The Organisational Climate of Sustainability: A Survey

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Abstract: This study describes three dimensions of the climate of sustainability and the development of a survey for assessing these dimensions. The authors report the results of two studies conducted to measure the climate of sustainability dimensions of sensitivity to sustainability (six items), motivation for sustainability (six items), and responsibility for sustainability (five items). Results support that the climate of sustainability is a reliable instrument and demonstrate the convergent and discriminant validity of each survey dimension. Furthermore, results show the criterion-related validity of the climate of sustainability with respect to innovation strategy and employee attitudes including satisfaction and turnover intentions. Implications and suggestions for the use of this survey in future research are discussed.

Keywords: sustainability; organisational climate; ethics; innovation.

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1   Introduction

The ultimate goal of intermodalism is the development of a transportation system that promotes sustainable and ethical mobility (The National Center for Intermodal Transportation, 2008). More specifically, a sustainable transportation system needs to provide optimal, affordable and safe transportation for all of its constituents. It supports sustained economic growth and trade, limits waste, emissions and noise pollution and minimises the consumption of non-renewable resources. It is a system that is concerned with the sustained health of economic, social and environmental systems.

In 1987, The World Commission on Environment and Development (WCED) published a globally accepted definition of sustainable development. It identified that many of the current unsustainable systems are rooted in technological inadequacies and inequitable social organisation. Since then companies have increased their efforts to respond to these concerns. For example, more than 80% of the largest corporations worldwide report their environmental efforts and activities (Edwards, 2008). Many companies engage in efforts to more effectively balance environmental, economic and social sustainability. Most of these efforts are the result of governmental regulation and policies (Orts, 1995; Shrivastava, 2008), only few of these are systematic efforts. Yet, addressing these problems and concerns requires systemic change (Senge et al., 2007). A systemic change in local, regional and global transportation systems can not be forced by government or state regulation. It requires a voluntary shift in behaviours, values, beliefs, attitudes and mental models (Arnaud and Williams, 2010; Senge et al, 2007). It requires a shift in the climate of the company and system.

The organisational climate represents a values-based system that instils enduring beliefs, attitudes, mental models and behaviours. Furthermore, organisational climates have a stronger influence on promoting desired attitudes and behaviours in organisations than rules-based systems such as regulation and policies. For example, in the ethics literature values-based systems such as a strong ethical climate have been found to be more effective in promoting ethical behaviour than other state, government, or organisational policies and rules (Paine, 1994; Treviño and Weaver, 2001). Hence, companies need to adapt a climate of sustainability, a values-based system, to foster optimal balance between environmental, economic and social sustainability efforts. The purpose of this paper is to describe what constitutes a climate of sustainability and develop a measure for assessing it. Results of two studies offer initial support for the validity of the construct and its measure. The study concludes with suggestions for practical implications and future research.

Before defining the climate of sustainability and its dimensions, it is important to summarise some of the key developments on sustainability and review some of the important research that shapes our understanding of sustainability. This review serves as a foundation for the development of the climate of sustainability and its dimensions.

2 The conceptual foundation for the climate of sustainability

The WCED defined in its final report, commonly called the Brundtland report, the most commonly cited definition of sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987). Viederman (1994) built on this definition to define sustainability as a participatory process, in which organisations play a key role. He explains that sustainability requires participation from all of society's stakeholders to pursue a vision of community. This vision requires stakeholders to respect and make prudent use of the natural, human, human-created, social, cultural, and scientific resources. Stakeholders need to assume responsibility for future generations to provide them with the "where-with-all for their vision, hoping that they have the wisdom and intelligence to use what is provided in an appropriate manner" [Viederman, (1994), p.5].

Environmental sustainability is frequently considered the single most important sustainability concern. However, sustainability is more than just environmental sustainability and encompasses three important concerns: economic sustainability, environmental sustainability and social sustainability. Balancing the sustainability of these three dimensions is a critical and difficult endeavour (Arnaud and Williams, 2010). Environmental sustainability is directly linked to economic and social sustainability. It refers to a systems ability to conserve natural systems and limit the harm inflicted on those natural systems. While being sufficient to maintain the functions of society and the overall economy, the total volume of resources extracted may not overburden the environment (Giljum et al., 2005). Economic sustainability refers to a systems ability to achieve sustained, equitable prosperity and economic continuity. This supports "permanent income for mankind, generated from non-declining capital stocks" (Spangenberg, 2005). Social sustainability refers to a systems ability to promote enduring human health, healthy communities and social systems, and fair labour and community practices to encourage human well-being (Viederman, 1994).

2.1 The need for a climate of sustainability

Government and state regulation and policies have been enacted to promote sustainability. For example, the United States Environmental Protection Agency was created on December 2, 1970 to protect US natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade. The agency's goal is to make communities and ecosystems diverse, sustainable and economically productive. Burtraw and Portney (1991) reference over 100 independent federal environmental statues. Numerous state level regulations have been developed and implemented to foster healthy, safe, sustainable communities (Orts, 1995; Rosenbaum, 1991). In addition, companies have adapted initiatives to promote economic, environmental and social sustainability. The Global Reporting Initiative reports relevant and credible information on the economic, environmental and social sustainability

performance of corporation. The report shows that today over 74% of US corporations enact policies and procedures to actively pursue the sustainability goals outlined above (Sherman and DiGuilio, 2010). These regulations and policies have mitigated many environmental and social problems and have certainly steered corporate attention to sustainability concerns. Yet, these efforts are limited in that they are usually reactive; they represent government responses to infractions that include harm to society and the environment. For example, the Sarbanes-Oxley Act was essentially enacted in response to Enron's bankruptcy and the lost trust in the US accounting system. It was ineffective in preventing harm to Enron stakeholders and society because it was enacted in response to Enron's bankruptcy. Sarbanes-Oxley Act is limited in scope; it includes several specific rules and regulations but does not encompass every possible transgression or desired action.

In addition to governmental regulation, organisations develop policies and procedures to encourage a focus on sustainability performance (Lee, 1993; Shrivastava, 1995). Formal organisational policies prescribe and help to enforce desired values, attitudes, and behaviours with regard to sustainability. These policies are likely to lead to compliance in order to prevent, detect, and punish violations of such policies. However, just like governmental rules-based efforts, they are limited because they require monitoring and control for implementation and enforcement (Arnaud and Sekerka, 2010; Sekerka and Zolin, 2007).

Organisations invest millions of dollars to create control and reward systems to encourage compliance with organisational policies, yet these efforts are frequently considered ineffective and costly. For example, formalised, rules-based systems such as codes of ethics and other ethics policies have been found to be less effective in generating ethical outcomes than systematic, values-based programmes, such as a strong ethical climate (Schminke et al., 2007; Treviño and Weaver, 2001; Treviño et al., 1999). Rules-based approaches are limited directly to the rules and policies they define. They depend on continuous enforcement and control mechanisms to achieve compliance. The goal should not be to replace rules-base systems with values-based systems. The goal is to combine a values-based system, such as an ethical climate, with carefully crafted policies and rules that further promote the development and sustainability of this values-based system. Combining values-based approaches with rules-based approaches does not only result in employee discipline and desired behaviours and attitudes but promotes a more sustainable organisational environment (Arnaud and Rhoades, 2008; Treviño et al., 1999).

Payne (1990) defines organisational climate as a molar concept that represents the relatively enduring quality of the work environment reflecting the content and strength of the prevalent values, attitudes, and behaviours of the members of a social system such as an organisation or work unit. It is proposed that a climate of sustainability will promote desired values, attitudes and behaviours related to balancing environmental, social and economic sustainability. Employees need to develop shared sustainability attitudes, values and behaviours that are directly built into the system of the organisation (Starik and Rands, 1995). A climate of sustainability defines such a system because it represents employees' perceptions of "how things are done around here". It includes characteristics, which the members of the organisation perceive and come to describe in a shared way (Verbeke et al., 1998). In the following pages the key dimensions of the climate of sustainability are explained.

2.2 The climate of sustainability and its dimensions

Shrivastava (1995) explains that corporations have a vast potential to resolve sustainability related problems and concern. Organisations characterised by a climate of sustainability develop values, attitudes and behaviours aligned with their economic, social, and environmental sustainability goals. To achieve sustainability, organisations should promote values, attitudes and behaviours that lead employees to consider the organisation's impact on society and the environment, today and in the future. They must embrace all dimensions of sustainability and consider the intergenerational, intragenerational and interspecies fairness of their actions (Gladwin et al., 1995). This climate of sustainability can limit or promote the judgments of decision makers to do what is right and sustainable (Cohen, 1993; Treviño et al., 1998). Therefore, a climate of sustainability has a strong moral foundation (Arnaud and Rhoades, 2008).

Ethical foundation of a climate of sustainability. Organisations pursuits of sustainability requires a deepened sense of moral obligation to the environment and society. Hence, processes and activities to foster sustainability are generally grounded in ethical decision making. This decision process requires an understanding that polluting the environment and endangering the survival of any species or engaging in activities that endanger the welfare of humans today or in the future is wrong (Howarth, 1992). It is ethical in nature because it requires an understanding and sensitivity to what is right versus what is wrong and a willingness to do what is right for all living things today and in the future. Sustainable processes and activities require a concern for ethics including social justice, avoiding harm, and promoting safety and health. Sustainable development requires organisations to demonstrate a concern for the natural environment and requires a focus on sustainable decision processes, such as the ethical decision making processes, of organisational participants (Flannery and May, 2000). Therefore, a climate of sustainability should be grounded in an ethical process.

Rest (1986) explains that before individuals perform four basic psychological processes before they engage in ethical behaviour. First, *moral sensitivity* involves recognising that an ethical dilemma exists and evaluating how one's actions affect others. *Moral judgment* involves bringing one's moral decision-making framework (as reflected in one's cognitive moral development) to bear on the problem, to determine the ethical course of action. *Moral motivation* concerns the degree to which ethical values dominate other potential values (e.g., power or economic values) in a particular situation. *Moral character* relates to whether people possess the personal responsibility to follow-through on what they determined to be the correct ethical course of action. For moral behaviour to occur, these four factors must all occur: they specify the complete ethical decision-making process and serve as the foundation for understanding ethical decision-making of individuals (Jones, 1991).

Raised to the social system-level (e.g., work group, department or organisation), these four dimensions give rise to the *Psychological Process Model* and define the ethical climate of the organisation (Arnaud and Schminke, 2007). Hence, an ethical organisational climate can be defined by the four dimensions of collective moral sensitivity, collective moral judgment, collective moral motivation, and collective moral character (Arnaud and Schminke, 2007). *Collective moral sensitivity* includes the prevalent mode (of the social system) of imagining what alternative actions are possible, and evaluating the consequences of those actions in terms of how they affect others and who would be affected by them. *Collective moral judgment* reflects the prevalent form

(of the social system) of moral reasoning used to decide which course of action is morally justifiable. *Collective moral motivation* involves assessing whether ethical concerns dominate other concerns when determining actions and reflect whether individuals in a social system generally intend to do what is morally right. Finally, *collective moral character,* describes the norms (of the social system) for implementing a planned course of action characterised by the norms of self-control and assuming responsibility.

The climate of sustainability presented in this research is grounded in these dimensions and the psychological process model described above and includes the dimensions of sensitivity to sustainability, motivation for sustainability, and responsibility for sustainability. Below each dimension is defined in depth.

2.3   Sensitivity to sustainability

Sensitivity to sustainability refers to the shared understanding and care for sustainability. It is characterised by the collective awareness and sensitivity of employees with regard to how they, their work and the organisation are interconnected and interdependent with others, society and the environment. This includes a shared awareness and sensitivity of employees to revere, reduce, and correct the damage that has been done to the environment and society. It also includes a shared awareness and concern related to the company's impact on nature and society today and in the future.

For example, transportation companies with higher levels of sensitivity to sustainability possess a more integrative view of sustainability and engage in a more rigorous life-cycle analysis of impacts. Employees are likely more cautious about their impact on others and the environment and try to save energy in their daily operations. These organisations and work units understand the importance of conservation, recycling, reducing emissions in daily operations and the development of intermodal solutions that save energy. Furthermore, they are aware and sensitive to balancing the needs of the organisation, community, and other stakeholders. For example, they take care to employ work practices that do not violate human rights and demonstrate concern for justice and fair work practices.

2.4   Motivation for sustainability

Motivation for sustainability refers to the prevalent values of the organisation; its shared endurable beliefs regarding what is right and desirable. It promotes balance of economic, environmental and social sustainability. After employees are hired, they are socialised into the organisation. Over time, they either learn the organisation's values or they are going to leave. These values are important because they affect employee decision-making and behaviours (Schneider, 1990; Arnaud and Sekerka, 2010). Motivation for sustainability refers to the shared values of employees that will motivate employees to make decisions that lead to sustainable actions. These values include an understanding and respect for the welfare of all living things and nature. In particular, it includes shared values focused on protection of living beings, things and the natural environment, social and economic justice, fairness and equity, self-transcendence, and conservationism.

The corporate focus on profitability and shareholder wealth creation has promoted an emphasis on values that promote achievement and growth, self-enhancement, economic and political power and organisational dominance regardless the cost to others and the environment. Companies that are motivated to promote sustainability are focused on

'doing what is right'. These companies and work units are less likely to compromise these values to maximise profitability and shareholder wealth. They are less likely to sacrifice the well-being of others, human rights, or the natural environment.

A motivation for sustainability encourages service-orientation, altruism, and prudent risk-taking. For example, individuals who put self-transcendent values (caring about others and going beyond purely egoistic and selfish desires) above self-serving values are more likely to serve the community and engage in ethical behaviours that promote environmental sustainability (Schwartz, 1992; Stern et al., 1995; Egri and Herman, 2000; Karp, 1996). In addition, understanding, tolerance, respects and concern for others has been found to promote pro-social behaviours (Franc et al., 2002; Gaerling, 1999).

These findings suggest that motivation for sustainability, characterised by the upholding of and adherence to these values will be positively linked to decisions and behaviours promoting sustainability. Specifically in the transportation industry, a motivation for sustainability should encourage companies and work units to develop intermodal technology and infrastructure that provide equitable and fair access for people, society and their goods while reducing the impact on the natural environment. These companies exhibit consideration for environmental concerns such as noise pollution and the contamination of land, air and water. These organisations understand the need to protect the welfare of all living beings and nature and have a deep respect for the environment.

2.5 Responsibility for sustainability

This dimension encompasses the norms for implementing actions that promote sustainability. It is characterised by the shared responsibility employees of the organisation assume for the well-being, all living things and nature, today and in the future. It includes employees' shared commitment to meeting the environmental, social and economic goals of the organisation and follow-through on doing what is right for society and the environment. It is defined by the level of support and rewards for sustainability behaviours developed to balance economic, social and environmental performance. These organisations achieve a balance between environmental and economic objectives because employees have a general willingness to deal with external constituents and are committed to achieving integrated solutions (Egri and Pinfield, 1996).

This responsibility for sustainability defines companies that encourage employees to act on a sense of duty to human systems and prevention of harm to those systems. These companies are characterised by a personal and collective commitment to environmental care (Portugal and Yukl, 1994). Values are not compromised and policies and procedures promote the commitment to sustainability and consider the impact of the organisation on society and the environment. For example, the 3M company is defined by a climate with a responsibility for sustainability where employees are encourage and rewarded when initiating Pollution Prevention Pays (3P) projects (Starik and Rands, 1995). Also, the National Audubon Society cut its use of energy by 40% when the organisation and its employees followed-through and implemented solar architectural design, energy efficient lighting fixtures, conservation-oriented maintenance, and energy use programme (Shrivastava, 1995). Finally, Patgonia is a high-end outdoor clothing company with a mission to use business to inspire and implement solutions to the environmental crisis ('Patagonia Founder', 2013). Employees are asked to be sustainable members of their

work and life communities. Patagonia is committed to remain debt free while giving 1% of company total sales or 10% of the company's profits, whichever is more, to environmental groups. Production factories are chosen carefully to ensure human-rights are not violated, labour practices benefit employees, and wages are fair ('Patagonia: A Sustainable', 2013).

A lack of responsibility for sustainability has been associated with a disregard for others and human well-being (Gottfredson and Hirschi, 1990). This evidence suggests that a higher level of responsibility for sustainability will give rise to a balance between environmental, economic and social sustainability performance of the organisation.

In order to test this three dimensional framework of the climate of sustainability, the climate of sustainability survey was developed, including scales for each one the dimensions defined above. In the following section of this paper, the development and validity assessment of the climate of sustainability survey is described.

3   Synopsis of research strategy

To develop and assess the validity of the climate of sustainability survey two studies were conducted.

- *Study 1*. The first study served to develop, refine and test the climate of sustainability survey. First, the researchers used three of the reliable and validated scales of the ethical climate index (Arnaud and Schminke, 2007), including scales for collective moral sensitivity, collective moral motivation, and collective moral character to develop the first version of the climate of sustainability and its three scales.

   Those scales included a measure for sensitivity to sustainability, motivation for sustainability and responsibility for sustainability. Items for each scale were carefully developed to include questions related to environmental, social, and economic sustainability. An introductory paragraph was developed to define sustainability and ask participants to consider sustainability as a three dimensional construct including environmental, social, and economic concerns. Then the researchers conducted a sorting exercise with a group of 15 panelists who included sustainability consultants, experts, and researchers. During the sorting exercise, panelists were introduced to the theoretical model of the climate of sustainability and received definitions of each one of the three dimensions. Then they received a list with all of the items for all of the scales of the climate of sustainability at random (the total number of items included 14 items for sensitivity of sustainability, 24 items for motivation for sustainability, and 23 items for responsibility for sustainability). Panelists were asked to sort items according to the theoretical dimensions. Items were eliminated if the majority of the panelists assigned an item to the incorrect dimension or were unable to assign the item to any dimension. This resulted in a first version of the climate of sustainability with six items for sensitivity to sustainability, nine items for motivation for sustainability, and nine items for responsibility for sustainability.

   This version of the Climate of Sustainability Survey was tested using a sample of 47 MBA (RR = 88%) students from a University in the Southeast of the United States. 68% of the sample were male and the mean age was 29 years (SD = 7.60). Respondents averaged 6.19 years of tenure with their organisations (SD = 8.02). Because we had theoretical support for the existence of three distinct factors and

adopted existing measures we used maximum likelihood extraction with oblique rotation for the factor analysis. Factor analysis yielded three distinct factors with eigenvalues greater than 1 and led to the current version of the climate of sustainability (Appendix). Following the factor analysis we assessed the reliabilities for each factor. The factors showed strong internal consistencies with Cronbach alphas of .92 for sensitivity to sustainability, .90 for motivation for sustainability, and .93 for responsibility for sustainability. (More information about Study 1 can be obtained from the authors.)

Study 1 resulted in the current version of the climate of sustainability with six items for the sensitivity of sustainability scale, six items for the motivation for sustainability scale and five items for the responsibility for sustainability scale.

- *Study 2*. Study 2 was designed to assess the construct validity of the survey, including its discriminant, convergent, and criterion-related validity. The following discussion highlights the findings related to Study 2.

3.1 *Instrument validation*

After developing an internally consistent measure, the next step is to confirm its dimensionality and proceed with construct validation testing (Spector, 1992b). Construct validity includes convergent validity (the extent to which a scale measures what it is intended to measure), discriminant validity (the extent to which a scale measurement differs from measurement of dissimilar constructs), and criterion-related validity (the extent to which the scale is related to its theoretical causes, correlate and effects) (Nunnally and Bernstein, 1994).

3.2 *Sample*

In the Spring of 2010, with the assistance of a team of students of a Southeastern US university, US organisations willing to participate in a study of organisational work climate were identified. Organisations included companies from retail, aviation, and banking industries. Participants from these organisations worked in various departments including customer service, marketing and sales, accounting and administration. In these organisations work units had at least six members. Members of the team served as contact persons for each participating work unit. Agreements to participate were received from 25 organisations, which included both product- and service-oriented firms as well as for-profit and not-for-profit organisations. Work units included a variety of departments such as operations, marketing and finance.

A total of 67 usable surveys were received (RR = 85%). All of the participants were guaranteed confidentiality and anonymity. 62% of the sample was male and had a mean age of 36 years (SD = 12.25). Respondents averaged 7.46 years of tenure with their organisations (SD = 7.54). 50% had a bachelor's degree or higher.

3.3 *Procedure and measures*

Surveys included demographic questions regarding age, sex, education, organisation tenure. Surveys also included the final version of the climate of sustainability survey (Appendix) and scales to assess convergent, discriminant, and criterion-related validity.

To assess convergent validity, two constructs were identified, which can be expected to relate to a climate of sustainability because they are grounded in similar values and beliefs and emphasise the well-being and fair treatment of others. In particular, an abbreviated four-item version (α = .86; Ehrhart, 2004) of the original seven-item version of the *procedural justice climate scale* (Colquitt, 2001) was used to measure the perceived fairness of reward procedures in the organisation. The *perceptions of general justice scale* (α = .82; Ambrose and Schminke, 2000) was included to measure the perceived level of general justice in the organisation. To assess discriminant validity, demographic variables including sex, education and organisational tenure were used. These variables were not expected to be related very strongly to a climate of sustainability.

To assess criterion-related validity, three constructs were included. They have been discussed in the literature as likely outcomes of an organisation's focus on sustainability concern (Arnaud and Sekerka, 2010; Porter and Van der Linde, 1995). These include the four-item version of the *job satisfaction index* (α = .91; Brayfield and Rothe, 1951), to measure overall job satisfaction and the three-item *turnover intentions scale* to measure employee general intentions to leave the organisation (α = .81; Cropanzano et al., 1993). Innovation strategy was measured using the *innovation strategy scales* of He and Wong (2004) and expanded to include a total of 18 items to measure strategies of incremental product innovation and innovation for sustainability. The former were developed based on knowledge statements with respect to innovation from Katila and Ahuja (2002) and were tested for and exhibited satisfactory levels of reliability and validity (α = .91; Tinoco, 2007).

All scales were assessed on a five-point Likert-type scale and were coded such that higher scores represented higher degrees of the construct and lower scores represented lower degrees of the construct.

3.4   Dimensionality – confirmatory factor analysis

CFAs were performed to cross-validate the three-factor structure of the climate of sustainability. The three-factor solution was compared with a one-factor solution. LISREL 8 (Jöreskog and Sörbom, 1993) was used to evaluate the fit of the two models. The covariance matrix was used as input for the CFA. We followed Bollen's (1989) and Hu and Bentler's (1995) recommendation to interpret multiple indexes of fit.

The CFA of the three-factor model was a good fit to the data, χ^2(116, N = 67) = 155.27, p < .00, RMSEA = 0.05, GFI = 0.80, CFI = 0.98, IFI = 0.98, NFI= .93. The alternative one-factor model provided a poorer fit to the data, χ^2(119, N = 64) = 230.67, p < .00, RMSEA = 0.09, GFI = 0.70, CFI = 0.95, IFI = 0.94, NFI = .90. A difference in Chi-square tests indicates that the three-factor model provides a better fit than the one-factor model (p < .05). Also, results support the theoretical prediction that the three factors of the climates of sustainability are distinct.

3.5   Aggregation analysis

The climate of sustainability is a molar construct reflecting the content and strength of the prevalent sustainability values, norms, attitudes, feelings, and behaviours of the members of a social system such as a workgroup, department, or organisation. The climate literature suggests that aggregate scores of individuals' psychological climates

(individuals' perceptions of their work climates) are indicators of collective climates such as the climate of sustainability of an organisation.

Before aggregating the individual responses to the organisation level, the statistical adequacy of aggregation by within-group (here within-organisation) agreement, was determined using the r_{wg} statistic (George, 1990; George and James, 1993). The r_{wg} statistic measures the degree to which individual ratings within an organisation are interchangeable, with mean r_{wg} values of .70 or greater providing evidence of acceptable agreement among member responses on a scale (George, 1990; Janz et al., 1997).

R_{wg} scores for each of the three subscales of the climate of sustainability were assessed. The average r_{wg} of the subscales was .82 with all of the estimates greater than .70. The r_{wg} for sensitivity to sustainability was .87, the r_{wg} for motivation for sustainability was .79 and the r_{wg} for responsibility of sustainability was .79. These results indicate that, at the organisational level, responses on the subscales were homogeneous and that aggregating scores to the organisation level of analysis is statistically justified.

3.6 Factor correlations for the climate of sustainability

Correlations, represented in Table 2, between the factors of the climate of sustainability were reviewed to assess their strength and direction (Scale reliabilities, means and standard deviations are reported in the front of the table). As expected, correlations for the three factors are significant and vary in strength as expected. The average correlations for all of the factors is .52. As expected, motivation for sustainability strongly and positively correlates with sensitivity to sustainability (r = .73) and responsibility for sustainability (r = .76). Also, responsibility for sustainability correlated positively with sensitivity to sustainability (r = .65). Organisations that value sustainability are likely to be perceived to be more sensitive to sustainability concerns and assume responsibility for sustainability. Overall, the climate of sustainability factors all correlate in strength and direction according to expectations.

3.7 Convergent and discriminant validity assessment

Convergent validity is the degree to which concepts that should be related theoretically are interrelated in reality. Discriminant validity is the degree to which concepts that should not be related theoretically are, in fact, not interrelated in reality. Following Campbell and Fiske (1959), convergent and discriminant validity were assessed comparing the correlations of the climate of sustainability scales to measures of other constructs. Correlations including means, standard deviations and Cronbach alphas are reported in Table 2.

3.8 Convergent validity

To assess convergent validity of the climate of sustainability, the correlations of sensitivity to sustainability, motivation for sustainability, and responsibility for sustainability to perceptions of general justice and procedural justice climate were reviewed.

3.8.1 Justice

Justice and sustainability are directly related and grounded in similar values and beliefs of doing what is right and just (Arnaud and Rhoades, 2008; Ambrose and Schminke, 2000). An organisation that cares to balance environmental, economic and social sustainability goals does so because it understands this to be the right and just thing to do. To care for, value and feel responsible for the sustainability of society and to "meet the needs of the present generation without compromising the ability of future generations to meet their needs" is grounded in a commitment to social justice and an understanding that it is unfair to violate the abilities and needs of future generations. The concern for justice and fairness is therefore directly related to the concern for sustainability.

Evidence for convergent validity would be demonstrated if scores on the justice scales were relatively highly correlated with scores on the climate of sustainability scale. For this purpose, two specific justice scales will be studied: perceived general justice scale and procedural justice climate scale. Mean correlation between perceptions of general justice and the climate of sustainability scales was .37. Scores on the perceptions of general justice scale are positively and significantly correlated with scores on the sensitivity to sustainability scale ($r = .50$, $p < .01$), motivation for sustainability scale ($r = .39$, $p < .01$), and responsibility for sustainability scale ($r = .36$, $p < .01$). These findings support that the climate of sustainability is positively and significantly related to perceived general justice and procedural justice climate.

Mean correlation between climate for procedural justice and climate of sustainability scales was .44. Scores on the climate for procedural justice scale were positively and significantly correlated with scores on the sensitivity to sustainability scale ($r = .50$, $p < .01$), motivation for sustainability scale ($r = .53$, $p < .01$), and responsibility for sustainability scale ($r = .44$, $p < .01$). These results suggest that, as expected, procedural justice climate and the dimensions of the climate of sustainability are positively and significantly related constructs.

3.9 Discriminant validity

To assess discriminant validity of the climate of sustainability, the correlations of sensitivity to sustainability, motivation for sustainability scale, and responsibility for sustainability scale to sex, education, and organisational tenure were reviewed. There is not a strong argument for the link between sustainability, sex, education, and organisational tenure. They are distinct constructs and theory does not support a theoretical argument for a significant relationship between climate of sustainability and these constructs. Hence, significant correlations between these constructs are not expected.

Table 1   Regression results

Dependent variable	Product innovation strategy	Innovation strategy for conservation	Job satisfaction	Turnover intentions
n	66	67	67	67
Sensitivity to sustainability	.01	.18*	.53**	−.32*
Motivation for sustainability	.30*	.06	.21*	−.26*
Responsibility for sustainability	.24*	.73***	.01	−.00

Notes: *$p < .05$; **$p < .01$; ***$p < .001$

Table 2 Means, standard deviation, correlations and reliabilities

	α	Mean	SD	Age	Sex	Education	Sensitivity to sustainability	Motivation for sustainability – sustainability values	Responsibility for sustainability	Innovation strategy for conservation	Product innovation strategy	Procedural justice climate	General justice climate	Satisfaction	Turnover intentions
Age		36.14	12.14	1											
Sex		1.37	4.88	–.08	1										
Education		4.26	1.06	–2.67*	–.01	1									
Sensitivity to sustainability	.9	3.16	.85	.32**	–.06	–.10	1								
Motivation for sustainability – sustainability values	.87	2.99	.86	.26*	–.01	–.04	.73**	1							
Responsibility for sustainability	.88	2.73	1.08	.18	–.15	–.02	.65**	.76**	1						
Innovation strategy for conservation	.83	3.11	1.05	.23	–.06	–.08	.61**	.62**	.80**	1					
Product innovation strategy	.83	3.21	1.00	–.02	–.07	–.07	.34**	.48**	.47**	.48**	1				
Procedural justice climate	.86	3.10	.98	.13	–.07	–.09	.50**	.53**	.44**	.43**	.48**	1			
General justice climate	.87	2.40	.96	–.27*	–.02	–.17	.50**	.39**	.36**	.43**	.30*	.60**	1		
Satisfaction	.78	2.19	1.16	–.14	.02	.09	–.45**	–.25*	–.27*	–.37**	–.17	–.26*	.67**	1	
Turnover intentions	.74	3.25	1.22	.30*	.03	–.25*	.52**	.50**	.39**	.52**	.32**	.38**	–.522**	–.51**	1

Notes: *p < .05; **p < 0.01

The mean correlation between climate of sustainability and sex was .10 and correlations for sex and each of the subscales of the climate of sustainability survey were non-significant. The mean correlation between climate of sustainability and education was .08 and correlations for education and each of the subscales of the climate of sustainability survey were also non-significant. The mean correlation between climate of sustainability and organisational tenure was .20 and correlations for organisational tenure and each of the subscales of the climate of sustainability survey were non-significant except for motivation for sustainability (.25, p < .05). Results support expectations that the correlations between climate of sustainability scales and sex, education and organisational tenure are overall insignificant.

3.10   Criterion-related validity

Construct validation includes the assessment of criterion-related validity of the scales under investigation (Spector, 1992b). For this purpose, multiple regression analyses was performed. The results of these analyses are presented in Table 1. Relationships were assessed between climate of sustainability dimensions and organisational innovation strategy including product strategy and innovation strategy for conservation as well as employee attitudes including job satisfaction and turnover intentions.

- *Innovation strategy.* The development of innovative technology, systems and infrastructure is critical to a sustainable transportation system. The literature suggests that the current lack of innovation is a threat to the continued optimisation of intermodal transportation systems (see Finkbinder and Prince, 2007; Gard, 2007; Woodcock et al., 2007). In the past, intermodal transportation innovation in the USA has focused on technological innovation to move individuals and commodities with greater speed and efficiency and regulatory innovation by Federal agencies to improve the efficiency of routes and cost of rates of international carriers (Arnaud and Williams, 2010). In order to address the continuous challenges of balancing economic, environmental and social sustainability in the transportation industry, organisational infrastructure needs to be developed, such as a climate of sustainability, that promotes innovation. A climate of sustainability is likely to promote novel and creative ideas that solve some of the sustainability problems. Therefore, it is predicted that a climate of sustainability is likely to be related to increased innovation. More specifically, the relationship between the climate of sustainability dimensions and organisational innovation strategy including product innovation strategy and innovation strategy for conservation was examined.

  Innovation for sustainability is defined as novel and creative strength-based and problem solving ideas implemented to support sustainability. An organisation that values sustainability and is characterised by a climate of sustainability is likely to encourage and promote innovation for sustainability in order to find alternative solutions to sustainability related problems and concerns (Arnaud and Sekerka, 2010). Therefore, the climate of sustainability should be predictive of innovative activitie*s* and strategies of the organisations.

- *Product innovation strategy.* Motivation for sustainability (β = .30, p < .05) and responsibility for sustainability (β = .24, p < .05) were significant positive predictors

of product innovation strategy. Overall the model explained 25% of the variance in product innovation strategy.

- *Innovation strategy for conservation.* Furthermore, sensitivity to sustainability ($\beta = .17$, $p < .05$) and responsibility for sustainability ($\beta = .73$, $p < .001$) were positive and significant predictors of innovation strategy for conservation. Overall the model explained 65% of the variance in innovation strategy for conservation. These findings provide some support for the hypothesis that a climate of sustainability positively influences organisational innovation activities related to product innovation strategy and innovation strategy for conservation.

- *Job satisfaction.* As described in this paper, an organisation characterised by a climate of sustainability values fairness, justice and empowers people to do what they think right for the environment, society and the organisation. This is likely to positively affect the attitude of employees such that employees' job satisfaction will increase. Sensitivity to sustainability ($\beta = .53$, $p < .01$) and motivation for sustainability ($\beta = .21$, $p < .05$) were significant predictors of job satisfaction such that higher levels of sensitivity to sustainability and sustainability values were related to higher levels of job satisfaction. Overall the model explained 21% of the variance in job satisfaction.

- *Turnover intentions.* Parallel to the argument provided for the effect of an organisation's climate of sustainability on job satisfaction, an organisation characterised by a climate of sustainability is likely to decrease employees' intentions to leave the organisation (turnover intentions). Sensitivity to sustainability ($\beta = -.32$, $p < .05$) and motivation for sustainability ($\beta = -.26$, $p < .05$) were significant predictors of turnover intentions such that higher levels of sensitivity to sustainability and sustainability values were related to lower levels of turnover intentions. Overall the model explained 29% of the variance in turnover intentions.

3.11 Interpretation of results

The purpose of this research was to assess the dimensionality and construct validity of the climate of sustainability dimensions of sensitivity to sustainability, motivation for sustainability and responsibility for sustainability. Results indicate that this was accomplished and that the climate of sustainability represents a reliable and valid indicator of the content and strength of the prevalent sustainability values, norms, attitudes, feelings, and behaviours of the members of a social system; in this study, the organisation. CFA results provide evidence that the proposed three factor structure fit the data well. The three climates of sustainability factors are distinct, yet significantly and positively related. This provides further support for the validity of the climate of sustainability and its three dimensions.

In addition, aggregation analyses further supports the proposition that shared perceptions of sustainability values, norms, attitudes, feelings, and behaviours exist. Department members have shared perceptions regarding the sensitivity to sustainability, motivation for sustainability, and responsibility for sustainability. This is further evidence of the validity of the climate of sustainability.

Evidence for the construct validity of the climate of sustainability survey was found by assessing the relationships between the climate of sustainability scales and other

measures purported to assess similar and distinct constructs. Overall, convergent validity was supported with significant and moderate to high correlations between the climate of sustainability and scales of perceived general justice and climate for procedural justice. The climate of sustainability survey has shown discriminant validity, as it was not significantly correlated with education, sex, and tenure.

Criterion-related validity was assessed by regressing climate of sustainability on product innovation strategy, innovation strategy for conservation, job satisfaction and turnover intentions. Overall the regression results suggest that shared perceptions for all the dimensions of the climate of sustainability exist and that these shared perceptions exert a collective influence on employee attitudes and their innovative activities and strategies. In addition, it is important to note that different climate of sustainability survey factors influence different behaviours, a further indication of the distinct nature and importance of the various climate types. Therefore, researchers who study the influences of climate of sustainability on different organisational outcomes and employee behaviours and attitudes should include all of the dimensions of the climate of sustainability survey in their studies to identify which factor of the climate of sustainability influences the particular behaviours and outcomes.

Overall, the model including all climates of sustainability dimensions explained 25% of the variance in product innovation strategy and 65% of variance in innovation strategy for conservation. Two of the three climate factors (motivation for sustainability and responsibility for sustainability) were significant predictors of product innovation strategy. It was interesting to find that sensitivity to sustainability did not seem to influence product innovation strategy significantly, yet it did significantly affect innovation strategy for conservation. It may be that the climate factors affect the different innovation strategies differently. For example, product innovation is considered an ongoing activity of the organisation needed to secure and improve its market position and goals of economic growth and profitability (Galbraith, 1982; Porter and Van der Linde, 1995). This does not require a focus on sustainability and is not immediately a result of an awareness and understanding toward balancing environmental, economic and social sustainability goals. In other words, product innovation strategy is likely to be a desired organisational outcome regardless an organisation's sensitivity to sustainability. On the other hand, sensitivity to sustainability was significantly related to innovation strategy for conservation. An organisation that cares for sustainability and understands the importance of sustainability concerns is likely to affect employees' engagement with regard to sustainability concerns such as innovation strategy for conservation. An organisation characterised by sensitivity to sustainability, where employees share a responsibility for sustainability, encourages employees to identify opportunities where they can make a favourable impact on the planet and conserve natural resources (Ambec and Lanoie, 2008).

It is also interesting to find that responsibility for sustainability does not seem to affect employee attitudes such as turnover intentions and job satisfaction, yet motivations for sustainability and sensitivity to sustainability do affect employee attitudes. It seems that shared values, care and understanding influence employee satisfaction and turnover intentions while norms for implementing actions that promote sustainability do not. The organisational culture and climate literature supports the findings that organisational values and beliefs affect employee attitudes (Schneider, 1990); but it is surprising to find that responsibility for sustainability, standards of behaviours with regard to sustainability,

does not seem to affect employee attitudes. This offers an interesting avenue for future research.

4 Discussion

The main purpose of this paper was to present the climate of sustainability as a relevant and important construct that can promote a sustainable intermodal transportation system. In addition, the goal was to develop a measure capable of assessing the three dimensions of the model. This goal was accomplished. Findings suggest that the climate of sustainability survey composed of the three factors of sensitivity to sustainability, motivation for sustainability and responsibility for sustainability represents a valid and reliable measure of the climate of sustainability. Each dimension of the climate of sustainability is internally consistent; Cronbach alphas are .9 for sensitivity to sustainability, .87 for motivation for sustainability and .88 for responsibility for sustainability. The climate of sustainability is positively related to innovation strategies including product innovation strategy and innovation strategy for conservation. For the current sample, a stronger climate for sustainability is related to more product innovation strategy and innovation strategy for conservation. Study results also confirm that the climate for sustainability is positively related to job satisfaction and negatively related to turnover intentions. This indicates that a stronger climate for sustainability is related to increased job satisfaction and decreased turnover intentions.

Therefore, it is expected that the development of a strong climate of sustainability in transportation companies can serve to promote the long-term sustainability of this industry and its constituents. Furthermore, should transportation companies adapt a climate of sustainability it may be the foundation of a systemic infrastructure that serves to connect the rather fragmented transportation industry. A systemic climate that transcends companies can serve as a platform to promote collaboration between modes of transportation and public and private organisations and institutions that have been disconnected for some time. This opens an avenue for future research. The goal of this research is to prompt further investigation in this area.

This work has significant implications for future organisational climate research as well. For example, initial findings support the prediction that the climate of sustainability and its three factors have differential effects on various organisational outcomes. The climate of sustainability survey gives researchers the opportunity to investigate how an organisation is affected by a climate of sustainability and how specific factors affect different outcomes. Furthermore, as identified by the correlation analyses, the climate of sustainability is significantly related to many other organisation-specific constructs. This is not surprising because the climate of sustainability defines an element of the larger environment within which organisations and its employees operate. Because the environment of the organisation influences most of its processes and activities, it represents an interesting and important moderator in research (Pfeffer and Davis-Blake, 1990). Future investigations should apply ethical work climate as a moderator in organisational behaviour research.

This research has potentially important implications for practice, as well. For example, understanding the differential effects of the climate of sustainability dimensions on important organisational outcomes is especially important in order to develop effective training and development programmes. Organisations and their social systems

are likely to vary in strength with regard to each one of the dimensions of the climate of sustainability. As a result, training needs will differ depending on the strength with which these three dimensions exist in the organisation. Furthermore, the climate of sustainability survey leads to a more thorough understanding of the existing weaknesses and strengths with regard to each one of its dimensions and will permit organisations to develop more effective intervention to promote sustainability.

4.1   Limitations and conclusions

Even though this paper makes numerous contributions, several limitations must be noted and should be addressed in future research and validity testing. First, this research presents a first empirical investigation of the Climate of Sustainability. While the usable sample was relatively small (n = 67), it offers a good first look at the validity of the climate of sustainability and its dimensions.

Second, all data were collected by survey. Although participants represented a wide array of demographic background and included both employee and supervisor assessments of both individual and organisational constructs, common method variance still exists as a potential concern. Future research could, for example, collect different and direct outcome data related to the innovative activities of organisations and other more objective outcomes such as organisational performance and profitability.

A third possible limitation is that the results were entirely based on self-reports. Respondents may attempt to 'fake good', thus biasing the results. However, Ones et al.'s (1993) meta-analysis of integrity measures suggests that self-report criteria tend to result in higher estimates of validity than external measures. When studying the climate of sustainability, self-reports present a useful tool for understanding the perceptions employees form with regard to the sustainability related values, attitudes, and behaviours in the organisation. Participants were assured anonymity. However, regardless of the significant evidence, which supports the validity of self-reports in general (Spector, 1992a), researchers need to be alert to fact that self-reports are vulnerable to social desirable responding.

Another limitation is that direct, main effects for the different climate scales on the outcomes were assessed. As mentioned above, this work represents a first step in the development of a measure for the climate of sustainability. The existence of this measure will now allow scholars to pursue more complex models including mediating and moderating influences of climate on outcomes, the effect of climate strength on outcomes, and antecedent effects on climate types.

Finally, it is suggested to further develop and refine the survey in future research. Even though the survey was developed with the help and advice of sustainability experts and has been tested to support reliability and validity, it can benefit from further testing and refinement. For example, even though participants are asked to consider sustainability as a three dimensional constructs, and the survey includes questions related to all three dimensions of sustainability a future research project may refine the survey to include a carefully balanced number of questions for environmental, social, and economic sustainability for each one of the survey dimensions.

In conclusion, the present findings provide an important first step in introducing the concept and measurement of the components of the climate of sustainability. Although more research is needed to further validate and refine the climate of sustainability survey,

and to replicate the current findings, the present investigation provides a base for further examining the climate of sustainability and its impact in the workplace.

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Appendix

Current version of the climate of sustainability survey

Sustainability is generally defined as: "Meeting the needs of the present without compromising the ability of future generations to meet their needs." A sustainable work environment seeks to participate within its immediate and global community and seeks to balance economic, social and environment within its operation.

Sensitivity to sustainability					
In this section we ask questions regarding the existing level of awareness with regard to environmental concerns and sustainability in general. How well does each statement describe your organisation?	*Does not describe my organisation at all*			*Describes my organisation very well*	
1 Employees are sensitive to environmental issues (e.g., preservation of nature and wellbeing of all living things).	1	2	3	4	5
2 Employees are alert to how the organisation's daily business operations affect the environment (natural and social).	1	2	3	4	5
3 Employees are sensitive to environmental concerns (e.g., protecting nature).	1	2	3	4	5
4 Employees are alert when using natural resources and minimising waste.	1	2	3	4	5
5 Organisation staff is alert to the things this organisation can do to reduce its negative impact on human health and the environment.	1	2	3	4	5
6 Employees around here are concerned about the marginalised, vulnerable segments of society, living things and nature.	1	2	3	4	5

Motivation for sustainability					
Following is a list of values in alphabetical order. Each value is accompanied by a short description. Please determine how important those values are in your organisation.	*Not important at all*			*Very important*	
1 Altruism (unselfish devotion to welfare of others)	1	2	3	4	5
2 Conservationism (using resources consciously).	1	2	3	4	5
3 Environmental performance (preservation and wellbeing of human and non-human life above all)	1	2	3	4	5
4 Protecting the environment (preserving nature)	1	2	3	4	5
5 Protecting the welfare of all living things (preserving habitat and life)	1	2	3	4	5
6 Unity with nature (minimising environmental impacts)	1	2	3	4	5

Responsibility for sustainability					
The following questions refer to how sustainability is integrated in your organisation. How well does each statement describe your organisation.	*Does not describe my organisation at all*			*Describes my organisation very well*	
1	Management encourages waste reduction and improved energy efficiency.	1	2	3	4	5
2	The organisation recognises employees, who find innovative ways to save energy, reduce waste and reduce impacts on the environment.	1	2	3	4	5
3	The organisation is committed to finding energy saving solutions to meet ecological and economic goals.	1	2	3	4	5
4	Employees feel empowered to make sustainability a priority.	1	2	3	4	5
5	The organisation reports its environmental activities.	1	2	3	4	5