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Mixed Methods Research: A Comprehensive Approach for Study into the New Zealand Voluntary Carbon Market

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Abstract

Climate change and solutions to solving this wicked problem require a mixed methods research approach that draws on quantitative and qualitative inquiry together. The purpose of this article is to demonstrate the applicability (and effectiveness) of a mixed methods approach applied to research into the voluntary carbon market (VCM), a key path available for organisations electing to offset their carbon emissions, in New Zealand. The mixed methods approach included three unique data sets (quantitative documents, quantitative surveys, qualitative in-depth interviews), and was both explanatory (qualitative interviews built upon and contextualized the document analysis and survey results) and convergent (data sets were examined separately, then, as they represent different aspects of the same phenomenon, were combined for analysis). These complementary methods were used to gain a fuller picture of the evolution and institutional dynamics of the VCM field in order to produce a comprehensive case study.

Keywords

Document Analysis, Survey Analysis, Interview Analysis, New Zealand, Voluntary Carbon Market

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Mixed Methods Research: A Comprehensive Approach for Study into the New Zealand Voluntary Carbon Market

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Climate change and solutions to solving this wicked problem require a mixed methods research approach that draws on quantitative and qualitative inquiry together. The purpose of this article is to demonstrate the applicability (and effectiveness) of a mixed methods approach applied to research into the voluntary carbon market (VCM), a key path available for organisations electing to offset their carbon emissions, in New Zealand. The mixed methods approach included three unique data sets (quantitative documents, quantitative surveys, qualitative in-depth interviews), and was both explanatory (qualitative interviews built upon and contextualized the document analysis and survey results) and convergent (data sets were examined separately, then, as they represent different aspects of the same phenomenon, were combined for analysis). These complementary methods were used to gain a fuller picture of the evolution and institutional dynamics of the VCM field in order to produce a comprehensive case study. Keywords: Document Analysis, Survey Analysis, Interview Analysis, New Zealand, Voluntary Carbon Market

Mixed methods research designs have been growing in popularity in the accounting literature (Brown & Brignall, 2007; Kakkuri-Knuuttila, Lukka, & Kuorikoski, 2008b; Lee, 1991; Modell, 2005, 2010; Vaivio & Sirén, 2010). Accounting draws theoretical and methodological inspiration from multiple disciplines (mathematics, economics, sociology, organizational studies, behavioral science, etc.) to investigate complex organizational transactions. Brown and Brignall (2007) suggest that this multi-disciplinary characteristic makes accounting studies ideal candidates for multi-method research designs.

Following this reasoning, climate change accounting and other alternative accounting research which incorporate an additional multi-disciplinary dimension are supremely suited to the use of mixed methods. Researchers in these fields have responded accordingly: “The social and environmental and critical accounting research communities are known to embrace methodological pluralism and inter-disciplinary perspectives on accounting” (Milne & Grubnic, 2011, p. 950).

However, the use and usefulness of mixed methods has been the subject of academic debate (Ahrens, 2008; Bryman, 2007; Kakkuri-Knuuttila, Lukka, & Kuorikoski, 2008a; Parker, 2012). Primary criticisms stem from a presumed incommensurability between quantitative and qualitative approaches due to an underlying philosophical gap. Quantitative and qualitative studies are commonly equated with positivism and interpretivism respectively; these approaches are said to hold fundamentally distinct underlying assumptions and agendas. Attempting to bring together evidence from these different perspectives is thus viewed by some as an impossible pursuit (see Teddlie & Yu (2007) and Santiago-Brown,

Jerram, Metcalfe, & Collins (2014) for exceptions). Academic researchers are often clustered into disparate camps and publish in separate journals promoting their preferred paradigm. Since accounting has traditionally favored quantitative positivist research, Parker (2012, p. 61) warns of the “romance of objectivising qualitative research” to validate findings. Though qualitative research can and should stand on its own merits, integrating different methods can be beneficial. As Kakkuri-Knuuttila et al. (2008b) demonstrate, in practice divergent paradigms can co-exist and co-operate; straddling the subjective/objective divide is possible.

Mixed methods can involve multiple researchers, data sets, methodologies, and/or theories.¹ The term usually implies integration of quantitative and qualitative dimensions (Johnson, Onwuegbuzie, & Turner, 2007). Application of both quantitative and qualitative methodologies can yield assessable statistical results as well as in-depth contextually grounded understanding of underlying processes and relationships. The components must be mutually illuminating to ensure that “the end product is more than the sum of the individual quantitative and qualitative parts” (Bryman, 2007). Thus, integration is essential. Without it, the research design becomes simply a collection of methods that might “talk past” each other (Brown & Brignall, 2007).

In her editorial “Mixed Methods and Wicked Problems,” Mertens (2015) highlights the merit of mixed methods in pursuing solutions to complex problems such as climate change. As the author explains, wicked problems like climate change “involve multiple interacting systems, are replete with social and institutional uncertainties, and for which only imperfect knowledge about their nature and solutions exist” (p. 3).

Indeed, climate change has the potential to significantly alter the world as we know it in terms of both the environment and the way in which societies operate. In response, and in a variety of ways, organisations are taking notice and taking action (e.g., Besio & Pronzini, 2014; Birchall, 2014; Galbreath, Charles, & Klass, 2014; Lee, 2012), including engaging in the voluntary carbon market (VCM).

The purpose of this article is to demonstrate our mixed methods approach to research into the VCM. The design type we decided on is both explanatory (qualitative interviews built upon and contextualized the document and survey results) and convergent (data sets were examined separately, then, as they represent different aspects of the same phenomenon, combined for analysis) (e.g., Harrison, 2012). These complementary methods were used to gain a fuller picture of the evolution and institutional dynamics of the VCM field in order to produce a comprehensive case study.

We have organized this article around four substantive sections. Building off the Introduction the body of the article describes the three phases of the research, and discusses decisions around why particular approaches were adopted for this program. We then highlight the limitation of the research and offer concluding thoughts on our approach.

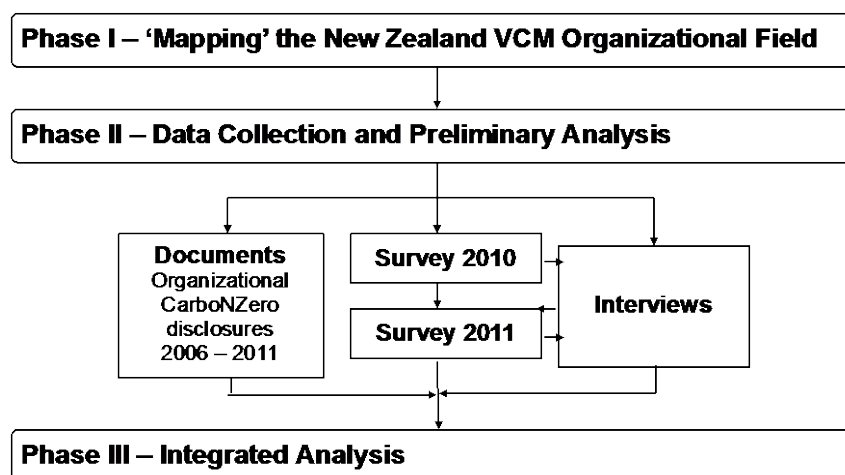
Our Mixed Methods Approach²

As a research team, with backgrounds in environmental science/ studies, engineering and accounting, and positioned in the field of accounting through a College of Business and Economics, we decided that a mixed method approach would yield the richest and most dynamic data. The following describes our approach (Figure 1).

¹ The use of multiple methods can be applied in many different ways for many different reasons. Harrison (2012), drawing on Bryman (2006), provides a summary table describing these various design types and rationales.

² The University of Canterbury Human Ethics Committee approved this research.

Figure 1: Research Design Summary



Phase I: Mapping the New Zealand Voluntary Carbon Market

Phase I of the research involved “mapping” the New Zealand VCM organizational field by identifying organizations providing and purchasing offsets and services. Given the country’s small size and geographical isolation, we believe New Zealand offers the unique advantage of exploring the entire range of consumption, production and services related to the carbon industry within well-defined and manageable boundaries. We focused on organizations that were self-declared, accredited with, or pursuing “carbon neutral” status under voluntary carbon offset schemes, as well as their interaction with the evolving carbon market services industry.

Initially, we identified organizational actors from prior knowledge and by searching company websites and media releases. Information gathered from these initial sources lead us to further points of research in a snowball effect. As organizations were found, we searched their websites to identify with whom they interact, such as clients or service providers, who might also be involved in the field. Their environmental certifications or affiliations were researched to identify further potential actors. We found that certifier and registry websites were particularly useful to identify multiple actors engaging in the market.

We carried out general internet searches using Google for field related terms such as “carbon neutral,” “offset,” “carbon market,” “emissions trading,” etc., with and without a “New Zealand” qualifier. Although all leads were thoroughly examined, the resulting list of organizational actors comprising the New Zealand VCM field was not expected to be exhaustive. The field was in a state of continual flux, thus making the search potentially infinite. The initial search was therefore limited to a three-month time frame ending in May 2010.

Phase II: Data Collection

Phase II of the research involved collecting data and conducting preliminary analysis. Three types of data were collected: (1) Documents, (2) Surveys, and (3) Interviews.

Documents

CarboNZero is the most prominent carbon neutral certifier in New Zealand. Their clients are required to produce yearly third-party verified public reports of their GHG

emissions and carbon management plans. These disclosure documents allowed for a quantitative review of program participation trends and historical GHG emission accounts, thereby providing evidence of the evolution of the carbon market as well as the level of success of the program in reducing organizational emissions.

CarboNZero has two certification programs: CarboNZero^{Cert} and CEMARS^{Cert} (Carbon Emissions Measurement and Reduction Scheme). While both programs involve measuring and reducing emissions, the former also includes offsetting emissions. We compiled and examined disclosures made by participants in these two programs: 340 disclosure documents (263 for CarboNZero^{Cert} and 77 for CEMARS^{Cert}) from 136 organizations were collected and tabulated (including total emissions and offsets purchased for each disclosure year).³ These account for all available program disclosure documents from New Zealand participant organizations from 2006 (beginning of formal certification) until the end of the collection period in March 2012.⁴

Surveys

An important step in the case study was to gain direct insights from the entire range of actors in and around the VCM field. We used surveys to achieve this aim. The survey was delivered in 2010 and 2011 (with adjustments to test for changes in the market through time).⁵

Survey Design

We designed the web-based survey using Qualtrics software. This method was chosen to facilitate administration, response and analysis (Dillman, Smyth, & Christian, 2008). For example, questions not relevant to a respondent are automatically skipped⁶, multiple-choice options are randomized where appropriate to prevent order bias⁷, and multiple-choice responses are automatically coded and easily exported to analysis software. Although there are some potential limitations with the web-based method, mainly certain respondents' preference for hard-copies or telephone surveys, we deemed the conceivable skewing effect to be minimal (Dillman et al., 2008).

The questionnaire was deliberately designed (e.g., using a combination of multiple-choice, short and longer answer questions) and organized to minimize respondent fatigue and keep respondents interested. Each questionnaire web-page contained a progress bar and only a small number of questions to maintain respondent motivation through forward movement. The questionnaire begins with quick and easy to answer questions that tie in directly with the project description. For example:

“Have you ever heard of the term “carbon neutrality?”

³ Both programs were included in this study for comparison. For a more detailed discussion of the evolution of these programs, see Birchall et al. (2015).

⁴ The first available documents were for the 2005-2006 certification period, while the most recent documents at the time of collection were for the 2010-2011 certification period, which runs from 1 July 2010 to 30 June 2011.

⁵ A devastating earthquake as well as numerous aftershocks occurred in Christchurch, New Zealand during this interval, adding a further dimension to before and after comparisons.

⁶ Several sections of the questionnaire begin with a question that determines if that section is relevant to the respondent. For example, “Does your organization measure its greenhouse gas emissions?” If the respondent selects “no,” then the remaining questions on measurement are automatically skipped.

⁷ Literature suggests that respondents may be slightly more likely to select the first given option but this effect is minimized by randomizing the order of answer options (Dillman et al., 2008).

“Do you actively promote carbon neutrality to other organizations?”

“What do you believe is the primary motivation for achieving carbon neutrality?”

It has been shown that starting with questions directly related to the research topic is more motivating for participants and results in higher response rates (Dillman et al., 2008).

We organized the questions into twelve sections: (1) Climate Change Perceptions; (2) Motivators and Barriers; (3) Strategy; (4) People; (5) Measurement; (6) Commitments; (7) Carbon Neutrality; (8) Offsetting; (9) Services Offered; (10) Perception of Actions; (11) Demographics; and (12) Additional Comments. Since the VCM is an emerging field in which institutions have yet to be firmly established, actors in this field have the potential to act as institutional entrepreneurs and shape the rules, norms, beliefs, and ultimately the actions and outcomes of organizational carbon management. The survey sections were designed to gain direct insights about participant’s cognitions, commitments, and actions from the entire range of organizations in and around the field. Responses also allowed us to critically investigate important institutional entrepreneurship constructs such as institutional structures, legitimacy concerns and motivations, agency, interests and power in the evolving VCM field.

Given the newness of the field, open-ended questions - although more onerous on the respondent - were judged essential in certain instances to elucidate insights into what people believe is most important. Sample open-ended questions included:

“What is the main barrier against taking climate change action for your organization?”

“What most influenced your organization’s climate change strategy?”

“When you think of “carbon neutrality”, what are the first three words that come to mind?”

“Please explain in one or two sentence your understanding of carbon neutrality.”

“Why did your organization purchase emissions offsets?”

In order to allow respondents the opportunity to indicate their level of agreement or disagreement with a particular statement, we used Likert scales for a number of multiple-choice questions. For example:

“Climate change is real.”

“Climate change is human-caused.”

“Organizations making voluntary choices about the environment will provide adequate environmental protection.”

“Greenhouse gas emissions should be regulated by the government.”

In almost all cases a six-point scale with no neutral option (“neither agree nor disagree”) was provided, although a “don’t know” or “not applicable” option was often

available. The six-point scale was chosen to allow for measurable variations in the degree of agreement while forcing respondents to choose a side, agree or disagree (Dillman et al., 2008).

We carefully crafted each question to ensure that it was clear, concise and useful to the project aims. Although no explicit cross-check questions to test the reliability of responses were included in the questionnaire due to concerns over the length of the instrument, related questions placed in different question blocks allowed us to investigate response consistency.

The survey was reviewed by insiders and outsiders prior to administration to further ensure clarity, disambiguation, and usefulness of all questions: Two project supervisors, one colleague familiar with the project, one colleague not familiar with the project, and one member of the carbon services industry tested the survey instrument. Testing by the carbon services member was performed in front of the researcher to note any initial reactions and hesitations that could later be discussed to improve the survey instrument. The testing resulted in shortening of the questionnaire by removing questions deemed unessential to the project aims and combining similar questions into multiple-choice matrices where appropriate⁸. In addition, we sent the survey to a small sample of the target organizations two days prior to the remaining potential participants to further ensure that there were no glitches with the survey instrument; no problems with the survey instrument were identified.

Survey Participant Selection and Response Collection

The project focused on organizations self-declared and accredited with (or pursuing) “carbon neutral” status under voluntary carbon offset schemes, as well as their interaction with the evolving carbon market services industry. All organizations that we identified during the mapping of the New Zealand VCM were solicited for their input. In addition, we also investigated a small sample of potential and non-participants. The selection process for organizations outside the VCM was purposive and semi-random. Using a leading New Zealand business directory, ubd.co.nz, organizations in specific industries and locations were selected to match with those engaging in the VCM field. For example, since several wineries in the Marlborough area engage in the VCM and were solicited for their input, additional wineries in and outside the area, as well as other businesses in the area, were selected for comparison. A total of 292 and 328 organizations were invited to participate in 2010 and 2011, respectively.⁹

The survey was sent to one senior manager or relevant environmental personnel at each selected organization. Where possible and appropriate, the company founder or CEO was the preferred target. These top-level decision-makers were used as proxies for the organization. An invitation to participate in the survey was sent by email and included an attached project information sheet and a link to the web-based questionnaire. In 2010, this was followed two weeks later by contacting potential participants who had not yet responded by telephone to personally invite them to participate in the online survey and a final email reminder was sent one week after that. In 2011, the telephone contact was omitted and only a second final email reminder was sent two weeks after the first reminder.¹⁰

8 For example, previously separate questions enquiring about items used in the GHG emissions measurement process (i.e., external consultant, computer calculation tool, formal guidelines, third-party verifier) were combined into one matrix.

9 The 328 organizations in 2011 include all those contacted in 2010, as well as additional organizations newly engaging in the VCM.

10 Health complications of one of the researchers, following a severe concussion, prevented additional telephone reminders in 2011.

To test for non-response bias, we compared numerical responses from early and late respondents (i.e., respondents who answered following the first email contact versus those who answered following the telephone contact); we found the difference not to be statistically significant. The total achieved survey response rate was 47% (137 respondents) and 32% (105 respondents) in 2010 and 2011, respectively.¹¹

Survey Analysis Methodology

We compiled survey responses, then tabulated and exported the data to an Excel spreadsheet with each row corresponding to one respondent. The Qualtrics software automatically codes multiple-choice questions into numbered responses when compiling the results. We verified the integrity of the spreadsheet by randomly selecting five respondents and confirming that responses in their individual survey matched those in the tabulated spreadsheet.

We examined open-ended questions for recurring terms and/or themes. To ensure comprehensive and thorough results, the identification of terms and themes was done in a recursive fashion. First we identified the most evident themes, then remaining responses were re-examined for recurring themes, and this process was repeated until no new themes were identified. Each subsequent examination analysed smaller samples making it easier to identify less common but potentially important themes. The identified themes were coded where appropriate.

Category counts and percentages, as well as modes, medians, means, and standard deviations were computed where appropriate for all coded open-ended and multiple-choice questions.¹² The results were then exported into SPSS statistical software for further analysis. Nonparametric statistical measures were used since variables were reported on categorical or ordinal scales that cannot be assumed to be equal-interval. Statistical tests were applied as per Siegel and Castellan (1988) and calculated using SPSS software. Spearman's correlation coefficient was used to test measures of association, the Wilcoxon-Mann-Whitney test (for ordinal) and Chi-square test (for categorical) were used to test the significance of the difference between two independent samples (i.e., participants in different groups), the Kruskal-Wallis Test was used to test the significance of the difference between multiple independent samples, and the Wilcoxon signed ranks test was used to test the significance of the difference between two related samples (i.e., participants answers to different questions).

Interviews

To expand on insights gained from the surveys, we interviewed a cross-section of leaders in the field (Table 1). Actors in the VCM have the potential, either individually or collectively, to become institutional entrepreneurs and shape the rules, norms, beliefs, and ultimately the actions and outcomes of organizational carbon management. The goal of the interviews was to complement survey findings by providing a more in-depth and contextualized look at potential institutional entrepreneurs and at how the process of institutional entrepreneurship was unfolding in the voluntary carbon market.

¹¹ These response rates include partially completed questionnaires. When excluding partials, the achieved response rate is 41% for 2010 and 30% for 2011.

¹² "Don't know" and "Not Applicable" responses were not included in any of the statistical calculations.

Table 1: Interviews by Industry

Code Name	Comment	Interview Date	Length (min)
Wine			
Wine 1	CarboNZero certified	02-Dec-2010	70.5
Wine 2	Aspiring to be carbon neutral	03-Dec-2010	36.5
Wine 3	CEMARS certified, considered carbon neutrality but decided against it	16-Dec-2010	56
Taxi			
Taxi 1	Carbon neutral, not certified	07-Dec-2010	83.5
Taxi 2	CarboNZero certified	29-Nov-2011	72
Taxi 3	CarboNZero certified	10-Dec-2010	111
		08-Dec-2011	183
Carbon Services			
Certifier 1	Carbon neutral certifier	06-Dec-2011	112.5
Certifier 2	Former carbon neutral certifier	01-Dec-2011	37
Consultant 1	Consultant; offset provider	05-Dec-2010	120
Consultant 2	Consultant; project developer	06-Dec-2010	109.5
Registry 1	Leading offset registry	20-Dec-2010	46
Auditor 1	Big four accounting firm; Carbon claims auditor	17-Dec-2010	83
Energy			
Energy 1	Formerly CarboNZero certified, currently CEMARS certified; offset provider	09-Dec-2010	70.5

Interview Design

Qualitative semi-structured interviews were carried out with managers and decision-makers. We investigated participants regarding their cognitions, narratives, sense-making, and accountabilities, as well as their operational activities and interactions with the range of actors in the field; and how these evolved over time. We formulated questions to identify perspectives and opinions on climate change strategies, carbon neutrality, offsetting and their organization's involvement with the New Zealand VCM.

Each topic was explored in terms of: Who? What? Why? How? In addition, participants were asked specific questions related to their survey responses and/or related to publicly available information such as organizational climate change policies, emissions inventories, and media releases. Interviewees were encouraged to expand upon ideas. Short silent pauses before moving on to the next question were used as a technique to ensure that the interviewee had exhausted their thoughts on the topic. The semi-structured interview design allowed for exploratory questions with a free flow of conversation.

Interviewee Selection

We selected organizations and industries most associated with carbon neutrality in New Zealand for interviews. The prominence of certain organizations in the VCM was confirmed by a survey question asking respondents to identify organizations that come to mind when they think of carbon neutrality.

The chosen organizations represent a cross-section of those involved in the New Zealand VCM: 2 certifiers, 2 consultants, 1 registry, 1 auditor, 3 CarboNZero certified, 1 carbon neutral non-certified, 1 looking into becoming carbon neutral, and 2 CEMARS certified (i.e., decided against carbon neutrality, including one formerly CarboNZero certified). Two of these organizations also directly provide offsets: one in the forestry sector (Consultant 1) and one in the energy sector (Energy 1). The organizations thus include a range of offset buyers and sellers, as well as middlemen.

We chose the wine industry and the taxi industry for case studies. Three organizations from each industry were selected. Both industries include businesses that actively promote themselves as carbon neutral. Wineries were among the first business organizations to become involved with carbon neutrality. The three wineries investigated in this study represent different levels of involvement with the VCM: one was CarboNZero certified, one was aspiring to become carbon neutral and was just starting to look into options on how to achieve this goal, and one decided against carbon neutrality but was measuring and attempting to reduce its GHG emissions. In contrast, all three selected taxi companies advertise themselves as carbon neutral; one was self-proclaimed carbon neutral while the other two were CarboNZero certified. Highly visible street presence and advertising, as well as the recent taxi industry shake-up with the hybrid movement provide an interesting case study.

The carbon services industry was also included in this study. This new industry rapidly evolved and expanded to fill any perceived needs associated with the carbon market and provide an infrastructure of skills for organizational climate change actions and emissions trading. Service providers advise their clients and thus have the potential to influence norms and practices. Two carbon neutral certifiers, two consultants, one auditor, and one offset registry were included in this study.

Interviewees included a senior manager or appropriate environmental personnel at each selected organization. Where possible and appropriate, the company founder or the person(s) who initiated climate change initiatives was interviewed. In other cases, the person responsible for continuing or for looking into organizational climate change actions was selected. Since individuals who occupy higher hierarchical positions are more likely to have the knowledge, authority and key resources to act as institutional entrepreneurs and implement divergent organizational change (Battilana, 2006), these managers and decision-makers were deemed the most apt sources of information on the research topic.

The interviews were conducted at the end of the year in 2010 and 2011. Investigation at two time points had not been part of the original research plan. Some of the interviews were delayed due to a concussion and long-lasting post-concussion symptoms suffered by one of the researchers. However, consistency of the survey results between 2010 and 2011 indicate that the effect of the delay is likely minimal. To further minimize and account for any time-based effects, the 2011 interviews consisted of directly comparable organizations. In short, 20 hours of interviews were conducted during 14 interviews at 13 organizations with key actors in the New Zealand VCM.

Interview Analysis Methodology

Digital recordings of the interviews were transcribed by a professional service.¹³ The transcripts were then reviewed and checked for accuracy by the researchers. The transcripts

¹³ Transcriptions were done by the Centre for Evaluation & Monitoring [CEM (NZ)] at the University of Canterbury; they provide professional and confidential transcribing services.

were also sent to the interviewees for verification.¹⁴ Transcripts were edited to remove speech ticks (e.g., “you know,” “sort of,” “and things”), remove false sentence starts or broken thoughts were not relevant to the context or idea ultimately presented, and occasionally add punctuation to run-on sentences.

Each interview was first analyzed individually. Transcripts were thoroughly examined, broken down into topics, ideas, or quotes and then organized into themes. Since the interviews were digitally recorded, minimal notes were taken down by the researchers during the interviews to avoid disruption and fully engage with the interview subject. Immediately after each interview, a brief summary was put together of initial thoughts and potentially important themes and ideas brought up by the interviewee. These preliminary thoughts and themes were taken into account during a re-examination of the transcripts to ensure that no initial impressions were overlooked.

The re-structured and analyzed transcripts were then reviewed for each industry, comparing and contrasting the themes and ideas brought up by the different interviewees. Commonalities and differences between the industries were also subsequently investigated. As Bryman and Burgess (2002) emphasize, qualitative data analysis is a dynamic process with “messy” interactions, back-and-forth, between different sequences and procedures. Analysis was done in an iterative process to explore inter-relationships between discourses. Particular attention was paid to concepts related to institutional entrepreneurship (i.e.: institutional structures, legitimacy, agency, and interests, resources and power). Ultimately, these case studies provide a contextualized look at potential institutional entrepreneurs and at how the process of institutional entrepreneurship unfolded in the voluntary carbon market.

Phase III: Data Integration

We used the three different sources of data to explore and gain a fuller picture of the evolution and institutional dynamics of the VCM:

1. Disclosure documents allowed a quantitative review of organizational emissions changes and participation trends for the most prominent carbon neutral program in New Zealand;
2. Surveys provided insights into the participant’s commitments and actions from the entire range of organizations in and around the field; and
3. Interviews provided an in-depth and contextualized look at potential institutional entrepreneurs and the process of institutional entrepreneurship.

These complementary data sets were analyzed through the lens of institutional entrepreneurship theory and integrated to produce a comprehensive body of knowledge. Integration of the findings was used to complement each other and offer a holistic examination of the research field. Critical investigation of institutional structures, legitimacy concerns and motivations, agency, interests and power relationships was performed at the organizational and field levels. The aim was to increase understanding of the institutions that are emerging in the VCM, the influence that actors have in shaping and sustaining these new

¹⁴ Although most interviewees returned their transcript unchanged or made minor corrections/clarifications, one interviewee notably made major alterations/deletions that de-emphasised the financial motivations and implications of their climate change strategy.

institutions, and the effect these institutional dynamics have on participants' cognitions, commitments, and actions. Taken together, results from the documents, surveys, and interviews form a comprehensive empirical case study of the New Zealand VCM.

Limitations and Reflexivity

The research aims to provide a significant contribution to knowledge in terms of both practice and theory about one way New Zealand organizations are voluntarily managing one of the most important contemporary problems. It amounts to a substantial case study that other nations can use as a comparative reference point for mitigating and managing climate change. Nevertheless, the study has its limitations. The research is confined to the New Zealand context. Although it is not assumed that all findings can be generalized to other national settings or to a global market, they may provide insights into the institutional dynamics involved in shaping carbon markets and organizational carbon neutral strategies. Since managers and decision makers were used as the primary source of information for questionnaires and interviews, the study was limited to a top-level perspective deemed particularly relevant and significant for the issue of institutional entrepreneurship.

The study is also primarily limited to organizations and individuals engaging in the VCM. The focus is on organizations that chose to employ the carbon market to manage and offset their emissions. It is assumed that these organizations are amongst the more proactive with respect to carbon management strategies, and that they represent only a selected range of organizational responses to climate change. Although it would be interesting to investigate how these actors influence those outside the field, this is beyond the scope of this project; nonetheless, a small sample of potential and non-participants were included in the study to obtain a different perspective. Moreover, in addition to focusing on proactive organizations, there is also a risk of self-selection bias. Since participants in the surveys and interviews voluntarily chose to partake in the study, organizations which perceive themselves as doing well may be more inclined to participate (Bailey, 1994). Participants may also be influenced by the very fact of being studied and alter their discourse (McKinnon, 1988).

Furthermore, the data collected through organizational documents, questionnaires and interviews may be limited by the discourse surrounding carbon markets and environmental management. Discourse "acts as a powerful ordering force in organizations" (Alvesson & Kärreman, 2000, p. 1127). It "rules in" and "rules out" certain ways of writing and talking about a topic (Hall, 2001), thereby influencing the construction of reality (Grant & Hardy, 2004). Analyzing discourse can provide valuable insight as to how knowledge is created and promulgated in an emerging field such as the VCM.

As Taylor (2001) stated "all knowledge is considered situated, contingent and partial" (p. 319). It must therefore be acknowledged that the researchers' background and beliefs undoubtedly informed the analysis. The results and discussion presented are the researchers' interpretations. This is particularly true for research that is qualitative in nature. Reflexivity requires recognition and disclosure of potential predispositions from the onset.

As a research team, we have backgrounds in environmental science/ studies, engineering and accounting. Our educational and work background provided us with a well-rounded understanding of industrial processes, their impact on the environment including monitoring and assessment, and the regulatory and economic challenges faced by organizations. This study is positioned in the field of accounting through a College of Business and Economics. Because our team includes a multidisciplinary perspective, this afforded a fresh outlook on the subject matter and allowed a critical investigation of ready-held assumptions.

From an ideological standpoint, we recognize that we live in a capitalist society but also view this society and economy as contained within the all-encompassing sphere of the

biophysical environment. Without the environment, there can be no society or economy. We thus believe in taking all reasonable measures to act sustainably, but would stop short of considering ourselves environmentalists. In terms of climate change, we came into this study convinced by the scientific evidence that it is real and human-caused¹⁵, but with no strong pre-conceived opinions on carbon neutrality, offsetting, or how best to manage the problem.

In short, the research was confined to the New Zealand context, focused primarily on a particular proactive spectrum of organizations, and was necessarily informed and interpreted by the researchers.

Conclusion

Organizations are central to the success or failure of efforts to mitigate anthropogenic climate change. In this study we used a mixed methods approach to investigate the emerging New Zealand VCM and organizational carbon neutral strategies. We analyzed three data sets using methods relevant to each set. The three sources provide complementary information: (1) the CarboNZero disclosure documents (326 in total) provided quantitative evidence of the evolution of carbon market participation and emissions reduction success rate; (2) the surveys (137 responses in 2010 and 105 in 2011) provided insights about participants' cognitions, commitments, and actions from a full range of organizations in and around the field; and (3) the interviews (20 hours from 13 organizations) provided an in-depth and contextualized look at potential institutional entrepreneurs and the process of institutional entrepreneurship.

Overall, analysis of CarboNZero disclosure documents suggests that growth of the VCM organizational field is slowing. Further, the data indicate that organizations participating in the CarboNZero^{Cert} and CEMARS^{Cert} programs were only minimally successful at reducing their emissions, with 38% and 54% of organisations respectively, having reduced their absolute emission (Birchall et al., 2015).

With that said, survey results reveal that the majority of respondents strongly agreed that climate change is real, that it is human-caused, and that their organisation can indeed make a meaningful contribution to climate change prevention. Nevertheless, there were mixed views regarding whether organisations making voluntary choices about the environment will provide adequate environmental protection. Moreover, though it was hypothesised that organisations that have been measuring their emissions for longer would be more likely to report a decrease in emissions, no significant correlation was found; thus supporting the notion that meaningful emission reductions may remain elusive under a voluntary scheme. In this vein, most respondents agreed that emissions should be regulated by government.

Findings from interviews with key actors highlight the setbacks and successes of the VCM. The major setback is summarized as market stagnation, with buyers and sellers drifting away from the VCM. Communication challenges, low certification recognition, risk of greenwash exposure, policy uncertainty, the global financial crisis, and general disenchantment with the carbon market were listed as some of the causes. Successes include endeavours which focused on promoting market integrity through infrastructure (e.g., a registry, certification programs). Networking, knowledge sharing, and influencing others to shift behaviour were also identified as successes.

Participation in the New Zealand VCM has become a preferred option for organizations looking to offset their carbon emissions. However, while the VCM has shown

¹⁵ We believe that although natural factors play a large role in climate change, human activities have caused a more rapid change that has exacerbated the steady-state equilibrium.

promise, it is not evident that it represents a fundamental shift towards a low-carbon economy.

Climate change and solutions to solving this wicked problem require a research approach that is holistic, one that draws on quantitative and qualitative inquiry together, instead of being confounded by their underlying philosophical differences. This article reinforces this notion, and demonstrates that taken together, the mixed methods approach of this research forms a unified and comprehensive methodology for the study of the evolution and institutional dynamics of the New Zealand VCM.

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