CHAPTER 1

INTRODUCTION

1.1 MOTIVATION

In recent years, an exciting new branch of management has emerged. Variously known as Corporate Social Responsibility (CSR), Sustainability Management, Corporate Citizenship, or just Corporate Responsibility (CR), this new field is best referred to, in our view, as Corporate Sustainability Management, or CSM.

Here we note that we are not alone in taking a sustainability-oriented view of the field. In its fifth International Survey of Corporate Responsibility Reporting 2005, the international consultancy KPMG made the following observation (p. 4):

“A dramatic change has been in the type of CR reporting which has changed from purely environmental reporting up until 1999 to sustainability (social, environmental, and economic) reporting which has now become mainstream among G250 companies (68%) and fast becoming so among N100 companies (48%).”

To be clear, CSM is a school of management theory and practice that:
1. begins with recognition that businesses and other types of organizations can, and do, have a broad range of non-financial impacts in the world, and
2. that such impacts can and should be managed. Indeed, many of the ills in the world are arguably attributable to the behaviors of business, as are many of the positive things people value, such as employment, income, personal growth and achievement.

Together, such ancillary, non-financial impacts of business are referred to in the lexicon of CSM as externalities, a term borrowed from economics. An externality, in economics, is defined as (Oxford Dictionary of Economics, 1997 Edition):
“A cost or benefit arising from any activity which does not accrue to the person or organization carrying on the activity. External costs or diseconomies are damage to other people or the environment, for example by radiation, river or air pollution, or noise, which does not have to be paid for by those carrying on the activity. External benefits or economies are effects of an activity which are pleasant or profitable for other people who cannot be charged for them, for example fertilization of fruit tress by bees, or the public’s enjoyment of views of private buildings or gardens.”

The goal of CSM, of course, is to manage organizational impacts in the world such that they are socially and environmentally responsible. That, at least, is the expectation increasingly being placed upon businesses by society, in response to which a growing number of companies are establishing and maintaining CSM functions every year.

Despite the very positive trend of increasing business commitments to CSM, the state of the art in terms of how CSM is performed is still in its infancy. Of particular relevance to this thesis is the manner in which organizations measure and report, or assess, their actual non-financial impacts in the world as a basis for taking related actions. Indeed, in order to manage its externalities effectively, an organization must have a solid grasp of what its impacts in the world actually happen to be. Yet mainstream tools and methods designed to produce this kind of information usually fail to deliver, for reasons we will explain in the next section below.

That, then, is the principal motivating factor behind this thesis: to rectify a serious deficiency in the manner in which organizations measure and report their own sustainability performance, and by doing so to make a valuable contribution to the exploding new field of CSM. The contribution we purport to make is a new CSM measurement and reporting methodology called the Social Footprint Method (SFM). Whereas other CSM methods focus on measuring the ecological sustainability of organizations, our focus will be on measuring their social sustainability.
1.1.1 The state of sustainability theory and practice

Before we introduce the method, we must first set the stage by calling attention to:

1. the concept and state of human well-being,
2. basic terms and principles in the field of sustainability,
3. the resulting inadequacy of mainstream CSM methodologies to properly measure and report the sustainability performance of organizations, and
4. the role of knowledge and epistemology in related schools of thought.

1.1.1.1 Human well-being

The particular orientation to sustainability we have taken in our development of the Social Footprint Method is one that is grounded in the concept of human well-being, and the need to achieve and maintain it in order to create and sustain peaceful and satisfactory conditions in society.

Before we turn to some current sources for insight as to what the state of the world may actually be, it should be useful to stop and consider for a moment what is meant by the phrase human well-being. McGillivray and Clarke provide a very useful discussion of the subject in their book, Understanding Human Well-Being, in which they first call attention to the ambiguity of the term (2006, p. 3):

“Human well-being, however, is an ambiguous concept. It lacks a universally acceptable definition and has numerous, often competing, interpretations [...] Further, terms such as quality of life, welfare, well-living, living standards, utility, life satisfaction, prosperity, needs fulfillment, development, empowerment, capability expansion, human development, poverty, human poverty, and, more recently, happiness are often used interchangeably with well-being without explicit discussion as to their distinctiveness.”

The authors go on to make the very important point that despite differences in how various scholars define well-being, most agree that it cannot be directly measured, and that indicators, therefore, are required to monitor and keep abreast of it. While most such indicators in the past were of an economic sort, many con-
temporary indices have broadened to include non-economic aspects of human life, including capabilities, agency, and functionings (Sen, 1984, 1985a, 1985b, 1987a, 1987b, 1987c, 1999, 2006), Nussbaum’s central human capabilities (1988, 1992, 2000), Doyal and Gough’s (1991) intermediate human needs, and Narayan et al’s (2000) axiological needs. Importantly, the authors further point out that issues “such as gender and sustainability have also become increasingly integrated within human well-being analysis” (McGillivray and Clarke, 2006, p. 4).

Dasgupta (2001), however, observes that income “continues to be regarded as the ‘quintessential’ well-being indicator” (p. 53). Many analysts tend to equate human welfare with material wealth. Accordingly, various economic metrics such as Gross National Product (GNP), Gross Domestic Product (GDP), or income per capita are frequently used to assess and report the general well-being of people in national settings. As McGillivray and Clarke point out, however, “the limitations of income-based (or consumption-based) measures of human well-being are well known, including limitations around equity, environment and its own construction” (2006, p. 4; see also Clarke and Islam, 2004, for a summary).

In response to the perceived limitations of such uni-dimensional indicators, another class of composite indicators has emerged over the years, including the UNDP’s Human Development Index (HDI), the UN’s Millennium Development Goals (MDGs), the UN’s Commission on Sustainable Development (CSD) indicators, the World Bank’s World Development Indicators (WDIs), and many others. Some sources have even gone so far as to combine aspects of multiple indices into meta-indices. Cherchye and Kuosmanen (2006), for example, combine aspects of 14 well-known indices into a single, synthesized sustainability index.

Separate and apart from the kind of objective indicators discussed above has recently come an entirely new and different class of subjective schemes (McGillivray and Clarke, 2006, pp. 4-5). Such subjective schemes tend to focus on happiness as the principal indicator of well-being, including consideration of “cognitive judgements of life satisfaction and effective evaluations of emotions and moods” (McGillivray and Clarke, 2006, p. 4; see also: Diener, 1984; Argyle, 1987; Diener and Larsen, 1993; Eid and Diener, 2003). One particularly extensive index, or database, of subjective happiness, the World Happiness Database (Veenhoven, 2004), contains 2300 surveys from 112 countries, dating from as far back as 1946 to the present day.
We provide the brief summary of human well-being indices above for background purposes only, and not because we intend to study them closely or choose from among them for our own purposes. Nor do we intend to develop our own competing index. Rather, we will be making reference to one or more of these indices in the pages that follow, as we attempt to illustrate the various conditions or dimensions in society that businesses and other types of organizations can have impact on, and the manner in which third-party measures can be used to classify and understand them. Our goal, however, will be to remain neutral on the question of which sustainability or human development index ought to be used in a given context, since it is our intent to provide a measurement solution, or template, for determining the social sustainability of organizational operations that can be used with any one of them.

Before we move on, let us take a moment to consider what some of the indices mentioned above are actually telling us about the world we live in today. Perhaps the most influential, if not dominant, set of standards and indicators for human development is the UN’s Millennium Development Goals (MDGs) program. In total, there are eight MDGs:

1. Eradicate extreme poverty and hunger;
2. Achieve universal primary education;
3. Promote gender equality and empower women;
4. Reduce child mortality;
5. Improve maternal health;
6. Combat HIV/AIDS, Malaria and other diseases;
7. Ensure environmental sustainability;
8. Develop a global partnership for development.

By far the most common, and arguably serious, concern expressed by the various indices discussed above is what the MDG program lists as its number 1 Goal: the eradication of extreme poverty and hunger in the world, and the effects that a failure to do so has on the other Goals listed. Indeed, all of the eight Goals listed in the MDG program are deeply intertwined, with the state of any one of them being contingent upon the status of the others.

The UN’s MDG campaign is administered by the United Nations Development Programme (UNDP). Each year, the UNDP publishes a report on progress made towards achieving the Goals. The first Goal (i.e., eradicating extreme poverty and hunger) is expressed in terms of two specific targets:
1. Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day, and

2. Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

Here is how the world was doing, as of 2006, in terms of achieving that Goal and its two targets, as reported in the *Millennium Development Goals Report* published by the UNDP in the same year (2006b, p. 4):

“In 1990, more than 1.2 billion people - 28 per cent of the developing world’s population - lived in extreme poverty. By 2002, the proportion decreased to 19 per cent. During that period, rates of extreme poverty fell rapidly in much of Asia, where the number of people living on less than $1 a day dropped by nearly a quarter of a billion people. Progress was not so rapid in Latin America and the Caribbean, which now has a larger share of people living in poverty than South-Eastern Asia and Oceania. Poverty rates in Western Asia and Northern Africa remained almost unchanged between 1990 and 2002 and increased in the transition economies of South-Eastern Europe and the Commonwealth of Independent States (CIS). These two regions had previously nearly eradicated the worst forms of poverty, and recent survey data suggest that their poverty rates are again dropping. In sub-Saharan Africa, although the poverty rate declined marginally, the number of people living in extreme poverty increased by 140 million. Many sub-Saharan countries are now showing potential for long-term growth that could bring up standards of living.”

Here is the summary on progress made towards achieving the hunger target (2006b, p. 4):

“Chronic hunger - measured by the proportion of people lacking the food needed to meet their daily needs - has declined in the developing world. But progress overall is not fast enough to reduce the number of people going hungry, which increased between 1995-1997 and 2001-2003. An estimated 824 million people in the developing world were affected by chronic hunger in 2003. The worst-affected regions - sub-Saharan Africa and Southern Asia - have made progress in recent years. But their advances have not kept pace with those of the early
1990s, and the number of people going hungry is increasing. Of particular concern is Eastern Asia: in the early 1990s, the number of hungry people declined; but again it is on the rise.”

Turning to the UNDP’s *Human Development Report*, in which the *Human Development Index* is published each year, we find (in the 2006 edition) the following general assessment (UNDP, 2006a, p. 263):

“Over the past decades there have been unprecedented increases in material wealth and prosperity across the world. At the same time these increases have been very uneven, with vast numbers of people not participating in progress. Mass poverty, deeply entrenched inequality and lack of political empowerment contribute to deny a large share of the world’s population the freedom to make real choices. Moreover, GDP is still measured in a way that does not take into account environmental degradation and the depletion of natural resources.”

Apart from the moral and ethical arguments that can be made for the alleviation of human suffering in the world, there are practical ones as well. As Jeffrey D. Sachs of the Earth Institute in New York put it in his book, *The End of Poverty* (2005, p. 1):

“The $450 billion that the United States will spend this year on the military will never buy peace if it continues to spend around one thirtieth of that, just $15 billion, to address the plight of the world’s poorest of the poor, whose societies are destabilized by extreme poverty and thereby become havens of unrest, violence, and even global terrorism.”

In this regard, we can say that human policies, or behaviors, that tolerate extreme poverty are unsustainable; they are unsustainable in the sense that they erode and undermine human security, and thereby put human well-being at risk. Meadows et al express this idea in compelling terms in their 1992 sequel to their 1972 book, *The Limits to Growth*, as follows (1992, pp. 210-211):

“A sustainable society would not freeze into permanence the current inequitable patterns of distribution. It would certainly not permit the persistence of poverty. To do so would not be sustainable for two reasons.
First the poor would not and should not stand for it. Second, keeping any part of the population in poverty would not, except under dire coercive measures, allow the population to stabilize. For both moral and practical reasons any sustainable society must provide material sufficiency and security for all.”

Returning to our main thesis, which concerns the manner in which organizations - businesses, in particular - can measure and report their impacts on society as they attempt to increase their positive externalities and decrease their negative ones, one of the several human well-being indices discussed above, the UN’s Millennium Development Goals program, has explicitly hit upon the idea that businesses, not just governments, can in fact make contributions towards achievement of the Goals. By the same token, the UN claims that businesses can benefit from getting involved with the Goals, not just the reverse. In Business and the Millennium Development Goals: A Framework for Action (Nelson and Prescott, 2003), the UN makes its case as follows (p. 4):

“...there are three broad reasons why it makes sound business sense to contribute towards the achievement of the Millennium Development Goals. Each of these is a crucial pillar for building successful and competitive private enterprises:
- First, investing in a sound environment in which to do business;
- Second, managing the direct costs and risks of doing business;
- Third, harnessing new business opportunities.”

The report goes on to explain how businesses have impact on the Goals and affect development as follows (Ibid, p. 5):

“Most companies have some impact on development and can make a contribution in the following spheres of influence:
- Their core business activities - in the workplace, the marketplace and along the supply chain;
- Their social investment and philanthropy;
- Their engagement in public policy dialogue and advocacy activities.

These three spheres of influence form the basis of our Framework for Action throughout the report.”
Here it should be clear that organizations can have impact on alleviating human suffering in the world, either as a direct consequence of their core business activities, or as an indirect consequence of making contributions in other ways. Helping to achieve the Millennium Development Goals is one of them. Indeed, all indications suggest that as businesses around the world increasingly take up the task of measuring, reporting, and managing their social and environmental impacts, expressing such impacts in terms of their effects on achieving the Millennium Development Goals will be common practice. Green Mountain Coffee Roasters, for example, a publicly-traded company in the United States, recently listed the following policy decision in its 2005 *Corporate Social Responsibility Report* as one of several notable accomplishments it made that year (2006, p. 10):

“A new social and environmental bottom line: We made the decision to align the work of our social responsibility initiatives and programs with the United Nations’ Millennium Development Goals (MDGs). We have committed to measuring ourselves based on how well we support MDG #1 - reducing poverty and hunger - and #7 - ensuring environmental sustainability.”

Another company, ABN AMRO, in its 2004 *Sustainability Report*, made a similar pronouncement (2005, p. 10):

“...it is our firm belief that the business community has a crucial role to play in achieving the UN Millennium Development Goals. Our contribution will be mainly in the area of poverty alleviation (microfinance), education (social and community investment), protecting the environment (building our sustainable business processes and risk management framework) and developing and strengthening international trade and financial systems (our emerging markets and risk advisory services.”

Exactly how Green Mountain Coffee Roasters and ABN AMRO will measure their impacts on achieving the MDGs is unspecified and remains to be seen. Indeed, methodologies for measuring the social and environmental impacts of corporations in the world are still very much in their infancy, and, as we have alleged and will explain later on, are largely inadequate, too.

Still, organizations have much to offer and the need for adequate tools and methodologies for assessing their impacts is great. But until and unless companies
have accurate means of measuring their impacts on society and the environment, we cannot expect their related management efforts to be as effective as they could be. To be effective, managers involved in such efforts must first be informed about what their organizational impacts in the world already happen to be. Otherwise, they are flying blind.

All of this presupposes, of course, that it makes sense to focus our sustainability improvement efforts on businesses as opposed to other kinds of social or political collectives in the world. This, in fact, is simply a choice we have made. It is not to say that other avenues or strategies for intervening in the global conduct of human affairs should not be pursued at the same time (by others), or that such alternative strategies are not worth pursuing.

Rather, for us, the corporate arena is simply one that we have chosen to focus on because of the potential it represents and the need it displays for advances in CSM tools and methods. Indeed, corporations are uniquely qualified, with their resources and global reach, to steer human civilization towards sustainability (Hart, 1997; Adams et al, 2004).

Corporations also happen to be centers of growing political and economic power. As Gray and Bebbington (2005, p. 1) put it:

“It seems incontrovertible that, in the absence of a fundamental change in the political will of governments (especially those of the developed world), any serious examination of sustainability and how it might be achieved must have the corporation at its heart.”

Once again, it is the purpose and motivation of this thesis to develop a tool for measuring and accurately reporting the social sustainability performance of organizations, and of corporations, in particular. It is the very absence and need for such a tool that motivates and inspires us, therefore, to make a material contribution to the development of the new CSM school of management. In that way, we also hope to do what we can to foster and facilitate the improvement of human conditions in the world, the current state of which is so disturbingly portrayed by the various indices of well-being we have touched on.
1.1.1.2 Sustainability terms and principles

In the preceding section, we declared our affinity for a sustainability interpretation of what may be more generally referred to as the field of Corporate Responsibility. Opponents to our inclusion of the term sustainability in the phrase, Corporate Sustainability Management, or CSM, will say, either that we are biasing an otherwise more broadly defined field to the narrower realm of sustainability theory, or that the term sustainability itself is so ambiguous and ill-defined as to be meaningless.

To the first accusation we plead guilty as charged. It is absolutely our intent to approach the field of Corporate Responsibility, or Corporate Social Responsibility - however one wishes to put it - from a sustainability perspective. This is because we think sustainability is precisely what the responsibility issue boils down to in all cases.

To be responsible is to embrace a particular strategy, or means, for achieving sustainability as an end. We embrace responsibility not only because we believe it is the right thing to do, but also because we believe that not doing it is self-defeating. To be irresponsible is to undermine our own well-being, and that, in the plainest sense of the term, is unsustainable.

Indeed, speaking in terms of sustainability allows us to put a finer point on the concept of responsibility, and removes the haze of ambiguity that otherwise envelops the field. Thus, it helps bring clarity to a field (Corporate Responsibility, or Corporate Social Responsibility) that is in desperate need of it, and which is still trying to find its way in the world - a world in which the conduct of human affairs is arguably unsustainable, and in which the well-being of humanity tends to suffer accordingly.

As to the second charge, we agree that there is a kind of definitional crisis afflicting the field of sustainability management. The term is indeed ambiguous, and many people use it in many different ways (see, for example, Daly, 1973, 1977, 1996; Pearce et al, 1989; Meadows et al, 1992; Wackernagel and Rees, 1996; Elkington, 1998; Henriques, 2001; Willard, 2002; Porritt, 2005; Princen, 2005; Faber et al, 2005; Jorna, 2006). Princen, in particular, describes the situation as follows (2005, p. 30):
“The many uses and abuses, the lack of consensus on a single meaning, and the incessant bickering about what sustainability really is have led many to give up on the term. As if to throw up their hands in exasperation, they dismiss it as yet another buzzword, a term rendered meaningless through overuse and co-optation.”

We believe this difficulty has more to do with a lack of rigor than with ambiguity. People can easily formulate a plain sense definition of the term, and doing so would clearly serve a useful and important purpose in terms of helping us to describe and understand real conditions in the world - conditions, that is, that are sustainable in some cases, and unsustainable in others.

In recent years, the multiplicity of competing definitions for the term sustainability has arguably narrowed (Pezzey, 1989; Pearce et al, 1989; Rees, 1990; Lélé, 1991; Stern, 1997; Dresner, 2006), culminating in a synthesis of theories and a consensus surrounding what some refer to as the capital theory approach (CTA) to sustainability (Stern, 1997, p. 145):

“The large number of definitions of sustainability proposed in the 1980s has been synthesized into a smaller number of positions in the 1990s [Tisdell, 1988; Pearce et al, 1989; Rees, 1990; Simonis, 1990; Lélé, 1991; Costanza and Daly, 1992; Pezzey, 1992; and Toman et al, 1994]. There is agreement that sustainability implies that certain indicators of welfare or development are non-declining over the very long term; that is, development is sustained (Pezzey, 1989). Sustainable development is a process of change in an economy that does not violate such a sustainability criterion. Beyond this, the dominant views are based on the idea of maintaining a capital stock as a prerequisite for sustainable development.”

Here it is important to point out that capital, in the sustainability literature, usually refers to non-financial assets or resources that are productive. We embrace this general sense of the term, expressed by Costanza et al as follows (1997, p. 107):

“...a stock [of anything, in line with Porritt, 2005, p. 112] that yields a flow of valuable goods or services into the future. What is functionally important is the relation of a stock yielding a flow; whether the stock is
manufactured or natural is in this view a distinction between different kinds of capital and not a defining characteristic of capital itself.”

In this thesis, we will also be using a term from ecology, carrying capacity (Odum, 1983), to refer to the level of needs a stock of capital can support, given the volume of goods or services it can produce (Randers and Meadows, 1973). In that regard, when we say that a stock of capital is sufficient in size to produce a flow of goods or services to meet the needs of a human population, we will be saying that its carrying capacity is sufficient. And when we say that a human activity is sustainable, we will mean that its impacts on capital are such that it either does not diminish, or succeeds in creating and/or maintaining, sufficient levels of related carrying capacities.

Related to all of this are two broadly divergent views on what the CTA approach to sustainability might mean in practice. Referred to as the strong sustainability versus weak sustainability schools of thought, they generally differ on the question of how much capital of one sort or another can be consumed or destroyed relative to the remaining supplies of others, while still maintaining human and ecological well-being. The disagreements between them turn on the issue of substitutability, or how much of a loss of natural capital can be substituted, or compensated for, by another type of capital (i.e., artificial or human-made capital).

Strong sustainability theorists hold to the notion of no, or low, substitutability between natural and artificial capitals (Daly, 1973, 1977, 1996; Daly and Cobb, 1989; Costanza et al, 1997; Dresner, 2006; Ekins et al, 2002). Weak sustainability theorists contend, by contrast, that human-made capitals, such as technology and other anthropogenic innovations, can, with few exceptions, be substituted for natural capital, and that independently managing and maintaining separate capital stocks is unnecessary. Instead, they argue, it is the overall size, or aggregate, of all capitals that must be maintained in order to safeguard human and ecological well-being (Pearce et al, 1989; Guter, 1996).

Much less specific, and yet more influential, is perhaps the most often quoted definition of the term sustainability, the so-called Brundtland definition, put forward in 1987 by the World Commission on Environment and Development (also known as the Brundtland Commission) in its report entitled, Our Common Future. There, the term sustainable development was famously defined as follows (1987, p. 8):
“Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.”

It is indeed ironic that what is so often referred to as the most influential or authoritative definition of sustainability is arguably not a definition of sustainability at all. Rather, it is a definition of ‘sustainable development’, in which the notion of sustainability is used as an adjective, and in which the subject is development. Thus, it is a definition of a type of development that leaves open the question of how the adjective it uses is, or should be, defined. As a putative definition of sustainability, then, the Brundtland contribution fails to deliver.

In this thesis, we embrace the CTA approach, notwithstanding the differences between its strong and weak adherents. Indeed, as will become clear later on, such differences between sub-schools of thought in the CTA approach to sustainability are of little consequence to the use of the method we are proposing. The Social Footprint Method is indifferent to such distinctions, and is of equal value and use to both sides of the CTA debate as we will show.

CTA, however, is not completely free of problems. Of main concern is its myopic focus on ecological, or natural, capital. While it is true that CTA does take other forms of capital into account, it:

1. only does so in the context of debating how substitutable they may or may not be relative to natural capital, and
2. is incomplete in its treatment of them. Nowhere in CTA, for example, do we see mention of human or social capital. These and other problems with CTA are addressed in our thesis.

In sum, our method is predicated upon acceptance of the CTA school in general. That, and other key conceptual commitments to sustainability theory we have made in this thesis are as follows:

1. Sustainability is a concept that refers to an aspect of the relationship between people - and, in particular, their behaviors or activities - and various types of capital that people rely on for their well-being, especially natural (or ecological), human, social, and constructed capital (we will refer to the latter three types as anthro capital).
2. Capital is “a stock [of anything (Porritt, 2005, p. 112)] that yields a flow of valuable goods or services into the future” (Costanza et al, 1997, p. 107). Capital is not to be confused with the flows it produces.

3. The extent of human and/or non-human needs that a flow of goods or services yielded by capital can support is referred to as its carrying capacity. A given population of humans in an organization or social system will have a corresponding need for carrying capacity at some level, a level required to meet basic human needs. The carrying capacity of a stock of capital can either match, fall below, or exceed such needs. Similarly, the needs of a human population for capital-based resources or services can either match, fall below, or exceed available levels of carrying capacity in both natural and anthro capital.

4. Importantly, anthro capital, unlike natural capital, can be created by people. That is, it is anthropogenic capital (see, for example, Schultz, 1961; Coleman, 1988; McElroy et al, 2006); hence our use of the term anthro capital.

5. Human activities in a social system are sustainable if they do not diminish the stocks of capital required to produce a flow of goods or services needed to meet basic human needs, or if, in the case of anthro capital, they do not fail to create and/or maintain such stocks. Human activities which have the effect of diminishing stocks of capital below needed levels, or which fail to create and/or maintain them, in the case of anthro capital, at required levels, are unsustainable.

1.1.1.3 A methodological gap

Despite the widespread consensus behind the CTA theory of sustainability, no sustainability measurement, accounting, or reporting systems - also known as non-financial reporting - have been developed, or systematically applied, to operationalize the theory in any sort of comprehensive way (Adams et al, 2004, p. 20). It is our intent, therefore, to fill that gap.

Notwithstanding the above, it is true that various attempts have been made over the years to popularize the CTA approach, or to implement parts of it in practice. In 1998, for example, Elkington coined and defined the phrase, triple bottom line (TBL), as follows (Elkington, 1998, p. 70):
“Today we think in terms of a ‘triple bottom line,’ focusing on economic prosperity, environmental quality, and - the element which business had preferred to overlook - social justice.”

In his 1998 book, Elkington, like us, is clearly concerned with the measurement of sustainability performance in organizational or business settings, only. To that end, he goes on to explain his three bottom lines in terms of impacts that corporations can have in each of the three areas. And he does so by making explicit use of CTA-type language: Economic Capital, Natural Capital, and Social Capital (Elkington, 1998, pp. 74-92). Indeed, for Elkington, the TBL is all about corporate impacts on three types of capital. That much is clear.

Still, while Elkington can easily be credited with having single-handedly popularized the CTA approach to sustainability in the form of his TBL metaphor, he never really provided us with a tool, or an accounting instrument, to go along with the concept. That would come later, when others would take up the challenge of how to operationalize the TBL, or the CTA more generally, into an executable or instrumental form.

By far and away the most successful implementation of TBL/CTA-type sustainability reporting is the Global Reporting Initiative (GRI). GRI is both an organization and a method, which together have attracted a growing list of corporations interested in measuring and reporting the triple bottom line impacts of their operations to stakeholders of all walks. According to GRI, over 1700 organizations around the world have committed to the use of GRI for annual sustainability reporting (Grist, 2006).

Notwithstanding the progress made in corporate sustainability measurement and reporting over the years, and the associated uptake of CTA theory that has accompanied it, there is a problem in sustainability reporting that must be resolved if we are to make any real progress in improving the performance of business. Indeed, for all of the talk of TBL reporting, corporate responsibility, and sustainability measurement and accounting, the leading CSM method in the world, GRI, arguably fails to do precisely the one thing it purports to do, which is make it possible to measure and report on an organization’s non-financial sustainability.

GRI comes up short in this regard by virtue of its failure to adhere to its own theoretical foundations. While it faithfully sticks to Elkington’s three bottom lines in
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its structure and orientation (and the CTA theory that lies behind them), it falls well short of actually measuring, not to mention reporting, impacts on the capitals involved. Instead of measuring capital impacts against capital constraints, limits, or standards, GRI merely measures impacts against the same impacts in a time series or trend-lining fashion. While it is true that GRI argues for more than this by advocating for the inclusion of ‘sustainability context’ in related reports, it provides no specific guidance for how to do so, nor have we ever seen a GRI report with such context included.

Table 1.1 Excerpt from 2006/2007 GRI Sustainability Report*

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<td>heating consumptions (tons of CO₂)3,4</td>
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1 Includes the data for half of the reporting period (July 2006 - December 2006). Data for 2007 is not yet available (see EN4 for more details).
2 Emissions factor used provided by GRI’s energy supplier for 2006: 447.331515414666g/ kWh
3 Emissions factor 1.974 kg/m³ provided by GHG Protocol Initiative is used.
4 Data on usage of natural gas for heating is available only as a total amount for period from October 2002 to December 2006. Consequently, average consumption of heating is displayed here to project the generation of CO₂ emissions caused by heating in the period.

data includes the consumption of energy by the GRI Secretariat's office


Even GRI itself, in its one and only sustainability report issued thus far, fails to include sustainability context in its disclosures. As shown in Table 1.1, for example, GRI’s reporting of its greenhouse gas emissions are presented in precisely the time series or trend-lining fashion we describe, without any mention of associated context, which in this case would consist of something like the assimilative capacity of the atmosphere to absorb such emissions. Thus, we are able to see what GRI’s emissions were, but we have no way of putting them into context, much less to form conclusions as to what GRI’s sustainability performance was in the years described.

In their present, conventional form, then, GRI-type reports are analogous to bank statements that only record deposits and withdrawals, but which fail to include
mention of starting and ending balances. Because of this, GRI is perhaps best described as an illustration of *triple top line* reporting, not *bottom line* reporting. By preventing stakeholders who rely on it to determine an organization’s impacts on the viability of vital capitals, GRI fails to support them (the stakeholders) in their most basic attempts to understand whether or not their organizations’ activities are, in fact, sustainable. It (GRI) is the leading sustainability reporting method in the world, and yet it fails to perform this most basic function!

Not all contemporary sustainability measurement and reporting methods fail to deliver, however, as GRI does. One in particular, the *Ecological Footprint* (Wackernagel and Rees, 1996), not only quantifies top-line impacts, but also measures and reports such impacts against natural capital conditions in the world. Thus, turning again to our banking metaphor, the Ecological Footprint not only tells us how much our deposits and withdrawals have been, it tells us so in the context of our starting and ending balances, and thereby makes it possible for us to determine whether our rate of spending is itself sustainable.

Despite its more faithful adherence to the CTA approach and the manner in which it makes true bottom-line accounting possible, the Ecological Footprint is:

1. strictly limited to analyses of impacts on natural capital only, and
2. rarely used by organizations.

Most of what we see in the form of Ecological Footprint analyses is performed at the level of regional or national human populations (i.e., *physical* aggregates of humans), as opposed to organizational populations (*conceptual* aggregates).

### 1.1.1.4 Knowledge and epistemology

In this thesis, we take the position that sustainability measurement and reporting invariably reduces to a process of creating and asserting knowledge claims - claims about the sustainability performance of organizations. Of particular importance is the distinction we can make between descriptive claims about an organization’s actual performance, and normative claims about what such performance ought to be (see Sections 1.3 and 2.3 below). We will argue that in order for sustainability measurement and reporting to be meaningful, related assertions
must include claims of both kinds; if they do not, they will fail to serve their purpose.

Indeed, claims regarding actual performance, made in the absence of claims regarding normative performance, suffer from a fatal lack of context, and thereby tell us little about the true sustainability performance of the organizations they pertain to. This, unfortunately, is all too often the case, including for most of what passes for mainstream sustainability measurement and reporting today, as our analysis will show. It is by taking such a knowledge-based, epistemological approach to sustainability that a solution can be found, however, as we will demonstrate in Chapters 2, 3 and 4 in the development of the Social Footprint Method.

1.1.2 Implications for sustainability performance

In order to be sustainable, organizations must have access to information about what their operational impacts in the world actually happen to be. But as we have seen from our discussion above, this is precisely what the leading CSM method in the world, GRI, fails to provide. As Gray and Milne put it (2002, p. 5), “whilst a GRI-influenced report might approach a triple bottom line report, it is highly unlikely to ever be a sustainability report.”

How, then, can we expect organizations to function in sustainable ways in the absence of such information, or in the absence of feedback concerning the effects of their own actions? The answer, we believe, is we can’t. Unless and until mainstream CSM methods make it possible to express organizational impacts in terms of their effects on the sufficiency of capital stocks and flows, sustainability management, per se, will not be possible, much less practiced.

Gray and Bebbington (2005) take an even more critical stance. In their view, it is not just the inadequacy of sustainability reporting that is the problem, it is the fact that corporations, by their very nature, cannot be sustainable in the first place. Contemporary methods for measuring and reporting the sustainability of corporate operations, they argue, merely mask and make all the more inevitable the devastating effects of their dysfunction. In a stinging rebuke of GRI sustainability reports and others like it, the authors say (p. 7):

""
“No reasonable person could make any sensible judgement on the basis of an organization’s reporting in their ‘Sustainability Reports’ on whether or not the organization was un-sustainable. Given that research has also shown that the attestation or assurance statements which attach to these reports are also, at best, useless and, at worst, highly misleading we are left with a major international initiative with considerable resources behind it which has little more than hubris, smoke, mirrors and deceit to offer society.”

The same authors go on to conclude the necessity of bona fide sustainability reporting at the corporate level of analysis if society is to make any headway in reforming the status quo. Here they echo our own thoughts as to the strong need for accurate and meaningful reports as a necessary precondition for achieving sustainability in the conduct of human affairs (Ibid.):

“The tragedy is not just that such extensive resources are used to mislead and deceive society. The real tragedy is that if sustainable business organization is ever to be achieved, then societies, individually and collectively, need to know [the extent to which] corporations, with the very best will in the world, are not capable of delivering sustainability. It is this - accountability for the extent to which a corporation cannot be sustainable, socially responsible and/or environmentally benign - that is the real potential of corporate reporting. Only then can societies learn whether or not:

1. it is necessary to reform the corporation and/or
2. it is possible for the corporation to reform itself and/or
3. as we reluctantly suspect, we face a systemic problem and unsustainability lies at the very heart of our current advanced form of international financial capitalism. Our failure to develop substantive sustainability reporting prevents us from addressing these entirely crucial matters.”

We agree with these sentiments, although we are not necessarily as quick to conclude that our current international system is beyond repair, or as systemically dysfunctional as Gray and Bebbington seem to suggest. This is all the more reason, we think, to accelerate the process of creating precisely the kinds of tools and methods we need to get to the bottom of the issue.
1.1.3 The need for effective tools and methods

Assuming managers in organizations (with the support of their stakeholders) in fact have a desire to function sustainably, the situation described above is untenable - untenable even in the absence of such conditions. Not only are businesses qualified and equipped to tackle intractable problems of sustainability, they are very often the causes and perpetuators of them as well. Thus, it is important that managers in corporations have access to meaningful and reliable information about their organizations’ impacts in the world, both for the sake of prevention and in support of remediation initiatives available to them.

Turning back to GRI, the leading CSM method in the world, there is some cause for optimism, or hope, in terms of where that method may be heading. In both the latest and previous versions of the method (‘G3’ and ‘G2’, respectively), an acknowledgement has been paid to the importance of what is referred to as sustainability context in the preparation of corporate CSM reports. G3 reads as follows (GRI, 2006, p. 13):

“Sustainability context

Definition:
The report should present the organization’s performance in the wider context of sustainability.

Explanation:
Information on performance should be placed in context. The underlying question of sustainability reporting is how an organization contributes, or aims to contribute in the future, to the improvement or deterioration of economic, environmental, and social conditions, developments, and trends at the local, regional, or global level. Reporting only on trends in individual performance (or the efficiency of the organization) will fail to respond to this underlying question. Reports should therefore seek to present performance in relation to broader concepts of sustainability. This will involve discussing the performance of the organization in the context of the limits and demands placed on environmental or social resources at the sectoral, local, regional, or global level. For example, this could mean that in addition to reporting on trends in
eco-efficiency, an organization might also present its absolute pollution loading in relation to the capacity of the regional ecosystem to absorb the pollutant.

This concept is often most clearly articulated in the environmental arena in terms of global limits on resource use and pollution levels. However, it can also be relevant with respect to social and economic objectives such as national or international socio-economic and sustainable development goals. For example, an organization could report on employee wages and social benefit levels in relation to nation-wide minimum and median income levels and the capacity of social safety nets to absorb those in poverty or those living close to the poverty line. Organizations operating in a diverse range of locations, sizes, and sectors will need to consider how to best frame their overall organizational performance in the broader context of sustainability. This may require distinguishing between topics or factors that drive global impacts (such as climate change) and those that have more regional or local impacts (such as community development). Similarly, distinctions might need to be made between trends or patterns of impacts across the range of operations versus contextualizing performance location by location.”

Notwithstanding this apparent nod to the importance of tying corporate impacts to their effects on the sufficiency of vital capitals in the world, GRI’s guidelines fail to provide what is ultimately needed: a detailed method or procedure for doing so. The latest guidelines, G3, offer no prescriptive means whatsoever as to how to actually take sustainability context into account, and every GRI report that we have ever seen, before or since, is entirely devoid of context. Until this changes, users and readers of such reports will be condemned to ignorance on what the true sustainability performance of the described organizations may or may not be. It should come as no surprise to anyone, therefore, if performance actually worsens over the years, despite the presence of such reports.

There are currently no corporate sustainability reporting methods in use today that make sustainability measurement and disclosure possible in any sort of literal, multi-capital, CTA-based way. Once again, the leading method, GRI, is at best described as a triple top line method, and offers no insight whatsoever as to
what the capital impacts of organizations that use it might be. Thus, it fails as a bona fide sustainability measurement tool. And other tools, such as the Ecological Footprint (discussed in Chapter 3), while they do address impacts on natural capital, fail to address the other bottom lines, so to speak, and are therefore too narrow in scope to address the whole problem.

What CSM practitioners need now, then, is a comprehensive CTA-based approach to non-financial reporting, and in particular new tools that make the measurement of impacts on non-natural, non-financial capitals possible. When combined with similarly-constructed tools, such as the Ecological Footprint, that already make such non-financial impacts on natural capital understandable, we will have at least an entry-level, and complete, multi-capital set of corporate sustainability measurement tools at our disposal. Only then can we expect the actual sustainability performance of businesses to improve, because for the first time managers in such organizations will have access to information as to what their actual impacts on the sufficiency of vital capitals is, and how far away their organizations might be from where such impacts ought to be.

1.2 THE SOCIAL FOOTPRINT

The Social Footprint Method (SFM) is our response to the question of how to measure the social sustainability performance of an organization, or to compute a social bottom line, as John Elkington might put it (Elkington, 1998).

The SFM differs from all other attempts or methodologies aimed at measuring the social sustainability of organizations in at least the following three ways:

1. It measures the social sustainability impacts of organizations against standards for such impacts. Thus, it is not just a top-line or trend-lining method, as GRI is.

2. The social sustainability standards against which the impacts of an organization are measured are expressed in terms of impacts on capitals. The SFM is, in that regard, a product of the CTA school of thought, and is an attempt to operationalize CTA (and, more broadly, the triple bottom line) in a practicable form. The particular forms of vital capital addressed by the SFM are human capital, social capital, and constructed capital. We refer to these three types of non-financial, non-natural capitals as anthro
capital, because they are human-made, or anthropogenic (see, for example, Schultz, 1961; Coleman, 1988; McElroy et al, 2006).

3. The specific kinds of impacts on anthropo capital that the SFM measures and accounts for are impacts on their carrying capacities. Thus, the standards of performance we use in assessing the social sustainability of organizations are standards of carrying capacity in anthropo capital, at levels required to meet the basic needs of a population. Impacts that have the effect of meeting or exceeding such standards are treated as sustainable. Impacts that have the opposite effect are treated as unsustainable.

In practice, the SFM takes the form of an arithmetical quotient. Below we introduce the theoretical basis of this idea, and the manner in which it can be applied to both ecological and non-ecological contexts.

1.2.1 Sustainability quotients

As noted above, the SFM is based on the simple idea of comparing organizational performance, or impacts on anthropo capital, with related standards of performance, or standards for what such impacts ought to be. We further contend that such sustainability performance can be expressed quantitatively in the form of a quotient, where the numerator is an organization’s actual impact on capital and the denominator is the standard or norm for what such an impact ought to be. While similar constructions have been developed by others in ecological contexts (Wackernagel and Rees, 1996), no one has yet done so for cases involving social contexts. That is what we purport to do here.

In our attempt to develop a social sustainability measurement model, as opposed to an ecological one, we found it necessary to step back and specify a theoretical framework that would capture and express the CTA-based notion of sustainability in more general terms for both social and non-social (or ecological) purposes. This was due to the fact that we could find no such practicable formulations of CTA in the literature. Once we had formalized CTA in such broad or generic terms, we were then able to develop the social instantiation of it we were looking for.
In the process of filling this gap, we developed a framework that can arguably be applied to other domains, such as the ecological one, and even the financial or economic ones. In that regard, the sustainability quotient is a design specification for sustainability metrics of many kinds, since it operationalizes a broad theory of sustainability (CTA), not just a theory of social sustainability.

Other sustainability measurement and reporting methods, including GRI, when viewed from the perspective of our quotients approach, can be seen as numerator-only schemes. In other words, they report performance in terms of actual impacts on the world without attempting in any way to compare or measure such impacts against standards, thresholds, context, or normative considerations of any kind.

In sum, the logic of sustainability quotients is simply this: that the sustainability of a behavior is best determined by comparing its impacts with standards for what such impacts ought to be (i.e., by comparing actuals with normatives). Impacts that violate standards for what such impacts ought to be are unsustainable; impacts that conform to such standards are sustainable.

1.2.2 The Ecological Footprint

The Ecological Footprint (Wackernagel and Rees, 1996) is, in some respects, the inspiration for the Social Footprint Method we develop in this thesis. What the Ecological Footprint Method (EFM) showed was that the impacts of human activities on a type of capital - natural capital, in the case of the EFM - could be measured and expressed in quantitative terms, and then compared to a standard for what such impacts ought to be.

While not explicitly cast or expressed in terms of sustainability quotients per se, the EFM does rely on a quotients approach to assessing the sustainability of a human population. It does this by relying, at least implicitly, on both a numerator and a denominator. Consider the following explanation put forward by the EFM’s creators (Wackernagel and Rees, 2006, p. 56):

“As noted previously, the fundamental ecological question for sustainability is whether stocks of natural capital will be adequate to meet anticipated demand. Ecological Footprint analysis approaches this question
directly. It provides a means to compare production by the ecosphere with consumption by the economy, thereby revealing whether there is ecological room for economic expansion or, on the other hand, whether industrialized societies have overshot local (and global) carrying capacity. In the latter case, the Ecological Footprint also reveals the sustainability gap confronting society. In short, Ecological Footprint analysis can help to determine the ecological constraints within which society operates; to shape policy to avoid or reduce overshoot; and to monitor progress towards achieving sustainability.”

In the statement above, there is an implicit quotient being referred to by the authors. Specifically, the phrases ‘production by the ecosphere’, ‘ecological room for economic expansion’, ‘carrying capacity’, and ‘ecological constraints’ all refer to a denominator in a sustainability quotient which specifies limits (ecological ones, in this case) against which actual performance or impacts in the world can be compared. The numerator, through which such impacts are expressed, is referred to in the statement above by the phrases ‘anticipated demand’, ‘consumption by the economy’, and ‘economic expansion’.

### 1.2.3 Societal quotients

As we have shown, the Ecological Footprint Method relied at least implicitly on a quotients approach to the measurement and reporting of sustainability. Moreover, its emphasis was on ecological issues only; or on the impacts of human activity on natural capital. Because natural capital is limited, measuring and reporting the sustainability of human activity in that context necessarily entails the measurement of performance against limits or constraints.

This is fundamentally not the case, however, when it comes to measuring human performance against impacts on anthro capital. Unlike natural capital, anthro capital is theoretically unconstrained, since it is produced by humans who can almost always create more of it, if and when they choose to do so.

As noted above, we define anthro capital as consisting of three types of human made, or anthropogenic, capital, vitally important to the well-being of people on earth. Here, briefly, is how we define these three types of capital:
1. **Human Capital**

Human capital consists of *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]).

2. **Social Capital**

Social capital consists of *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).

3. **Constructed Capital**

Constructed capital (or ‘built’ capital) consists of *material objects and/or physical systems or infrastructures* created by humans for human benefit and use. It is 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).

In our approach, we take the position that anthro capital yields goods and services that people rely on - *and which they appropriate* - in order to take (what is hoped to be) effective action in the service of their own well-being. In some cases, such action is taken individually, while in others it is taken collectively. In all cases, though, it is action taken using capital-sourced goods and services in order to ensure human well-being.

Managing stocks of anthro capital is therefore important to human well-being. Unlike natural capital, however, which exists in fixed supplies on earth, anthro capital is not fixed in supply, and is produced by humans. People teach and learn, and thereby create human capital; they form social, economic, and government bonds and thereby create social capital; and they build highways, office buildings, schools, shopping centers, factories, and material products and technologies, and thereby create constructed capital.
In the case of ecological capital, then, our problem is that we have too much demand relative to fixed supplies. So we must focus on measuring demand and lowering it. In the case of anthro capital, however, our problem is not that we have too much demand, it is that we have too little supply. We can take this position, since in the case of anthro capital, supplies are not fixed; rather, because they are anthropogenic, we can always make more of them. Thus, when confronted with social unsustainability, we must focus on measuring supply and raising it.

This difference in perspective on how to view human impacts on natural versus anthro capital gives rise to a difference in how we should attack the measurement problem in the design of the two, respective footprint methods. As we have already discussed, the Ecological Footprint is set up to compare the use of resources with corresponding limitations in capital. A Social Footprint, by contrast, must hold human actors accountable to the levels of capital they produce. The resulting ecological and societal quotients we can construct will differ, accordingly.

We will have much more to say about our societal quotients, the scores they produce, and how to interpret and work with them in Chapters 3 and 4. For now, however, suffice it to say that we believe we can construct sustainability quotients that quantitatively express the social sustainability performance, or bottom line, of an organization, in much the same way as others have done in the ecological domain. While there are important differences to contend with, the principles in both cases are the same: human impacts are measured and expressed in terms of their effects on the sufficiency of vital capital, norms and standards for which must be an integral part of any CSM reporting system.

1.3 EPISTEMOLOGY

The Social Footprint Method (SFM) is, at base, an epistemological tool. Its purpose, that is, is to produce knowledge about the sustainability, or sustainability performance, of an organization. In that regard, it is a knowledge production tool that organizations can use in support of their attempts to manage their social impacts in the world.
Epistemology, however, is not a unified field. There are many different branches of epistemology, and competing points of view within them (Kirkham, 2001; Audi, 2000). Because of this, it is important that we disclose our own orientation, and the particular theories of knowledge and truth that we subscribe to.

1.3.1 Facts, values, and fallibilism

In this thesis, we will rely heavily on the distinction between knowledge of facts and knowledge of values (Hall, 1952, 1956, 1961; Popper, 1971[1945]; McElroy et al, 2006). For us, the former will consist 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; the latter will consist 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).

When we speak of factual knowledge, we will be talking about truth, although never with certainty, since we do not believe certainty of knowledge is possible in the realm of human experience, “except for valid and simple proofs in world 3” (Popper, 1979[1972]) (i.e., the world of human-created artifacts, such as logic, mathematics, etc.). In that regard, we will rely on a fallibilist theory of knowledge (Peirce, 1955[1897]; Hall, 1961; Popper, 1979[1972]; Notturno, 2001; Firestone and McElroy, 2003a; Niiniluoto, 2004[1999]).

That said, we will not deny that the world is real, or that our statements can correspond with the facts - or not - as the case may be. Here we will rely on a realist epistemology and a correspondence theory of truth (Hall, 1961; Popper, 1979[1972]; Alston, 1996; Kirkham, 2001). We will agree that a correspondence can exist between a statement and a fact, and that seeking such correspondence should be the regulative ideal of choice in knowledge production. We will simultaneously deny that knowledge with certainty of such correspondence is ever possible.

When we speak of value knowledge, we will be talking about legitimacy or the fitness or desirability of a fact (Hall, 1961), as opposed to the truth of it. Again, we will adhere to our fallibilist epistemology and will deny that knowledge of
values with certainty is possible. Still, we will claim that knowledge of values can be approached from a realist perspective, and that legitimate claims about values can be made just as true statements about facts can. Here we will rely on a blend of Hall (a correspondence theory of legitimacy, 1961) and Popper (objective knowledge, 1979[1972]).

The notion of a regulative ideal will also be vital to our epistemology, both for the truth of facts and the legitimacy of values. In the case of facts, our regulative ideal for investigating the correspondence between descriptive statements, and the facts they may correspond to, will be “the way the world is”. In the case of values, the regulative ideal for investigating the correspondence between evaluative or normative statements, and the values they may correspond to, will be “the way the world ought to be”. This, in turn, will lead us to another branch of epistemology that we will call theories of evaluation - also referred to as justification or validation by others (Hall, 1961; Kirkham, 2001). There we will find a theory known as the Fair Critical Comparison Theory (Firestone, 1973, 1974; Firestone and McElroy, 2003a) according to which we can test and evaluate competing fact or value claims against one another under the influence of our regulative ideals, and thereby get closer to the truth and/or the legitimate.

The epistemology we have described here is a variant of Karl Popper’s Critical Rationalism (CR). We have simply expanded CR to include a component of value theory that is otherwise missing from its construction (Hall, 1952, 1956, 1961). We then apply the resulting doctrine to organizational settings (McElroy, 2003; Firestone and McElroy, 2003a, 2003b).

Mark A. Notturno, a leading Popperian scholar in the United States, characterizes CR as follows (2001):

“Rationality, according to Popper, is not so much a property of knowledge as a task for humans. What is rational is not so much the content of a theory or a belief as the way in which we hold it. We are rational to the extent to which we are open to criticism, including self-criticism; and to the extent to which we are willing to change our beliefs when confronted with what we judge to be good criticism” (p. xxv).

.......
“These ideas - that objective rational knowledge is inherently fallible; and that we can never justify, but can only criticize it - are essential both to Popper’s philosophy of science and to his concept of open society” (p. xxvi).

We will have more to say about Popper’s ideas and their relevance to sustainability, and to sustainability measurement and reporting in particular, in Chapters 2 and 3.

1.3.2 Sustainability reports as knowledge claims

Sustainability reports, as we have constructed them, are best understood as arguments of a sort - they are arguments consisting of knowledge claims about whether or not an organization’s operations are sustainable. As explained above, a report should ideally include a fact claim that expresses an organization’s impact on some type of capital, and a value claim that expresses standards for what such impacts ought to be.

The fact claim should always express, in a descriptive sense, some understood or measured scope of impact that an organization claims to be having on the carrying capacity of capital. The value claim, in turn, should always express, in a normative sense, some prescriptive impact that an organization ought to be having on the same capacity, according to some norm or standard of performance.

Here we acknowledge that values are notoriously controversial. Many claim that they are entirely relativistic (i.e., one value claim is as good as another) (see Audi, for example, 2000, pp. 259-260). As we have already noted, however, we hold to a realist epistemology, not a relativist one (see Kirkham, for example, 2001, pp. 73-79). Under our epistemology, competing value claims, not just fact claims, can be judged by a correspondence theory (Hall, 1961, pp. 183-189). Thus, ours is an anti-relativist position.
1.4 RESEARCH QUESTIONS

From the preceding discussion it should be clear that the perspective we plan to take in our discussion of corporate, or organizational, sustainability is a decidedly epistemological one. Our intent, in fact, is to frame our thesis as an epistemological theory of sustainability. This orientation to the subject has also informed our thinking on what the research questions of interest to us should be. Here they are:

1. Are there any organizational sustainability measurement and reporting methods that actually (or purport to) measure and report sustainability performance in a literal (i.e., context-based) way?
   - If so, in what sense do they measure and report sustainability performance?
   - What are the key principles or assumptions behind such methods?
   - What are the key differences between the methods (with respect to scope and validity), and can it be argued that some methods are more effective than others?
   - What are the explicit or implicit epistemologies behind such methods?

The purpose of our first set of questions above is to establish the current lay of the land in terms of how organizational sustainability management takes place today - in other words, to establish the current state of the art. We then go on in our second set of questions (below) to determine whether or not any of the existing methods also happen to address social sustainability performance, in particular.

2. If these methods exist, do they measure social sustainability performance?
   - If so, which ones and how do they work?

Our third and final set of questions (below) then addresses the possibility that current tools and methods do not, in fact, address social sustainability performance. Of particular interest to us in that case is whether or not the principles relied upon for the measurement of non-social sustainability performance can be applied, as well, to the social domain. If so, we then want to explore the question of what the nature of such a tool or method might be.
3. If existing, literal methods do not address social sustainability performance, can the measurement principles they rely on in other domains be applied to the social domain?
   - If so, how would the resulting tool or method work, and what sort of measurement model would it entail?
   - What would its advantages and disadvantages be over other competing approaches?

1.5 METHODOLOGY

The intent of this thesis was to create a design specification, or template, for measurement models that can be used to measure the social sustainability performance of organizations. Thus, the method we followed was, at root, a design process. That said, we can distinguish between two different types of such methods: forward engineering and reverse engineering (Raja, 2008, p. 2):

   “Forward engineering is the traditional process of moving from high-level abstractions and logical designs to the physical implementation of a system.”
   
   “The process of duplicating an existing part, subassembly, or product, without drawings, documentation, or a computer model is known as reverse engineering.”

Forward engineering methods are typified by the following formulation (Pahl and Beitz, 2007, p. 129):

   Step 1: Planning and Task Clarification,
   Step 2: Conceptual Design,
   Step 3: Embodiment Design,
   Step 4: Detail Design.

Reverse engineering methods, however, take a different path (Raja, 2008, pp. 4-8):

......
Step 1: Scanning,
Step 2: Point Processing,
Step 3: Application-Specific Geometric Model Development.

Whereas in the case of forward engineering design, the purpose of the process is to solve an instrumental problem of some kind by developing (usually) a new physical artifact as a solution, in the case of reverse engineering, the purpose of the process is to duplicate, or replicate, an already-existing design for business or economic reasons. That said, it is also true that in the case of forward engineering, the analysis of existing designs often occurs as “one of the most important means of generating new or improved solution variants in a step-by-step manner” (Pahl and Beitz, 2007, p. 81).

In this thesis, we relied on a hybrid of the forward and reverse engineering design methods. Our hybrid approach, however, was dominated by the reverse engineering method, perhaps because of the degree to which we had reverse engineering in mind from the start. In general, we set out to replicate existing sustainability measurement tools of a demonstrably literal kind (i.e., ecological oriented CTA-based tools), but not in their entirety. We wanted to understand how such tools function in the ecological space, and then see if we could redesign or recast them for use in the social space, while adhering to the same robust theory of sustainability - the CTA-based approach. Thus, the replicas we set out to build were only partial replicas, with new functionality added of our own making. Given the extent to which recently-formulated reverse engineering methods give precedence and priority to the replication of existing designs, as opposed to the production of new ones, we chose to subordinate the forward design aspects of our work to the reverse engineering method, instead of the reverse.

To the extent that our hybrid approach also featured aspects of forward engineering in it, such aspects were limited to the design of new functionality as we attempted to modify the reversely-engineered models we looked at. This occurred exclusively in the form of removing ecological elements or concepts from existing methods, and replacing them with social elements of our own choosing or design.

Even here, however, our use of forward engineering logic was heavily constrained. It was constrained because we were always confined to operating within a predetermined structure and context: the reversely-engineered methods we were
trying to modify. For example, in removing natural capital elements from such models in order to replace them, the only viable substitutions we could consider were other types of capital. This was true if what we wanted was to remain true to the CTA approach, which we did. The result was the replacement of natural capital with anthro capital; there was arguably no other choice. Thus, the range of alternative designs we could consider was a very narrow one at best. Forward engineering in this case, such as there was any, was thereby reduced to modifying an existing design, as opposed to creating an entirely new one.

For that reason, the design discussion contained in Chapter 4 of this thesis does not follow the usual forward engineering pattern, in which multiple alternatives are identified, tested and evaluated against one another on a blank slate, and so forth. Instead, we confine ourselves to the modification of existing designs, since it was always our explicit intent to reverse engineer such designs (as found in the ecological space), and modify or reinvent them in some way in order to adapt them to the social space.

Despite the industrial, material focus of both forward and reverse engineering design methods, it should also be obvious that our intent was to produce an intangible artifact, not a tangible one, as is usually the case when such methods are applied. Our artifact is the Social Footprint Method, consisting of both a design specification, or template, for measurement models, and a procedure for using them.

In effect, then, much if not most of the design of the Social Footprint Method and the measurement modeling framework it entails, was pre-determined, or pre-designed, and was simply imported into the design, or adaptation, of the solution described on these pages. In that regard, many of the functional requirements set forth below in Section 4.3 were inspired by an understanding of how CTA-based models in the ecological domain already work, albeit with modifications made to account for the social particularities of our case. All of this came about by a concerted effort to study and abstract the central concept and theory of practice embodied in such methods, and to determine which parts of them could be applied to the social domain, and which parts would have to be replaced with new ones of our own making. That, in fact, was our first step, and it corresponds to what Raja (Ibid.) refers to as Step 1 of the reverse engineering method, Scanning.
Step 2 of the reverse engineering method, Point Processing, is a computer-based process that, in the case of physical designs, results in a raw virtual or digitized representation of material objects scanned in Step 1. As Raja explains, “The output of the point processing phase is a clean, merged, point cloud data set in the most convenient format” (Ibid., p. 7). Point clouds define, and graphically depict, the geometry of scanned objects on a computer, but only roughly so. The output of step 2, then, is a crude, digital representation of scanned material objects.

In our case, however, since we were not dealing with a material object, but instead were dealing with an intangible measurement model, our output consisted of a set of revised technical design specifications, or ‘as builts’ (Section 4.4), with social elements and substitutions added, and a similar modification of the underlying functional requirements (Section 4.3), again with social elements and substitutions added. On the assumption that the methods and models we set out to reverse engineer and modify were in their own case forward engineered at some point in time (i.e., their technical specifications were prospective), this part of our work essentially amounted to recalling or revisiting those earlier efforts, and revising their outcomes (i.e., our technical specifications are retrospective). In that regard, we were modifying earlier forwardly-engineered designs, but always against the backdrop of our own, more controlling reverse engineering method. Even so, however, we were arguably operating at Step 3 of the method, since Step 2, for us, was unnecessary for reasons we explain below.

Step 3 of the reverse engineering method, Application-Specific Geometric Model Development, involves the translation of digital point data (produced in Step 2) to CAD (computer aided design) models. The output of this Step is a geometric model, coded in one proprietary CAD format or another (i.e., for use with a CAD ‘application’), in which the object scanned in Step 1 is fully specified. Thus, it is a linguistically-expressed technical design specification, or description, of the object. Here we can see that Steps 2 and 3 essentially work together in a joint effort to describe whatever material object has been scanned in Step 1. Step 2 provides a first approximation, and Step 3 then refines and more fully articulates it.

In our case, since we were not dealing with a material object, but instead with an immaterial one, scanning for us was a cognitive analytical process. Furthermore, because it was cognitive, our process did not necessarily require an intermediate step in which only a crude approximation of the scanned object was produced as
a precursor to the final step. Instead, we were able to move more quickly to the
detailed specification, or description, of the scanned (or analyzed) object. This
was further facilitated by the existence of descriptive documentation for the
models of interest to us (e.g., Daly’s theories, articles about the CTA approach,
books and articles about the Ecological Footprint Method, etc.). This is usually
not the case in most reverse engineering situations. Instead, specifications in such
cases must be inferred from physical designs and then reconstructed in a pre-
sumptive fashion - with or without fidelity.

To summarize, the purpose of forward engineering is to develop new solutions;
by contrast, the purpose of reverse engineering is to replicate existing ones. In
our case, we relied on a reverse engineering approach to adapt an existing solu-
tion to a new problem: the need for a CTA-based model for measuring the social
sustainability performance of organizations. Thus, ours was only a partial replica-
tion. Adapting an existing model for our purpose required that parts of it be
re-designed for functions it was never intended to serve. To that extent, we relied
on forward engineering to a degree, but only in a subordinate fashion to the re-
verse engineering method we had embraced.

Lastly, the options available to us as we engaged in re-design were highly con-
strained, both by virtue of the other aspects of the model that were not to be
changed, and also by the thematic or functional nature of the elements that were
to be changed, the principles of which it was important to uphold. The result is
the technical design specifications (as built) provided in Section 4.4, the related
functional requirements in Section 4.3, and the prototypical illustrations of the
Social Footprint Method described in Chapter 5. The theoretical bases for the
modifications we made to the reversely-engineered and adapted Social Footprint
Method are, in turn, laid out in Chapters 2 and 3.

1.6 DISSERTATION OUTLINE

This dissertation is organized into six chapters. Chapter 1, Introduction, provides
a general orientation to the subject of organizational sustainability, the manner in
which it is tied to human well-being, and the major themes to follow in Chapters
2 through 6. Our major research questions and the methodology we followed are
also included in Chapter 1.
Chapter 2, *Knowledge and Action*, presents the epistemological foundations upon which our thesis is based. There, for example, we discuss the important distinctions between knowledge of fact and knowledge of value, competing theories of truth, competing theories of evaluation, and our own commitment to fallibilism.

In Chapter 3, *Sustainability Theory and Practice*, we provide a general overview of sustainability - the social science - and the leading tools and methods used today to measure and report the sustainability performance of organizations. We conclude the chapter by returning to the epistemology discussion contained in Chapter 2, which we then rely on as we present our own epistemological theory of sustainability.

Chapter 4, *The Social Footprint Method*, is essentially an instruction manual for how to use the method in real-world situations. In particular, it describes a 5-step process for measuring and reporting the social sustainability performance of organizations; and also includes the results of a face validity survey on the method itself.

Chapter 5, *Illustrations of the Social Footprint Method*, contains the results of two prototypical applications, or illustrations, of the method. One involved a case at Ben & Jerry’s Homemade, Inc., a wholly-owned subsidiary of Unilever Corporation, and the other involved a study at Wal-Mart Stores, Inc.

In Chapter 6, *Conclusion and Discussion*, we return to the research questions raised in Chapter 1, and attempt to answer them in light of the content of Chapters 2 through 5. In this chapter, we also acknowledge and respond to several issues and implications raised by the Social Footprint Method, and then conclude by identifying possible future directions for continued development and use of the Social Footprint Method.