NTRC: CONTEMPORARY RESEARCH DIVISION
SERIES: ENVIRONMENTAL INSIGHTS AND SUSTAINABLE GUARDIANSHIP

CAN SUSTAINABILITY AUDITING BE INDIGENIZED?

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ORIGINALLY PUBLISHED: *Agriculture and Human Values,* (2018) 35(2), 283–294.

The final publication is available at Springer via https://doi.org/10.1007/s10460-017-9821-9

Abstract

Although there are different approaches to sustainability auditing, those considered authoritative use scientific indicators and instruments to measure and predict the impact of organizational operations on socio-ecological systems (Alrøe and Noe 2016). Such approaches are biased because they can only measure phenomena whose features lend themselves to quantification, control, and observation directly with the instruments produced by technology (Drengson 1995). This technocratic bias is a product of the mechanistic worldview, which presumes that all components of socio-ecological systems are identifiable, discrete, and material. In contrast to the mechanistic worldview, indigenous people use animist familial representations. In the case of New Zealand Māori a family tree (*whakapapa*) is used to represent socio-ecological systems. This is a flexible conception, which views socio-ecological systems as both composites made up of interlinking causally-connected parts but also as reciprocating systems that have intangible elements such as consciousness, emotion, and agency. The technocratic approach is ontologically incapable of incorporating intangible elements to such a degree we consider that it incompatible with animist approaches. It is not, however, epistemologically-incongruous for indigenous peoples because of the flexible hybridity of their worldview. This worldview provides a broad moral framework, which avoids discrediting subjectivity and reducing socio-ecological systems to only their instrumental value. Finally, we conclude that the indigenous approach has much to offer the field of sustainability auditing, given that it provides a moral framework, and insight into building assessment systems upon abductive reasoning.

Keywords: Audit Culture; Indigenous; Indigenous Knowledge; Instrumentation; Māori; Market Assurance; Standardization; sustainability; Sustainable agriculture

Abbreviations:

GPS: global positioning system.

ICT: information and communication technologies**.**

NTHC: Ngāi Tahu Holdings Corporation.

TSA: technocratic sustainability auditing.

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Acknowledgments

This study was funded by the New Zealand Ministry of Business, Innovation and Employment (Contract Number AGRB1201).

Introduction

The Māori tribe Ngāi Tahu's businesses face internal and external demands to implement sustainability auditing as they seek to grow their operations within the primary sectors of farming, forestry, and fishing. However, sustainability auditing is a Western construct and could thus be culturally incongruent in indigenous contexts. This paper will explore potential discord between

sustainability auditing and indigenous businesses, with the aim of developing a working sustainability audit system for Ngāi Tahu's businesses by examining the philosophical foundations of orthodox sustainability assessment approaches to understand how they can be suitably 'indigenized'.

The most common critique of sustainability auditing is its neoliberal nature, and resulting neocolonial outcomes. Freed from regulation, sustainability auditing is criticized for empowering large, generally Western, corporations, who force the costs of compliance onto smaller, often non-Western, producers (Campbell 2005; Hatanaka and Busch 2008; Marsden 2006). Recently Campbell et al. (2011) have criticized the overwhelmingly neoliberalist focus, positing that there is an underlying and largely unexplored 'cultural politics' component.

This paper argues that there is a fundamental cognitive aspect that goes deeper than politics – be it neoliberal, neocolonial, or cultural. Specifically, that sustainability auditing is a manifestation of the technocratic mindset that seeks to manage and control through the ordering, standardizing, and universalizing of production processes (Davison 2001; Drengson 1995). This 'technocratization' of sustainability auditing sees the expansion of management into socio-ecological systems, driven by the mechanistic worldview of nature as machinelike and the consequent belief that even these complex qualitative systems can be measured and controlled (Abram, 1991; Bell and Morse, 2008).

This mechanistic worldview has seen human emotion and embodied experience increasingly devalued in management activities, with the focus nearly exclusively on explicit, codifiable knowledge (Bell and Morse 2008; Drengson 1995). This is seen as the most significant issue, as indigenous peoples also value the subjective 'sense experience' of belonging to, and protecting, a socio-ecological family. Rather than seeing nature as a machine whose services are to be maintained, indigenous people view themselves as synonymous with nature, associating care of the non-human as care for oneself. This sense experience creates a cognitive framework for thinking about sustainable relations, offering a critical foundation for indigenizing sustainability auditing.

Internal and external pressures to adopt sustainable auditing

Tribal businesses are experiencing rapid growth, particularly in primary sectors, and Ngāi Tahu faces internal and external pressures to implement sustainability auditing. Some context will help

explain the internal factors. The 1998 Settlement for Crown breaches during colonization saw the consolidation of sub-tribally owned assets into the Ngāi Tahu Holdings Corporation (NTHC), which distributes investment returns to tribal members via a development agency. Although NTHC reports to an elected tribal council, which has a values-framework to guide decision-making, the corporate-beneficiary model is a Western construct that distances the beneficiaries from the NTHC's operations.

This distance, exacerbated by the increasing demographic spread of tribe members, has created demand for greater transparency and communication by tribal governors. The beneficiaries want assurances their assets are being managed in a way consistent with their values. These values, common to indigenous people, are based on a worldview that emphasizes the interdependent relations between humans and nonhumans, and a consequent moral impetus for environmental care (Reid and Rout 2016a). Although these values remain well-articulated at a governance level, NTHC's corporate interests are predominantly in sectors with high environmental impacts, often on historic tribal lands. It is hoped indigenized sustainability auditing can reassure tribal members their values and land are being respected.

The key external driver is that sustainability audits are increasingly critical for gaining access to international markets as they become 'must-haves' rather than 'nice-to-haves' (Hatanaka and Busch 2008). Furthermore, audits can also add value as consumers will pay more for products that are sustainable and come with unique (indigenous) stories.

The need to demonstrate socio-ecological responsibility to the New Zealand public is another external driver, particularly as the tribes have long demanded the New Zealand Government provide social justice and environmental protections. The tribes must meet these standards in their own business activities to maintain credibility, which is particularly challenging as their interests in the primary sectors are subject to intense scrutiny.

However, despite these internal and external drivers, there is a fundamental question of whether sustainability auditing is congruent with Māori culture – whether it is actually possible to indigenize sustainability audit systems. This paper aims to answer these questions by uncovering the cognitive foundations of 'technocratic sustainability auditing', which can then be critically compared with indigenous and Māori cultural perspectives to determine compatibility.

The origins of sustainability

'Sustainability' emerged in the second half of the twentieth century as concerns for the environment, and particularly humanity's impact, grew (Davison 2001). It is, however, a contested concept (Alrøe and Noe 2016). Generally speaking, the concept of sustainability is approached from a continuum of perspectives ranging from the purely anthropocentric – where nature is understood as an instrument to be maintained to serve human ends – through to the ecocentric – where humans and non-humans are intrinsically valuable, interdependent components of a holistic system (Davison 2001; Drengson 1995). Each approach to sustainability is driven by its own moral impetus – from the belief that a decline in nature's 'services' is only bad if it inhibits current and future generations meeting their own ends, through to the belief that any act that fails to inherently and equally value humans and nature is wrong.

Despite the broad spectrum of approaches to understanding sustainability that have materialized since the 1960s, the anthropocentric view has come to dominant. Davidson (2001) traces this to the merging of the sustainability movement with the development agenda, where environmentalism became fused with progressivism. Through this process nature became viewed as a 'limiting factor' on human progress. The concept of 'sustainable development,' or progress within nature's limits, emerged and, in turn, demanded methods of assessing, verifying, and communicating the impact of development activities on nature and society (Davison 2001). Sustainability auditing provides a means to undertake such assessment and verification.

Sustainability auditing

Generally speaking, auditing is an emergent phenomenon of distancing, providing a mechanism for creating trust and maintaining control when scale has restricted the face-to-face interactions that traditionally built trust and extenuated direct hierarchical power structures (Power 1997). The application of auditing to sustainability in the primary sectors is generally portrayed as being driven by multinational food retailers who use these systems to reassure consumers (trust) and exert influence on producers (control) (Campbell 2005).

Rising concerns for animal welfare, environmental health, and 'food scares' certainly drove consumer demand for sustainability auditing (Friedberg 2004). However, while portrayed as an objective means of verifying the safety, ethicality, and sustainability of products, sustainability auditing has been criticized for enabling the big retailers to 'greenwash' the situation: portrayed as

'trust-building', it has an underlying element of control (Busch 2014; Marsden 2006). Critics have also argued that these mostly Western-derived systems reinforce colonial power hierarchies by forcing non-Western producers to meet audit standards (Campbell 2005; Marsden 2006). The situation is more complex, however, as smaller, localized producers within historical colonial centers are also marginalized by sustainability auditing (Marsden 2006). These issues hint that something deeper is at play: hegemonizing management and control.

The technocratization of sustainability auditing

It is argued that the dominant form of sustainability auditing is part of a wider technocratic impetus to order, standardize, automate, and universalize management and control processes (Drengson 1995). Technocracy is the "systematic application of technology to all levels of human activity… The aim becomes the control of life by means of management techniques… [reducing] all phenomena to those features which can be quantified, controlled, and observed directly with the instruments produced by technology" (Drengson 1995, p. 81-82). Driven by instrumental reason, technocratization "threatens to take over our lives" (Taylor 1991, p. 5). This 'take over' can be observed in the spread of auditing from sectors focused on financial and physical processes, like accounting and manufacturing, through to those involving social and ecological processes, like healthcare and farming (Powers 1997). Certainly, sustainability auditing is a diverse field and there have been numerous attempts to develop alternative auditing systems, with many, often community-led, 'bottom-up' initiatives offering substitutes or complementary methods to technocratic approaches (Eckerberg and Mineur 2003; Fraser et al. 2006). Still, contemporary sustainability auditing is dominated by the technocratic mindset (Bell and Morse 2008; Cook et al. 2016; Davison 2001). A dominance derived from a strong belief in technocracy's powers of universal 'quantification, observation, and control' and its ability to manage the planetary socio-ecological system as a "controlled artifact" (Drengson 1995, p. 82). Thus, the focus here will be on 'technocratic sustainability auditing' (TSA).

Technocracy is itself underpinned by the mechanistic worldview, which sees nature as a machinelike 'artifact to be controlled' (Abram 1991; Drengson 1980; Riskin 2015). This cognitive orientation is founded on the belief that "all physical systems, all events, can be regarded as part of a vast mechanistic process" (Davies and Gribbin 1992, p. 8). While it facilitated the scientific revolution, the mechanistic worldview's very success has led to the problematic assumption that socio-ecological systems can also be measured and controlled just like physical systems (Riskin 2015). Just as with sustainability auditing, it would be wrong to portray this worldview in too stark

or simplistic a fashion as there are a myriad of perspectives contained within and beyond it (Horst 2007). Nevertheless, it has "penetrated Western consciousness" (Drengson 1995, 83) and its reach and influence remain puissant beyond the purely physical realm (Davies and Gribbin 1992). "Mechanism", as Riskin (2015, p. 3) explains, has been the "core paradigm of modern science from the mid-seventeenth century onwards".

Mechanism is limited in its semiotic flexibility; an expression of epistemic modality that denotes a near-literal representation of reality (Abram 1991). While deductive reasoning, which has empowered the mechanistic worldview, is excellent for deconstructing physical systems to understand their 'parts' it struggles to provide the cognitive framework necessary for understanding, let alone controlling, complex open systems (Wheeler 2010). Mechanism is incapable of providing the abstracted, intuitive, and flexible connotative representations necessary for the abductive reasoning required to move upward from smaller to larger systems (Wheeler 2010). It attempts to deal with this dilemma by examining individual 'parts' and their 'interactions' through multidisciplinarity and interdisciplinarity to 'model' the whole machine. Not only is this limited because it presupposes the system is a machine but as each part of the socio-ecological system must be measured by a different instrument such that – following the 'law of the instrument,' where each instrument dictates cognition – this multidisciplinarity and interdisciplinarity produces numerous 'islands' of understanding rather than holistic cognition (Drengson 1995; Parker 2014). In short, attempting to understand the whole by deduction obscures "the many meanings in the nonlinear, non-logical interconnections and relationships between entities" (Davis-Floyd and St. John 1998, 18).

Not only has this worldview restricted humanity's capacity to comprehend the 'big picture', but it has also impacted our ethics. As Taylor (1991, p. 5) has warned, "things that ought to be determined by other criteria will be decided in terms of efficiency or 'cost-benefit' analysis, that the independent ends that ought to be guiding our lives will be eclipsed by the demand to maximize output", explaining that "once the creatures that surround us lose the significance that accrued to their place in the chain of being, they are open to be treated as raw materials". People become beholden to the technocratic system, rather than the system serving them, forced into making decisions based on 'optimization' rather than personal morality (Drengson 1995; Taylor 1991). Thus, the moral source of self-reflexive reason that informed sustainability has been largely sidelined by the technocratic imperative, moral freedom has been curtailed by this "minimalist ontology of the individual in society based on atomistic calculations of individual benefit" (Parker

2014, p. 5). Descartes' severance of mind from matter reinforced both the instrumental view of nature and the instrumental reason that negotiates humanity's interactions with the wider environment (Davison 2001; Taylor 1991).

Standardization and instrumentation

Identifying sustainability thresholds, and managing production within them, takes place through the interrelated processes of standardization and instrumentation. The sustainability status of a product is dependent upon it meeting certain standards throughout production; specifically, that production does not diminish, or compromise, key economic, social, and ecological functions (e.g., ecosystem services) crucial for supporting industrial operations in perpetuity. However, the thresholds where production processes begin to compromise functions are not entirely known, or accurately defined, making establishing acceptable sustainability standards for industrial operations problematic (Azar, Holmberg, and Lindgren 1996; Cook et al. 2016). This difficulty is well summarized by Bell and Morse (2008, p. 43) who persuasively outline the "limitations of the reductionist, mechanistic and quantitative approach to sustainability".

Nevertheless, there is an 'explosion' of effort to identify and define these thresholds (Busch 2011), particularly through the development of a "classic reductionist set of tools" to identify key quantifiable properties of socio-ecological systems (Bell and Morse 2008, p. 42). For example, declining biodiversity or rising mental health issues among workers may indicate that socio-ecological processes are being compromised by industrial operations. The quality of an indicator is generally dependent upon the accuracy, fidelity, and sensitivity with which it measures industry impacts (Busch 2011). The process of developing instruments for identifying thresholds is intimately linked to the process of standardization, given that standards cannot be developed without first identifying thresholds. Creating instrumentation for measuring sustainability precedes the development of standards, and process of definition and operationalization effectively sets the TSA agenda (Eckerberg and Mineur 2003).

Consequently, TSA develops instrumentation to help industries detect when and how they are compromising the functioning of socio-ecological processes so they can recalibrate their operations to mitigate negative impacts. Ultimately, this learning process entails the identification, development, and implementation of production practices that meet thresholds and are then enshrined as new sustainability operating standards.

The limits and bias of instrumentation and standardization

TSA appears to be logical, although on closer examination there are limitations, which can be illustrated using an aviation analogy. Sophisticated instrumentation, automation, and standardized operating procedures enable modern planes to operate efficiently within safety thresholds. Aircraft are now so advanced they can largely fly themselves, albeit with detailed instrument panels that provide pilots with moment-to-moment indications of flight performance. Primary sectors also show a trend towards standardization and automation, where instrumentation is increasingly used to guide practice, from GPS locators to nitrate sensors, giving moment-to-moment feedback on operational efficiencies and environmental impact (Morris and Reed 2007).

Although instrumentation and standardization of practices can lead to significant improvements in efficiency and environmental performance within primary sectors, lessons from the aviation industry suggest that overreliance on instruments causes the loss of valuable tacit and embodied knowledge among pilots, creating dangers when instruments fail or provide false readings. Piloting a plane is, fundamentally, an embodied skill based on mind-body-aircraft awareness, developed through extensive personal experience. Instrumentation, automation, and protocol are currently supplementary to this underlying skill. Pilots interiorize the instruments, and even the plane itself, through what Polanyi calls 'indwelling', which explains that while people dwell in their body, they are able to "attend *from* it *to* things outside" by 'dwelling in' the extracorporeal focus of their attention (Polanyi and Grene 1969, p. 148 – emphasis in original). Piloting a plane is an embodied sense experience that includes both past and present indwelled tacit experiences (e.g., the feel of the plane in different conditions) and explicit codified forms of knowledge (e.g., data from plane instruments in different conditions), which provide an overall context for wise action. As Küpers (2005, p. 116) explains, 'knowing' "is not only what people think about it, but primarily what they 'live through'". Crucially, this sense experience generates emotion, the phenomenological fusion of the tacit and explicit through indwelling means people "participate feelingly" in what they are doing (Polanyi and Grene 1969, p. 148). It is this 'feeling' and 'knowing' that enables a pilot to operate effectively and respond when the unexpected happens.

Compared to a pilot, the 'emotional, embodied sense experience' of a farmer, fisher, or forester is enfolded through relationships with complex 'living systems' – including animals, plants, and landscapes – that, Wilson (1984) postulates, humans have an urge to affiliate with. Put simply, human experiences of nature are inherently emotional (Morris and Reed 2007). Direct experience embeds the individual in a dense network of meaningful socio-ecological relationships. The depth

of this embedding is, *inter alia,* personally and culturally variable, but we contend that a farmer or pilot who experiences indirectly via instruments or automated technologies will have less 'knowing' and 'feeling' than if they had experienced it directly. In contrast, indigenous peoples, possess a heritage of largely direct experience of socio-ecological contexts via hunting, gathering, and low-tech agrarian practices, meaning their environmental interactions are less mediated by technology and abstract constructs (Willerslev 2007). As Willerslev (2007, p. 20) explains, indigenous "mental representations or cognition instead of being primary is derived from a practical background of involved activity". Indigenous peoples have "a practice-oriented view of knowledge that stresses the emergent, relational, embodied, and contextual dimensions of knowledge" (Lauer and Aswani 2009, p. 323).

While 'indigenous knowledge' is often delineated as subjective/local and 'Western knowledge' is portrayed as objective/universal, they are not so binary (Browder 1995; Lauer and Aswani 2009). Browder (1995) and Knapp and Fernandez-Gimenez's (2009) discussions of the 're-localization' of colonizer's knowledge shows, unsurprisingly, how Westerners also bond with and learn from place. Furthermore, not all in the West are blind to the risks of devaluing embodied and emotional forms of knowledge, as Chambers (quoted in Bell and Morse 2008, p. 153) explains:

> *"The knowledge of local people… has a comparative strength with what is local and observable by eye, changes over time, and matters to people. It has been undervalued and neglected. But recognizing and empowering it should not lead to an opposite neglect of scientific knowledge… The key is to know whether, where and how the two knowledges can be combined, with modern science as servant, not master".*

The importance of 'indigenous knowledge' is recognized in wider sustainability auditing, often as part of re-localization initiatives, and there have been attempts to incorporate this knowledge using participatory approaches (Alrøe and Noe 2016; Lane and Corbett 2005). However, as Fraser et al. (2006, p. 115) note, these alternatives generate "non-standardized data that prevents regions from being compared". Alrøe and Noe (2016) argue that TSA and alternative systems provide "mutually excluding forms of sustainability assessment based on different cognitive interests", positing a fundamental incompatibility that means their indicators can never be merged. This is true, we believe, only if 'science remains the master'.

Non-codified knowledge is tolerated as a stopgap until it can be replaced with or converted into quantified knowledge – even those with a nuanced understanding refer to the need to 'decode'

indigenous knowledge (Woodley 1991). Certainly, aspects of embodied knowledge, particularly physical components, can be 'decoded'. For example, the practice of tilling a field can be automated by a GPS-driven tractor and plough. However, much of it defies codification, as the subjective sense experience of indwelling generates emotional bonds that are personal rather than universal. For example, the actual subjective sense experience of tilling can only be known by a person engaged in the learnt tilling experience. The subjective sense experience is felt emotionally and is based on a relational experience between a person and another entity, whether soil, river, community, or landscape. This process creates an emotional bond with place, presence, and action, which is inherently uncodifiable – though the existence of this 'place attachment' has been confirmed by a number of studies (Gosling and Williams 2008; Lincoln and Ardoin 2016). However, this knowledge has become increasingly marginalized in the West due to the mechanistic worldview, which devalues emotion and encourages the growth of mediated experience-via-telepresence that has increasingly replaced direct sense experience (Bell and Morse, 2008; Davies and Gribbin, 1992; Drengson, 1995).

Critically, over time the direct experience of place embeds humans in a network of socio-ecological relationships that *matter* to them (Gosling and Williams 2008), and the emotional, embodied knowledge gained provides wisdom in decision-making (Woodley 1991). For example, many farmers will know whether to replant a field based on their ongoing interpretation of visual/tactile soil tests, growth patterns, weed types, rainfall etc. that comes from their ongoing relationship with the land (Knapp and Fernandez-Gimenez 2009) and they will interpret this as the land being either exhausted or vibrant, which generates the consequent emotion of protection or engagement in the farmer. Wisdom is "the application of tacit as well as explicit knowledge as mediated by values" (Sternberg 2001, p. 227); it is 'knowledge in context'.

This 'knowledge in context' is increasingly important for primary sectors, where the process of instrumentation and standardization must grapple with complex social and ecological phenomena (Bell and Morse 2008). Parameters are hard to identify in these open systems as their processes are noisy, complex, fuzzy, and vary depending on context (Azar, Holmberg, and Lindgren 1996; Cook et al. 2016). The data from them is categorical, ordinal, and often qualitative, making the identification of standardized, repeatable, and quantifiable indicators and measures difficult. Put succinctly, "nature and its management have little to do with quantification" (Morris and Reed 2007, p. 212). The development and application of instrumentation and standardization for other auditing domains is far easier, but, as Cook et al. (2016, p. 33) note, "environmental auditing is a

special case… [that] poses specific challenges".

Criticisms of technocratic sustainability auditing

Instrumentation and standardization's role can be seen in most standard criticisms of TSA. First, deregulation and standardization has concentrated the power of large corporations as they have the interest and resources to create and regulate sustainability auditing systems (Campbell 2005; Friedberg 2004). Their primary motivation, however, is profit, meaning their systems will tend to the technocratic because of its focus on maximizing outcomes. This power disparity means that the actors with important emotional, embodied wisdom may have little say on the development of TSA measures and indicators.

Closely related, there is an asymmetrical burden of compliance. Neilson and Pritchard (2007, p. 312) explain that auditing schemes are not "mere neutral market lubricants: they are strategic tools for supply-chain governance". The big retailers rarely have any direct involvement in production, meaning audits become a negative externality for producers (Hatanaka and Busch 2008). Consequently, smaller producers, those most likely to be socio-ecologically embedded, are least likely to be able to afford auditing in comparison to their big corporate counterparts.

The instrumentation process has also been criticized. Auditable 'objects' are abstracted from context and presented as rationally-derived 'truths' rather than as simplified, arbitrary and reductive representations (Morris and Reed 2007; Power 1997). Auditing has an 'aura around numbers' (Strathern 2000), using "descriptive devices (numerical and narrative) that are by and large conventional and arbitrary" (van Maanen and Pentland quoted in Power 1997, p. 95). Quantification portrays certain standardized forms of measurement as the most effective means of achieving sustainability (Campbell 2005). This abstraction strips TSA of emotional, embodied knowledge, leaving only that which is codifiable.

Auditable objects also require systems to be divided into smaller, compartmentalized components, as it is far easier to identify, measure, compare, and report on 'bite-sized' quanta (Busch 2014). Producers must divide "the problem into different technical and bureaucratically convenient palliative packages" rather than using a "holistic approach to 'farming nature'" (Marsden 2006, p. 204). The emotional, embodied sense experience of the whole socio-ecological system is restricted as the producer must focus on instrumentation to monitor the auditable objects, reducing 'sustainability' to arbitrary thresholds and severing the relationship with place that helps give

sustainability intrinsic value.

A further criticism is that instrumentation and standardization lead to homogenization. Face-to-face trust comes from direct engagement with producers (Power 1997). Trust-at-a-distance sees local 'quality control cultures' replaced by universalized, standardized 'auditable objects' (Power 1997). TSA values standardization over localized embodied knowledge (Busch 2014), which is problematic as productive activities occur across drastically diverse socio-cultural, ecological, and economic contexts. This homogenization potentially places tacit and explicit knowledge in conflict if the standardized 'object' does not match the embodied experience.

Finally, TSA strips 'sustainability' of the vital ethics of care and respect that form through the emotional, embodied relationship with place and provide critical motivation and meaning to sustainability efforts, reducing it to a largely instrumental project focused on maintaining ecosystem services (Davison 2001; Drengson 1995). This comes not just from the ontological conception of nature as a machine but also from the epistemological demands TSA places on producers: it instrumentalizes human relations with nature not just philosophically but practically as well. The criticisms of TSA outlined above indwell producers into a 'control room' not a 'living room'.

The cosmological family

While socially and ecologically embodied forms of knowledge are, we believe, vital to providing the wisdom to guide TSA, TSA cannot accept this knowledge. Its goal is to, ultimately, remove human emotional subjectivity from the management of socio-ecological operations (Bell and Morse 2008). Hence, TSA lionizes instrumentation and measurement: if socio-ecological systems are analogous to machines, their operations can be detected and measured, and the points where industries compromise key socio-ecological functions can be identified (Drengson, 1995). Accepting that subjective forms of knowledge are crucial to sustaining these systems questions the mechanistic worldview and compromises the technocratic goal of managing and controlling socio-ecological parameters.

Generally, indigenous people describe their emotional, embodied experience of place as the sense of belonging in a 'family' that extends beyond humans to include nonhuman entities such as whales, oceans, birds, and forests (Willerslev 2007). This 'animistic' worldview understands that interactions – both intra-human and extra-human– are mutually-shaping and mutually-creating

(Reid and Rout 2016a). The entities that one relates *with* are entities one is related *to,* they are not just fellow subjects, but 'family' members. The use of the English word 'family' is problematic as the word is used, in a biological sense, to refer to a group of humans that are closely-related genetically. However, from an indigenous perspective the idea of family is understood in a broader sense. For example, in Māori all living things are understood to be members of the same family tree, and that these living family members are in turn the descendants of the elements (e.g. the earth) that give rise to their existence. In Māori the entire family tree is referred to as *whakapapa.*

The application of the word 'family' to non-humans is also problematic from a Cartesian perspective, it is generally interpreted as an anthropomorphic projection of genuine experiences of belonging to and being nurtured by human families onto nonhuman entities (Willerslev 2007). However, we would argue that the notion of cosmological family, in the indigenous sense, not only provides an accurate objective description of reality (we are indeed related to all other living things that have elements as their forebears) it also describes a subjective and emotional sense of belonging, being supported by, and dwelling in place. From this perspective emotional and embodied experiences, and the objective description of the cause and effect relationships (the cosmological family unfolding), are one and the same – the indigenous orientation "obviates subject/object dichotomies that permeate western scientific rationalism" (Browder 1995, p. 21). The mechanistic approach is similar in that it describes cause and effect relationships, albeit as discrete material interacting parts; however, in contrast to the indigenous cosmic family, it cannot accommodate the conscious, emotional, relational, and agency found among parts, or the whole. Instead, it is an alienating worldview, establishing conscious human subjects as ghosts observing the material machine, rather than beings with agency, that belong, relate, unfold, and dwell in place.

Perhaps most problematically the mechanistic orientation limits the way in which complex open systems can be symbolically represented to codified 'objective' descriptions of cause and effect relations between material objects. Conversely, the indigenous worldview allows application of emotion and agency to co-creating family members. The relational process of co-creation may be described using either, or both, objective and codified descriptions of cause and effect, or through representations that aim to capture non-codifiable emotive, embodied, and holistic knowledge (e.g. through poetic metaphors). The 'cosmological family' representation has a greater flexibility, through "which meaning (expression) is changed by emergent (i.e. different) context", enabling the nature of open-systems/family-members to be captured through creative, emotive, and elastic connotations as well as more literal denotations (Wheeler 2010, p. 39). This has heuristic value,

providing a basis for abductive – rather than deductive – reasoning as there is an 'unbridgeable gap' between the signifier and the signified that facilitates 'newness' to emerge through intuitive-experiential cognition (Williams 1996; Wheeler 2010). It is the ontological flexibility and consequent hybridity that emerges from the indigenous worldview that can be harnessed to indigenize sustainability auditing.

Indigenizing sustainability auditing

TSA struggles to accommodate emotional, embodied indigenous knowledge. Conversely, most indigenous cultures are repelled by the moral implications of the mechanistic worldview, where subjectivity is discredited and everything nonhuman becomes an object with only instrumental value (Davison, 2001; Drengson, 1995). TSA and animism are ontologically incompatible; however, TSA's approach is not epistemologically-incongruous for indigenous peoples because the flexible hybridity of their worldview allows them to perceive both the subject/subjective and object/objective simultaneously.

Maori have shown historically that they can enfold explicit, codified knowledge into their understanding of the socio-ecological family while retaining ontological integrity (Petrie 2006). With regard to current approaches, the comprehensive environmental plan by Te Rūnanga o Kaikōura (2007), a Ngāi Tahu sub-tribe, provides insight into the adoption of technocratic management practices within an animistic orientation, while the Ngāi Tahu-run muttonbird industry shows how the incorporation of Western science and technology over decades has actually protected rather than weakened the Maori worldview in the face of colonization (Kitson and Moller 2008).

Certainly, there is a potential risk that TSA instrumentation could erode the familial bonds as technocracy's hegemonizing character 'literalizes' the mechanistic worldview (Drengson 1995). As a counterpoint, however, while the technocratic approach dominates Western healthcare, the field of holistic medicine has shown how these mechanistic tools can be used to provide abductive diagnoses and person- rather than ailment-centric care (Davis-Floyd and St. John 1998). Davis-Floyd and St. John (1998, p. 250) found that "holistic physicians tend to be strong supporters of and believers in science", they just have an "expanded view" of it. If technocratically-indoctrinated doctors are able to overcome this literalization, indigenous actors, with their flexible worldview, can too.

Even more encouraging, information and communication technologies (ICT) offer a new potential for limiting this ontological risk. ICT can be seen as the ultimate expression of Latour's (1993) 'quasi-object', or hybrid subject-object, displaying a flexibility similar to the indigenous orientation. As Ess (2005, p. 91) writes, "an increasing number of cases from a wide range of cultural provenances show how 'savvy users'… develop often sophisticated ways of reshaping the use and even the design of Western-based [ICT] in order to both sustain and enhance their defining cultural values and communicative preferences". ICT provides a range of ways – from language preservation to community cohesion – for indigenous people to preserve and reinforce their worldview, though used uncritically it risks 'colonizing the mind' (Dyson 2004).

Sustainability auditing needs to be indigenized reflexively, prioritizing the emotional sense experience that comes from indwelling in an unfolding nexus of familial relationships. Fundamentally, this needs to be achieved through the way the auditing system is framed. Reviewing incompatibilities between international organics standards and indigenous farmers, Eernstman and Wals (2009) see the problems emerging from the former's inability to encompass indigenous 'perceptions' of nature and social organization. Similarly, a group of Maori academics examining genomic research concluded that the interface between worldviews can be overcome through the "reinterpretation of concepts within the cultural foundation" (Hudson et al. 2006, 351). Roncoli et al. (2001, 3) expand on this, stating that "scientific information must be present in ways that conform to cultural notions concerning the nature of knowledge, its production and validation, and its relationship to society". Thus, rather than being based on deduction, an indigenous audit system must incorporate an ongoing process of 'abductive relationalism', where understanding and, consequently, meaning are derived through embodied sense experiences with the socio-ecological family (Wheeler 2010).

Abductive relationism among indigenous people can be illustrated using Māori cosmology. Like many indigenous cultures, Māori see the Earth as a female body, Papatūānuku, while the sky is a male body, Ranginui. All things contained within Papatūānuku's body are considered their descendants – which is reflected in the way many Māori words have nested sociocultural and biological meanings, like *hapū*, which refers to the social unit 'band' and 'to be pregnant'. Such symbolism represents a 'summative' emotional sense of belonging (generated through embodied sense experience), which provides an overarching form of abductive reasoning pertaining to a family of interconnected and mutualistic socio-ecological entities.

This sense awareness, and associated reasoning, draws attention to the quality of relationships between entities, as the health and wellbeing of the 'family' is dependent upon the quality of relationships. Specifically, Māori use the concept of *mauri* to define this quality. *Mauri* refers to the vitality of a body's (whether human body or water body) essence, and is shaped and formed through relationships between socio-ecological family members (Reid and Rout 2016a). Fundamentally, the level of *mauri* a body expresses is determined by its overall health and life supporting capacity: a polluted river supports less life and, therefore, demonstrates less vitality, or low *mauri*. *Mauri* can, however, be built through mutually-beneficial interactions: humans sustainably managing a river catchment increase the *mauri* of the river, which, in turn, increases the *mauri* of those who gain sustenance from the river by increasing their health. There is an optimal state of *mauri* for any body, when it is fully expressing its vital essence; critically, this state is dependent upon the quality of the relations with other members of the socio-ecological family.

The notion of *mauri* is complex, because the level of *mauri* an entity exhibits can to some extent be measured, but other elements remain immeasurable. That is to say, *mauri* is able to encompass technocratic management practices within an overarching animistic relationship, as long as TSA is framed as being used in service of maintaining relationships. Instruments can be developed for measuring water quality, or bio-diversity – both of which can be indicators for determining levels of *mauri*; however, the *mauri* of a body is also simultaneously a summative sense experience – the sense of the vital expression of a body through the sum of tacit relations with it. The *mauri* of a river comes not just from the level and diversity of fish it produces, or its water purity, but also the emotional subjective experience of catching the fish, drinking the water, the terror of it in flood, and the gentle sound of it lapping. The sum of these many expressions of the river are its *mauri* – its vibrancy – that when tacitly experienced enable it to be sensed as a river. It has both measurable parameters and immeasurable qualities bound to the emotive human sense experience.

Perhaps most importantly, *mauri* provides a framework for understanding the types, and quality, of relationship between bodies in the socio-ecological family. These relationships can be mapped specifically: symbiotic (mutually enhancing *mauri*); mutualistic (mutually maintaining *mauri*); commensalistic (not affecting each other's *mauri*); and, parasitic (one body diminishing the *mauri* of another for its short-term gain but long-term demise). For example, Morgan has developed an environmental assessment system that examines the quality of human care for the environment as *mauri ora* (a relationship where humans are managing environmental bodies at full vibrancy), *mauri piki* (a relationship where humans are building the *mauri* of environmental bodies), *mauri heke*

(relationships where humans cause *mauri* to decline) *mauri noho* (at state where *mauri* is fully denigrated).[1]

Clearly then, optimal relationships between humans and the ecological bodies that support them are symbiotic, whereby the *mauri* of bodies can be vibrantly expressed. For Māori, this is also guided by the ethic of care and respect for place/family, which further provides impetus to enhance and protect the *mauri* of bodies. Thus, sustainability is an obligation towards maintaining family health out of care and respect, rather than maintaining the instrumental value of ecosystem services by not compromising the functioning of the ecological machine/host – a view that leans toward parasitism. Māori refer to this obligation as *kaitiakitanga* (guardianship). They understand they have a responsibility to care for and respect their non-human family members, as this builds and maintains their own *mauri* and the *mauri* of the ecological family. In fact, it can be argued that Māori are obliged to use TSA instrumentation to ascertain the extent to which they are meeting their *kaitiakitanga* responsibilities.

Thus, the concept of *mauri,* and the related responsibility of *kaitiakitanga,* provides a 'bridge' between the technocratic and alternative approaches, which have traditionally been fraught with compatibility problems (Fraser et al. 2006; Lane and Corbett 2005). Morse et al. (2001, p. 13), examine the problem of integrating the indicators of sustainability as a 'management approach' with the outcomes of sustainability as a 'system property', concluding that it is the subjective value judgements rather than the indicators themselves that are "the 'stuff' of sustainability". Unlike the West, however, where the anthropocentric and ecocentric views of sustainability are at odds, Māori, like most indigenous peoples, are able to adopt both perspectives simultaneously as their worldview is not so ontologically rigid, but rather has a nested and nuanced understanding of the wider socio-ecological family as both relations to be cared for and resources to be used (Willerslev 2007). Consequently, *mauri* is not epistemologically-prescriptive but rather an ontologically-derived ethic that demands maximizing mutually beneficial outcomes through any method possible.

This is not to say that there will never be clashes between TSA's quantitative metrics and the subjective aspects of *mauri* but there are several general considerations that will help ameliorate these. First, both TSA and *mauri* are focused on improving indicators and outcomes so even when there is a compatibility issue it will generally be a matter of degree rather than kind. There will be some situations where an element of TSA will demand an action that may be commensalistic or

[1] Morgan's mauri-ometer can be found here: http://www.mauriometer.com/WebPage/Show/2

even parasitic rather than symbiotic but this will be dealt with by the second consideration, which is that the TSA's standards have to be met due to the external pressures to adopt them. In other words, while *mauri* will be used as the overarching ethic of care, there also has to be a practical focus on the external pressures for adopting TSA. This form of compromise is hardly new for indigenous peoples who have lived within settler states for decades and are "used to operating in multiple cognitive frameworks" (Rocini et al. 2001, p. 1); they have to adopt TSA, and any indigenization will ameliorate potential ontological degradation.

Reframing sustainability auditing and adding instrumentation

While additional instrumentation is important, changing how sustainability auditing is viewed is crucial for several reasons. The first is ontological – animism is a worldview, meaning there is an intrinsically animistic way of viewing the same auditing instrumentation and this reframing is critical to ensuring that auditing can be related to in an animistic manner. The second is practical, there are limits to instrumentation changes as the indigenized system must still meet the external requirements of sustainability auditing.

Fundamentally, the reframing would involve shifting the emphasis from maintaining industrial operations within socio-ecological thresholds to reporting on growing, or symbiotically regenerating, the health, or *mauri,* of bodies. At its most basic, this would involve changing the way the system was presented to the user by embedding indigenous values. The language used by the system would need to shift from predominantly objective terminology to being simultaneously grounded in subjective terminology that expresses a clear sense of emotional care for the health and well-being of bodies. An indigenous auditing system would need to frame the audit as a means of monitoring the health of land, water, and people (including their industry), based on levels of mutual care and respect evident in symbiotic behaviors and practices.

We also propose four interrelated additions to sustainability auditing that will help with the reframing while also counteracting TSA's major problems.

The body construct

Rather than a dashboard of instruments indicating the progress of business operations against economic, social, and environmental thresholds, reporting could present the business and systems as bodies whose wellbeing is detrimentally affected by harmful practices. This, in turn, would communicate that harm would likely return to the business, and be transferred to other family

members (e.g., streams and rivers). In such a case, the socio-ecological system could be presented as a person, whose vitals, such as soil health, and water quality, are communicated like medical readouts. To provide a connection, the construct would need to bring all the various discrete metrics being measured into a cohesive, singular construct, re-embodying the knowledge, inviting interaction, and evoking emotion. In keeping with indigenous representations, waterways could be veins, wetlands would be kidneys etc. These symbolic representations help with quick comprehension of complex systems. While some fidelity would be lost, a body construct could deliver a holistic overview, it could even help recapture the synergism inherent in embodied knowledge through dynamic symbolic representation. Critically, it also helps create an emotional connection. Though the 'medical' perspective could potentially reinforce the mechanistic worldview, the overarching familial framing will help prevent this issue. When a patient is connected to instruments measuring blood pressure and oxygen levels, the instrumentation does not discount the emotional connections that exist between the patient and their family.

The embodied sensor

Reporting cannot focus on physical parameters alone but must also include the embodied sense experience of *mauri*. ICT provides a means for monitoring and recording the intangible, uncodifiable elements of production, which could involve anything from expressing emotive connections to place through to perceptual impressions of vitality using *mauri* measures. It could include a multimedia component for photos, videos, and sounds (e.g., videos demonstrating change along a river bank that includes bird song, river sound, and landscape beauty). The point is to restore the embodied, emotional, and local. The embodied sensor would also help the producer gauge their own changing relationship with the system over time. While there is a risk this could mediate the experience by distancing, with the right cultural framing the embodied sensor would offer more ways of emotionally relating to place by digitizing moments, evoking emotive autobiographical memories even when distant in time or space – much like a family photo album.

The localized calibration

TSA's undesired effect of homogenizing diverse, fuzzy, and complex systems could be counteracted by a greater allowance for the contextual customization of instruments – though substitution is obviously not possible. Indigenous producers could add a codified component, e.g., measuring a change in a unique indicator species, or a qualitative one, e.g., impressions of local wildlife vitality. This 'localized calibration' ensures that the instrumentation is able to be fine-tuned

for the specific locality, reinforcing the bond with place. Providing localized calibration would also ensure the best fit between an indigenous producer's embodied knowledge and the explicit codification of this knowledge, ensuring a higher fidelity of transmission. This means the instrumentation needs to be modular; it must have a degree of inbuilt flexibility to account for different contexts. While this does increase the potential for clashes between indicators, the localized ones serve an internal rather than external purpose meaning they can be used to appease alternate demands.

The feedback mechanism

Also core to indigenizing audit systems would be adding a way for reports to be shared with various stakeholders, be they retailers, regulators, consumers, other indigenous producers, or tribe members interested in accessing data relevant their interests, including the body construct, the embodied sensor, and the localized calibration information. For example, tribe members might access images showing the body construct, regulators may access information demonstrating the health of waterways, and localized indigenous producers could share indicator species data. This 'feedback mechanism' would ensure that tribal members and other stakeholders are able to check the system vitality and provide input, enabling the tribe to communicate how they are improving the health and vitality of bodies. It would also need to provide a means for parties to communicate with each other, helping to build relationships.

Conclusion

Māori tribal businesses in the primary sectors seek to adopt sustainability audit systems. These systems offer a means of communicating to tribal owners that their businesses are operating according to Māori values, reconnecting dispersed tribal populations. There is also impetus to use sustainability reporting to access discriminating premium markets, meet government regulations, and align tribal business interests with indigenous social and environmental ethics. There are, however, concerns regarding compatibility between TSA and indigenous cultures.

It has been argued that TSA is part of a wider technocratic impetus to order, standardize, and universalize production processes. TSA's goal to reduce, or entirely remove, human emotional subjectivity in the management of industrial operations is incongruent with embodied indigenous knowledge that also includes the subjective sense experience of belonging within, and caring for, a socio-ecological family as a basis for sustainable relations, TSA is unable to fully accommodate the indigenous perspective.

Conversely, the sense of care and belonging for people and place common to indigenous people provides the motivation and grounds for contextually-grounded indigenous environmental and social ethics. Furthermore, indigenous peoples' emotional, embodied sense knowledge provides socio-ecological context – a critical basis for wise holistic decision-making. This wisdom can accommodate the emotional and embodied whilst at the same time incorporating objective knowledge of physical processes. In short, the indigenous perspective can, with some reframing and additions, accommodate quantitative TSA metrics because it provides a flexible cognitive framework that is able to accommodate the object/objective with the subject/subjective in nuanced hybrid forms. Consequently, indigenous people might frame any sustainability audit system using their family cosmology, enfolding TSA's tools, instruments, and operating procedures within their worldview.

Such an indigenized sustainability audit system would need to exhibit the following characteristics. First, businesses would be considered members of a broader socio-ecological family that is obligated to engage in symbiotic relations with other human and non-human family members. Second, the sustainability auditing process would seek to record and communicate qualitative sense experiences of place as a means to contextualize 'hard' numerical data concerning physical and measurable properties. Third, the system would need to allow extra added components that enable a localized context to be included, overcoming TSA's homogenizing nature and allowing place connections to grow. Finally, the audit systems should create feedback mechanisms that permit tribal members and other stakeholders to engage in an open learning and communication processes focused on continual improvement.

Finally, while TSA has seen morally-guided decision making subsumed by instrumental reason informed by the scientific method and technological control, there is also a growing convergence between Western philosophies of sustainability and animism. For example, the 'rehabilitation' of practical reason, which "can only develop, be expressed, and be passed on through embodied relationships", sees a cognitive framework similar to the animistic worldview (Davison 2001, p. 161). This 'reasoning in transition' "brings to light the moral character of our essential relationality as members of human and biotic communities" (Davison 2001, p. 166). Likewise, critical realism's ontological stratification helps negotiate the difficult interface between the natural and social sciences by overcoming the 'epistemic fallacy' and outlining different 'levels of reality' that reconnect nature with culture (Parker 2014), providing a similarly flexible conception of existence

as the 'cosmological family'. In other words, the indigenous perspective can not only motivate indigenous sustainability, but provides crucial philosophical support to the global endeavor to sustain the Earth. Animism is not an indigenous orientation, but a pan-cultural one.

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