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## **SOCIAL FOOTPRINTS**

Measuring the social sustainability performance of organizations

**Mark W. McElroy**



**Rijksuniversiteit Groningen**

**SOCIAL FOOTPRINTS**

**Measuring the social  
sustainability performance of organizations**

**Proefschrift**

ter verkrijging van het doctoraat in de  
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aan de Rijksuniversiteit Groningen  
op gezag van de  
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door

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to my friend Donella H. Meadows and all that she stood for,  
and to my family, and theirs, and theirs, and theirs.....

## Preface

The thesis put forward on these pages is the improbable, if not unintentional, result of a ten-plus year effort to explore the connections between sustainability and epistemology. I can easily trace the genesis of my work, first and foremost, to the late Donella H. Meadows (Dana), whose many conversations with me (and powerful writings) on the challenges of sustainability (or unsustainability) in the conduct of human affairs provoked an irresistible desire on my part to get to the bottom of things, as it were. Whether or not I have managed to do so is, of course, debatable. In any case, it is to Dana's memory, and in recognition of her contributions to humanity and to the field of sustainability, that I dedicate this thesis. Her influence on my intellectual development was profound, and I thank her for that.

I say my thesis is improbable and unintentional because the confluence of sustainability and epistemology so prominently featured in it was, in large part, an accident. It only occurred to me long after I had, first, devoted myself to learning as much as I could about sustainability - for purely personal reasons - and then, second, immersed myself in the subjects of knowledge management and epistemology - for purely professional reasons. It was not as if I had developed a theory or hypothesis from the start on how epistemology can be employed as the key to sustainability, and then set out to test and evaluate it in some preconceived way. Rather, it was only after I had developed some understanding and skill in epistemology (which followed my study of sustainability) that I realized, or discovered, that the former could be applied to the latter; and that sustainability management, measurement, and reporting is so deeply grounded in the business of making knowledge claims; and that the science of making such claims, therefore, can be harnessed in the service of sustainability - to advance it, that is, in unforeseen ways.

This leads me to my second expression of thanks, which is to Joseph M. Firestone, who almost single-handedly taught me epistemology over a ten-year period, as if I were his private student and the world depended on it. His incredible patience and generosity in this regard was a gift I daresay I shall never be able to repay, although he has my eternal gratitude, friendship, and respect. What I



learned most from Joe was how to appreciate the power and importance of fallibilism as a management tool - a la Karl Popper's epistemology - and that people can make both fact and value claims in non-relativistic terms. Moreover, Joe taught me that action can be taken on the basis of knowledge that has merely survived our tests and evaluations without the need for consensus, much less the possibility of certainty. Once Joe's arguments had sunk into my thinking, I can honestly say that the world changed for me, and that I never looked back. Otherwise intractable problems, such as humanity's sustainability crisis, suddenly seemed less daunting to me, the effects of which were liberating, almost euphoric - like being able to see clearly for the very first time, having lifted the fog, so to speak.

Next in my journey came another unexpected turn: my introduction to the University of Groningen, and to Professors René J. Jorna, Jo M. L. van Engelen, and Dr. D. J. Kiewiet there. Professors Jorna, van Engelen, and I would first cross paths in 2002 in The Netherlands, where I had the pleasure of speaking at a conference on sustainable innovation led by the two of them. Afterwards, the three of us and Dr. Kiewiet would meet in the spring of 2005 for more intense discussions at a small colloquium organized for that purpose at Dartmouth College. Others who would attend that meeting included Joseph M. Firestone, Professor Steven A. Cavaleri of Central Connecticut State University, and Professor Benoit Cushman-Roisin of Dartmouth. I am especially grateful for the role Professor Cavaleri played, before, during, and after that meeting, in helping me to better understand the fields of system dynamics and organizational learning. And I thank Professor Cushman-Roisin, as well, for his unremitting rigor in critiquing the quantitative and assertive side of my thinking, and for his contribution of office space at Dartmouth where I did some of my work. All of these contributions were of tremendous help in the development of my thesis, and I thank everyone named above, one and all, for their kindness and generosity.

Shortly after our 2005 meeting at Dartmouth, I was offered a position at the University of Groningen as a Visiting Researcher, and was accepted as a doctoral candidate there, as well - a possibility that would never have even occurred to me only six months earlier. I cannot begin to express my gratitude to the University for allowing me to step into its program, and to Professors Jorna and van Engelen, in particular, for having sufficient faith in my abilities to suggest as much, and to serve as my promoters. I thank them both sincerely for the opportunity they have given me. And I thank them, as well, for the respectful manner in which they allowed me to pursue my ideas on a largely self-directed basis, even as they would gently steer me back on course when I occasionally strayed.

And I thank them, too, for the rigor and attention to detail they brought to the process. My work and my thinking are better off because of it.

I also want to thank Dr. D. J. Kiewiet, who later joined Professors Jorna and van Engelen as a co-promoter of my thesis, when it became clear that I would need more support on the statistical, methodological, and validation sides of my effort. It is hard to imagine having gotten through this experience without the aid of his prodigious skills in these areas, and I thank him for that.

Also key to my progress were the contributions of two others, whose work with me on the campus at Dartmouth would prove very beneficial in the end. First was the assistance of Lee Fisher, who in the summer of 2006 worked with me as an intern, while pursuing his own MBA at the Warwick Business School in the UK. Lee's work with me in developing some of the early applications of the Social Footprint Method would later pay dividends, as I found myself fine-tuning the Wal-Mart and Ben & Jerry's cases described in this thesis. Equally valuable was the help I received from Professor Matissa Hollister in the Sociology Department at Dartmouth, whose impressive skills and experience in the quantitative analysis of social data helped steer me through a statistical thicket or two, as I was working on the Ben & Jerry's case. Thank you Professor Hollister and Lee Fisher, both, for your invaluable assistance.

Next I want to acknowledge the influence of the many interactions I had with other students, faculty, and staff members at the University of Groningen, whose feedback, comments, and reviews of my work over the past three years have been instrumental to my thinking. Of particular note has been the role played by Niels Faber, Henk Hadders, and Kristian Peters, whose own interests have perhaps been closest to mine. I am also deeply grateful for the considerable assistance Niels and Kristian provided in helping me to prepare for my defense. I could not have done it without them.

In addition to Niels, Henk, and Kristian, I also want to thank Laura, Joost, Rob, Janita, Jesus, and Marjolein for the various roles they played in helping to test, evaluate, and contribute to my thinking. And so, too, do I want to thank Sonja Abels and others in the secretarial staff at the University, who always helped me with my travel arrangements, and made me feel so much at home whenever I was in Groningen. And how can I possibly thank Henny Wever at the University enough, for her incredible contribution of time, patience, and skill to the process of formatting and producing the document you now hold in your hands? Thank you Henny for that, and thank the rest of you for everything.

I'd also like to express my appreciation to Rob Gray, Bert de Vries, Alan AtKisson, and Markus Milne, who in addition to several of the folks already mentioned above, participated in a face validity survey on the Social Footprint Method - the results of which are discussed in this thesis. Thank you all for your thoughtful comments, and for taking my work seriously enough to get involved.

Finally, I want to thank my family, especially my wife, Amy, for putting up with what must have, at times, seemed like a curious, and protracted, case of mid-life crisis - as perhaps it was. To be sure, this work would not have been possible without her active support and tolerance for the commitment of time and resources it would take for me, and her, to see this project through. She, too, in her own way, had a hand in this, and I will always be grateful for that.

Mark W. McElroy  
Thetford Center, Vermont, July 4, 2008

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## GLOSSARY

<i>Anthro Capital</i>	A category of anthropogenic (i.e., human-made) vital capitals, consisting of human capital, social capital, and constructed (or built) capital.
<i>Anthro Economic Capital</i>	A subset of Anthro Capital consisting of vital human, social, and constructed (or built) capitals required to ensure basic human economic well-being.
<i>Binary Performance Scale</i>	A reporting system for plotting the results of Full-Quotient (or Quotients-Based) Sustainability Measurement and Reporting efforts, according to which human impacts on vital capitals are scored and interpreted as either sustainable or unsustainable.
<i>Capital</i>	A stock of anything that yields a flow of beneficial goods or services into the future - as required by humans and/or non-humans for their well-being (Costanza et al, 1997; Porritt, 2005).
<i>Carrying Capacity</i>	The extent to which the flows of beneficial goods or services from a stock of capital can satisfy a population's basic needs - usually expressed in terms of the maximum size of the corresponding population that can be so supported by such flows.
<i>Constructed (or Built) Capital</i>	Material objects and/or physical systems or infrastructures created by humans for human benefit and use; the world of human artifacts, in which human knowledge is also embedded. Constructed capital includes instrumental objects, tools, technologies, equipment, buildings, roads and highway systems, power plants and energy distribution systems, public transportation systems, water and sanitation facilities, telecommunications networks, homes, office buildings,

---

	etc. (Daly, 1973, 1977; Daly and Cobb, 1989; Costanza et al, 1997).
<i>Corporate Responsibility (CR)</i>	A management discipline synonymous with Corporate Sustainability Management (see below), although sometimes confined to either social or environmental concerns, only.
<i>Corporate Social Responsibility (CSR)</i>	A term originally coined by the World Business Council for Sustainable Development (WBCSD, 1999) and defined as follows: “Corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large.”
<i>Corporate Sustainability Management (CSM)</i>	A management discipline that focuses on measuring, managing, and reporting the overall sustainability performance of a company, usually in terms of the Triple Bottom Line, but not always.
<i>Denominator-based Sustainability Measurement and Reporting</i>	Same as Full-Quotient (or Quotients-Based) Sustainability Measurement and Reporting (see below).
<i>Eco-efficiency</i>	An alternative, numerator-only approach to sustainability (see below) originally put forward by the World Business Council for Sustainable Development (Schmidheiny, 1992), which explained the term as follows: “Industry is moving toward ‘demanufacturing’ and ‘remanufacturing’ - that is, recycling the materials in their products and thus limiting the use of raw materials and of energy to convert those raw materials [...] That this is technically feasible is encouraging; that it can be done profitably is more encouraging. It is the more competitive and successful companies that are at at the forefront of what we call ‘eco-efficiency’.”

- Eco-efficiency strives for reductions in energy and material throughputs in human enterprise, although not in any standards-based sense. Thus, it is entirely possible for an organization to show progress in eco-efficiency even as it simultaneously experiences declines in sustainability.
- Ecological Capital* Same as Natural Capital (see below).
- Ecological Footprint Method* A full-quotient-type approach for measuring and reporting the ecological impacts of a human collective (on Natural Capital), developed by William Rees and Mathis Wackernagel (1996). Takes (ecological) Sustainability Context fully into account.
- Ecological Quotient* A variant of the Sustainability Quotient intended for use in measuring and reporting an organization's (or other human collective's) Environmental (or Ecological) Bottom Line, as an element of its overall (Triple Bottom Line) Sustainability Performance.
- Economic Bottom Line* A component of the Triple Bottom Line; a measure of the economic sustainability performance of a company. Sometimes confused with the financial performance (or bottom line) of a company, the Economic Bottom Line is more a measure of an organization's impacts on Anthro Economic Capital in the communities in which it operates; one of the things the Social Footprint Method was designed to compute.
- Environmental (or Ecological) Bottom Line* A component of the Triple Bottom Line; a measure of the environmental (or ecological) sustainability performance of a company. The kind of thing the Ecological Footprint Method was designed to measure.

- 
- Full-Quotient (or Quotients-Based) Sustainability Measurement and Reporting* An approach to measuring and reporting the sustainability performance of an organization (or human collective) that measures impacts on vital capitals (quantified in numerators) against norms or standards of performance for what such impacts ought to be (quantified in denominators). The Social and Ecological Footprint Methods are examples of this.
- Human Capital* Individual knowledge, skills, experience, health, and ethical entitlements that enhance the potential for effective individual action and well-being (Mincer, 1958; Schultz, 1961; Becker (1993[1964])).
- Knowledge* Beliefs or claims consisting of two types: knowledge of facts and knowledge of values (Hall, 1952, 1956, 1961; Popper, 1971[1962]; McElroy et al, 2006). Fact knowledge consists of descriptive beliefs or claims about the world (the way it is), which have survived our tests and evaluations and which may help us to adapt; value knowledge consists of evaluative or normative beliefs or claims about the world (the way it is or ought to be), which have survived our tests and evaluations and which may help us to adapt (McElroy, 2003; Firestone and McElroy, 2003a).
- Natural Capital* Defined by Hawken, Lovins and Lovins (1999) as: "...the sum total of the ecological systems [including life itself] that support life, different from human-made capital in that natural capital cannot be produced by human activity."
- Numerator-Only Sustainability Measurement and Reporting* An approach to measuring and reporting the sustainability performance of an organization (or human collective) that measures actual impacts on vital capitals, while failing to take norms or standards of performance for what such impacts ought to be into account. Eco-efficiency as an approach to sustainability is one such example.

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<i>Social Capital</i>	Shared knowledge and organizational resources (e.g., formal or informal networks of people committed to achieving common goals) that enhance the potential for effective individual and collective action and well-being in human social systems (Coleman, 1988, 1990; Putnam, 2000; Ostrom and Ahn, 2003; McElroy et al, 2006;).
<i>Social Bottom Line</i>	A component of the Triple Bottom Line (see below); a measure of the social sustainability performance of a company. One of the things the Social Footprint Method was designed to compute.
<i>Social Footprint Method</i>	A full-quotient-type approach for measuring and reporting the social and economic impacts of a business (on anthropic capital), developed by the Center for Sustainable Innovation. Takes (social and economic) Sustainability Context fully into account.
<i>Societal Quotient</i>	A variant of the Sustainability Quotient intended for use in measuring and reporting an organization's (or other human collective's) Social or Economic Bottom Line, as elements of its overall (Triple Bottom Line) Sustainability Performance.
<i>Sustainability</i>	The subject of a social science that studies human impacts on various kinds of capital (natural, human, social, and constructed), relative to norms for what such impacts ought to be in order to ensure human well-being.
<i>Sustainability Context</i>	Defined by the Global Reporting Initiative (GRI, 2006) as an account of "economic, environmental, and social conditions, developments, and trends at the local, regional, or global level" against which organizational sustainability performance should be measured and reported. GRI adds: "This will involve discussing the performance of the organization in the context of the limits and demands placed on environmental and social resources at the sectoral, local, regional, or global level."

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<i>Sustainability Performance</i>	A measure of an organization's (or human collective's) impacts on vital capitals, relative to their effects on human well-being; based on norms for what such impacts ought to be in order to ensure human well-being.
<i>Sustainability Quotient</i>	A design specification for a measurement model that can be used to measure and report the Triple Bottom Line Sustainability Performance of an organization, or other human collective.
<i>Sustainable</i>	An adjective indicating a state of affairs in which human activities on various kinds of capital conform to norms for what such impacts ought to be in order to ensure human well-being.
<i>Quotients-based Sustainability Measurement and Reporting</i>	Same as Full-Quotient (or Quotients-Based) Sustainability Measurement and Reporting (see above).
<i>Triple Bottom Line (TBL)</i>	An organizing principle introduced by John Elkington in 1998, which refers to the measurement, management, and reporting of corporate performance, in terms of a social bottom line, an environmental bottom line, and an economic bottom line.
<i>Vital Capitals</i>	Types of capital required for basic human well-being, the absence or insufficient quality or supply of which can put such well-being at risk. In sustainability theory and practice, such capitals generally consist of natural or ecological capital, and anthro capital (i.e., human, social, and constructed capital).