) find a few more studies in the HIA field that at least mention

epistemology. They favour a relativist epistemology which is concerned with "*the practical adequacy of that knowledge, rather than claims to truth*" (Haigh *et al.*, 2012, p.70). Herein, we believe, lies a problem. Accepting that knowledge is useable providing it is adequate, but not necessarily truthful, has repercussions in the modern age where Information and Communication Technology (the Internet in particular) makes access to knowledge almost universal. We argue in this paper that the advent of 'fake news' and the 'filter bubble' illustrate new ways in which the knowledge possessed by IA stakeholders can be subverted, actively or passively, and which presents a real threat to the legitimacy of tools like IA which inform political decision-making. Epistemologically positioning IA as essential to understanding knowledge legitimacy alongside organisational legitimacy ties in with an understanding that there is a strong relationship between epistemology and legitimacy (Mizrachi, 2002), and this may help to explain why knowledge is clearly regarded as being an important component of an effective IA system (Bond *et al.*, 2017).


### 4. Methods

In order to achieve our aim of conceptualising knowledge legitimacy in IA we take a stepwise, literature-based approach. To draw boundaries around the conceptualisation we restrict it to what we define as key issues related to knowledge legitimacy in IA that we can find evidence for in the literature. We use these to constrain the derivation of dimensions that underpin our conceptualisation. That is, our conceptualisation comprises dimensions which together incorporate all the issues we can find related to the legitimacy of knowledge in IA.

Our literature review uses the Scopus database as this includes, at the time of writing, more than 22,800 journals, including all those with a main focus on impact assessment, and more than 150,000 text books. It has been favourably compared with Web of Science in terms of volume of journals and articles covered, both of which are suggested to bias natural sciences relative to social sciences (Mongeon and Paul-Hus, 2016). As with all searches, the database restricts the results made available. These were constrained to the English language and also to academic sources. Search terms included combinations of "bias"; "impact statement"; "impact report"; "environmental statement"; "environmental report"; "power"; "knowledge"; "environmental impact assessment"; "ignorance"; "impact assessment"; "uncertainty"; and "ambiguity". Terms such as 'fake news' and 'filter bubble' were considered too new to warrant searching in the context of IA. However, since the inspiration for the research was based on press coverage of these new phenomena, a variety of newspaper sources were identified through Google searches on these terms, along with a Scopus database search for literature containing the key words. Our literature review was iterative; as we progressed it became clear that additional search terms were required in order to more fully capture relevant literature (that is the terms listed above and below evolved over time).

Once these knowledge legitimacy issues are identified, we follow the approach of Pope *et al.* (2017) in developing a conceptualisation structured around dimensions. We thus undertook a further literature review following Pope *et al.* (2004) and Pope *et al.* (2017) who have conceptualised sustainability assessment; Morrison-Saunders and Pope (2013) who have conceptualised trade-offs in sustainability assessment; Sinclair *et al.* (2008) who have conceptualised learning in the context of environmental assessment; and Vanclay (2002) who conceptualised social impacts. Our review again used the Scopus database and sought literature using a combination of search terms including

"knowledge"; "taxonomy"; "dimensions"; "conceptualisation"; "ignorance"; ambiguity"; "uncertainty"; "bias". No attempt was made here to restrict the investigation of knowledge dimensions to the IA literature. We acknowledge that there is much more literature than can be accommodated in this paper; what is presented here represents our critical selection.

In summary, a literature review was used to identify relevant knowledge legitimacy issues for IA consistent with a reliabilist virtue epistemology. Then specific dimensions of knowledge legitimacy were identified through a subsequent literature review to incorporate all the issues identified. The outcome of this two-stage literature-based approach is presented in section 5.


### 5. Conceptualising knowledge legitimacy in IA

The purpose of this section is to draw on the literature identified through our search in order to conceptualise knowledge legitimacy in IA compatible with a reliabilist virtue epistemology.

Bond *et al.* (2010) distinguish between formal (also called explicit or objective) knowledge which is easy to access and well documented, and informal knowledge which can be hard to access or put into words. This thinking drew on Nickols (2000) in further subdividing informal knowledge into tacit knowledge (see Polanyi, 1966) which can never be translated into formal knowledge, and implicit knowledge which could be translated into formal knowledge. Other authors do not see this distinction, with Ambrosini and Bowman (2001) regarding tacit and implicit knowledge as being points on a continuum. Indigenous communities' knowledge can sometimes be considered tacit where it relates specifically to context and may be culturally embedded. Tacit knowledge can be difficult to identify and incorporate within formal IA systems (O'Faircheallaigh, 2009; O'Faircheallaigh and Howitt, 2013; Costanzo and Sánchez, 2014).


Whilst the literature distinguishes between these types of knowledge, as pointed out in Bond *et al.* (2010): "*in undertaking an EIA, formal (explicit) and informal (implicit) knowledge together play an important role, but the latter is usually forgotten in any general analysis*". Stoffle and Minnis (2008, p.2) highlight 'two-communities' theory to explain the difficulties inherent in translating the concerns of affected communities to decision makers where the two groups "*live in separate worlds with different and often conflicting values, different reward systems, and different languages*". Indeed Sánchez and Morrison-Saunders (2011) are clear that knowledge management systems within IA practitioner organisations are set up to deal with explicit knowledge. Implicit knowledge in the critical realist ontology has virtue and therefore needs to be knowledge that is accommodated by the conceptualisation of knowledge legitimacy. As such we include implicit knowledge as a knowledge legitimacy issue that needs to be encompassed by the dimensions we derive.

In the context of IA, Van Asselt and Rotmans (2002) argue that even systematic inquiry can't lead to complete knowledge, i.e. there will always be things that are unknown or uncertain. As well as uncertainty, which is known to be inadequately reported in IA (Leung *et al.*, 2016), knowledge is also subject to ignorance or ambiguity (Bond *et al.*, 2015). The deliberate manipulation of ignorance is also acknowledged to take place and has led to a new branch of science investigating its approaches and effects: Agnotology (Proctor and Schiebinger, 2008). That is, knowledge can be subject to uncertainties associated with a person's scientific ignorance, but ignorance can also be a strategy

where particular stakeholders have a vested interest in other stakeholders being unaware of some evidence. Therefore we include uncertainty, ignorance and ambiguity as knowledge legitimacy issues, which are key to the reliability of evidence, and knowledge will lack virtue where deliberate manipulation is involved.

Prediction accuracy has long been considered as crucial to effective IA and calls for more evidence-based IA at different tiers of decision-making are commonplace, including policy-level (Bäcklund, 2009); plan-level (González et al., 2011) and project-level (Fuller, 1999). Prediction accuracy is something that can only be tested after implementation of the project, plan or policy, which has led to calls for increased follow-up activities (Arts, 1998; Morrison-Saunders and Arts, 2004; Gachechiladze-Bozhesku and Fischer, 2012; Morrison-Saunders et al., 2014). Prediction accuracy is directly related to the reliability of evidence, and notions of falsehoods, which have been identified as a political campaigning strategy, are relevant here in underpinning inaccuracy. We therefore consider reliability and falsehoods to be key determinants of knowledge legitimacy.

Bias has been the subject of much debate in IA literature, with Hollick (1986, p.164) writing that "*bias or distortion can take a number of forms, for example failing to mention or playing down certain impacts, failing to consider all phases of a project, leaving out or failing to collect certain information, making overoptimistic predictions of the effectiveness of mitigation measures, and using personal value judgements of the significance of factors or impacts*". Such bias is captured by the considerations of ignorance and reliability / falsehoods to an extent. Nevertheless research also suggests that there will likely be different interpretations of evidence by different stakeholders in the IA process, even if evidence is reliable. Political campaigning research, for example, reveals that voters are subject to negativity bias (negative information dominates over positive information), and candidate bias (whereby information about the preferred candidate dominates over information about the opposition) (Meffert et al., 2006). That is, people are generally lazy thinkers and choose the evidence they wish to engage with and believe where it already ties in with their existing preconceived ideas. This has potentially significant implications for impact assessment and how knowledge gets communicated (Retief et al., 2013). As discussed previously, social media and the Internet bubble exacerbate this problem by selecting on behalf of users which evidence they are likely to engage with, at the expense of a balanced view. And research has also shown that the perceptions of community individuals about the legitimacy of decision processes related to infrastructure siting were directly related to their initial attitude (Wilkinson et al., 2000). The extent to which all the evidence available is actually accessed by stakeholders is therefore another knowledge legitimacy issue.

Based on this understanding of knowledge, we propose that the key knowledge legitimacy issues which all need to be incorporated into our conceptualisation are:

- Ensuring the reliability of the evidence base underpinning knowledge claims, which involves the identification and removal of falsehoods.

- Acceptance of all forms of implicit knowledge as valid.

- Acknowledgement and accommodations of uncertainty.

- Acknowledgement and accommodations of ignorance.

- Acknowledgement and accommodations of ambiguity.

- Access to the full range of evidence that is available.

Knowledge is not conceptualised within the IA field, and therefore we drew on literature from outside the IA field in order to identify appropriate dimensions of knowledge that could incorporate the issues listed above. Our conceptualisation of knowledge legitimacy in IA is set out below synthesised into four dimensions: knowledge accuracy; knowledge restriction; knowledge diffusion; and knowledge spectrum. We describe these in turn along with examples of their relevance to IA.

1) ***Knowledge accuracy*** (incorporating the issues of reliability, falsehoods, and uncertainty). It is clear from the advent of 'fake news' that some alleged 'facts' have simply been invented by those with a vested interest in order to achieve the decision outcome they desire. Whilst a very cynical approach to generating knowledge, evidence can also be inaccurate through mistakes (for example, faulty equipment readings, transcription errors, etc.). This dimension specifically addresses the issue of falsehoods, which are especially easy to promulgate through the Internet and social media.

   Section 2 has already alluded to concerns over the misuse of information to meet political ends in both the 'Brexit' referendum in the United Kingdom in 2016, and the US Presidential election in 2017, and the increased emergence of 'fake news'. In the UK referendum on EU membership, the 'Leave' campaign was notable for using strategies favoured by climate deniers, whereby an overwhelming proportion of expert opinion in favour of climate change fails to persuade a large number of doubters who instead are urged to focus on the few experts with the opposite view. Where the media choose to present both sides of the debate, the weight of opinion in favour of one side can be lost (Bedford, 2010). That is, efforts to present both sides of an argument in the interests of fairness can unintentionally mask the overwhelming imbalance in expert opinion on a subject. Furthermore, the media can play an active role in presenting misinformation, as has been demonstrated in analyses of the reasons for the US public supporting the invasion of Iraq where the source of news stories was found to be significantly related to the extent to which misinformation was believed (Kull *et al.*, 2003). In order to obtain particular decision outcomes, then, evidence can potentially be manipulated knowingly or unknowingly. This points to the media as an important provider of knowledge that can influence decision-making. It is clear that the media can actively promote bias through the political agenda of the organisation controlling the news channel in question, or passively promote misinformation through policies of giving equal weight to counter arguments even where the weight of evidence against one view is compelling.

2) ***Knowledge restriction*** (incorporating the issues of ambiguity, and ignorance). This reflects the extent to which the evidence has been selectively edited and some withheld (and draws on the concept of 'abstraction', identified by Boisot (1998)). Through restriction, IA becomes practicable and economically viable, but someone makes decisions on what knowledge is appropriate. In IA – this crosses over into the realms of power-relations; research is clear that knowledge is influenced by the powerful in strategic ways (e.g., Flyvbjerg, 1998; Stirling, 2006; Richardson and Cashmore, 2011; Cashmore and Axelsson, 2013). In the context of legitimacy, this represents the degree of abstraction that has taken place of the knowledge

that can be brought to bear (implicit and explicit). To be clear, abstraction is necessary – and scoping is a form of abstraction in IA. But the choices made can have legitimacy consequences as scoping could be subverted through the strategic manipulation of ignorance to exclude issues, which would otherwise be recognised as being potentially significant.

Sinclair *et al.* (2017, p.153) provide the example of a developer of a Canadian tar sands pipeline project deleting over 1000 km$^2$ of islands from the route map to make it look more benign than the reality. This is an example of the powerful strategically manipulating knowledge – which is therefore a practise that needs to be included in the conceptualisation of knowledge. Whilst this is an isolated example, Galison (2004) argues, quite convincingly, that the stock of classified literature in the world is likely 5 to 10 times larger than the stock of unclassified literature. To put this in perspective it means that if you go into the largest public library you have ever visited, somewhere there is a bigger stock of material you are not allowed to see. Albeit the Internet may have changed some of the actual statistics, there is clearly a lot of hidden information – which is hidden for a purpose! On this basis we might suggest it is naïve in the extreme to assume ignorance is not actively controlled in IA, particularly as it is already recognised that implicit knowledge is poorly dealt with in IA (Bond *et al.*, 2010).

3) ***Knowledge diffusion*** (incorporating the issue of access to the full range of evidence). This reflects the extent to which the evidence gathered is made available to all stakeholders, i.e. its extent of diffusion. From a knowledge legitimacy perspective, those controlling the IA can control, to a degree, access to the evidence. It is also important for the IA practitioners to be aware of the filter bubble effect, which could adversely affect access despite no attempt on their part to do so. This has legitimacy consequences, and social media may be responsible for polarisation of views even where some arguments lack credibility with experts. Boisot (1998, p.52) argues that access to evidence "*establishes the availability of data and information for those who want to use it. It does not measure adoption: information may be widely diffused and yet remain unused*". So diffusion recognises that evidence, whether strategically manipulated or not, might not be universally available to all stakeholders, but does not include the extent to which that evidence which is available informs knowledge and therefore exerts influence.

One might counter the argument that 'access to evidence can be controlled' by pointing to modern technology, and the existence of the Internet in particular; i.e. a source of more information than has ever been accessible in the history of the world. It might be assumed that any observer seeking the 'truth' can find the full range of evidence available in order to make up his or her own mind in an objective way. However, it has been pointed out that Internet search engine and social media site algorithms actually control the search results an individual receives based on past search history (Bozdag and van den Hoven, 2015; Dillahunt *et al.*, 2015). It is claimed this can act to reduce the diversity of information made available to anyone searching, a phenomenon referred to as being in a 'filter bubble' (Pariser, 2011).

Another argument is that social media users join groups sharing similar values to their own, and so actively cut themselves off from counter-opinions (Bozdag and van den Hoven, 2015).

Researchers, including two co-authors working for Facebook that had access to search records of over 10 million US Facebook users over a six-month period, investigated this claim regarding social media. They found that those with more polarised political views shared their views more frequently and also acknowledged that the cross-cutting context any individuals are exposed to "*depends on who their friends are*" (Bakshy *et al.*, 2015, p.1130), though they did acknowledge limited bias in the news feed proposed by Facebook. Thus, (Pariser, 2015) argued that individual choice matters more than their algorithms. Here the key finding is that electronic media do not provide an unbiased platform, instead social media acts to reinforce existing views. In terms of social media, Sinclair *et al.* (2017, p.150) regard it as a "rapid response 'opinion-amplifier'", demonstrating that it can mobilise those sharing a particular point of view very quickly and potentially give a false impression of the weight of opinion.

Thus, in being aware of knowledge diffusion, IA practitioners need to be aware of how information is accessed and used by stakeholders, and perhaps develop strategies to enhance diffusion.

4) ***Knowledge spectrum*** (incorporating the issue of implicit knowledge). This is developed to accommodate knowledge that is difficult to incorporate into systems developed for explicit knowledge only. The inclusion of informal knowledge is argued to produce better assessments (Kemm, 2001); yet participatory intervention can be "*criticized for its systemic inability to embrace alternative world-views and knowledges*" (Sanderson and Kindon, 2004, p.115), and Bond *et al.* (2010) indicate that such knowledge is "*usually forgotten*" (p.9). Thus implicit knowledge can be missed both because known approaches are inadequate for capturing it, and also because it is systematically ignored. Both present a threat to legitimacy where implicit knowledge is excluded,

## 6. Conclusions

In this paper we have drawn on the academic literature in arguing that a shift has taken place in IA practice from rational, objective decision-making to more open, inclusive and transparent decision making. It is on this basis that we have highlighted potential legitimacy issues associated with our consideration of knowledge and, specifically, its validity. On this basis we have aimed to identify the dimensions of knowledge legitimacy in IA. Nevertheless we recognise there is little research that fully evaluates the practice of IA and its theoretical positioning today, and this remains an ongoing research challenge.

The dimensions of IA knowledge legitimacy have been developed based on a reliabilist virtue epistemology that is appropriate for a critical realist ontology that we have assumed is valid for the IA context. This conceptualises what evaluators might need to look for, although we have not provided the appropriate investigative tools to quantify the performance of an IA against each of the dimensions. This remains a challenge for future researchers to develop a reliable means of evaluation against these dimensions. We would argue that our conceptual framing in this paper is a first attempt at an epistemologically grounded explanation of knowledge legitimacy in IA. Taking this approach has exposed some weaknesses where our understanding of legitimacy is limited to

organisational legitimacy only, with a focus on process legitimacy, which is the current situation for IA. Whilst we do not dispute the validity of this understanding of legitimacy, we argue that it can be undermined in a number of ways and is therefore inadequate on its own. As such we have developed a conceptualisation of knowledge legitimacy to complement organisational legitimacy as two components of IA legitimacy.

Focussing on the reliabilist virtue epistemology has enabled us to constrain the key issues associated with knowledge legitimacy in IA that need to be included in the development of legitimacy dimensions. This assumes that a critical realist ontology and reliabilist virtue epistemology is a valid theoretical framing for IA. This assumption can be contested. Nevertheless, we consider that conceptualising the legitimacy of knowledge in IA based on an explicit theoretical framing is a significant contribution to the literature. This is because it systematically considers the meaning of knowledge and therefore acts as a basis for considering the validity of practice. This paper has exposed limitations in the IA literature in the way legitimacy incorporates meanings of knowledge in the absence of epistemological positioning. Measuring the extent to which each of the dimensions of knowledge are reliably incorporated into an IA remains a work to be undertaken.

Knowledge accuracy recognises the extent to which unscrupulous stakeholders can derail an IA process through the introduction of false facts primarily through the Internet. As well as this premeditated inaccuracy, it is also recognised that mistakes in gathering and analysis of data can be made in a number of ways. Not being explicit about uncertainties can also undermine the accuracy of the knowledge base.

Knowledge restriction is closely related to the issue of abstraction which is a known issue in terms of accurate representation of socio-ecological systems (discussed by Bond and Morrison-Saunders, 2011 in terms of 'reductionism'). It is clear that where the evidence available is manipulated or biased, then the opportunity arises to directly affect the entire IA process and its conclusions and outcomes – albeit this is difficult to prove. This dimension raises an uncomfortable element with respect to the consideration of knowledge legitimacy as an IA cannot be efficient unless evidence is restricted appropriately through scoping.

Knowledge diffusion is directly linked to engagement strategies under the control of the proponent and their consultants and might superficially seem to be directly related to organisational legitimacy only. Nevertheless our research has demonstrated that effects like the filter bubble present a risk to proponents that the legitimacy of their engagement will be questioned. This dimension also acknowledges the extent to which arguments accepted only by a very small majority can gain purchase through social media. Further, the personal biases of individuals will also have implications for their engagement with evidence. Therefore the diffusion of evidence to inform knowledge is subject to a number of influencing factors, which proponents would overlook at their peril.

The knowledge spectrum includes implicit as well as explicit knowledge – and there is a direct threat to IA organisational legitimacy where implicit knowledge is either seen to be, or is perceived to be, ignored. Likewise negative knowledge is important to the full understanding of impacts.

In closing, we hope that our conceptualisation of legitimacy in IA and in particular the four dimensions of knowledge legitimacy that we have advanced provokes reflection by IA practitioners and debate from other academics keen to advance the theoretical basis of IA.

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