



Risk regulation, community pressure and the use of management accounting in managing climate change risk: Australian evidence



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ABSTRACT

This exploratory study is amongst the first to investigate how companies perceive the regulation of carbon emissions and the pressure exerted by the community in an environment characterised by risk and uncertainty. Semi-structured interviews were conducted among 39 executives who were directly involved in carbon emissions management in 18 large listed Australian companies. Consistent with Prospect Theory, we find that decision-makers are threat biased and are more likely to take immediate actions when climate change issues are framed as threats as opposed to opportunities. From the interview data, it is seen that managers use management accounting techniques as a risk management tool in mitigating risks associated climate change issues. Furthermore, this use of management accounting appears to be driven primarily by the protection of economic interests, regulatory pressure and reputational pressure. The study provides insights into how perceptions of climate change uncertainties and external pressure for disclosure of emissions information influence companies to use management accounting in managing climate change risk.

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1. Introduction

Climate change has been identified as the most pressing issue in the modern world that threatens the existence of mankind (Stern, 2007; International Panel on Climate Change, 2014). Carbon emissions have been identified as the primary contributory factor to climate change (Gillett, Arora, Zickfeld, Marshall, & Merryfield, 2011). Companies across the globe dispense about 70 per cent of total global emissions (Carbon Disclosure Project (CDP), 2013a). A solution to climate change risk cannot be found without the engagement of these companies. In Gray's (2010) words, "any solution to the exigencies of sustainability must involve corporations as no other solutions are feasible" (p. 57).¹

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¹ Since carbon emission is the biggest issue that companies face in relation to climate change, the phrases "climate change" and "carbon emission" are used interchangeably in this article.

According to the sustainability literature, companies' responses to environmental issues are driven by the protection of economic interests, meeting regulatory requirements and the management of legitimacy threats (Gray, 2010; Gunningham, Kagan, & Thornton, 2003; Hrasky, 2012; Schaltegger & Hörisch, 2015). These factors are integral parts of the social contract that exists between an organisation and the society in which it operates. When this social contract is ruptured, the long-term survival of that organisation is threatened (Hrasky, 2012). Existing studies provide convincing evidence that regulatory pressure exerted by governments and regulatory bodies, together with the pressure exerted by communities, are the main drivers of environmental actions of companies (Hrasky, 2012; Pinkse & Busch, 2013).

An understanding of what management practices are used by companies in managing the risk associated with climate change (i.e. internal processes of decision-making in relation to carbon emissions) is timely in the context of the pragmatic view of social and environmental accounting (SEA). Advancing this view, Baker and Schaltegger (2015) emphasise that the goal and role of accounting should be to initiate and foster internal communication processes within the company and engagement processes with stakeholders, rather than focusing only on transparency. Organisational processes can be supported when managers change their perceptions when new information (such as carbon emission information) is created and engagement processes are initiated with both internal and external stakeholders (Baker & Schaltegger, 2015). However, the issue of what prompts companies to use particular management practices in responding to climate change risk and how the adoption of such practices benefit companies in managing carbon emissions have not been explained clearly in the literature (Burritt, Schaltegger, & Zvezdov, 2011). Addressing this vacuum is timely as the cognitive complexity displayed by managers in analysing the business case for sustainability (i.e. the dimensions through which corporate sustainability creates competitive advantages) depends on the degree of sustainability performance by the firm (Hockerts, 2015), which in turn could have an impact on management practices adopted by firms in mitigating emissions risk.

Uncertainty is a central element in most aspects of climate change issues (Stern, 2007). In addition to scientific uncertainty, regulatory uncertainty plays a significant role in carbon emissions issues (Zehr, 2000). Australia has been particularly prone to political uncertainty surrounding climate change issues and directors identify this political uncertainty as one of the top three challenges faced by their companies (Australian Institute of Company Directors, 2012). These scientific and regulatory uncertainties relating to carbon emission issues can complicate organisational decision-making processes, potentially causing some organisations to do nothing or little until greater clarity is obtained, while others to be more proactive (Engau & Hoffmann, 2011).

The predictions of Prospect Theory are highly applicable to managerial decisions regarding climate change issues. This behavioural economic theory analyses decision-making under risk and uncertainty; presenting the same information about risk in different ways (for example, as a gain as opposed to a loss) alters people's perspectives and actions (Kahneman & Tversky, 1979). The evidence suggests that managerial perceptions of climate change risk influence them to perceive it either as a threat, an opportunity, or as a combination of both. According to the CDP report 2013, companies see regulatory pressure related to climate change not only as a threat but also as an opportunity.

Engau and Hoffmann (2011) observed that managers took more mitigating actions in an uncertain environment when they perceived regulatory uncertainty as a risk. Weinhofer and Busch (2013) found that companies' responses to climate change issues depended on the degree of influence of such issues on their business actions. Yet, little is known about the influence of uncertainty about climate change issues on managerial perceptions and the influence of managerial perceptions under uncertainty on the use of management accounting in managing climate change risk. Thus, given the inherent uncertainty attached to regulatory response to climate change risk (Talberg, Hui, & Loynes, 2013), and the associated scientific uncertainty, the use of Prospect Theory as a conceptual underpinning for examination of the issue is justifiable.

The purpose of this study is to gain some insights into how Australian companies respond under uncertainty when the government enforces regulations to mitigate climate change risk, and when community pressure exerts a threat to their legitimacy over issues surrounding climate change. For this purpose, we conduct an exploratory study by interviewing the managers of 18 large Australian companies who play key roles in managing carbon emissions of their firms. Predictions under Prospect Theory are used to gain some insights into how managers perceive climate change issues under uncertainty, and whether such perceptions influence their actions in managing climate change risk. In relation to managerial response, we focus on the use of management accounting techniques. By investigating the goal and role of accounting in fostering companies' internal communication processes and engagement processes with stakeholders, our study provides valuable insights into what prompts companies to use management accounting in managing their carbon emissions.

The study contributes to the existing literature in two ways. Firstly, it provides insights into how managerial perceptions of climate change uncertainties and risk influence managers' actions in managing carbon emissions. Secondly, it advances our understanding of how management accounting techniques are used by companies as a risk management tool in managing their climate change risk. An understanding of the above aspects may provide managers and policy makers with insights into the mechanisms that stimulate climate change actions by organisations.

The rest of the article is structured as follows: Section 2 reviews the relevant literature and builds the theoretical foundation for the study. Section 3 describes the Australian regulatory response to climate change, while the sample, data and research methods are outlined in Section 4. Section 5 presents the findings and Section 6 provides a discussion of the results and the implications of findings. The last section concludes.

2. Prior literature and theoretical foundation

Ageing of industry modernity has paved the way for the emergence of the risk society (Beck, 1992). In his thesis of the risk society, Beck argues that the risk faced by the modern society has been transformed from “negative side effects of seemingly accountable and calculable actions (i.e. residual risks) to one that is neither calculable nor controllable” (Beck, 1999, p. 33). This theory identifies ‘the global market risk’ as a new form of ‘organised irresponsibility’; it is an institutional form which is impersonal in nature with no responsibilities. The climate change issue lies deep within modernity and it epitomises Beck’s definition of risk (Bulkeley, 2001). Climate change risk could be characterised as ‘organised irresponsibility’ because it cannot be assigned to one particular actor and source, but in fact is inherent to the industrialised, energy- and material-intensive lifestyle of most countries (Matten, 2004). Slovic (2007) contends that humans face formidable psychological obstacles in taking actions in disastrous events and forming emotional connections with their victims. He argues strongly that societal rights can be protected only through the establishment of laws and institutions.

“... all our day to day concerns and worries ... disrupt other feelings we may have about ... other more global distant problems and they takeover and distract us and we forget about the others. ... when we do relate, its short and shallow and trenchant That's why it's important to create laws and institutions that force us to deal with these things in a way that is true to our values.” (Slovic, 2008; University of Oregon Today Show #385)

Accordingly, studies find government regulations to have a direct influence on environmental actions by companies (Gunningham et al., 2003; Hrsky, 2012; Pinkse & Busch, 2013). While Lodhia (2011) claims that environmental regulations could compel companies to be accountable for their carbon emissions, Wahyuni and Ratnatunga (2015) find carbon regulations to play a vital role in companies’ carbon management strategies.

According to Legitimacy Theory, a ‘social contract’ exists between a company and the society in which it operates (Cho & Patten, 2007). When there is a legitimacy gap, this social contract is ruptured and the community exerts pressure on the organisation that could threaten its long-term survival (Hrsky, 2012). Consequently, managers take remedial actions in order to become legitimate (Dowling & Pfeffer, 1975). This perspective has been used to explore the motives behind voluntary environmental disclosures by companies (Hrsky, 2012; Pellegrino & Lodhia, 2012). Hrsky (2012) found that disclosures by carbon intensive companies were motivated by protecting their legitimacy, which was supported by substantive actions.

Literature reveals that the threats posed by regulatory and legitimacy pressures on companies can be intensified because of the great deal of uncertainty attached to climate change issues. Decision-framing has a powerful influence on the way a problem is perceived by individuals, leading to different outcomes (Kahneman & Tversky, 1979). Sebora and Cornwell (1995) found that decision-makers were subject to a framing effect when they make strategic decisions under uncertainty, while Jackson and Dutton (1988) found that strategic decision-makers were more sensitive and react more quickly when decisions were framed as “threats” rather than “opportunities”. According to Dutton and Jackson (1987), the “threat” involves “a negative situation in which loss is likely and over which one has relatively little control”, and the “opportunity” implies “a situation in which gain is likely and over which one has a fair amount of control” (p. 80). Studies have found that the categorisation of issues as threats or opportunities had a direct influence on executives’ decision-making; they have also found that strategic decision-makers were threat biased (Chattopadhyay, Glick, & Huber, 2001; Engau & Hoffmann, 2011). Jawahar and McLaughlin (2001) found that managers tended to take more actions when they perceived environmental issues as a threat to their companies’ financial performance or reputation than when they perceived environmental issues as opportunities. Indeed, the existing evidence suggests that companies view climate change issues to bring a combination of both threats and opportunities to their firms (CDP, 2011; CDP, 2013a,b). Therefore, companies’ actions in response to regulatory and legitimacy pressures relating to carbon emissions should be investigated in the context of whether they perceive carbon emissions issues as threats or opportunities.

As an internal communication mechanism, management accounting could play an important role in driving companies towards sustainable development (Contrafatto & Burns, 2013). The evidence suggests that the companies that use management accounting techniques (i.e. planning, budgeting, target setting, performance measures, and incentives) embedded environmental issues into their organisational strategies and showed an improvement in their economic and/or environmental performances (Albelda Pérez, Correa Ruiz, & Carrasco Fenech, 2007; Henri & Journeault, 2010). Schaltegger and Csutora (2012) argue that carbon accounting can play a vital role in the provision of emission information for both internal decision-making and external reporting.

Some studies have investigated the advantages associated with the incorporation of climate change risk in companies’ formal management control systems. Subramaniam, Wahyuni, Cooper, Leung, and Wines (2015) emphasised the importance of incorporating climate change risks into companies’ formal risk management systems, which are integral parts of their management controls. Lee (2012) states that clear planning and setting specific emission reduction targets are essential in effective management of risk associated with carbon emissions. Even though climate change presents a business risk that is different from other environmental risks² and it should be an integral part of companies’ management control systems, a formal investigation of whether/how companies use management accounting techniques in managing climate change risk

² According to Winn, Kirchgeorg, Griffiths, Linnenluecke, and Günther (2011), climate change presents a special type of business risk that is different from other forms of risk as its impact is global, the problem is long-term and the harm is irreversible.

remains absent from the literature. This study fills that vacuum by examining how Australian companies use management accounting techniques in managing the risks associated with climate change (i.e. compliance risk, financial risk and reputational risk), especially in an environment where companies are under pressure from both regulatory and community pressures.

3. Australian regulatory response to climate change

Two significant regulations relating to carbon emissions have been enacted in Australia during the recent past. The *National Greenhouse and Energy Reporting (NGER) Act 2007* imposed a mandatory reporting requirement on entities emitting in excess of 125 kilo tonnes per annum of carbon or using/producing over 500 terrajoules of energy in 2008–09. These thresholds were reduced to 50 kilo tonnes per annum or using/producing over 200 terrajoules of energy from 2010 to 11 and onwards. In July 2012, the Australian Government imposed a fixed price Carbon Tax. This mechanism was argued to be an emissions trading scheme with an initial fixed price on carbon pollution and applied to Australia's biggest carbon emitters, called liable entities. Unlike the reporting requirements of the NGER Act, this pricing mechanism imposed a huge financial burden on affected carbon intensive companies. As such, during the period of this study Australian companies faced tighter carbon emissions regulations than had been the case previously.

However, considerable uncertainty remained as to how the government would address the climate change problem through policies and regulations. The move to introduce a Carbon Tax led to a significant outcry and resistance by organisations, industry associations, and businesses (Newman, 2011). The disagreement between Australia's major political parties created uncertainty about the future of Carbon Tax policy (Kelly, 2010). Indeed, subsequent to the election of Liberal Party led Coalition Government in September 2013, the Carbon Tax was repealed on the 14 July, 2014.³ What is especially relevant is the contested nature of the policies relating to the Carbon Tax in Australia. This created an environment in which companies needed to make decisions regarding the management of carbon emissions under a great deal of uncertainty. This context provides an ideal research setting and opportunity to investigate whether the predictions of Prospect Theory apply to Australian companies in managing their carbon emissions.

4. Sample, data and research method

Australia is considered a useful research setting for this study for three main reasons: (i) it has the highest per capita emissions of CO₂ in the developed world (Garnaut, 2008); (ii) it is vulnerable to climate change; and (iii) it has experienced substantial political uncertainty in relation to climate change policies (Beeson & McDonald, 2013). Australia is a hot and dry country; small variations in climate can have a huge impact on agriculture, infrastructure, biodiversity and ecosystems (Garnaut, 2008). The companies that make up Australia's resources oriented economy would be impacted significantly if the pace of climate change is not slowed. Therefore, this study focuses on large Australian companies.

Given the exploratory nature of the current study, and the objective to make sense of how company executives perceive carbon emissions issues, semi-structured interviews were considered most appropriate. We invited emissions management executives from 20 randomly selected companies to participate in a semi-structured interview using personal contacts, telephone calls, posted letters and e-mails. These companies were members of the S&P ASX200 index; 10 companies represented the carbon intensive (CI) sector while the balance represented the low carbon (LC) sector.⁴ Prospective interviewees were assured that the interview data would be treated with strict confidentiality. Thirty-nine executives representing 18 companies responded positively to our requests; nine companies represented CI sector and the balance represented LC sector companies.

As shown in Panel A of Table 1, 39 interviews were conducted in total of which 18 were with CI sector representatives and 21 with LC sector representatives. Thirteen interviewees were engineers by profession, of which nine (four) represented CI (LC) companies. Nine interviewees (three CI sector and six LC sector) had an environmental sustainability background. Eight interviewees were accountants, with five representing CI companies.

Panel B provides codes used to identify interviewees in different professional categories. In presenting our findings, we use the most suitable quote(s) which represents the general consensus of interview participants.

From December 2012 to June 2013, semi-structured interviews were conducted with all selected executives. Appendix 1 provides a list of open ended questions used as a guide. The average interview length was 40 min and interviews ranged between 25 and 50 min. Notes were made for three interviews, with others audio recorded with permission, transcribed and made available for review to interviewees; none requested subsequent amendment.

According to Panel C, 11 managers in the CI sector, and 15 managers in the LC sector had held their positions for four years or less. Closer analysis reveals that six (seven) CI sector (LC sector) managers had less than four (three) years of experience. The main reason for this relatively short experience is that their positions had been created only recently. Even though some executives' length of service appeared to be short, almost all the managers had vast experience in similar roles elsewhere.

³ Talberg et al. (2013) provide a chronology of events in relation to the development and enactment of Australia's climate change policies.

⁴ The carbon intensive (CI) sector includes companies in the utilities; chemicals; construction materials; oil, gas, and consumable fuels; metals and mining; and transportation industries. The low carbon (LC) sector includes companies in industries such as property; food and beverage; finance; pharmaceutical wholesalers; media providers; and telecommunication service providers.

Table 1
Sample classification and interviewee information.

	Full sample	CI companies	LC companies
Panel A: Interviewee Demographics			
No. of interviewees	39	18	21
Professional Background:			
Engineering	13	9	4
Environmental Sustainability	9	3	6
Accounting	8	5	3
Other	9	1	8
Male: Female (%)	55: 45	72: 28	38: 62
Panel B: Interviewee Codes			
Engineering		CI(E)1–CI(E)9	LC(E)1–LC(E)4
Environmental Sustainability		CI(S)1–CI(S)3	LC(S)1–LC(S)6
Accounting		CI(A)1–CI(A)5	LC(A)1–LC(A)3
Other		CI(O)1	LC(O)1–LC(O)8
Panel C: Years of experience in current position			
More than 6 months to 1 year		0 (0%)	5 (24%)
More than 1 year to 2 years		4 (22%)	3 (14%)
More than 2 years–3 years		5 (28%)	5 (24%)
More than 3 years–4 years		2 (11%)	2 (10%)
More than 4 years–5 years		0 (0%)	0 (0%)
More than 5 years		7 (39%)	6 (28%)

5. Findings

5.1. Managers' perceptions of climate change risk regulation and community pressure

This section analyses the perceptions of interviewees in relation to the regulatory pressure on carbon emissions and to the associated community pressure. We were particularly interested in investigating whether interviewees perceived regulatory and community pressures as opportunities or as threats or as a combination of both. Analysis of the interview data reveals that the majority of representatives seemed to believe that regulatory and community pressures on climate change issues brought both opportunities and threats to their companies in achieving their organisational goals. Of the 18 sample companies, representatives from 16 companies demonstrated this balanced view.

"Well there's both [threats and opportunities]. So there's risks involved, and we're highly exposed in terms of being an emissions-intensive trade-exposed industry. ... we have an exposure and a risk under a Carbon Tax. ... On the other hand, we have great opportunities, which we're working on to reduce our carbon footprint. We also have an opportunity to look for new technologies." [CI(E)12]

"I don't think it's one or the other [threat or opportunity]. I think it's both It depends on how you choose to manage it. for us it's more around lot of opportunity in terms of supporting our clients who are responding to this and it's also around failing to adequately manage the credit risks associated with client impact." [LC(S)5]

However, the rationale for perceiving these issues as opportunities or threats varied across interviewees. With respect to regulation of climate change risk, many interviewees seemed to believe that introduction of the Carbon Tax would bring a significant financial threat to their firms. The CI sector representatives expected this financial threat to come from two fronts. First, the Carbon Tax as a direct expenditure would drain their earnings since they could not pass that expenditure on to their customers:

"...there's a carbon price being put in place, and the threat is that we won't be able to pass that cost on through to our customers, and, therefore, our earnings suffer as a result." [CI(A)9]

Second and indirectly, they expected an increase in energy costs which would result in a substantial increase in their operating costs:

"The cost of energy has certainly pushed us to try and reduce that energy/carbon footprint, because, well, energy prices have been going up." [CI(S)4]

The LC sector interviewees did not necessarily perceive the Carbon Tax to be a direct financial threat.

"The value of carbon, at the moment, is so low that it's not driving anything in the [financial sector], from a carbon point of view, from price. The cost of energy is making a bigger argument for making projects and energy management, rather than the cost of carbon." [LC(S)3]

This is likely to be because the regulation of carbon emissions would not impose a direct tax on these low carbon entities. However, they also perceived the Carbon Tax to have an impact on their operations because of possible increases in energy prices.

Clearly, the interviewees seemed to believe that the regulation of carbon emissions through introduction of the Carbon Tax would reduce their earnings and cash flows substantially as it was associated with a direct tax and/or an increase in their operating expenses.

“Carbon emission management is really about costs. ... So it's really about how we can decrease our costing structures. Or how we can avoid more cost structures. Carbon's obviously around energies and fuels. So one of our biggest costs is that sort of stuff. ... and most times they won't realise it's about carbon management, it's really about cost driving.” [LC(A)13]

This financial threat seemed to be the most influential factor as it could have an adverse impact on their future investment programmes, payout policies, financing decisions and finally on the market values of their firms.

While acknowledging that the Carbon Tax imposed a financial threat for their companies, the interviewees seemed to believe that the same scenario would offer them also opportunities to be innovative in their production processes in order to remain competitive in the market. They believed that this scenario had presented their companies with opportunities to focus on reducing energy consumption and to invest in energy efficient programs, while harnessing the attention of their top management on energy reduction initiatives.

“We also have an opportunity to look for new technologies a lot of our customers are also quite emissions-intensive. ... that's a technology that could assist our customers to reduce their carbon impact as well. So there's a commercial opportunity for us ” [CI(E)12]

“Opportunities such as the opportunity to help accelerate fuel efficiency initiatives and getting a system to do things like that through government programs. Being able to advance things such as renewable jet fuel development which has multiple benefits not just in greenhouse gas emissions, but setting up new local industries, fuel security issues and stuff like that.” [CI(E) 17]

With respect to community pressure associated with the regulation of carbon emissions, almost all LC sector interviewees acknowledged the need to uphold their companies' image as environmentally concerned organisations. They viewed inactivity on emissions issues as a threat to their reputation:

“... it's [community pressure] again the reputational threat of not being seen to be doing enough, and also not understanding the carbon risk associated with some of our particularly larger, or more carbon intensive clients.” [LC(S)7]

They also perceived climate change issues as a threat to their competitive position.

“It's [carbon emission] a growing concern amongst organisations within our industry, a lot of finance organisations ... are taking it very seriously, and are becoming more involved in that type of area, and I guess we felt that we needed to step up and start doing it as well.” [LC(O)4]

LC sector companies, with their reputation for being environmentally friendly, perceived climate change issues to bring reputational benefits through gaining demonstrated leadership in the field which can translate into reputational advantages:

“[Company Name] has always been an organisation that takes its social legacy very seriously. It's a natural extension of our culture to be concerned about sustainability ... It's a potential differentiator from our competitors. It's an area that we can demonstrate leadership.” [LC(O)6]

Conversely, only two CI sector interviewees perceived carbon emissions to be associated with reputational risk. They perceived public exposure of their carbon emissions practises due to regulatory requirements as a reputational risk:

“... we're going to come in as one of the top five, probably, liable under the scheme, so there's big reputational issues for [Company Name] as well.” [CI(E)1]

“There's a real risk around compliance.... There's significant penalties associated, as well as reputational risk, around compliance, with both NGER and the Carbon Tax.” [CI(E)12]

Only one CI sector interviewee identified reputational benefits associated with climate change issues. This interviewee believed that the prevailing scenario would bring competitive advantages to their firm through product differentiation.

“...So we see it [community pressure] as an opportunity to further use it as a brand differentiator ... competitive advantage, in the long-term, in exploring alternative uses for fuel, or alternative sources of fuel.” [CI(E)15]

Two interviewees representing the LC sector perceived the pressures exerted by climate change regulations and the community to bring only opportunities. None of the interviewees perceived climate change issues as threats only. However, the interviewees in both sectors seemed to believe that being proactive on climate change issues would bring competitive advantages to their companies.

Interestingly, interviewees in the two sectors perceived community pressure associated with climate change risk differently. The LC sector firms seemed to fear that their companies' images would be damaged if they were accused of “not [being] actively involved” or “not understanding” communities' concerns surrounding climate change. On the other hand, CI sector firms perceived community pressure as a threat revolving around being labelled as “polluters”. Irrespective of these differences in perceptions, the ultimate concern of both sectors appeared to be the potential threat to their legitimacy (i.e. reputation).

5.2. The influence of decision framing on actions

We now investigate how managers' perceptions on the regulation of carbon emissions and the related community pressure influenced their companies' actions pertaining to carbon emissions management. Consistent with Prospect Theory, the interview data reveals that companies were more likely to take immediate actions when climate change issues were framed as threats rather than opportunities. This phenomenon was commonly observed among interviewees who perceived carbon emissions issues to offer both threats and opportunities.

The financial threat imposed by the regulation of carbon emissions risk reportedly had influenced many companies to take important strategic decisions, such as the establishment of emissions management personnel positions and the recruitment of emissions management specialists. As observed in Table 1, many interviewees were new recruits with a short history of service in their respective companies. The main objective of recruiting these professionals had been to expedite energy efficiency programmes and to meet emissions reporting requirements.

"They brought me here [12 months ago] because I knew energy efficiency and I knew refrigeration fairly well" We knew the Carbon Tax was coming ... and so they needed somebody to prepare for that and also to expedite what was being done." [LC(E)1]

"I joined the company probably about 18 months ago, specifically to help them prepare for carbon [tax]". [CI(A)2]

The financial threat associated with regulation of carbon emissions has had an impact on CI sector companies to rethink their operational activities. The companies responded to this threat by repositioning their project management processes and responsibilities of various business units.

"I think it's (Carbon Tax) has accelerated projects, which have a large impact or a large carbon reduction. ... it has brought those in line with a lot of companies' payback periods and financial hurdles."[CI(E) 12]

"[T]he best motivator ... in the corporate sense, is that you're going to have costs and legislations, all that sort of thing ... various business units see, on their bottom line, an accruing financial liability for their carbon obligation, and they start to think, well, if we can do anything to reduce that, it will be to our benefit " [CI(E)1]

The ultimate objective of taking actions seemed to be the reduction of per unit energy cost, implying that actions were based primarily on economic benefits (O'Dwyer, 2003). However, CI sector interviewees regarded taking actions in respect of the financial threat as a "win-win" situation.

"[I]t is about costs, because we run sustainability on the profit-planet-people model. So it's about having that sweet spot between reducing costs, as well as having great environmental outcomes [reduction in carbon emissions] " [CI(A)6]

"Number one is they want to save; they want to reduce fuel costs and we know if fuel efficiency improves, our emissions' efficiency improves as well." [CI(E)17]

In general, the main driver for LC sector companies seemed to be reputational risk management (Deegan, Rankin, & Tobin, 2002; Hrasky, 2012).

"... with greater community concern around the issue of climate change, there were risks of negative brand perception for companies which were seen to be not proactive in relation to climate change and their emissions. So that's part of the reason to put in place emission reduction targets " [LC(O)1]

Unlike CI sector companies, LC sector companies did not have strong financial pressure to take action on emissions management. Therefore, their emission management actions could be seen as a response to community pressure and an attempt to improve brand image in order to protect corporate legitimacy (Deegan, 2002; O'Donovan, 2002).

One of the interesting findings of this study is that the two companies that perceived only opportunities to arise from climate change issues also admitted that actions would be taken only when these issues were perceived as a threat. As one interviewee expressed:

"... the fact there's a carbon price is quite significant ... a large proportion of our emissions are obviously from our electricity use and our refrigeration. ... It certainly makes sense to be addressing them from a financial perspective." [LC(E)1]

Such admissions indicate that, even though interviewees perceived climate change issues to offer both opportunities and threats, action on climate change issues were taken only when these were perceived as threats to their companies. Thus, in line with Prospect Theory, the analysis confirms that strategic decision-makers are "threat-biased". The companies responded quickly when they saw carbon emissions issues as threats to their businesses.

5.3. Use of management accounting in carbon emissions management

This section discusses findings in relation to the use of management accounting techniques by companies in response to regulatory and community pressures associated with emissions management. We also attempt to identify any similarities and differences in the use of management accounting techniques between CI and LC sector firms. Analysis of interview data shows

that companies considered regulatory reporting requirements, enforcement of the Carbon Tax and the necessity for reputational risk management as main drivers for using management accounting techniques in managing carbon emissions.

“... once the NGER Scheme started, we were one of the companies that hit the threshold, so had to start reporting [accounting for emissions] that was another driver in terms of ... managing to reduce, ... so that we're aware of what's going on.” [CI(S)4]

“... it's been more in earnest since the NGERs legislation had been put in place. It would have been for an organisation of our complexity almost impossible to have got accurate carbon metrics [accounting for emissions] without it being legislatively required.” [LC(O)10]

Setting targets for emissions management by CI sector companies appeared to be motivated by the need for active management of emissions in the long-run, the necessity for tracking the effectiveness of the actions against set goals and to capitalise on the associated opportunities.

“... there's a few reasons to set a target. So, you set a target, you have a goal to work towards and to stretch yourself against. Also, it demonstrates that we're actively managing our emissions profile, and capitalising on opportunities to reduce our carbon footprint.” [CI(E)12]

Companies tended to emphasise the need for having a long-term view with respect to emissions management when setting targets.

“I think the purpose of setting targets is ... it's human nature to want to understand how you're going. ... I think it does demonstrate a level of commitment [long-term commitment].” [CI(S)6]

“... I suppose we have a goal to look to and certainly when those goals are set, we know that within those five years we have certain things that are already in plan [long-term plan], because, obviously, we don't plan year to year and pull out stuff out of a hat.” [CI(S)4]

All nine CI sector companies had some climate change-related targets, but only four reported specific targets for emissions reduction. The other five companies had financial or energy efficiency targets that had direct effect on emissions management. The main reason behind this target setting appeared to be companies' desire to be successful in emissions management and to achieve a significant reduction in energy costs.

“We have financial goals and we certainly, ... one of goals in my role is to beat the market price of the carbon. So, if we can identify projects that come in at \$20 a tonne, and they've got a payback period of one year, they make actual returns” [CI(E)1]

For LC sector companies, the desire to enhance reputation was the primary motivation for setting emissions targets.

“It's [target setting] something to talk to our customers about; it's something to talk to our shareholders about. It's more of a PR thing, I guess. ... obviously we're reducing our emissions where possible,, ... but, yeah, it's kind of a PR exercise.” [LC(E)14]

“I think it's [target setting] a win-win really. There're many benefits involved by setting these targets. Not to mention from a reputational point of view, it would look good as well. So, it would be a huge selling point for us...”. [LC(O)4]

However, LC sector interviewees seemed to believe that the target setting could also expose them to an extra risk:

“If we were to publicise our measurements, our results and our targets, which we don't currently, but we are aiming towards doing that, reputation-wise, it doesn't look so good if we're not achieving those targets we're setting ourselves. I guess that's the major risk for it as well.” [LC(O)4]

The above findings are consistent with Legitimacy Theory which recognises negative community perception as a threat to organisational legitimacy (Deegan et al., 2002; Patten, 1992).

However, only a minority of LC sector companies, four of nine, had emissions reduction targets. The interviewees from two of these companies acknowledged that their carbon emissions targets could not be achieved due to reasons such as new acquisitions, expansion of business, lack of leadership and lack of resources. One interviewee commented on resources availability as follows:

“Probably just resource constraint as well. To achieve that target, we had two people working on it, for the whole of Australia.” [LC(S)6]

Most of the companies in the LC sector did not have a willingness to set emissions management targets. This is understandable because LC sector companies do not emit to the extent as their CI sector counterparts. The following response represents such a view held by LC sector interviewees:

“... it [target setting] tends to be a bit too much of just plucking a number out of the air and then, hopefully, working on it. ... So, definitely getting better at that, but it's probably something that, I think, we're working on.” [LC(S)3]

It was also observed that the consideration given to accounting processes in LC companies is much less than for CI sector companies. This is most evident in LC sector financial companies. This may be because financial companies use management accounting techniques as merely a “PR exercise”. Such notions could cause some LC sector companies' carbon emissions practices to be viewed as symbolic exercises (Hrasky, 2012).

Performance measures represent a crucial factor that can ensure the effective implementation of an environmental strategy and the execution of that strategy in accordance with the expectations of the business (Perego & Hartmann, 2009). Our interview evidence reveals that regulatory reporting requirements and enforcement of the Carbon Tax were the main drivers for CI sector companies to measure their carbon emissions. This finding supports the early claim that regulatory requirements such as the NGER Act could have direct influence on measuring and reporting corporate emissions (Lodhia, 2011). The CI sector representatives, however, emphasised that they had been measuring and recording energy consumption from the first day of business operations. The difference now was that they measured not only energy consumption, but also carbon emissions associated with that consumption.

“The history of the manufacturing operations is very energy intensive. So managing energy use, energy consumption, has been a key focus of the business since it started ... In terms of managing carbon [accounting for carbon] - ... the two major emission sources, which is electricity and ... I guess, for those things weren't fully captured before only since Carbon Tax comes in.” [CI(E)8]

The interview evidence also revealed, in line with the pragmatic view of SEA, that CI sector companies seemed to believe that management accounting had the potential to not only increase internal transparency pertaining to emissions issues, but also to draw the attention of the broader community.

“... certainly the community and the investment sectors - have probably shifted focus from the broader environments and sustainability spectrum. I think there's a very strong focus, currently, on carbon, and I think accounting has assisted in that.” [CI(E)12]

However, gaining the attention of the broader community that arose from using management accounting techniques was perceived also to bring risk for their companies by some interviewees. The CI sector interviewees, in particular, seemed to believe that reporting emissions data could make them more visible and put them under the spotlight.

“...the disclosure of both targets [target setting], and the disclosure of emissions [measurements] publicly ... has raised the public and investment communities' awareness. Also, [it has] put into the spotlight the risk and exposure of certain companies, and also how effectively those companies are managing that risk.” [CI(E)12]

For most LC sector companies, measuring, recording, and reporting of carbon emissions seemed to be a new exercise, driven primarily by their need for reputation risk management, fulfilment of regulatory reporting requirements and the enhancement of operational efficiency.

“[Name of the company] of course aims to meet regulations [reporting requirements], really they're doing this because it makes good business sense to do. So, we actually go beyond what's required under regulation. It's not just about its licence to operate. It's also about its licence to grow. So we go beyond regulation.” [LC(S) 2]

Some LC sector managers revealed specifically that they did not conduct detailed measurement of energy consumption before introduction of the Carbon Tax. The increase in electricity prices and greater community pressure motivated them to measure carbon emissions, which, in turn, benefited their companies by enhancing operational efficiency.

“As we began reporting and measuring on our own performance, we initially saw it as if we were going to look at asking our clients to do it, then we thought it was important to do it for our own operations. But ... we very quickly realised there were whole areas of operational efficiency that we didn't really have any transparency over, and that we weren't really actively managing; and in particular energy efficiency, I think, would be the main driver for that.” [LC(S)5]

In general, all interviewees from both CI and LC sector companies admitted that the initiation of measurement processes enhanced the transparency and visibility of energy and carbon emissions drivers. Such initiations also helped their companies to take actions on reducing their carbon footprints:

“Certainly, in terms of tracking to ensure that our emissions reduction measures have been working, and to track our performance over time.” [CI(E)12]

“So, I guess it [measurement] has enhanced visibility of the data around comparability; so that we can estimate what our relative performance is so we've reduced our emissions by 40 per cent since we've started measuring and that's quite powerful.” [LC(S)6]

Providing incentives for employees to manage carbon emissions effectively however was not commonly practiced by sample firms. Only one CI sector company had such an incentive scheme and the executive representing this company did not want to elaborate on it.

“There - I can't comment on - there will be incentives for, possibly, particular employees. But I can't really comment, as an overall, singular incentive.” [CI(E)12]

Nevertheless, a number of interviewees, representing four CI sector firms, acknowledged that their companies had incentive schemes in place for energy efficiency initiatives, which had a direct influence on their carbon emissions management.

"No we don't [have] separate carbon emissions [incentives] It comes back to work the people have done to save energy. It's the same for us as work to save emissions ... there's no political commentary attached to saving energy. There can be some political commentary attached to saving greenhouse gas. What we're after is the result; however we get there." [CI(A)6]

The interviewees from LC sector companies seemed to believe that having an incentive scheme called "carbon emissions management" was simply not practical.

"... if I were to call it [incentive scheme] a carbon emissions management, no, because they wouldn't get it. If I were to say this is an energy - or reducing energy, increased recycling, reduced gas emissions - they would get it, because it's more hands on." [LC(E)1]

Interviewees from remaining sample companies in both the CI and LC sectors with no direct emissions management incentives claimed that they had broader environmental reward schemes that recognised and rewarded initiatives on environmental sustainability.

"There are incentives for sustainability, but not specifically for carbon. ... incentivising people to think more sustainably and integrate sustainability into their day to day jobs. ... We also have an award program where we have categories such as excellence in sustainability...". [LC(E)8]

This absence of incentives relating directly to carbon emissions management was of concern, even though the interviewees claimed that there were some incentives that influenced emissions management indirectly.

6. Discussion and implications

The primary finding of this study is that the managers of large Australian companies appear to have balanced views regarding climate change issues. While they perceived a financial risk and a reputational risk to emerge from the pressures exerted by regulations and communities, they expected the same scenarios to offer them with explorable opportunities. In agreement with Prospect Theory, managerial decision framing (i.e. perceiving issues as 'threats' or 'opportunities') was found to have a direct influence on companies' actions relating to the management of climate change risk. Therefore, the findings are implicative of how managerial 'sense making' (i.e. how managers perceive the regulation of climate change risk and community pressure in an uncertain environment) results in differential actions.

The interview evidence reveals that managers tend to be threat-biased; they respond to threats with more immediacy than they respond to opportunities. This managerial threat bias could impart a negative impact on organisational performance as managers may fail to benefit from the opportunities provided by the same scenario. It is worth noting that almost all interviewees acknowledged many opportunities associated with carbon emissions management, such as development of renewable energy sources, the introduction of low carbon products, and supporting customers in managing their emissions. However, none of those opportunities were identified as having induced their companies to take immediate actions to improve carbon emissions management strategies. Therefore, educating decision-makers on the effects of decision framing and encouraging them to consider each strategic issue from multiple frames could be important since such a holistic perspective is likely to be associated with better outcomes. In relation to the research question investigated in this study, such an approach would assist in ensuring implementation of sound internal processes in relation to carbon emissions management, and achievement of long-term sustainability. As Hoffman (2007) claims, organisations should place a high emphasis on opportunities associated with climate change issues in order to achieve long-term solutions to emissions management. Therefore, it is important for companies to craft their reward systems carefully so as to not only encourage managers to handle these threats successfully, but also to take advantage of potential opportunities.

With respect to the use of management accounting techniques as a response to carbon emissions threats perceived by managers, we found that companies used techniques such as target setting and measurement to a great extent. The majority of interviewees seemed to believe that emission targets helped their companies to focus clearly on the emission management goals, while all interviewees felt that measurement of carbon emissions assisted them in better understanding emissions drivers and enabled their companies to take effective actions. However, implementation of such techniques was not a completely new exercise for CI sector companies. Apart from measuring and reporting emissions for regulatory purposes, these companies effectively engaged in energy reduction practices. The regulatory reporting requirements provided them with incremental motivation to focus more on emissions management. In contrast, for the majority of LC sector companies, use of accounting techniques relating to carbon emissions or energy efficiency was a new exercise deemed to be driven mainly by managing reputational risk, followed by enhancement of operational efficiency and regulatory reporting requirements.

According to Epstein and Buhovac (2014), performance evaluation and reward systems are crucial in creating a culture where employees understand and work toward corporate social and environmental goals. According to the CDP Global 500 Climate Change Report (2013b), companies with monetary rewards linked to energy/emissions reduction were more likely to report decreases in emissions. However, the sample companies in both sectors used incentives for emissions management

sparingly implying that their incentive schemes were linked mainly to economic performance. The absence of appropriate incentive schemes for emissions management may lead to a ‘crowding out’ effect, in which strong emissions reduction investments with marginal economic return could be assigned lower levels of importance by organisational participants.

With respect to the implementation of management accounting techniques, CI sector companies spearheaded their LC sector counterparts by using carbon emissions information to effectively face the financial threat imposed on them by measuring and reporting of emissions levels, engaging in energy reduction practices, employing accounting processes and using that information for internal decision-making purposes. The lacklustre consideration given to accounting processes in managing carbon emissions by LC sector companies may be due to their tendency to utilise accounting techniques as a “PR exercise” in managing their reputational risk. If LC companies use accounting techniques purely for reputational purposes, rather than to enhance carbon emissions performance, they could achieve little benefit in, and little use for, performance enhancement (Chenhall, 2003). Therefore, it is reasonable to conclude that Australian companies take real actions on emissions management only when they perceive climate change issues to pose a financial threat to their firms. This perception contradicts with the findings of the international study by Schaltegger and Hörisch (2015) where large companies were found to focus on legitimacy when shaping their sustainability management practices. However, it is important to note that Schaltegger and Hörisch (2015) did not look into whether these perceptions come from carbon intensive or low carbon intensive firms, nor whether these practices lead to any environmental actions.

Irrespective of the fact that the companies in the two sectors use management accounting techniques in managing climate change risk differently, all interviewees seemed to believe that management accounting information facilitated better understanding of carbon emissions issues, enabling their companies to take effective and corrective actions. The management accounting information not only helped managers make better decisions regarding emissions management strategies, but also provided feed-forward information on their carbon emissions. This could influence managerial perceptions of emissions issues by opening up new opportunities and revealing risks associated with companies' carbon emissions.

The threat biased behaviour of managers could have implications for carbon management strategies of sample companies. The majority of companies appear to focus on short-term risk management strategies in mitigating carbon emissions risk. Two main reasons contributed to this short termism. First, and most importantly, the great deal of uncertainty that prevailed regarding the regulation of carbon emissions discouraged companies in adopting a long-term perspective for carbon management strategies. Second, the priority given to corporate economic interests encouraged executives to implement short-term strategies that translated into visible reductions in energy costs. However, operating in a country highly vulnerable to climate variations, Australian companies should arguably place significant emphasis in adopting long-term carbon management strategies in order to achieve on-going stability of their businesses. The successful adoption of long-term strategies is possible only if companies carefully identify their carbon emissions risk, develop and implement appropriate plans and monitor and review their risk assessment processes (West & Brereton, 2013). Effective use of management accounting information could play a significant role in such a long-term risk assessment and risk management strategy (Linnenluecke, Birt, & Griffiths, 2015).

7. Conclusion

This study investigates how large Australian companies respond when the risk associated with carbon emissions is regulated and when their legitimacy is threatened through pressure exerted by the community. The study was conducted at a time when an important piece of regulation on climate change risk (i.e. the Carbon Tax) was implemented in Australia and there was an intense public outcry about the issue. This environment provided an ideal setting in which to investigate how managers respond to regulatory and community pressures under uncertainty and therefore to test predictions under Prospect Theory. Thirty-nine in-depth interviews were conducted with executives responsible for carbon emissions management of 18 large Australian companies.

The investigation of managerial perceptions in relation to the regulation of carbon emissions risk and the associated community pressure on their companies' legitimacy in an uncertain environment revealed that managers had a balanced view on climate change issues. They appeared to see both threats as well as opportunities arising from carbon emissions issues. However, companies' actions on carbon emissions management seem to be driven by threats rather than by opportunities. The financial pressure exerted by regulations and the reputational pressure were visible as the main factors that forced companies to take actions on climate change issues. It was seen that CI sector companies' actions were driven primarily by cost reductions associated with energy costs and the Carbon Tax, whereas LC sector companies' main motives were reputational risk management and reductions of energy costs.

Consistent with Prospect Theory, it was evident that managerial perceptions of climate change issues had a direct influence on their emission management actions. It was seen that managers were threat-biased and responded to threats immediately while demonstrating a lacklustre response to opportunities. This type of managerial response indicates that organisational actions were driven primarily by a “business case” of protecting their economic interests and inadequate attention given to opportunities arising from the regulation of carbon emissions risk (such as opportunities to introduce environmentally friendly products or to invest in renewable energy sources) could result in companies missing some strategically important competitive advantages. This managerial threat-bias could have a negative impact on companies' prime objective of protecting their economic interests in the long run. The encouragement of managers to consider strategic issues,

such as climate change viewed from multiple frames, and designing companies' reward systems to motivate managers to focus on opportunities, would minimise the negative effects associated with managerial threat-bias.

This study provides some insights into how climate change risks influence the use of management accounting techniques, and the way in which companies use such techniques. In considering the way in which accounting is used, it is seen that some LC sector companies use accounting techniques symbolically for the sake of portraying a proactive image. As emphasised previously, this misuse of accounting techniques to manage reputational risk is disadvantageous not only to the broader community, but also to companies' internal decision processes. Given that the companies examined were among the largest Australian companies that could make a significant contribution to emission management, it is likely that this misuse or under-utilisation of management accounting techniques could translate into a corresponding carbon emissions under-performance by these companies.

The study also reveals that government-initiated financial pressure through the introduction of the Carbon Tax and reporting obligations through the NGER Act were the main drivers for Australian companies to use management accounting techniques in emission management. However, managers began to look into their companies' emissions data insightfully and used this information for internal decision-making mainly after the introduction of the Carbon Tax. Therefore, the implication is that withdrawal of the Carbon Tax from July 2014 will have a direct influence on how Australian companies use emissions data for their internal decision-making. [Burck, Marten, and Bals \(2015\)](#) also claim that withdrawal of the Carbon Tax may have caused Australia to be ranked worst performing industrial nation with respect to climate change actions. Conversely, despite the fact that regulatory pressure was identified as the main factor driving climate change actions by companies, the uncertainty around regulatory requirements was also identified as an important factor that hindered companies in taking actions on emission management. Especially, it was noted from the interviews with company representatives that regulatory uncertainty was the main factor that hampered companies in investing in long-term emissions actions. Therefore, it is an important obligation of Government if its objective is to achieve a low carbon economy to take the necessary actions to minimise the uncertainties surrounding emission regulations and implement effective legislation that drives Australian companies to manage their carbon emissions. Without such an intervention, the emergence of effective self-motivated actions by companies in emission management is questionable.

Finally, some limitations of this exploratory study are acknowledged. The sample is limited to 18 large Australian companies. Therefore, the findings may not be generalisable locally and in other national settings. The use of semi-structured interviews as the mode of data collection helped to gain an in-depth understanding of how managers perceive climate change issues and how these perceptions translate into emissions management actions. However, interviews also should not be treated as a neutral tool, as there is a possibility that some interviewees may choose not to divulge their true personal views since they are expected to pursue economic goals set by their companies. Therefore, it is possible that some interviewees are motivated genuinely to achieve sustainability but do not divulge their true perceptions to interviewers who are complete strangers to them. This inherent limitation of qualitative research could prevail in this study to some extent.

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Appendix 1. Semi-structured interview questions

Background

1. With respect to carbon emissions management, please describe your role in the company and how long you have been in it.
2. How many people are involved in carbon emission management activities in your organisation?

Focusing on the strategic element....

3. How long has your company been managing carbon emissions, and which areas of the organisation are involved?
4. What factors encourage your company to take action on carbon emissions?
5. What factors hinder your company from taking action on carbon emissions?
6. Please explain whether your company see carbon emissions issues either as threats or opportunities in achieving your organisational objectives.

Focusing on the management of carbon emissions.....

7. How does your company manage carbon emissions issues? Please provide an overview (broad goals and timeframes) of the type of action plan(s) your company has in place.
8. Does your company measure the carbon emissions performance of its business activities? If so, what type of performance indicators does your company use?
9. Does your company provide any incentives to your employees/customers/suppliers to reduce their carbon emitting activities? If so, what form do these incentives take?
10. When preparing company budgets, how does your company incorporate carbon emissions costs relating to your business activities?
11. How does your company communicate its environmental values internally and externally?
12. What has your company been learning from the use of accounting (i.e. doing planning, forecasting, setting targets, measuring performance) to manage carbon emissions over time?
13. Are there any barriers in using accounting practices (i.e. planning, forecasting, target setting and measuring performance) for emission management?

Focusing on outcome.....

What benefits has your company experienced from managing its carbon emissions?

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