

Driving Water Management Change Where Economic Incentive is Limited

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Abstract The maintenance of safe and reliable water supplies presents a challenge for communities across the world. This paper responds by exploring how five large food and beverage producing organisations operating in Australia were able to develop some focus on water management at a time of acute drought. Despite weak economic and regulatory drivers, a heterogeneous range of responses was developing across all five organisations. Drawing on Laughlin's (Organ Stud 12(2):209–232, 1991) model of organisational change, we argue that each reshaped or developed archetypes and subsystems to enable a focus on improving efficiencies. Some were motivated by little more than compliance and so the extent of change was limited. A sense of community pressure was able to drive some change to interpretive schemes in two of the five organisations. Broad cultural change, supported by clear board level mandate, became critical to the survival of new practices. We also demonstrate that management level staff with a passion to champion water efficiency can be instrumental in driving change. This paper contributes to our understanding of water management, and to the factors needed to embed developing practice.

Keywords Water efficiency · Water management · Sustainability · Organisational change · Champions

Introduction

Large parts of Australia endured acute drought conditions through the 1990s and into the 2000s (WSAA 2009). In response, water authorities implemented a range of initiatives to motivate both industrial and residential consumers towards efficiency improvements. In this study we explore how five Sydney-based food and beverage producing organisations responded from 2008 to 2010. In particular, we focus on the nature and form of water management practices developed within each. Industry accounts for approximately 22 % of average global water consumption (WBCSD 2009). As communities seek to use water more sustainably, our study provides insight into how the industrial sector can respond.

Along with its practical value, our research interests are supported by calls for empirical exploration of sustainability management practices and the factors that drive or impede related change (Durden 2007; Holliday et al. 2002; Norris and O'Dwyer 2004; O'Dwyer 2003; Reinhardt 2000). Recent responses to these calls include: Qian et al. (2011) who used a case-based approach to explore waste and recycling management in the local government sector in New South Wales; Adams and Frost (2008) who examined how key performance indicators were used to measure sustainability performance in five companies; and Lansiluto and Jarvenpaa (2010) who investigated the implementation of sustainability management in a Finnish company. Egan (2014) explored how water efficiency change can institutionalise across a field of organisations. Exploration of what water management might mean as a specific sustainability initiative and the factors that might contribute to embedding related change within organisations, remains limited. We contribute with the following research questions:

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- (i) How were ‘water management’ practices developing across five large water consuming organisations operating in Sydney, Australia, in the late 2000s?
- (ii) What were the factors motivating those water management practices?

In this study we find that the passions and perspectives of the individuals involved contributed to either enabling or constraining the changes observed. In seeking a theoretical lens to aid with articulation of our findings, consideration was therefore given to drawing from ‘institutional logics’ which, Thornton and Ocasio (2008, p. 101) argue, accounts for organisational culture, beliefs and rules, and which collectively guide “organizing principles and provide social actors with vocabularies of motive and a sense of self.” Instead we have drawn from the alternative perspectives offered through Laughlin’s (1991) model of organisational change. Influenced by Habermas’ (1987) arguments that social developments can be understood through exploring the discursive contributions of all participants, Laughlin’s model assumes a novel ‘middle range’ approach. His model offers ‘skeletal’ categories to aid description of how all organisational features (culture, people, equipment, practices, controls, etc.) respond to ‘environmental disturbances’. Our case study responds to his call for empirical ‘flesh’ to bring this model to life. Researchers who commonly draw from an institutional lens may appreciate the insights offered through our use of Laughlin’s alternative lens of organisational change.

Laughlin’s (1991, p. 218) model starts from the premise that an organisation’s “real heart” (its core value and objectives), is relatively resistant to change. Here we assume that the core values of the five food and beverage producing companies targeted are likely to be focused on economic rationality, efficiency and profit maximisation (Heydon 1987). The most effective way to drive improved efficiency in the corporate sector may therefore be through increasing water prices. Drawing from Von Mises’ (1944) arguments that free market forces are always a more effective response to resource scarcity than bureaucratic restrictions, Brown (2009) argues that water prices ought to be completely liberated to respond naturally when supply is constrained. In this manner, questions of resource inefficiency for the business sector would be expected to more naturally align with core organisational objectives (profitability).

The liberation of water prices called for by Brown (2009) did not occur in Sydney in response to the drought conditions experienced through the 1990s and into the 2000s. While Sydney authorities progressively increased water prices for ‘non-residential’ consumers from approximately \$0.85/kL in 1999 to approximately \$1.90/kL by 2009 (Egan 2009), the corporate sector continued to view

water as a relatively immaterial expense (Macdonald et al. 2005; de Rogers et al. 2002; White 1999). Sydney Water Corporation (the sole retailer of water for all residential and industrial consumers in the basin), concurred at the time that those increases did little to factor in either the cost of scarcity, or the “full regulatory cost of the services provided” (SWC 2007, p. 9). The *NSW Water Savings Order 2005* was also implemented in 2005, requiring 237 large industrial water consumers operating within the basin to prepare and submit water-savings plans by 31 March 2006. Those plans were required to document how water was consumed, list a range of water-savings measures, and plan a management and technical review process.

In the absence of strong water pricing, water efficiency responses therefore largely depended on either an ethical or moral response, or on the impact of less efficient (Von Mises 1944) and limited regulations and restrictions. Nonetheless, our findings indicate that a heterogeneous range of water management practices were under development across all five case organisations into the late 2000s. Few of those practices were undertaken as little as 10 years earlier. We describe developing practices as having become ‘embedded’ within two of the case organisations (‘Alpha’ and ‘Beta’) because all staff were now required to participate, and because core production processes were re-engineered where possible to meet the needs of new related objectives. Limited developments in the other three cases (‘Gamma’, ‘Delta’ and ‘Epsilon’) are described as ‘marginal and fragile’ because they remained the responsibility of small teams. Despite evidence of change in all five organisations, many staff remained unconvinced of how new practices linked to core goals and values.

In accordance with Laughlin’s (1991) model, we make three key case specific contributions. First, we argue that water management change had embedded through the ‘real heart’ (Laughlin 1991) of our case organisations, where we saw evidence of a broadening or change to core organisational rules. Such change required clear board level support, and clear direction about the nature of the responses required. Evidence of fragmentary cultural change did not indicate change to the real heart. Second, we argue that the core interpretive schemes or metarules of the organisation could be understood as those which reflected the interests of the organisation as a whole, and to which design archetypes and subsystems were required to align. This leads us to observe that Laughlin’s (1991) concept of colonisation was apparent in those cases where developing design archetypes and subsystems reflected a new organisational focus. Third, we argue that management level passion to respond to issues of community concern was also able to drive some water management change.

Variations in the tenacity and skills of these ‘champions’ determined how design archetypes, subsystems, and possibly also interpretive schemes were able to adapt as a result.

The remainder of this paper is structured as follows. A literature review is firstly undertaken to explore current insights into water management. A theoretical framework based on Laughlin’s (1991) model of organisation change is then built which is later drawn on to articulate our findings. That is followed by methodology, findings, further discussion and conclusions.

What is Water Management?

We commence our study by exploring what the literature tells us about the nature of water management. The concepts of management control and ‘sustainability management’ are well developed in the literature. However, while some have explored the scope for voluntary water reporting (Egan and Frost 2010; Hazelton 2013), little insight is provided into water management specifically. Management may take a diversity of approaches to the development of management controls, and so the concept is “notoriously difficult to define” (Efferin and Hopper 2007, p. 225). Anthony (1965, p. 17) suggests that management control is the process of obtaining and managing resources “effectively and efficiently in the accomplishment of the organization’s objectives.” This understanding allows a conception of control that might be focused on both core economic concerns (such as cost control and profit maximisation), as well as potentially broader concerns (such as communal water scarcity concerns). Management controls may be formal, in that they are mandated from board level, or informal including “unwritten policies” as well as “shared values and norms” (Langfield-Smith 1997, p. 208). Informal controls can be critical, particularly with respect to sustainability management, by signalling “the role of social responsibility within the overall business culture and the emphasis that managers should place” on related practices (Durden 2007, p. 688).

Sustainability management in general might include a system of controls comprising “people, instruments and activities, which is aimed at collecting and processing data in order to provide environmental information for decision making or accountability purposes” (Bouma and Kamp-Roelands 2000, p. 132). In 2008 the then, Department of Resources, Energy and Tourism (DRET) suggested that a focus on water management should included a detailed water management plan focused on usage, wastage, and the development of detailed internal operational procedures (DRET 2008). The *Water Reuse Industry Survey, Review and Policy Development* (FSA 2009) report for Australia’s

food and beverage industry argued that most critically, “a board and corporate commitment is required to drive the uptake of these initiatives at the site-level” (FSA 2009, p. 36). That report also suggested that persisting low water costs made it difficult to justify investing significant time and resources in water management.

Theoretical Framework—Organisational Change and the Role of Champions

Organisational Change

Laughlin (1991) provides a model that categorises the pathways that organisations can follow in response to ‘environmental disturbances’. While organisations are fundamentally change resistant, disturbances may impact ‘subsystems’, ‘design archetypes’ and ‘interpretive schemes’ in a variety of ways. Design archetypes include organisational structures, decision processes, control systems and management control systems. Subsystems are the tangible organisational elements such as buildings, people, and equipment. Interpretive schemes comprise the shared values and beliefs of all members (Laughlin 1991) and reside at “the highest and most abstract level of organizational phenomena” (Tyrrall and Parker 2005, p. 508). Through exploring the extent to which these three elements change as a consequence of related disturbances, we can question whether the “real heart” (Laughlin 1991, p. 218) has been impacted (‘second order morphogenesis’), or alternatively whether core missions, aims and culture persist (‘first order morphostasis’).

Environmental disturbances may emerge from both outside and inside the organisation; “key stakeholders in any organisation could, for all sorts of reasons, deliberately try to disturb the current inertia situation” (Broadbent and Laughlin 2005, p. 16). Laughlin’s model suggests five potential pathways as a result of an environmental disturbance; inertia, first order rebuttal, first order reorientation, second order colonisation or second order evolution. At its most simple, an environmental disturbance may have no impact and so the organisation will demonstrate ‘inertia’. Management may demonstrate a “constant reproduction and reinforcement of existing modes of thought and organization” (Greenwood and Hinings 1996, p. 1027) or may allow for no more than cursory management responses (Cyert and March 1992). ‘First order rebuttal’ involves some change to design archetypes. If it is apparent that both design archetypes and subsystems have changed, the organisation may have progressed further to ‘first order reorientation’. In both of these latter two pathways, change is described as ‘first order’ (morphostasis) because the core

interpretive schemes of the organisation remaining basically the same.

Laughlin's fourth pathway of change, 'second order colonisation', is viewed as morphogenetic because interpretive schemes are also changed. At the most fundamental level, interpretive schemes include organisational 'meta-rules' which determine the organisational missions or aims. Within a corporation, metarules are likely to be focused on the maximisation of profit. Cultures, beliefs, values, and norms comprise a secondary level to an organisation's interpretive schemes (Tyrrall and Parker 2005). Organisational culture will not necessarily be integrated and homogeneous; Martin (1992) suggests that culture might differ from one organisational sub-unit to another, or be fragmented. There may be a 'loose coupling' between fundamental and secondary elements of interpretive schemes. Therefore, while we may see some suggestion of evolving cultural values, core metarules can persist (Broadbent 1992). Where we see evidence that environmental disturbances are fundamentally addressed through specialised workgroups, morphogenetic change is usually prevented (Tyrrall and Parker 2005).

Drawing on arguments from Habermas (1987), Laughlin argues that new design archetypes might colonise an organisation's interpretive schemes. Here Laughlin suggests that design archetypes can be seen as an example of Habermas' 'systems', which interpretive schemes can be seen as an example of Habermas' 'lifeworld'. Habermas argues that the lifeworld (our normative space within which culture, tradition and identity are reproduced) does not simply drive systems (action focused elements of human society). We also see an 'internal colonisation' of the lifeworld by systems (Habermas 1987). Systems (design archetypes and subsystems) increasingly impose their imperatives on the "institutions [interpretive schemes] which are intended to express popular will" (Power and Laughlin 1996, p. 444). In second order colonisation, a small group achieve a "coercive infiltration of new guiding values and beliefs" (Zakus and Skinner 2008, p. 426). "Remaining participants either leave or choose to live, however reluctantly, under a new underlying dominant ethos" (Laughlin 1991, p. 220).

Finally, unlike colonisation, 'second order evolution' may be apparent where we can observe that consensus on the importance of change has been achieved through "free open discourse" (Laughlin 1991, p. 221). Laughlin draws again here from Habermas who argues that society progresses through discussion and consensus. While not seeking to provide a predictive model, Laughlin suggests that the factors affecting where the organisation will move to as a result of an environmental disturbance include the magnitude of the disturbance, the level of commitment held by members of the organisation to the existing

interpretive schemes, the "power dependencies" (Laughlin 1991, p. 223) in favour of those schemes, the alternatives, and organisational competence.

In practice, change may be more complex than the neat categories suggested by Laughlin (Tyrrall and Parker 2005). Zakus and Skinner (2008, p. 436) suggests that this "idealised form of organizational change" does not "deal with the fuzziness and untidiness around the perimeters of these compartments" and fails "to accommodate for internal conflicts and contradictions." Broadbent (1992, p. 346) cautions us to beware of the "slippery nature of the categories." The concept of 'drift' may therefore assist with our descriptions of water management change. Drift is conceptualised as action, involving serendipity, chance and social factors, where actors are not necessarily operating with clear 'maps' describing where the organisation should go (Quattrone and Hopper 2001).

Smith (1982, p. 370) argues that morphostasis and morphogenesis must be understood by examining the relationship between the organisation and its environment, and that morphogenesis involves a "change in code such that the subsequent code is of a logically different order than that which preceded it". Gray et al. (1995) draw on Smith's arguments to contend with Laughlin's suggestions that colonisation and evolution necessarily mean morphogenesis. Gray et al. (1995, p. 219) conclude, while some colonisation may be apparent, 'sustainability' change will not be morphogenetic unless we can observe a deep penetration of new values such that all future organisational generations acquire and reflect those values, and that "dominant objectives, emphases, ethics" of the organisation have changed. In most cases they conclude therefore, that all we see at present within the business community "is minor [sustainability] reorientation at best" (Gray et al. 1995, p. 232).

Monteiro and Aibar-Guzman (2010) drew on Laughlin's model to explore suggestions of sustainability management change within several case organisations and argued for some change to design archetypes, subsystems, and interpretive schemes. Sustainability objectives continued to be subordinated to economic goals and so, in support of Gray et al. (1995) they concluded that morphogenetic change had not occurred. Nonetheless, they added that this conclusion was somewhat simplistic as new discourses emphasising a greater focus on sustainability suggest that the "seeds of morphogenesis" were present (Monteiro and Aibar-Guzman 2010, p. 429). Other studies of sustainability management change utilising Laughlin's model conclude that a "serious commitment to dealing with environmental issues must be accompanied by some form of change in organisational culture and/or attitude" (Tilt 2006, p. 5). In another case study drawing of Laughlin's model, Ball (2005, p. 365) argued that sustainability

management became “accepted and internalised but in a way which is guided by the interpretive scheme of the organisation.”

Other studies lend support to arguments that sustainability management change remains limited. O’Dwyer (2003, p. 532) found a “cursory and implicitly narrow recognition” of related responsibilities. Durden found strategies focused on “external image” alone (Durden 2007, p. 685). Dyllick and Hockerts (2002, p. 131) argue that most firms opt for “eco-efficiency as their guiding principle.” An organisation’s ability to progress beyond cursory responses may depend on “power relations between the groups espousing the different interpretations as well as the values of top management” (Rickardsson and Welford 1997, p. 60). Fussel and Georg (2000) argue that top management commitment is critical to any initiatives considered ‘fringe’ (as may be the case with respect to water management).

The Role of Champions

Bansal and Roth (2000) observe that four key drivers (or ‘environmental disturbances’ (Laughlin 1991) of sustainability management practice have been proposed in the literature: legislation, stakeholder pressure, economic opportunity and ethical motivations. They add that three key ‘contextual dimensions’ influence the impact that these motivations have on actual behaviour: issues salience, field cohesion and individual concern. Issues have ‘salience’ where they can be clearly measured, attributed to a particular firm, and are able to elicit an emotional response. Field cohesion depends on the formal and informal networks between constituents. The issue of individual concern allows for the possibility that internal ‘champions’ may be able to drive unique change responses. Bansal and Roth (2000) finish by calling for studies exploring how these drivers explain sustainability practices.

The importance of ‘individual concern’ stems from arguments that firms comprise individuals who have “‘bounded rationality’, cognitive biases, and personal values that direct their actions” (Bansal and Roth 2000, p. 731). Bansal and Roth (2000, p. 732) conclude that, where there is issue salience, a champion for related change may be able to “imprint the endeavours with his or her values and direct the firm towards ecological responsiveness.” A considerable body of research supports these arguments that social factors, and the impact of key individuals within organisational networks, can play a key role in determining organisational change (Quattrone and Hopper 2001; Tucker 2013). Bansal and Roth (2000) do not however, clarify how ‘ethical motivations’ as a driver might differ from ‘individual concern’ as a contextual

dimension. We will draw on, and contribute to, these concepts through this water management study.

Andersson and Bateman (2000) define champions as individuals who have a personal passion for activism, and who are able to drive some change to a product, process or method. ‘Products’, ‘processes’ and ‘methods’ sound very much like Laughlin’s design archetypes and subsystems. What will be more interesting to explore in this water management study, is whether champions can also drive some change to interpretive schemes. Andersson and Bateman (2000) add that the sustainability champion needs unique skills to be able to repackage issues so that they assume meanings of importance to the board. This suggests that while water management champions may not be able to alter core interpretive schemes, they may have the skill to give ‘meaning to’ related practices through arguments about how they link to core goals. Other studies suggest that a champion can make this link by focusing on opportunities such as reducing costs (Brown and Fraser 2006), improving relationships with local communities, or referencing other “positive [financial] organisational spill-overs” (Russo and Fouts 1997, p. 535). Schon (1963, p. 82) argues that resistance to change within an organisation is “not only normal but in some ways even desirable” in order to maintain core objectives. Again, these ideas can be linked to Laughlin’s model to question whether champions might enable some second order morphogenetic change.

While Schon (1963, p. 85) argued that a champion must have “considerable power and prestige in the organization”, Howell and Higgins (1990) go on to argue that champions can include both formally appointed leaders, and emergent informal leaders. A champion for sustainability management change needs particular skills to be able to scan and make sense of a range of complex data in order to meaningfully argue the importance of a particular issue (Andersson and Bateman 2000). While others suggest that there should be one key champion to carry the innovation to success, Maidique (1980) suggests a role for a variety of champions including ‘product champion’ and ‘executive champion’ (especially in larger diversified firms).

Methodology

The data in this paper draw from a broader research project exploring water efficiency change in Sydney, Australia in the late 2000s. While this paper explores the detail of the water efficiency practices that were developing within a number of organisations and the factors that motivated change within those organisations, Egan (2014) explored how change can ‘institutionalise’ across a field of

organisations. The methodology presented below is therefore similar to that presented in Egan (2014).

A case study approach allows for “a detailed view of the topic” (Creswell 1998, p. 17), and is widely advocated for studies exploring sustainability management change (Adams 2002; Gray 2002; Gray and Bebbington 2001; Gray et al., 1997; Hall, 2010; Parker, 2005). Adopting a case study approach enables exploration of the perceptions of a range of individuals, and reference to several sources of evidence including semi-structured interviews, field notes, and other documents. In this water management study we chose to target a number of case organisations operating within a similar context, in order to understand the impact of a range of antecedents (Eisenhardt, 1991). Within Australia, the Sydney basin was considered an ideal location to select those organisations as it is a small and hydrologically isolated water catchment (approximately 16,000 square kilometres), and yet contains one of Australia’s largest concentrations of households and industry.

A list was compiled of all organisations operating within the basin that were both large water consumers and financially large. Our definition of large draws on the *NSW Water Savings Order 2005* which targeted all organisations that consumed more than 50 megalitres of water in Sydney in the preceding year. The names of all 237 organisations captured by that Order were matched against the 2006 *Business Review Weekly* listing of Australian organisations whose total annual revenue exceeded AUD1billion (BRW 2006). We chose these discriminators so as to focus on organisations that both consumed similar water volumes, and had similar financial capacities to affect efficiency improvements. Of the 38 organisations that met both criteria, five were from the food and beverage sector. This was considered an ideal group to target as that industry uses water for a variety of purposes, and may demonstrate some ‘field cohesion’ (Bansal and Roth 2000), and a range of interesting challenges in seeking to implement water management change.

The sustainability/environment managers in those five organisations were contacted. In working with those managers, it is acknowledged that others having an influence on ‘water management’ may have been overlooked. All allowed access for some interviewing, site tours and document collection. A range of individuals responsible for compiling, reporting, accounting for, and using water-related data were contacted and all gave consent to be interviewed. An interview was also conducted with a representative from the New South Wales Department of Water and Energy, and from Sydney Water Corporation. All interviews were built around the ten semi-structured issues noted in Table 1. A semi-structured approach allows for related “research questions to emerge from the research process ... [which are] more pertinent to the problems of

Table 1 Semi-structured interview issues

1	Introductions
2	Uses of water
3	Overview of water management practices
4	Roles, responsibilities, networks and integration
5	Data collection, reporting processes and use in decision making
6	Integration with broader accounting systems
7	Effectiveness
8	The past—history, motivations and hurdles
9	The future—challenges, threats, opportunities, vision and strategies
10	Other matters

the subjects” (Hopper and Powell 1985, p. 447). Interviews were digitally recorded (with the interviewee’s permission). The aim throughout each interview was to obtain a full and clear understanding of each interviewee’s perceptions and understanding in relation to the study’s two research questions.

Broadbent and Laughlin (1997) suggest adoption of a number of methodological principles in a ‘middle range’ case study. Researchers should develop semi-structured interview issues that focus on the history of the organisation, and that question issues of interest in a manner guided by the theoretical framework. Having completed a first round of interviews, the researchers should then discuss key insights and return to the interviewees for further discourse focused on the understandings generated. We have applied these principles by working within a group comprising the author and two research supervisors. All members of the group contributed to designing the semi-structured interview questions and interpreting the data. Interviews were undertaken by the author with some participation from one of the supervisors. Follow-up interviews were designed to confirm developing interpretations, clarify uncertainties, discover how matters had progressed in that interval, and elaborate on more specific issues of theoretical and practical interest. A summary of all interviews undertaken between 2008 and 2010 is provided in Table 2.

A case database was created using NVivo 9. Interview transcriptions were coded according to key themes. Documents for individual themes were then generated and built into a narrative. In the interest of anonymity, the names of all interviewees were removed and replaced with generic position descriptions, and the names of case organisations were replaced with the pseudonyms; Alpha, Beta, Gamma, Delta and Epsilon. A summary report for each organisation was also sent to our key contacts asking for further feedback. Of the comments coded to themes relevant to this study, many are not included in this paper, either because

Table 2 Interview summary

Date of interview	Generic position description	Organisation	Length (min)
17/09/2008	Head office environment manager	Alpha	89
30/10/2008	Plant manager and effluent manager	Alpha	66
01/12/2008	Operations manager	Alpha	35
01/12/2008	Management accountant	Alpha	52
14/05/2009	Head office environment manager	Alpha	51
9/11/2010	Head office environment manager	Alpha	40
17/06/2008	Corporate affairs manager	Beta	75
25/06/2008	Head office environment manager	Beta	102
23/07/2008	Engineer	Beta	83
03/10/2008	Environment assistant	Beta	26
03/10/2008	Plant environment manager	Beta	46
03/10/2008	Plant manager	Beta	43
03/12/2008	Management accountant (2)	Beta	40
29/04/2009	Director	Beta	15
06/05/2009	Head office environment manager and corporate affairs manager	Beta	36
25/11/2010	Head office environment manager and corporate affairs manager	Beta	32
22/07/2008	Engineer	Gamma	44
22/07/2008	Management accountant	Gamma	16
22/07/2008	Water consultant	Gamma	57
22/07/2008	Plant environment manager	Gamma	74
14/05/2009	Plant environment manager	Gamma	42
20/10/2010	Plant environment manager	Gamma	28
30/04/2008	Environment manager	Delta	10
01/08/2008	Plant manager and effluent manager	Delta	62
26/06/2008	Sustainability manager and environment manager	Epsilon	69
08/05/2009	Head office environment manager	Epsilon	24
25/11/2010	Head office environment manager	Epsilon	10
04/05/2007	Water-savings specialist	NSW Department of Water & Energy	15
24/08/2009	Industry liaison manager	Sydney Water Corporation	43

similar comments were better expressed by others, or because the points raised were deemed secondary. As acknowledged by Ahrens and Chapman (2006), subjectivity occurs throughout a qualitative study of this nature, and so represents a limitation. Nonetheless, “subjectivity should not be seen as threatening”... “this discursive approach, in linking theory and practice, seeks to intervene in the social world in an emancipatory fashion allowing actors to develop their own understandings and solutions” (Broadbent and Laughlin 1997, p. 643). Reliability was enhanced by contrasting and comparing key arguments (Ahrens and Chapman 2006).

Findings—A Developing Focus on Water Management

As little as 10 years before this study, the approach to water management across the five case organisations had

largely been, as described by the environment manager in Epsilon, “just pouring it down the drain.” By the late 2000s this was no longer the case. Despite weak economic incentives for change, a range of heterogeneous responses were now under development across all five organisations. Responses were largely focused on monitoring water usage but also included a range of efficiency initiatives. Some were investing in rain harvesting, water treatment and recycling infrastructure. Beta was also implementing initiatives targeted to provide water benefits directly to community groups.

The term ‘embedded’ is drawn on in many studies exploring organisational change. While it is not specifically used by Laughlin (1991), related studies have utilised the term, to both consider how change is ‘embedded’ within the organisation (Adams and McNicholas 2007; Blomquist and Sandstrom 2004; Tucker 2013), and to consider how organisations are ‘embedded’ within broader environments

Table 3 Relevant features of each case organisation

Organisation	Corporate form	Food or beverage produced	% Total water used within the product	Water management outcome
Alpha	Private Australian-based	Staple	50	Embedded change
Beta	Multinational public with foreign parent	Non-staple	70	Embedded change
Gamma	Private Australian-based	Non-staple	Minimal	Marginal and fragile
Delta	Multinational public with foreign parent	Non-staple	90	Marginal and fragile
Epsilon	Multinational public with Australian parent	Staple	50	Marginal and fragile

(Erakovic and Powell 2006). It is the former usage of the term that is potentially relevant to this study. Most of these studies however, develop no specific definition. Blomquist and Sandstrom (2004) provide some suggestion of a definition by arguing that while some new routines, rules and procedures may be evident, change is only ‘fully embedded’ when standard operating procedures also change. We have an opportunity to contribute to studies in this field by further developing and describing this concept in the context of water management, and by linking it to the framework of organisational change developed by Laughlin (1991).

We argue that water management change had become embedded within Alpha and Beta because staff throughout these organisations were now required to consider opportunities to improve water efficiencies, continuously improve water usage KPIs, and re-engineer production processes where possible, to address new water management objectives. In this manner, we argue that an ‘embedding’ of change was suggested when it clearly impacted on core production processes, and on all staff across the entire organisation. In the other three cases, we argue that water management change was ‘marginal and fragile’ because related practices were undertaken by small and isolated teams.

Table 3 provides an initial overview of each of the five case organisations explaining corporate form, whether they produced staples or non-staples, and the relative percentage

of total water consumed that became an ingredient within their products (the latter information was obtained from estimates advised by interviewees). No pattern emerges from this analysis. We have already established that all five organisations were large consumers of water, and that all had the financial capacity to implement some water management change. Other factors must therefore explain the unique responses in each. Five sub-sections follow which separately explain the water management practices evident in each organisation, and the drivers.

Alpha

Water utilities commonly provide water consuming organisations with only one water meter per production site to enable measurement of total water consumed for billing purposes. A single meter is of no value to managers seeking to trace potential sources of inefficiencies or leaks. Several interviewees commented on this deficiency by effectively arguing, ‘you cannot manage what you don’t measure.’ To monitor efficiency well, usage data needs to be collected frequently and dissected in meaningful ways (by function, location or production cycle). Alpha had installed a number of water sub-meters within each of its production sites by the late 2000s. The head office environment manager explained,

the company is obviously putting its money where its mouth is in terms of monitoring water use and if there is any water efficiency measure that requires capital funding, then that’s likely to be approved.

Weekly water usage reports were reviewed by a committee of the board and discussed across production sites. The environment manager explained,

we actually show each site whether they have gains or whether they have reduced the amount of water they use. If it has increased the big question is asked; what happened? If it is reduced; how did you do it?

In this way, production sites were encouraged to utilise data to effect efficiency improvements. A water policy and staff training programs ensured that the focus on water efficiency was on-going. Production processes were also re-engineered where possible to further improve water efficiencies. The production manager explained for example, that “we try and go from the highest contamination to the least [in scheduling production], so the clean [that is, the use of water] is minimal.”

Interviewees in Alpha argued that Sydney’s low water prices, together with the modest impact of the *NSW Water Savings Order 2005*, were not the drivers of this embedded focus on water management. The key ‘environmental disturbance’ driving these changes was a sense that Alpha’s

significant water consumption was being closely scrutinised by regulators. Alpha's environment manager explained, "I guess the driver has been the recognition from a long time ago, and it must be almost 10 years, if not longer, that we were a big water user." The general manager of operations explained,

in the past, it was just a cost of business and they [authorities] provided water for you. Now, they may say 'no, it's just not available'. We would have to plan accordingly. So it becomes part of our strategic decision making.

As cost was not a key driver, Alpha's embedded approach to water management thereby suggests a broadening of organisational objectives beyond a focus on short-term cost control and profit maximisation. That adaptation of the organisation's interpretive schemes was evident in a developing focus on the longer-term survival of the organisation, and in efforts to secure those long-term resource needs. Those cultural changes drove further change to design archetypes, by requiring the collection and monitoring of more data on water usage, and the re-engineering of production processes where feasible. The environment manager in Alpha summarised in 2010 that water management was now "integrated into what we do", and the reason for this was because "we're very much driven by the CEO."

The environment manager explained that Alpha's CEO was "very hands on" and was "driving the whole sustainability agenda ... he is very committed to it." The plant manager explained that "it is also part of the company philosophy, we must say that ... to reduce our impact on the planet." In 2008 the environment manager summarised, "if we don't have water... then we can't produce our product... the CEO really does have that vision of being around for a lot longer and... being a leader." The 'hands on' role of the CEO was thereby central to explaining why water management change was able to become embedded in Alpha. While a number of interviewees in Alpha were also clearly passionate for water management change, the strong support from the CEO meant that their influence remained secondary.

Gray et al. (1995) argued that sustainability management is unlikely to reflect morphogenetic change, as economic objectives tend to dominate decision making. Our findings in Alpha contribute some alternative to this perspective. Here we highlight several factors that enabled penetration of new values within Alpha's interpretive schemes. Clearly articulated board level support for new water management values in Alpha was central to explaining how a new culture focused on maximising water efficiency was able to be driven among all staff. Through that support, new water management rules were enabled,

requiring a broad range of individuals to participate in developing practices. Maintenance of those cultural changes also required continuous attention to ensure that all staff appreciated how new practices continued to be compatible with core organisational objectives.

Beta

As in Alpha, an expanding conception of core objectives was also apparent in Beta, which was also championed from board level, and which enabled space for embedded water management change. The plant engineer explained,

we are constantly reviewing how far our sub-metering goes. I think we've about 23 sub-meters for this site. Could we do with more? Yes we could do with more... once we try to extract *every last drop*, we will need to put more metering into the process, absolutely.

In this explanation, cost was certainly an important consideration. However with low water prices, an organisation motivated only by cost would not be seeking to uncover 'every last drop' of inefficiency. Plant-level staff in Beta manually recorded water usage from all sub-meters on a daily basis which were linked to daily production data so as to present water usage as a percentage of production. A committee of the board reviewed those KPIs for compliance with established targets, and plant-level staff referred to them in investigations into inefficiencies, wastage and leaks. Those plant-level investigations were incentivised in a number of ways including through management bonuses. Related responsibilities were documented within duty statements. The plant engineer explained that water usage KPIs were "spoken about equally as importantly as a lot of the other KPIs in the business." A culture of water efficiency was also promoted through a water policy and a range of training and staff awareness programs. Other initiatives included some re-engineering of cleaning and production schedules, and minor equipment upgrades. The plant shift manager explained that "we can go back and actually look at the way we schedule [production runs] to make sure that we're minimising the amount of washes that we're using on a weekly basis."

Because Beta sought to continuously improve water usage KPIs, attention was also given to the possibility of investing in water-specific infrastructure including recycling and rain-harvesting technologies. Beta had recently constructed a new warehouse for its Sydney-based operations and took the opportunity to add infrastructure to capture and store rain water from the roof. The plant environment manager explained, "if you just look at the dollars, financially it would not stack up in almost any

business.” She added, “it is about pioneering the concept and seeing how we can make it work.” In addition, Beta was also pursuing a distinct range of projects targeted to provide water-related benefit directly to community groups. The plant environment manager explained in 2008 that the recently constructed rain-harvesting project was an “innovative project [for capturing storm water and] ... supplying the local community park” and to provide an “environmental flow to the [adjacent] creek.” The head office environment manager argued that related objectives across the multi-national were focused on being “engaged in supporting community projects that bring potable drinking water and sanitation to communities.”

Interviewees in Beta explained that a range of factors drove this embedded focus on water management. In particular, the organisation felt a significant sense of criticism from community groups with respect to its water impacts. The head office environment manager explained that Beta was “attacked for various different reasons and so of course you’ve got to be more ‘squeaky clean’ than your competitors because the goal posts are different.” These criticisms were not exclusively about water usage and connected with more general criticisms about the non-staple nature of Beta’s products. Projects targeted at community groups were specifically designed to respond to these criticisms and develop ‘reputational’ benefits for the organisation. Similarly to Alpha, Beta felt that its water consumption was being closely scrutinised by regulators and that the longer-term ability to access sufficient supply could be threatened unless it continued to demonstrate an embedded focus. Critically, like Alpha, interviewees added that championing from the CEO was clear and strong.

The plant engineer explained that “the commitment absolutely has been from senior management” and, as a consequence, water management had become “embedded, entrenched in the psyche now, it would be extremely hard to back away from that, almost impossible.” As in Alpha, a passion for water management change was also evident among staff. However with clear board level support, their impact became secondary. Board efforts to champion a new focus on maximising efficiency did not however, go unchallenged. Some staff expressed concern that in giving significant space to water management, the organisation was somehow losing its focus on core objectives. Beta’s engineer commented, “there is often some fairly vigorous debate as a management group about what are the right strings to pull” and so it was “a juggling act.” He added, “we talk [with staff] about it at every opportunity we can, but it’s one of those things... It’s always conflicting. It’s a dilemma.” Laughlin (1991) suggests that second order evolution is unlikely given the consensus required among all staff. Beta demonstrates that maintaining a regular and

vigilant management dialogue is a necessary element of second order colonisation.

Gamma

Up to 2010, weekly water usage data was compiled in Gamma by the environment manager from a limited number of sub-meters. He explained that this weekly data collection provided limited insight into potential sources of inefficiencies and waste. A multi-million dollar water treatment and recycling plant was also completed within Gamma’s key Sydney-based production site in 2009. Local council demands to improve effluent quality drove the development of phase 1; an on-site water treatment plant. The environment manager was then able to propose, negotiate and obtain board level approval for a second phase that enabled a significant proportion of the treated water to be recycled into production. He explained the financial considerations that went into the approval of phase 1;

our internal rate of return is 20 % minimum. I basically got it [the first phase] to 19.9 % with the grant [from the NSW Department of Environment and Climate Change (DECC)] and they [the board] accepted it. Otherwise, I would have had to go back [to DECC to ask for more funds].

The financial model for the second phase also showed similar marginal financial returns and so in the absence of the council pressure that drove phase 1, the environment manager needed significantly more tenacity to convince the board to proceed. He explained,

there was some buy-in [from the board], but not a lot. But I had to get it over the line with the grant [from DECC]... I had to come up with numbers. I had to come up with dollars saved. It was never going to get over the line otherwise.

As the environment manager explained in a return interview in 2010, water management was “not a really strong consideration” for Gamma’s board because water was cheap; “it is not in their view at the moment. It’s not in their mission. It’s not really at the forefront of their thinking. It may never be.” To some extent, Gamma also went ‘under the radar’ of community scrutiny because it was a private company (see Table 3).

The engineer commented on the development of the second phase of Gamma’s water treatment and recycling plant. “The climate [for considering such a proposal favourably] was established by a lot of people who talked well. Key people from Sydney Water Corporation were here, big people from multiple organisations.” The environment manager recognised that energy and saw it as

another lever to negotiate change. “I learned very quickly that Sydney Water Corporation were willing in many different ways, to help us save water. So I could actually do a lot of work and get a lot of credit with them.” The environment manager capitalised on the presence of Sydney Water Corporation to further influence the board and raise awareness of water management issues. It should also be noted, that very little of the water Gamma consumed was utilised as an ingredient in their products (refer Table 3). Most of Gamma’s water was consumed in cleaning and boiling. The board’s willingness to approve this development was due in part therefore, to the fact that most of the water consumer in Gamma was used for ancillary purposes.

In explaining the drivers of the limited water management practices in Gamma, the tenacious and creative championing efforts of the environment manager were clearly fundamental. He summarised; “I am ‘it’ for environmental for the business.” He continued, “as far as environmental corporate responsibility... it’s difficult to sell it to everyone. It’s a lot of manoeuvring.” Gamma’s environment manager had the necessary passion and skill to undertake the required ‘manoeuvring’ with the board, and champion some water efficiency change to both archetypes and subsystems. While Rickhardsson and Welford (1997) and Fussel and Georg (2000) suggest that board support is critical to driving sustainability change, Gamma demonstrates that management can also successfully contributed to shaping a range of water efficiency initiatives despite limited board interest. In Gamma, the environment manager’s passions were a key driver; he was not simply an enabling contextual factor (Bansal and Roth 2000).

The industry liaison manager from Sydney Water Corporation made comments that support these observations;

shop floor people in my opinion are the best source of innovation and ideas on resource use efficiency ... They know how to hold the place together. They know how to keep it running at four in the morning. They know the little glitches, they know what wastes water.

However without strong board support in Gamma, the connection between new water efficiency practices, and core profit focused goals remained tenuous. Gamma demonstrates that without a clear alignment of new archetypes and subsystems with core interpretive schemes, the practices championed by the environment manager remained marginal, fragile and at risk of erosion.

Delta

By 2008, Delta was reporting production and water usage data to the board on a daily basis. The effluent manager

qualified however, that water was “the cheapest of our ingredients [and so] that would be the least of their worries.” The board’s goal was simply to monitor usage and check that it remained within reasonable parameters. There was little emphasis placed on utilising the data at plant-level to investigate and address inefficiencies. The production manager explained, “if it’s [water efficiency] at a good level then I guess they don’t really need to go out there and make waves.” He also added that the board was unwilling to consider pursuing water-specific infrastructure investments where “you’re not going to see a return on it or a benefit from it for many years down the track.”

Delta was a large multi-national producer of non-staples (much like Beta; refer Table 3), and its board understood that the drought presented a threat to the continuity of water supply. Like Beta, Delta was therefore keen to see that accountability mechanisms were in place to enable monitoring of water usage. However, unlike Beta, Delta’s board did not feel a sufficient sense that their water usage was being scrutinised or criticised by community groups or water authorities, and so were not motivated to move beyond first-order rebuttal. Apparently Delta’s lower public profile (Beta produced a higher profile competing product) enabled some ‘slipping under the radar’ of public scrutiny. Without those drivers, an embedded approach to water management was not mandated.

Nevertheless, several initiatives were evident at plant-level which went beyond the compliance requirements of the *NSW Water Savings Order 2005*, including the conversion of conveyor belts to ‘dry lubrication’ and the implementation of a range of staff awareness programs. Like Gamma, those design archetype and subsystem initiatives can largely be attributed to the championing efforts of a (now resigned) plant-level environment manager. In explaining the plant’s conversion to dry lubrication, the production manager argued, “he [that environment manager] was the biggest pusher for all this ... if he was still around here now then something like that [a roof rain harvesting system] would have been pushed.” The effluent manager added that this passionate individual “would just have all the answers. He was extremely good on water.”

Despite that champion’s recent resignation, several of his initiatives persisted. The production manager explained,

“compared to 4 or 5 years ago ... now anyone walks past a tap they’ll be turning it off and if it starts dripping they’ll be straight up here reporting it ... where 5 years ago taps would be left fully on all the time.”

However because that champion had resigned, the momentum for water management was now stalling. The

production manager explained that some water processes “had fizzled away” and “we just don’t have that leader to push it ... someone has got to drive it.” In comparison to Gamma where new archetypes and subsystems were supported by a continuing management level champion, related practices were ‘fizzling’ in Delta because an important management level champion had resigned.

Epsilon

Into the late 2000s, water usage data was only collected from Epsilon’s production sites annually in order to meet the compliance requirements of the *NSW Water Savings Order 2005*. Annualised water usage data was of no value for plant-level investigations into inefficiencies, and was not otherwise included within any reporting to the board. Few other water management initiatives were evident. Epsilon’s sustainability manager explained, “we’ve taken a ... compliance approach to date and that’s been largely around just the availability of resources and people to work on it.” He added, “I don’t think it [the need for water management change] is real in their [the board’s] minds.” The environment manager explained that board attention was focused elsewhere at this time on fundamental threats to the organisation’s survival including rising commodity prices. Epsilon was a private producer of staples (refer Table 3). Like others, these factors appear to have enabled Epsilon to go ‘under the radar’, and contributed to the board’s non-urgent attitude to water management. As in all other case organisations, water costs were perceived to be too low to drive further water management change. The environment manager explained; “when you try and have some sort of capital type project that’s going to improve water efficiency... it just never stacks up.” Without clear board level support, the head office environment manager explained that all of the plants operated as “silos... in terms of getting out to the sites, that’s really your own initiative.”

With little board support, the head office environment management team in Epsilon struggled to influence plant-level water usage behaviours. Nevertheless, the sustainability manager argued that there was value in having a regulatory tool. The *NSW Water Savings Order 2005* gave him a “‘big stick’ that I can pull out of my pocket, and say, ‘well, if you don’t do it, we’re going to get fined; this is the law, and we have to comply’.” The environment manager therefore summarised his key strategy was undertaking “small incremental cultural steps to try to raise the profile of water.” Driving cultural change focused on improved water efficiency, would have been so much easier in Epsilon if it had been clearly championed from board level, which in turn would have been stronger if prices had been higher.

Further Discussion

Drawing on the arguments of Bansal and Roth (2000), we can observe that while water scarcity had become an emotional issue, and so had acquired a ‘salience’ in Sydney by the late 2000s, the limited water management change evident in some of our five case organisations suggests little ‘field cohesion’. Similar to O’Dwyer (2003) and Dyllick and Hockerts (2002), all of the water management initiatives described in this study were also justified by interviewees as being in the best interests of the organisation. However, where O’Dwyer (2003) and Dyllick and Hockerts (2002) found cursory sustainability management change focused largely on cost efficiency, the examples of embedded water management change evident in Alpha and Beta reflect a broadening of core profit focused values to allow for initiatives that contributed benefits over a longer timeframe. Those benefits included opportunities to improve reputation, brand, and secure long-term resource access.

A sense of criticism and scrutiny from community groups and water authorities, were the key factors (environmental disturbances) that convinced the boards of Alpha and Beta to make changes to a range of archetypes, subsystems, and interpretive schemes. Because those factors impacted at board level, dense networks within Alpha and Beta were called to take notice (Tucker 2013), and drive embedded water management change. In those organisations, adapted archetypes were apparent in new practices focused on monitoring and continuously improving water efficiencies. New subsystems were evidenced in new equipment including water sub-meters, water recycling infrastructure, and in new position descriptions which specifically included water management duties. These developments in turn colonised existing interpretive schemes, and drove these organisations towards taking a longer-term perspective of core goals focused on reputation, brand value, and resource security. Further to Laughlin (1991, p. 220), these suggestions of second order change in Alpha and Beta cannot however, be described as evolution, as many staff continued to question the importance of this developing “ethos” of water management.

Conversely, the limited focus on water management in Gamma, Delta and Epsilon was undertaken by small teams and largely focused on regulatory compliance and cost efficiencies. In these organisations, the board’s key water interest was simply to monitor usage in accordance with the requirements of regulation. Some change was therefore evident to archetypes focused on collecting new data. This also necessitated some change to subsystems including investment in additional water sub-meters. It is difficult to argue however, that board level interest in water

management change in these cases was anything more than ‘first order rebuttal’. As the environment manager in Gamma explained it, water was “not a really strong consideration.”

Despite that limited board level support for water management change, water had clearly developed some salience for many of the staff in Gamma, Delta and Epsilon. However, those individuals were only able to champion significant water efficiency initiatives where they also had the skill to convince their board that novel practices aligned with core organisational values. Tucker (2013) argues that champions will have little success in driving change unless they have some standing, or ‘interdependence’ with the board. Water management change in Gamma demonstrates that personality and passion can contribute to that sense of interdependence. Gamma’s environment manager clearly felt a salience for water scarcity however as he explained, he was ‘it’ for the environmental function in that company. While he was enthusiastic about issues of water efficiency, his board was occupied responding to core concerns including rising costs and declining profit margins. Nevertheless, through his passion, tenacity, and negotiation skills, he was able to champion development of a water treatment and recycling system (an archetype). He also had limited success championing some cultural change among production staff focused on improving water efficiencies (an interpretive scheme). In Gamma, limited environmental disturbances motivated the board to little more than rebuttal, yet a single management level champion was able to drive some first-order reorientation.

Like Gamma, Delta also benefited from an energetic management level champion who was able to drive some first-order reorientation by converting to waterless dry lubrication on conveyor belts (subsystems), and nurturing some water efficiency cultural change among production staff (interpretive schemes). However, without clear board level support, those initiatives remained marginal and at risk of eroding after he resigned in 2008. In Epsilon, the environmental management team were unable to significantly progress beyond the rebuttal apparent at board level.

Our data can be drawn on to develop understanding of the nature of interpretive schemes in general, and the distinction between ‘fundamental’ and ‘secondary’ interpretive schemes. Tyrrall and Parker (2005) suggest that interpretive schemes operate at both a fundamental level where the ‘metarules’, missions or aims of the organisation are specified, and at a secondary level where cultures, beliefs and values are developed. The idea of the ‘mission’ suggests a clearly stated, *raison d’être* for the organisation which is understood by all. Culture, beliefs, and values suggest a more personalised focus and so there may be

differences in the experience of culture from one individual, or workgroup to another (as suggested by Martin 1992). The distinct role for metarules is apparent in our case organisations when we investigate the overarching framework within which changing water management archetypes and subsystems were obliged to fit. It is apparent that archetypes and subsystems championed from staff level had to align with each organisation’s metarules.

In Alpha and Beta we see examples of the metarules changing to accommodate new archetypes and subsystems (suggesting colonisation). For example, projects to provide water supply to a local creek in Beta contributed nothing to short-term profitability goals, and so reflect an adapting of metarules to allow for a focus on providing longer-term benefit to the organisation through (it was hoped) improving community reputation. In these projects we see some morphogenesis to Beta’s metarules from a narrow focus on ‘we are here to maximise profit’, to a broader focus on ‘we are here to maximise profit and ensure our long-term survival’. By way of contrast, management level champions in Gamma and Delta were able to succeed in promoting new archetypes and subsystems where they could demonstrate how related proposals aligned with existing metarules. The environment manager in Gamma explained for example, that he had success in promoting new initiatives by clearly articulating how they contributed to cost savings;

the first thing I do is say ... ‘what’s the cost benefit to the business’ ... there’s a lot of environment managers who wouldn’t do that. They would say ‘look, it’s going to save this much water in an equivalent number of households or Olympic sized swimming pools’. I don’t think that way. I think, this is what the cost/benefit is going to be to the business... the other non-financial benefit?; ... the business doesn’t care.

Conversely, evidence of a developing cultural change focused on maximising water efficiencies, indicated in some cases, change to a secondary level of the organisation’s interpretive schemes. Management level water champions in Gamma, Delta and Epsilon attempted to colonise interpretive schemes with arguments about the importance of such cultural change. However with limited board level support, those efforts were fragmented (Martin 1992), and only affected the small teams that those champions were directly able to influence. Alternatively, the championing of a new focus on maximising water efficiency in Alpha and Beta resulted in integrated (Martin 1992) cultural change because those changes were driven from board level.

While Laughlin’s model of organisational change provides a helpful tool for explaining our findings, we also find value in Zakus and Skinner (2008) who argue that the neat compartments suggested by Laughlin are in fact, fuzzy and

untidy. For while we see changes to archetypes and subsystems in Gamma, Delta, or Epsilon, along with some suggestions of change to interpretive schemes, we cannot conclude that change in those organisations was ‘morphogenetic’. It is apparent that the metarules in Gamma, Delta and Epsilon persisted unchanged, despite some suggestion of fragmented change to secondary interpretive schemes. Further to arguments about the nature of morphogenesis from Gray et al. (1995, p. 217), we add that evidence of fragmented change to secondary level interpretive schemes, driven by management level champions, does not constitute “real morphogenetic change” or a ‘deep penetration’ of new values.

In their study of sustainability management change in Portugal, Monteiro and Aibar-Guzman (2010) concluded that morphogenetic change had not occurred despite some change to interpretive schemes. They added however, that evidence of a developing discourse suggested that the ‘seeds of morphogenesis’ were present. In this study by contrast, while economic objectives continued to dominate the core mission of each of the five case organisations, the way that those economic objectives were being conceived was adapting to a longer-term focus (in Alpha and Beta in particular). Further to the arguments of Monteiro and Aibar-Guzman (2010), our study shows that champions at both board and management levels can contribute to the planting and nurturing of those ‘seeds of morphogenesis’.

Arguments about champions in our case organisations move beyond consideration of whether the impact of such individuals represent a key environmental disturbance, or whether they were a modifying contextual factor to some other disturbance (Bansal and Roth 2000). In this study we see that the starting point for change can simply be personal passion and tenacity. Further to Bansal and Roth (2000), Gamma and Delta suggest potential for a distinct ‘environmental disturbance’ which we describe as ‘the concern of individual champions for communal water scarcity’. While that disturbance was not able to drive embedded change in those cases because board level support was limited, it was able to affect some ‘drift’ (Quattrone and Hopper 2001) to archetypes, subsystems, and some secondary interpretive schemes. Here we observe that the impact of those individuals was strengthened, not because issue salience increased (Bansal and Roth 2000), but rather where those individuals were able to present arguments about how pet projects aligned with core interpretive schemes.

Support for Schon’s (1963) description of the champion is evident in this study. In particular we see that in the absence of clear board support, successful champions had to be innovative. Our observations about the environment manager in Gamma add to the arguments of Howell and Higgins (1990) and Tucker (2013) by showing that the

extent of change could be explained, not so much by his power or position in the organisation, but more by his tenacity and negotiation skills. Further to the arguments of Andersson and Bateman (2000), we argue that in Gamma in particular, water management was an opportunity to pursue pet projects. We concur with Howell and Higgins that important features of a champion include, the ability to recognise opportunities, the ability to see the importance of those opportunities to core business goals, and the ability to promote those ideas among others of importance. In Delta, new initiatives were unable to progress beyond the ‘ideas stage’ because the developer of those ideas resigned before they were able to be implemented.

We can now summarise our findings in response to our two research questions. Research question (i) asked how water management practices were developing across our five case organisations. All organisations were now reviewing water usage. This necessitated some investment in water sub-meters. In some cases, the reports created were also being drawn on to enable investigations into inefficiencies and potential leaks. In response to these investigations, some low-cost investments in water-savings devices were made, and some focus on efficiency was nurtured among all staff through training programs. Some were investing in rain harvesting, water treatment and recycling infrastructure. Beta was also implementing some initiatives targeted to provide water benefits directly to community groups. Research question (ii) questioned the factors driving those changes. Embedded change in Alpha and Beta was driven by a concern at board level about community criticisms and a sense of scrutiny from regulators. Regulation and water costs were weak drivers, and motivated only some monitoring of water usage. Management eager to respond to community concerns about water scarcity were also able to champion and maintain a number of pet projects.

To summarise our analysis utilising Laughlin’s (1991) framework, the embedded change evident in Alpha and Beta suggests some second order colonisation. While this can be attributed to clear board level support, it is apparent that the boards in both of these cases were still struggling to align staff values to adapting interpretive schemes. There was no ‘revolution’ of new ethical objectives amongst all staff (Gray et al. 1995), developed through free and open discourse (Laughlin 1991). While we cannot therefore argue for second order evolution, we present an alternative perspective to Gray et al. (1995) who argued that morphogenetic sustainability management change will only be evident where we can demonstrate a deep penetration of new values. In Alpha and Beta, a morphogenetic broadening of core metarules to allow for a focus on maximising water efficiencies was suggested. While we cannot demonstrate that ‘future generations’ in those two organisations

Table 4 The environmental disturbances, and the outcome for each organisation using Laughlin's model of organisational change

Organisation	Environmental disturbance	Impacting at board level?	Impacting on management level champions?	Driving change to:				Outcome
				Design archetypes	Subsystems	Metarules	Secondary interpretive schemes	
Alpha	CC&RS	Yes	Yes	Yes	Yes	Yes	Yes	2nd order colonisation
Beta	CC&RS	Yes	Yes	Yes	Yes	Yes	Yes	2nd order colonisation
Gamma	R&C	Yes	Yes	Yes	Minimal	No	No	1st order reorientation
	WS	No	Yes	Yes	Yes	No	Yes	
Delta	R&C	Yes	Yes	Yes	Minimal	No	No	1st order reorientation
	WS	No	Yes	Yes	Yes	No	Yes	
Epsilon	R&C	Yes	No effective champions evident	Yes	Minimal	No	No	1st order rebuttal
	WS	No		Yes	No	No	No	

CC&RS community criticism and regulator scrutiny, R&C regulation and water cost, WS the concern of individual champions for communal water scarcity

will continue to assume those new ethical values, we argue that the on-going, open water dialogues (Habermas 1987) evident in these cases, provide evidence of progress. Similarly, Schon (1963) suggests that resistance and questioning will always be natural. Further to Gray et al. (1995), we therefore argue for a more nuanced understanding of effective sustainability management change.

Conversely, interviewees in Gamma, Delta and Epsilon did not explain the sense of community pressure and regulator scrutiny felt in Alpha and Beta. Gamma, Delta or Epsilon, went 'under the radar' of public interest for various reasons including the fact that some were private, and some produced staples. As a consequence, the key drivers impacting at board level in Gamma, Delta and Epsilon were simply modest regulation and water cost. The response of these three boards was therefore first-order rebuttal. Nevertheless, management level staff in Gamma and Delta that were personally concerned to respond to communal water scarcity challenges were able to champion the development of new archetypes, subsystems, and some fragmentary change to secondary interpretive schemes. First-order reorientation was the outcome in these organisations. A summary of the environmental disturbances impacting on each organisation, and the outcome using Laughlin's model of organisational change, is provided in Table 4.

Conclusions

We have explored how a heterogeneous range of water management practices developed within five case organisations located in Sydney, Australia into the late 2000s. Most developments were focused on one of two objectives:

improving water efficiency, and reducing effluent loads in sewage. Few of these practices were undertaken as little as 10 years earlier. In Alpha and Beta, community criticisms and a sense of regulator scrutiny impacted at board level and so drove an embedded approach to water management change. Cultural changes were apparent in a new focus on maximising water efficiencies, and a broadening of meta-rules to give more consideration to longer-term reputational benefits. This morphogenesis was not evolutionary however, as the board was still struggling with persisting staff concerns that metarules should remain concentrated on profit maximisation and cost control. Further to Fussel and Georg (2000), water management change was able to embed within these two organisations because of clear board support.

The only water-related environmental disturbance impacting at board level in Gamma, Delta and Epsilon was regulation and cost. The boards in each of these cases were therefore obliged to mandate limited changes to some archetypes, and so their response was little more than rebuttal. In Gamma and Delta however, a further distinct environmental disturbance is identified; 'the concern of individual champions for communal water scarcity'. While there was no evidence of board level support for embedded water management change in these cases, a currently employed management level champion in Gamma, and a recently resigned management level champion in Delta were able to drive some progress beyond rebuttal. Both of those individuals effected some first-order reorientation through the championing of a range of new archetypes and subsystems.

Laughlin's (1991) 'skeletal' model of organisational change enables three key case specific contributions from the empirical 'flesh' of this study. It was noted earlier that

we had given consideration to drawing from a theoretical framework focused on institutional logics. Such a framework would have enabled insight into whether new water logics were developing some salience within the five case organisations, and how those new logics interacted, or collided with existing core technical logics (for example, logics focused on profitability and cost control). We argue now that drawing from Laughlin's model has enabled a richer insight through consideration of the role and impact of interpretative schemes (akin to logics), along with the role and impact of sub-systems and archetypes, and a consideration of how all of these organisational features changed, and whether in turn those changes were morphogenetic (embedded) or reflected efforts to rebut or reorient.

As a first contribution, we provide insight into what is required to achieve 'morphogenetic' water management change. We argue that water management change became embedded or morphogenetic, where a broadening of the organisation's metarules was apparent. Evidence of fragmentary change to secondary interpretive schemes was not sufficient to argue that morphogenesis had occurred. Our study shows that both board and management level champions can contribute to the seeds of morphogenesis (Monteiro and Aibar-Guzman 2010). We add to Gray et al. (1995) by arguing that an adaption of core economic values provides evidence of morphogenetic sustainability management change.

Second, we contribute to understanding the nature of interpretive schemes. Here we have argued that the interests of the organisation as a whole, its mission and aims, reflect its core interpretive schemes (or metarules) (Laughlin 1991). We have argued that metarules are those elements of the interpretive schemes to which archetypes and subsystems must align. This leads us to observe that colonisation is apparent where developing archetypes and subsystems reflect adapting goals for the organisation as a whole. Alternatively, we argue that efforts to develop some water-related culture, beliefs, and values reflect a secondary level of interpretive schemes where championed by smaller groups. Adapting secondary level interpretive schemes championed from management level in Gamma and Delta remained fragile as they continued to be of little interest to many within these organisations.

Third, we develop an understanding of the nature and impact of 'champions'. We question the value of seeking to distinguish between 'environmental disturbances' and 'contextual dimensions' (Bansal and Roth 2000), particularly with respect to the role of management level champions. Here we have argued that the passions of both board and management level champions, can drive adoption of pet projects focused on issues of community concern. We add to the arguments of Bansal and Roth (2000) by

observing that variations in a champion's tenacity, passions, and skills will determine how archetypes and subsystems adapt as a result. In all cases, those champions must be able to present convincing arguments about how adapted archetypes and subsystems will align with core interpretive schemes. Where champions only reside at management level, a morphogenesis of interpretive schemes, or 'embedded' water management change, is unlikely.

Lending support to arguments for the importance of allowing water prices to be set by market forces (Brown 2009; Von Mises 1944), it would appear that Australia's water scarcity challenges of the late 1990s and early 2000s were not solved by the regulations and restrictions imposed by authorities. Drought conditions only abated as weather patterns changed, and significant rainfall events occurred into the late 2000s. Weak and ineffective restrictions and regulations imposed by authorities, together with the championing efforts of the few within industry keen to drive some focus on 'sustainability', 'environmental management', or water efficiency, were able to drive no more than limited water management change across this field.

As drought conditions abated, the Sydney Water Corporation's *Water Efficiency Report 2011–2012* (SWC 2013), revealed that many demand management programs implemented during the 2000s were now to be abandoned. Further studies could explore how the industrial sector responded as the drivers of demand management became even weaker. Exploring potential differences in other locations and industries also presents a rich opportunity for further study. Future studies could seek to explore how water efficiency practices differ in environments where water prices are allowed to respond more freely to supply constraints. Future research could also explore perspectives in business on the 'right' mix of demand management strategies and ask managers in particular, for their perspectives on how water prices should be set in response to scarcity challenges. If industrial consumers feel that water prices should always be subject to some level of control, why? What is it about that resource which requires this distinction from the pricing of other resources?

A key argument developed in this paper is that in the absence of clear board support, management level staff can champion some change to design archetypes and subsystems. Further studies could seek to develop insight into the limitations and opportunities for management level initiatives, and the techniques that champions can draw from in seeking to align pet projects with core interpretative schemes. We have argued that Laughlin's (1991) model of organisational change provides a helpful lens for such studies as it demands attention not only to organisational structures and controls, but also to the impact of people and equipment, and values and beliefs.

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Ethical Standards This study draws on data collected from interviews with a range of staff from five case study organisations. Approval for conducting these interviews was obtained from the appropriate university ethics committee. All interviews have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

References

- Adams, C. A. (2002). Internal organisational factors influencing corporate social and ethical reporting. *Accounting, Auditing & Accountability Journal*, 15(2), 223–250.
- Adams, C. A., & Frost, G. (2008). Integrating sustainability reporting into management practices. *Accounting Forum*, 32(4), 288–302.
- Adams, C. A., & McNicholas, P. (2007). Making a difference: Sustainability reporting, accountability and organisational change. *Accounting, Auditing & Accountability Journal*, 20(3), 382–402.
- Ahrens, T., & Chapman, C. S. (2006). Doing qualitative field research in management accounting: Positioning data to contribute to theory. *Accounting, Organizations and Society*, 31(8), 819–841.
- Andersson, L. M., & Bateman, T. S. (2000). Individual environmental initiative: Championing natural environmental issues in U.S. business organizations. *Academy of Management Journal*, 43(4), 548–570.
- Anthony, R. N. (1965). *Planning and control systems. A framework for analysis*. Boston: Harvard University.
- Ball, A. (2005). Environmental accounting and change in UK local government. *Accounting, Auditing & Accountability Journal*, 18(3), 346–373.
- Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal*, 43(4), 717–736.
- Blomquist, T., & Sandstrom, J. (2004). From issues to checkpoints and back: Managing green issues in R&D. *Business Strategy and Environment*, 13(6), 363–373.
- Bouma, J. J., & Kamp-Roelands, N. (2000). Stakeholder's expectations of an environmental management system: Some exploratory research. *The European Accounting Review*, 9(1), 131–144.
- Broadbent, J. (1992). Change in organisations: A case study of the use of accounting information in the NHS. *British Accounting Review*, 24(4), 343–367.
- Broadbent, J., & Laughlin, R. (1997). Developing empirical research: An example informed by a Habermasian approach. *Accounting, Auditing & Accountability Journal*, 10(5), 622–648.
- Broadbent, J., & Laughlin, R. (2005). Organisational and accounting change: Theoretical and empirical reflections and thoughts on a future research agenda. *Journal of Accounting & Organisational Change*, 1(1), 7–26.
- Brown, C. (2009). The water wizards of Oz. Mises Daily, Ludwig von Mises Institute. Viewed 27 March, 2014, from <http://mises.org/daily/3338>.
- Brown, J., & Fraser, M. (2006). Approaches and perspectives in social and environmental accounting: An overview of the conceptual landscape. *Business Strategy and the Environment*, 15(2), 103–117.
- BRW (Business Review Weekly). (2006). Top 1,000 companies. November 9 to December 13 2006, 56–79.
- Creswell, J. W. (1998). *Qualitative inquiry and research design. Choosing among five traditions*. Thousand Oaks, CA: SAGE Publications.
- Cyert, R. M., & March, J. G. (1992). *A behavioural theory of the firm* (2nd ed.). Cambridge, MA: Blackwell Business.
- de Rogers, P., Silva, R., & Bahatia, R. (2002). Water is an economic good: How to use prices to promote equity, efficiency and sustainability. *Water Policy*, 4(1), 1–17.
- DRET (Australian Government Department of Resources, Energy and Tourism). (2008). Leading practice sustainable development program for the mining industry—Water management. Commonwealth of Australia, Canberra. Viewed 11 June, 2010, from http://www.ret.gov.au/resources/resources_programs/lpsdp/water/Pages/default.aspx.
- Durden, C. (2007). Towards a socially responsible management control system. *Accounting, Auditing & Accountability Journal*, 21(5), 671–694.
- Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, 11(2), 130–141.
- Efferin, S., & Hopper, T. (2007). Management control, culture and ethnicity in a Chinese–Indonesian company. *Accounting, Organizations and Society*, 32(1), 223–262.
- Egan, M. (2009). Sydney water sector change and industrial water management. *Journal of Accounting & Organisational Change*, 5(2), 277–293.
- Egan, M. (2014). Progress towards institutionalising field-wide water efficiency change. *Accounting, Auditing & Accountability Journal*, 27(5), 809–833.
- Egan, M., & Frost, G. (2010). Corporate water reporting. A study of the Australian food, beverage and tobacco sector. Viewed 15 October, 2010, from <http://www.cpaaustralia.com.au/cps/rde/xbcr/cpa-site/Corporate-water-reporting.pdf>.
- Eisenhardt, K. (1991). Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management Review*, 16(3), 620–627.
- Erakovic, L., & Powell, M. (2006). Pathways of change: Organizations in transition. *Public Administration*, 84(1), 31–58.
- FSA (Food Science Australia). (2009). Water reuse industry survey, Review and Policy Development Report. Prepared for the Australian Food and Grocery Council.
- Fussel, L., & Georg, S. (2000). The institutionalization of environmental concerns. *International Studies of Management & Organization*, 30(3), 41–58.
- Gray, R. (2002). The social accounting project and accounting organizations and society. Privileging engagement, imaginings, new accountings and pragmatism over critique? *Accounting, Organizations and Society*, 27(7), 687–708.
- Gray, R., & Bebbington, J. (2001). *Accounting for the environment* (2nd ed.). London: SAGE Publications Ltd.
- Gray, R., Dey, C., Owen, D., Evans, R., & Zadek, S. (1997). Struggling with the praxis of social accounting. stakeholders, accountability, audits and procedures. *Accounting, Auditing & Accountability Journal*, 10(3), 325–364.
- Gray, R., Walters, D., Bebbington, J., & Thompson, I. (1995). The greening of enterprise: An exploration of the (non) role of environmental accounting and environmental accountants in organisational change. *Critical Perspectives on Accounting*, 6(3), 211–239.
- Greenwood, R., & Hinings, C. R. (1996). Understanding radical organizational change: Bringing together the old and the new institutionalism. *Academy of Management Review*, 21(4), 1022–1054.

- Habermas, J. (1987). *The theory of communicative action. Lifeworld and system: A critique of functionalist reason*. Cambridge: Polity Press.
- Hall, M. (2010). Accounting information and managerial work. *Accounting, Organizations and Society*, 35(3), 301–315.
- Hazelton, J. (2013). Accounting as a human right: The case of water information. *Accounting, Auditing & Accountability Journal*, 26(2), 267–311.
- Heydon, J. D. (1987). Directors' duties and the company's interests. In P. D. Finn (Ed.), *Equity and commercial relationships* (pp. 120–140). Sydney: Law Book Company.
- Holliday, C. O., Schmidheiny, S., & Watts, P. (2002). *Walking the talk. The business case for sustainable development*. Sheffield: Greenleaf Publishing Limited.
- Hopper, T., & Powell, A. (1985). Making sense of research into the organizational and social aspects of management accounting: A review of its underlying assumptions. *Journal of Management Studies*, 22(5), 429–465.
- Howell, J. M., & Higgins, C. A. (1990). Champions of technological innovation. *Administrative Science Quarterly*, 35, 317–341.
- Langfield-Smith, K. (1997). Management control systems and strategy: A critical review. *Accounting, Organizations and Society*, 22(2), 207–232.
- Lansiluto, A., & Jarvenpaa, M. (2010). Collective action in the implementation of a 'greener' performance management system. *Journal of Accounting & Organizational Change*, 6(2), 200–227.
- Laughlin, R. C. (1991). Environmental disturbances and organizational transitions and transformations: Some alternative models. *Organization Studies*, 12(2), 209–232.
- Macdonald, D. H., Lamontagne, S., & Connor, J. (2005). The economics of water: Taking full account of first use, reuse and the return to the environment. *Irrigation and Drainage*, 54(S1), S93–S102.
- Maidique, M. (1980). Entrepreneurs, champions, and technological innovation. *Sloan Management Review*, 21(2), 59–76.
- Martin, J. (1992). *Culture in organizations*. New York: Oxford University Press.
- Monteiro, S. M., & Aibar-Guzman, B. (2010). Organisational and accounting change within the context of the environmental agenda. *Journal of Accounting and Organisational Change*, 6(4), 404–435.
- Norris, G., & O'Dwyer, B. (2004). Motivating socially responsive decision making: The operation of management controls in a socially responsive organisation. *The British Accounting Review*, 36(2), 173–196.
- O'Dwyer, B. (2003). Conceptions of corporate social responsibility: The nature of managerial capture. *Accounting, Auditing & Accountability Journal*, 16(4), 523–557.
- Parker, L. D. (2005). Social and environmental accountability research: A view from the commentary box. *Accounting, Auditing & Accountability Journal*, 18(6), 842–860.
- Power, M., & Laughlin, R. (1996). Habermas, law and accounting. *Accounting Organizations & Society*, 21(5), 441–465.
- Qian, W., Burritt, R. L., & Munroe, G. (2011). Environmental management accounting in local government. A case of waste management. *Accounting, Auditing & Accountability Journal*, 24(1), 93–128.
- Quattrone, P., & Hopper, T. (2001). What does organizational change mean? Speculations on a taken for granted category. *Management Accounting Research*, 12(4), 403–435.
- Reinhardt, F. L. (2000). *Down to earth. Applying business principles to environmental management*. Boston, MA: Harvard Business School Press.
- Rickhardsson, P., & Welford, R. (1997). Clouding the crisis: The construction of corporate environmental management. In R. Welford (Ed.), *Hijacking environmentalism*. London: Earthscan Publications Limited.
- Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, 40(3), 535–559.
- Schon, D. A. (1963). Champions for radical new inventions. *Harvard Business Review* 41(March/April 1963 No. 2), 77–86.
- Smith, K. K. (1982). Philosophical problems in thinking about organizational change. In P. S. Goodman, et al. (Eds.), *Change in organizations* (pp. 316–374). San Francisco: Jossey Bass.
- SWC (Sydney Water Corporation). (2007). Sydney water submission to IPART. Viewed 17 September, 2007, from <http://www.sydneywater.com.au/Publications/Reports/SubmissionToIPART.pdf#Page=1>.
- SWC (Sydney Water Corporation). (2013). Water efficiency report 2011–2012. Viewed 23 February, 2013, from <http://www.sydneywater.com.au/water4life/WhatSydneyWaterIsDoing/Initiatives.cfm>.
- Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin (Eds.), *The SAGE handbook of organizational institutionalism*. London: SAGE Publications Ltd.
- Tilt, C. A. (2006). Linking environmental activity and environmental disclosure in organisational change framework. *Journal of Accounting & Organisational Change*, 2(1), 4–24.
- Tucker, B. (2013). Environmental disturbances, organizational transitions and transformations: A view from the dark side. *Critical Perspectives on Accounting*, 24(3), 242–259.
- Tyrrall, D., & Parker, D. (2005). The fragmentation of a railway: A study of organisational change. *Journal of Management Studies*, 42(3), 507–537.
- Von Mises, L. (1944). *Bureaucracy*. New Haven: Yale University Press.
- WBCSD (World Business Council for Sustainable Development). (2009). Water version 2. Facts and trends. Viewed 11 June, 2012, from <http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=137&NoSearchContextKey=true>.
- White, S. (1999). Water demand management and conservation including water losses control. *Water Supply*, 18(1), 163–175.
- WSAA (Water Services Association of Australia). (2009). WSAA Report Card 2008–2009. Viewed 23 February, 2010, from <https://www.wsaa.asn.au/Publications/Documents/WSAA%20Report%20Card%202008-09.pdf>.
- Zakus, D. W., & Skinner, J. (2008). Modelling organizational change in the international olympic committee. *European Sport Management Quarterly*, 8(4), 421–442.

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