

Managing multi-purpose leisure facilities in a time of climate change

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INTRODUCTION

As the debates on climate change – and global warming particular – close-in, there is a general understanding that unrestrained emissions of greenhouse gases (GHGs), especially carbon dioxide, are no longer an acceptable practice. It has been conceded that all industries – be they manufacturing or service based – have roles to play in reducing their carbon footprints. In addition, changing weather patterns associated with climate change have forced these same industries to review their commercial processes and practices, and to use their inputs more efficiently.

This paper examines the implications of climate change for the management of leisure centres that deliver exercise and physical recreation programmes. In Melbourne, Australia, where this study took place, these centres are mainly run by not-for-profit local government municipalities, who aim to deliver a variety of physical activity programmes. They are usually referred to as multi-purpose leisure facilities (MPLF), and are defined as facilities that have swimming pools, gymnasiums, changing facilities, creches, and cafe's.

This sector of the sports, exercise, and physical recreation industry has been selected for the analysis for two reasons. First, MPLFs play a significant role in their community, and encourage many members to become physically active, while also providing a sense of well-being (Dionigi & Lyons, 2010, p. 317). Second, as the issues of climate change have become more prevalent (Kolk & Pinkse, 2007, pp. 201–228), MPLFs are under increasing pressure from their communities to respond in suitable and sustainable ways. This is in part because MPLFs are both heavy users of power from coal-fired power stations, and heavy users of water. Despite the often pivotal recreational 'space' occupied by MPLFs in local communities, despite their often intimate connections to the physical environment, and despite the impact that changing weather patterns can have on the scope and quality of their physical activity programmes, little research has been conducted in this field.

In particular, there is a disconcerting absence of knowledge of the consequences of climate change for the sport, exercise, and physical recreation industry within Australia. This knowledge gap is also

evident in other western nations, and the only significant international research completed to date is a study undertaken four years ago in the UK, which found that swimming pool halls consumed up to five times more energy per square metre than offices (Carbon Trust (United Kingdom), 2008, p. 2).

THE CLIMATE CHANGE PROBLEM

Climate change is no longer just an interesting natural phenomenon. It is now a major environmental problem that leaves no sector of society or the economy unexposed. Recent research indicates a growing scientific and political concern about climate change (Intergovernmental Panel on Climate Change [IPCC], 2007, pp. 30–44). One of the biggest areas of concern is in reducing and stabilising the enhanced GHG effect on our planet. Australia's Commonwealth Scientific and Industrial Organisation and the Bureau of Meteorology (CSIRO and BOM, 2010) believe that: there is (a) greater than 90% certainty that increases in GHG's emissions have caused most of the global warming since the mid-20th century (BOM, 2010). The BOM then suggests that it is 'extremely unlikely that . . . warming could be explained by natural causes alone. (p. 31). The extent of this problem is seen in Australia, where, with only 0.3% of the global population, we emit '1.4% of the world's 8 billion tonnes of carbon' (Holper & Torok, 2008, p. 19). CSIRO and the BOM made plain the factual nature of the problem, when they argued that their observations clearly demonstrate that climate change is real.

Addressing issues arising from climate change has become a high priority for Australian Governments in a number of ways. The issue of climate change was first addressed in Australia by the federal government in 1996, when the Howard government introduced the Australian Greenhouse Office (AGO) which claimed to be the world's first government agency for dealing with climate change (Australian Competition and Consumer commission [ACCC], 2012). In 2006, the Asia-Pacific nations of Australia, Canada, China, India, Japan, Korea, and the USA agreed to the Asia-Pacific Partnership on Clean Development and Climate (APPCDC, 2008, p. 1). In 2007, the Howard government introduced the National Greenhouse and Energy Reporting (NGER) Act as a, 'national framework for the reporting and dissemination of information about greenhouse gas emissions, greenhouse gas projects, and energy use and production of corporations' (DCCEE, 2011). In 2010, the Gillard federal government announced a comprehensive policy response to climate change, including a transitional carbon tax, a longer term emissions trading scheme, and various other adaptable and renewable energy measures (Clean Energy Future, 2010).

CLIMATE CHANGE AND ORGANISATIONAL CONDUCT

Over recent times there has been considerable debate on the ways in which business strategies have been shaped by climate change. The literature identifies a variety of ways in which climate change affects Managing multi-purpose organisations, and they include the physical impacts on organisations (Winn, Kirchgeorg, Griffith, Linnenluecke, & Gunther, 2011), organisational adaptation and resilience to extreme weather events (Linnenluecke & Griffiths, 2012; Linnenluecke, Stathakis, & Griffiths 2011), scenario building (Hoffman, 2005; Levy & Kolk, 2002; Park, 2008; Porter & Reinhardt, 2007; Sussman & Freed, 2008; Wittneben & Kiyar, 2009), competitive advantage (Lash & Wellington, 2007), organisational innovation (Pinske & Kolk, 2010), and stakeholder interests (Haigh & Griffiths, 2009).

The literature also examines the vulnerability of organisations to change (Driscoll & Starik, 2004; Haigh & Griffiths, 2009). Vulnerability poses risks for organisations that may be direct (for example, damage to infrastructure from extreme weather events) (Linnenluecke & Griffiths, 2010), or indirect (for example, financial costs associated with government regulation of greenhouse pollution, or reputational costs associated with being a GHG polluter) (Lash & Wellington, 2007; Wittneben & Kiyar, 2009). On the other hand, for some organisations opportunities for competitive advantage can arise, with an example being the increase in demand by sport organisations for synthetic playing surfaces in periods of drought (Lash & Wellington, 2007).

The literature also confirms the centrality of mitigation and adaptation as tools for responding to climate change (DCCEE, 2011a). Mitigation refers to an organisation's attempt to form strategies to directly or indirectly reduce GHG emissions, which are seen to be the catalyst for climate change (Hahn, Kolk, & Winn, 2010; Kolk & Pinske, 2005; Winn et al., 2011). Adaptation, on the other hand, refers to strategies that enable organisations to move profitably into a future where extreme weather conditions are the norm (Linnenluecke & Griffiths, 2010; Stern, 2006, p. 6; Winn et al., 2011). Mitigation and adaptation are important strategic themes for this study since they highlight the different approaches managers can take in responding to climate change. Climate Change and MPLFs While MPLFs in Australia have, in recent times, become aware of climate change in general, and extreme weather conditions in particular, there are no studies that examine the impact that this awareness has had on the ways in which they are designed and managed. This is surprising in the light of a recent drought that forced the sports, exercise and physical recreation industry to focus its attention on the prudent use of water. Between 1999 and 2009 Melbourne experienced drought conditions where water restrictions were imposed, and residents invited to reconsider ways that water can be used more efficiently (Aquatic and Recreation Victoria [ARV], 2009, p. 8). ARV subsequently completed a best practice guide for water usage and savings in aquatic facilities. Additionally, Sustainability Victoria (SV) introduced an online tool called the 'Best Practice Tracker', which allowed facilities to benchmark their energy consumption against other facilities, and learn how to implement energy-saving actions (SV, 2011).

In general, though, the leisure sector conceded there was 'a lack of industry best practice guidelines' and this 'means that information gathered and learning experienced by other facilities are not being shared throughout the industry' (ARV, 2009, p. 8).

PURPOSE AND AIMS OF STUDY

The overall purpose of this study is to identify the extent to which MPLFs have responded to climate change, by undertaking in-depth interviews with a sample of managers. It has been organised around two phases that aim to first, seek a better understanding of managers' attitudes towards climate change and, second, reveal which of two potential responses to climate change were adopted. As noted previously, they are first, the mitigation of GHGs and, second; actions taken to adapt to climate change through adopting new strategic and operational opportunities. This study also concedes that some organisations may, in fact, do nothing. It, therefore, proceeds on the assumption that, when dealing with climate change, organisations can respond proactively by being 'adaptive' and 'opportunistic' (Linnenluecke & Griffiths, 2010), or choose to be 'non-responsive' by either rejecting the notion of climate change, or, alternatively, denying its relevance to their operations (Dunphy, Griffiths, & Benn, 2007, p.17).

METHOD

A qualitative methodology was deemed to be suitable for this study because it is allowed us to secure detailed responses, and to therefore better 'understand how people make sense of their environment' (Sarantakos, 2005, p. 134). In proceeding down this methodological path we were aware of the fact that this would involve an interpretative approach (Creswell, 2009, p. 175) where the meanings respondents held on climate change would be subjective, and additionally open to the researcher's own interpretations and biases (Creswell, 2009, p. 175). At the same time, we were acutely aware of the issues we wanted informants to address, and the contextual and situational factors we would use to frame the analysis of the data. As a result, we also incorporated a positivist element into our methodology, which involved a working-hypothesis about the relationship between the resources available to the managers and the nature of their responses.

It was also decided to use a multiple case study approach on the grounds that it allows for not only the compilation of in-depth data (Schramm, cited in Yin, 2009, p. 17), but also a more detailed exploration of the managers' attitudes to climate change, a sharper analysis of the decisions taken in response to the climate change problem, and an examination of how contextual and situational factors shaped the attitudes and decisions of managers for each of the MPLFs (Sarantakos, 2005, p. 213).

Case Selection

In order to ensure the study's manageability, only two MPLFs were selected for critical examination, with two managers from each facility being interviewed. In order to retain anonymity they were given the fictitious names of Elm Park and New Town. The manager-informants were referred to by the pseudonyms, Ernie and Pat, and Natalie and Toni, respectively. In order to 'capture major variations' (Harsh, 2011, p. 70) and allow for cross-case analysis, a socio-economic index of disadvantage for areas (SEIFA) (Australian Bureau of Statistics, 2006) was used to select contrasting cases. The SEIFA is derived from attributes such as income levels, educational attainment, employment levels, and the number of jobs in unskilled occupations. The Elm Park case was identified as a well-resourced facility situated in a wealthy municipality in an advantaged part of Melbourne, while the New Town case was identified as a poorly resourced facility situated in a less wealthy municipality in a disadvantaged part of Melbourne. This case selection process ensured that the facilities were controlled by different local authorities, did not have the same 'resource backing' profile, were not drawing on the same cohort of users, were in no way interdependent, and were not engaged in any partnership arrangements.

Data Collection and Analysis

Semi-structured interviews were used to generate qualitative data relating to beliefs, attitudes, and behaviour (Minichiello, Aroni, & Hays, 2008, p. 52; Patton, 2002, p. 341; Sarantakos, 2005, p. 269; Yin, 2009, p. 102). All interviews were conducted at the informant's place of work, and took 50–60 minutes to complete in each of the four instances. All informants were reminded that the interviews were confidential and, that, in keeping with University ethics protocols, their anonymity would be preserved at all times. The interviews were recorded and transcribed into a table-format for later analysis.

The researchers then explored the data for cases of patterns, similarities, differences, and unusual commentaries. It was integrated through a process of 'coding' that involved organising the material into segments of text (Creswell, 2009, p. 186) that corresponded to five pivotal themes, which were understandings of climate change; vulnerability to climate change; responding to climate change, adaptation to climate change, and responding to climate change through mitigation. These five themes were used to organise and interpret the respondents' comments.

Making Sense of the Data

As noted above, the methodology for this study comprised a fusion of an interpretivist approach when collecting the data, with a more positivist approach when undertaking the analysis. In doing the analysis, we utilised the theoretical assumption embedded in the resource-based view (RBV) of the firm. RBV was used to assist in the analysis of this study because it not only highlights the importance of quality resources in undertaking effective change, but also because it rates the human resources – and especially their accumulated knowledge – as prime movers of change when having to deal with external turbulence (Mauws, Mason, & Foster, 2003; Smart & Wolfe, 2000).

The basic principle underpinning RBV is that competitive advantage is most effectively gained by assembling resources that are (1) valuable, whereby they can generate greater efficiencies; (2) scarce, which means they are not easily or readily available, and (3) inimitable, where they are unique and not easily copied. In short, superior performance will result from a strong endowment of resources that cannot be matched by competitors. These resources, as fundamental factors of production that organisations own, control and use for the purpose of creating value (Newbert, 2005; Ordaz, Huerta, & Reinoso, 2003), can be divided into three categories, namely human, organisational, and physical. The first dimension, which encompasses human resources, includes stocks of knowledge, skills, training, experience, judgement, and intelligence (Barney & Clark, 2007; Baron & Armstrong, 2007; Fritz-enz, 2009). The second dimension, which embraces organisational resources, refers to things like organisational values and culture, corporate history, relationships, and trust. It also includes structural features such as the formal and informal hierarchy, planning systems, reporting relationships, tools for controlling and evaluation performance, and co-ordinating mechanisms (Barney & Clarke, 2007). The third dimension, which covers physical resources, includes information

technology, machinery, plant, equipment, facilities, buildings, and the physical space people have to work in (Barney & Clarke, 2007).

Crucial refinements were made to RBV when Hart (1995) argued that there was also a significant competitive advantage to be secured in the interaction between the organisation and its natural environment. He stated that strategy and competitive advantage in the coming years ‘will be rooted in the capabilities that facilitate environmentally sustainable economic activity – a natural resource based view of the firm (NRBV)’ (Hart, 1995, p. 991; Hart & Dowell, 2010, pp. 2–3). This expanded model was subsequently adapted by Haigh and Griffiths (2009), who underlined the dependency organisations have on the natural environment to provide critical resources to create and trade products. Haigh and Griffiths (2009) claimed that the natural environment can have a significant impact on organisational performance, and needs to be considered in shoring-up an organisation’s long-term sustainability. Hart and Dowell (2010) also claimed that the natural environment is a resource that not only gives strategic direction, but also secures a competitive advantage.

In applying the natural RBV (NRBV) model to an analysis of MPLFs, we focused on ‘knowledge’ of the natural environment as a resource. This allowed us to secure an understanding of not only the initiatives taken to build up stocks of environmental knowledge and environmental sensitivity in response to climate change, but also how these resources had been used to shape their infrastructure, strategic direction, and programme delivery. In wrestling with the data we consequently hypothesised that MPLFs which had accumulated large stocks of resources – especially those that built environmental sensitivity – were more likely to not only have well-informed views on climate change, but also respond positively to any lasting changes in weather patterns.

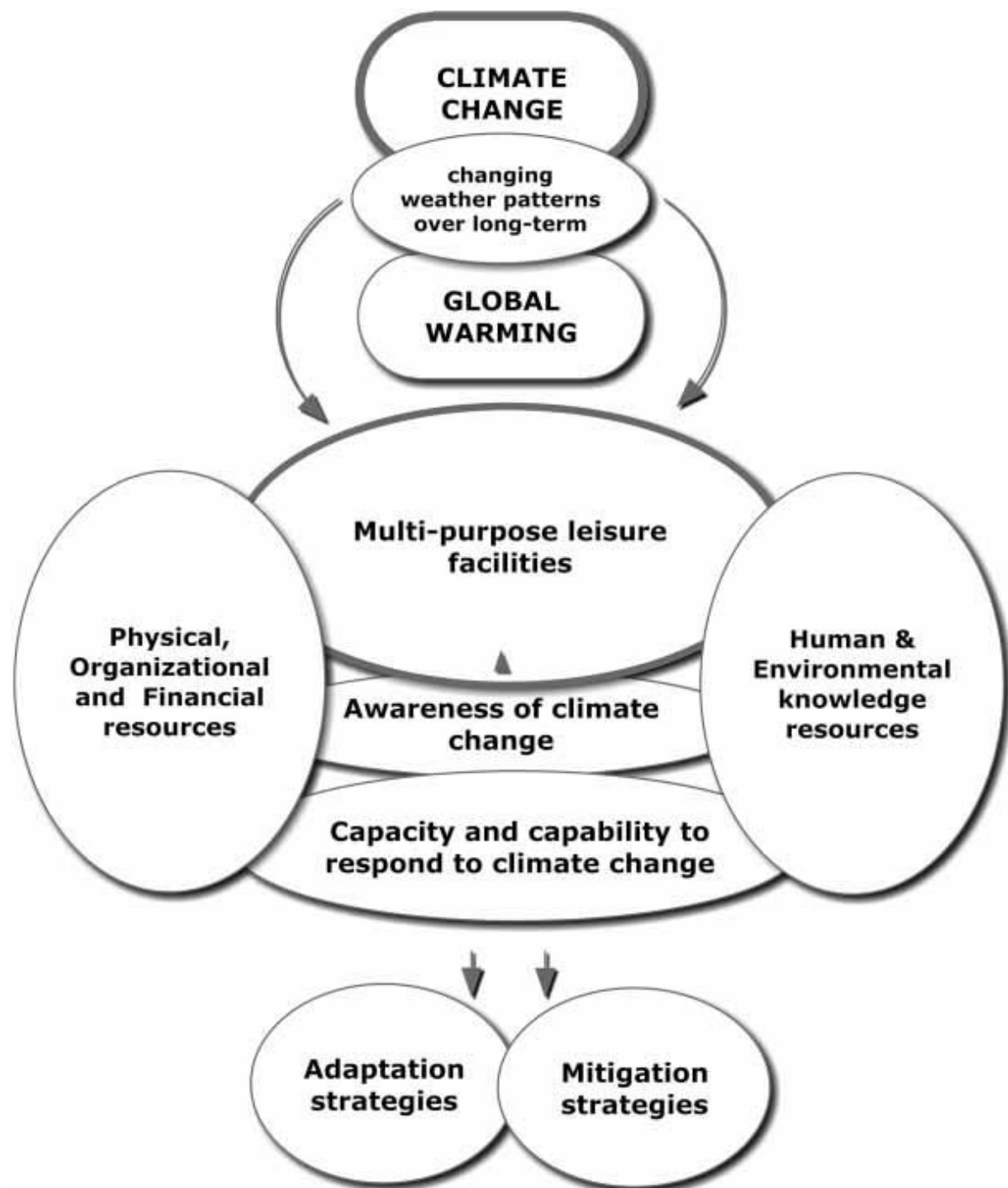
The NRBV model also provided a succinct frame for identifying the connections between the main variables that are addressed in this study. The key external driver of change is climate change and the attendant change in weather patterns, while the organisational capacity for change is contingent upon the scale and quality of its resources. The quality of its human resources is especially important, since they contain the knowledge and know-how that shape not only attitudes and awareness, but also the nature of the responses that will follow. These connections are illustrated in Figure 1.

RESULTS

Elm Park Case Responses

Understanding the climate change problem In order to get a clear understanding of Ernie and Pat’s responses to climate change it was essential to initially secure an understanding of their awareness and knowledge of climate change, and how they felt about it. Ernie stated . . . ‘it’s a consequence of effectively what we have done as a collective society – I’m talking worldwide – to influence the weather patterns’, while Pat described climate change as, ‘possibly related to global warming, uh possibly the seasons will be getting more intense, as in hotter summers and colder winters . . . and then even more intense weather so possibly more rain’.

Figure 1: A Process Model of Organisational Responses to Climate Change



When asked, ‘Do you believe if climate change is real?’, Ernie said . . . ‘Absolutely no shadow of a doubt that it’s real’. Pat initially felt that it was . . . ‘random at the moment in my opinion’, but later said . . . ‘I do personally’. Ernie believed that changing weather patterns would have a significant effect on their facility by saying, ‘certainly it’s at the mercy of significant changes in weather patterns’, while Pat felt that both hot weather and severe flooding were issues to be addressed. Both managers had a reasonable understanding of climate change, and appeared open to the idea of adapting to the changing climate, and mitigating their carbon dioxide emissions in order to soften their ‘carbon footprint’.

Vulnerability of facilities to climate change

Ernie did not feel that climate change was seriously undermining the facility's capacity to deliver appropriate programmes to its users. He felt that the facility was in fact more vulnerable to the effects of 'people's activity patterns' along with short-term changes in weather conditions. Ernie felt that if, 'we get another couple of bad summers, then the economic sustainability of the business comes into question'. Pat was little more circumspect, and believed that the facility was resilient to climate change, and very 'durable'. But he also noted that the facility was reliant on 'the types of initiatives that come out', and the resources made available to them. Pat made special mention of water use and developing better ways to manage it.

Management responses to climate change

When asked 'why are you responding to climate change?', Ernie's views revealed a high level of sensitivity when he said 'it's irresponsible not to, in a business that can have such an impact like this'. Pat concurred, saying that working in a, 'proactive organisation' encourages responses to climate change. Pat believed that local government had developed its resources to 'save and retain', which falls within its overarching objectives to 'enhance the environment'. Ernie added to this by saying that financial resources can be protected by responding positively to climate change. He noted that 'it's also financially more viable to operate in that manner than not to'. For example, both managers agreed that the introduction of pool blankets has been beneficial in reducing their electricity bills and consequently improving efficiency.

According to Ernie and Pat, a key reason why their facility was receptive to climate change pressures was because of the stance taken by its most powerful and proximate stakeholder, their local government. Ernie stated that 'they're [the local government] focused on trying to be as green as possible', and are 'very keen to promote this fact'. Ernie was aware that his local government was responding to climate change in part to gain a competitive advantage through 'differentiating themselves'. He also reckoned it was trying to 'really minimise the environmental impact through their operations'.

Adaptation strategies

Both managers agreed that adapting to climate change was 'not an essential core item of business', for their facility, with Ernie stating it's not 'something we address as much as we might'. At the same time, the facility was undertaking a number of adaptation strategies by using specific-use resources and related technologies. For example, in order to reduce power costs it had placed 'covers' on the pools when not in use, which turn allowed Ernie and Pat to turn the boilers off to ensure energy reduction. While Ernie in particular understood that pool blankets would reduce GHG emissions, it was agreed that the use of pool covers was viewed mainly as a tool for cutting costs and improving efficiency. The same motive was evident with the introduction of water recycling tanks, where both managers agreed that they had reduced energy and water costs within the facility.

The other point to note here is that severe drought conditions for the previous 10 years had forced the facility to adapt because of the water restrictions that were placed upon it. Ernie confirmed that this meant that they had to cut back on items such as hosing down the pool deck. But, interestingly, Pat was not completely happy with this arrangement, since it 'did not keep the pool deck clean enough', and he was going to 'welcome the lifting of restrictions, so we can go back to hosing [the] pool deck'.

Mitigation strategies

The Elm Park MPLF took mitigation seriously, and had put in place computerised systems to better manage its mitigation strategies. Through a Victorian State Government initiative, 'Grow me the Money', it was able to track its GHG emissions by setting up a reporting system that compared the GHG emissions with not only previous months, but also with other facilities. According to Pat, the data showed that the facility is on a par with the previous year. Pat had also found that solar panels on the roof of the facility had not been fully utilised, and secured financial support to get roof

panels working effectively. He subsequently added metering controls so that Ernie and he ‘could see how much energy they were saving’. Ernie also advised that the facility had access to specialist human resources, and with the assistance of an environmental officer the facility installed, ‘energy saving devices that you put onto the pumps . . . for the pool so, instead of running at full capacity all the time, we can cut it back by half and reduce the amount of energy consumption’. This new technology had a significant influence on the facility’s capacity to mitigate climate change by enabling GHG emissions to be monitored and reduced where possible.

New Town Case Responses

Understanding the climate change problem

Both Natalie and Toni understood the basics of climate change, acknowledging that Australia’s long-term weather patterns and physical environment was changing. Natalie agreed that the ‘environment has been damaged and it has been deteriorated by us not taking good care of it’, while Toni felt ‘we’re getting hotter. In Toni’s mind things were a lot more ‘unpredictable’, with Antarctica’s melting . . . and things like UV rays and that are more dangerous than they used to be’. Natalie and Toni also noted that changing weather patterns had effected their facility operations. Natalie, in particular, felt that changing weather patterns had a significant effect on the facility, having noted that ‘the unreliability of the seasons, you know . . . means that the weather changes so quickly and you think you are going to have summer’. In contrast, Toni felt that the warming conditions were actually beneficial for the facility, having suggested that . . . ‘if we had more hot days, we (would) earn more money when we have hot days’. Toni went on to say that ‘in that respect it’s a positive if we have more . . . sort of like . . . heatwaves because we need to make money because we’re a business’. When asked, ‘Do you believe if climate change is real?’, Natalie said that ‘I think it is, I think it is’, while Toni agreed that it is real, ‘just look at the last two/three years, with what’s happened in Australia alone’. Toni concluded that ‘something’s changing’.

Vulnerability of facilities to climate change

Natalie thought their facility was vulnerable, noting that the cost of electricity was already high, thus putting an extra strain on the financial resources within the organisation. Toni, in contrast, showed little interest in how climate change might adversely impact on the facility by stating ‘I don’t know. It’s not something I think about here all the time or worried about.’ Toni believed that people would still come to the facility no matter what the weather was like.

Responding to climate change

Neither Natalie nor Toni felt that their facility was responding directly to climate change, with both of them suggesting that dealing with its effects was not part of their management portfolio, but rather the responsibility of their local government’s environment department. Toni reported that ‘climate change is not something that is in the forefront of my mind’.

According to Natalie and Toni, climate change policy was driven by their local government, and they were dependent on local government directives when taking any initiative to more effectively manage climate change. As Natalie noted, ‘they are the ones that give us ideas or suggestions’.

Adaptation strategies

Despite management ambivalence, the New Town facility did initiate some energy efficiency improvements through the introduction of pool blankets for both the indoor and outdoor pools, and the introduction of a backwash recovery system. Toni said that while they were not directly involved in implementing these two systems, they were introduced as, ‘cost cutting’ devices in the light of seriously heavy use in the past. Both Natalie and Toni indicated that some of the facility’s infrastructure, such as the building design had limited the organisation’s ability to respond effectively to climate change. They had considered changing the light bulbs throughout the facility, but found the energy-saving devices did not fit their current roof structure, so they were unable to make this change. Toni also expressed frustration with the air conditioning system, in that it was either on for the whole

facility or not on at all. This led to serious inefficiencies, since rooms not constantly being used had the air conditioning running all day. The introduction of drought-related water restrictions also created a few dilemmas. While the practice of watering of the pool deck was discontinued, Natalie believed that it had constrained their ability to keep the pool deck clean, so when the restrictions are lifted, Natalie advised that the deck-watering procedure would be reintroduced.

Mitigation strategies

Unlike Ernie and Pat, neither Natalie nor Toni had much to say about mitigation strategies. However, they agreed that the installation of the pool blankets has helped reduce electricity costs, and by implication GHG emissions. Both Natalie and Toni felt that their capacity to introduce mitigation strategies was severely curtailed by lack of local government leadership and advice. It also meant that neither Natalie nor Toni were especially aware what mitigation involved, and how it was linked to the climate change problem. Natalie could only conclude that ‘I don’t know, I have never really thought about (it) . . . I am a bit oblivious to all that.’

Summary of New Town case

Like Ernie and Pat, Natalie and Toni felt that it was the responsibility of ‘Council’s’ environmental department to take control of the climate change problem since not only did they have the resources, but because it was also ‘their job’. Natalie and Toni also conceded that they did not have a deep knowledge of the climate change problem and its relationship with their facility. And neither were they especially worried about it. When it came to securing a competitive advantage, Natalie and Toni agreed that they did not seek to get cost-advantages through responding to climate change. Toni actually turned the climate change problem into an opportunity by suggesting that global warming was ‘a positive’ since it got more people to the pool, and that was good because ‘we are a business’. Natalie, on the other hand, felt that changing weather patterns would have more of a negative effect because of the unreliability of the seasons. Both Natalie and Toni agreed there were cost-advantages in responding to climate change, but overall, they were indifferent to the climate change problem. It is not an issue that they felt they needed to respond, or plan for in any seriously committed way.

CONCLUSIONS

While each of the four MPLF managers interviewed for this study had an awareness of climate change, it is also clear that Ernie and Pat – the Elm Park facility managers – were better informed than either Natalie or Toni – the New Town facility managers. And, while all four agreed that their facilities were vulnerable to climate change and that some adaptation and mitigation strategies were important for their future sustainability, neither Natalie nor Toni felt responsible for initiating any long-term strategic responses.

Overall, the Elm Park and New Town MPLFs responded to climate change in quite different ways. Elm Park managers showed a stronger understanding of not only the nature of climate change, but also how they might adjust their operations in response to changing weather patterns, especially when it came to power and water usage. As a result, it introduced an array of energy and water management strategies. New Town managers, on the other hand, were unable to clearly articulate the nature of climate change, and neither were they able to explain what it meant for the operation of their facility. They additionally felt that working out strategic responses was not their responsibility, and that it was the role of senior local government management to handle the climate change problem. In addition, the Elm Park managers, especially Ernie, felt that they had a moral obligation to respond to climate change.

Both Ernie and Pat were also aware that climate change provided an opportunity to review their facility’s operations, and, in particular, its power, fuel, and water costs. In contrast, Natalie and Toni – the New Town facility managers – felt they were not responsible for managing climate change issues, since they assumed it was in the hands of their local government senior management team.

The results indicate a direct relationship between the SEIFA index of disadvantage and the facilities' responses to climate change. There were also signs that a base of well-trained human resources are conducive to a clearer understanding of the climate change problem. While the better endowed and less disadvantaged Elm Park municipality actually spent less on capital works than the less well-endowed New Town municipality, the Elm Park facility had a much sharper understanding of the strategic pressures that climate change can impose on MPLFs. Moreover, Elm Park facility managers were better able to articulate the ways in which their facilities might either adapt to climate change, on the one hand, or mitigate climate change, on the other hand. It became clear that Elm Park facility managers had accumulated an 'environmental knowledge resource' in the form of an environmental sensitivity, which is highlighted through adaptation strategies that included more efficient input use, and mitigation strategies that included the reporting and analysis of the GHG emissions.

These results confirm the relevance of NRBV to this study, which argues that environmental sensitivity and know-how is a major resource within organisations operating in a 'carbon dioxide constrained' world. In this case, NRBV theory assisted in understanding what made facility managers operating in resource-rich municipalities more responsive to climate change. They had the resources – and especially 'environmental knowledge resources' – to more effectively implement strategies that deal with the climate change problem. NRBV theory was also useful in illuminating the attitudes and behaviours of facility managers operating in disadvantaged municipalities with fewer environmental knowledge resources. They made only marginal responses, even when they were aware of the problems that climate change presented.

The results of this study, therefore, show that management's accessibility to Hart's (1995) environmental resources' was a relevant factor in determining MPLF responses to climate change. That is to say, managers who displayed more environmental sensitivity and knowledge also responded in a more adaptive manner. At the same time, this study highlights a limitation of NRBV theory, since it indicates that NRBV alone cannot explain many of the more site-specific ways in which MPLFs are responding to climate change. Exposure to a variety of training programmes on changing weather patterns and shifting demand conditions may inform a manager's capacity to articulate the source of fall in patronage, but will say little about the type of adaptation or mitigation that is likely to follow. Prominent climate change and research scholars Kolk and Pinkse (2007) anticipated the limitations of NRBV, and highlighted the constraints associated with the use of a single theory to explain organisations responses to changing weather patterns (p. 370). They subsequently identified a range of theoretical perspectives that offer additional explanatory power for the more nuanced organisational responses to climate change, which include institutional theory, stakeholder theory, and supply chain theory.

POSSIBILITIES FOR FUTURE RESEARCH

While this study delivered useful insights into the ways MPLFs have gone about responding to climate change, there is still a significant knowledge gap that exists within this field of study. The small sample allowed the researcher to provide only a snapshot of how two MPLFs are managing the climate change problem in a large city in Australia, and it is uncertain as to just how generalisable they are to similar facilities elsewhere. There still a dearth of research in this area (McDonald, Stewart, & Dingle, 2011, p. 92), and there is a need for further research in order to fully understand how MPLFs respond to climate change within the broader sports, exercise, and physical recreation sector. The results of this study also reveal a cloudy distinction between the concepts of adaptation and mitigation in the eyes of some industry professionals, and they need to be investigated in much more detail in subsequent studies. In addition, the role of stakeholders in shaping organisational responses of MPLFs is especially worthy of further scholarly investigation, and the application of stakeholder theory in combination with NRBV represents a promising line of inquiry going into the future.

MANAGEMENT IMPLICATIONS OF THE FINDINGS

Despite the limitations of this study, it has a number of important implications for the future management of multi-purpose leisure centres. First, it confirms that climate change and the

consequent change in weather patterns is real and, as such, is now a crucial contextual factor in the strategy-formulation calculus of leisure centre managers. Water, wind, sunlight, and air temperature will be significant drivers of not only how leisure centres are managed, but also how they are designed and built. In addition, the climate change problem will force managers to better understand the different ways in which they can strategically respond, and the implications that each response has for the future redesign, operational, and service delivery features of centres. It is especially important that managers can effectively discriminate between adaptation strategies – where securing a more comfortable fit between the external environment and the centre's activities is paramount – and mitigation – where taking initiatives to eliminate the cause of the problem, which in this case is GHG emissions – is the primary initiative. These issues, which are embedded in the results of this study, will be critically important for the future good management of leisure activities.

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