

## **Natural Capital: Dollars and Cents/Dollars and Sense**

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# Article Title Page

## Natural Capital: Dollars and Cents/Dollars and Sense

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**Structured Abstract:**

Purpose	This paper uses natural capital as an example to offer some viewpoints on the expansionary economic hegemony facilitated by the concept of multiple capitals. In particular the paper highlights through drawing upon metaphor theory and cultural psychology theory how acceptance of the concept of natural capital is likely to impact our understanding of ourselves and facilitate a move to where we measure everything in cents rather than sense.
Design/methodology/approach	This paper draws on existing literature to develop its arguments.
Findings	Natural capital and the concept of multiple capitals may be necessary and accepted but the concepts are not benign they facilitate the expansion of economic concepts to new areas that will impact our humanity.
Research Limitations/Implications	This paper is a lament and aims to offer some cautionary notes to warn those who use the concept of natural capital.
Practical/Social Implications	The arguments presented highlight how the use of the concept of natural capital advances the economic hegemony and while this may be necessary within the current paradigm the outcomes could have significant impacts upon our society and how we interact with all that surrounds us.
Originality/value	In drawing on existing literature the originality lies in its combination of arguments brought together to realize the central claim that the concept of natural capital and multiple capitals will realize changes to ourselves and our society.

**Keywords:** natural capital, metaphors, sustainable development, systemic thinking, humanity

**Article Classification:** Viewpoint

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**Running Heads:**

## **Natural Capital: Dollars and Cents/Dollars and Sense**

*“The way people talk about the world has everything to do with the way the world is ultimately understood and acted in” (Eccles and Nohria, 1992, p.29)*

### **Introduction**

The central claim of this paper is that the concept of natural capital as captured within the conceptual domain of different capitals (for example; financial, manufactured, intellectual, human, social and relationship,) acts as a metaphor that facilitates continued and expansionary economic hegemony. A focus on natural capital is taken because it is, as will be discussed; the stuff of life and further it is considered a material issue by accounting bodies and firms (ACCA, 2013a). The ultimate the purpose of this paper is to help the reader be cautious on, what appears to be the almost inevitable path of economic conceptual domination.

While natural capital may facilitate continued economic hegemony and this may not be a problem in itself, the argument made in this paper is that such hegemony will impact our understanding of ourselves. In turn moving us away from homo sapiens to homo economicus, economic agents who measure everything through monetary outcomes. This movement will be facilitated by the concept of natural capital realizing a situation wherein everything has an instrumental as well as intrinsic value. Although an embrace of the monetary value of nature maybe necessary in order to realize sustainable outcomes, particularly within the current paradigm. Wherein such a concept makes ‘sense’ as it would appear that “economics has won the battle for theoretical hegemony in academia and society as a whole” (Ferraro, Pfeffer and

Sutton, 2005, p.10). The challenge is that such an embrace also impacts us as human beings. As the opening quote alludes to, in adjusting our concepts of the world around us, we impact our thoughts, actions and deeds. And again, while such a movement may be unavoidable, the aim of this paper is consider some of the challenges of such a move because at the least a world of economic totality limits the realization of alternatives; while impacting upon the more visceral sense we have of ourselves and our surroundings.

To develop its arguments, this paper weaves together a number of different areas. First the paper outlines some of the theory of metaphors and language and how they are key constituents of our reality that in turn guide our actions. This is done in order to build a bridge of understanding regarding words, language and concepts not existing in isolation, but rather their framing and application impacts upon us and our expectations and actions. Second some basic cultural psychology concepts regarding our understanding of ourselves as human beings are discussed. In addition this part of the paper will bring forward a simple model utilized by anthropologist Ingold (2011) that humans are a phenotype – a process of negotiation between their biology and all that surrounds them. Thus humans are neither nature nor nurture, rather they are a mix and neither is separable from the other. From there the third part of the paper will be a discussion of the basic understandings of natural capital.

Once these areas are laid out, the final part of the paper will discuss viewpoints regarding the potential impacts of natural capital. This discussion will highlight some of the challenges of natural capital, for example that it is the source of life and that nature is a system, yet the concept of natural capital and in turn capitals perpetuates a fractured epistemology. Finally the paper closes with some integrative comments and a reflection point regarding our humanity and whether we can continue to be homo sapiens.

Prior to continuing it should be noted that this paper is attempting to tie together different areas, and in so doing the hope is that the result is not an impenetrable Gordian knot; but rather a cohesive narrative.

### **Understanding Metaphors**

Metaphors are the basic building blocks of language and tools that allow us to conceive of one thing in terms of another (for example see; Cornelissen, 2002, 2004, 2005; Lakoff and Johnson, 1980; Lakoff and Turner, 1989; Morgan, 2006). In this regard, metaphors help us understand by referring to “something unfamiliar in terms of something familiar” (Inns, 2002, p.325) or by referring to something familiar in new terms. Either way the work of every metaphor is to “guide our perceptions and interpretations” (Cornelissen et al., 2008, p.8). In this regard, metaphors are more than just language designed to transfer understanding. They also imply mode of behavior (Morgan, 2012, Tsoukas, 1991, 1993) and are both “descriptive and constitutive of reality” (Tsoukas, 1991, p. 568) because they impact our frames of meaning and thus our actions (for example see; Lakoff and Johnson, 1980; Morgan, 2012; Porac et al., 2011; Tsoukas, 1991, 1993). Thus metaphors are a “cognitive technology that directly shapes our relations with the world, guiding how we think and act” (Morgan, 2012, p.12). This guiding by metaphors is what realizes both their use value and their difficulty. Their use value is raised because they allow the “transfer of information from a relatively familiar domain (variously referred to as source or base domain, or vehicle) to a new and relatively unknown domain (usually referred to as target domain or topic)” (Tsoukas, 1991 p.568). Consequently they provide us with a short cut, whereby we can conceptualize about that that which we know little, using the frameworks of that which we know something about. For example, we may use the metaphor of the organization as a machine to facilitate our thinking about how the organization behaves. While such a metaphor enables

opportunities in considering behavior, at the same time the conceptual shortcut realizes shortcomings. Shortcomings in so much as organizations of people are not machines; the machine metaphor is an approximation not a direct map to the thing itself. However, in using such a metaphor we also, either wittingly or unwittingly, allow through the use of such a metaphor the consideration of the humans that constitute the organization as being functional and component parts of a machine, as opposed to full human beings.

Thus while the metaphor enables a short cut that is enabling, the difficulty is that the short cut could be a misleading path as it can enable and or obscure ideological distortions (for example see; Akerman, 2003; Audebrand, 2010; Tsoukas, 1991, 1993). Thus metaphors refract and offer a partiality, a partiality that is unfortunately unavoidable because as humans we are “anthropologically condemned” (Tsoukas, 1993, p.335) to a less than complete perspective. Nevertheless, this difficulty can be known and a warning to the metaphor user; the challenge is that a metaphor’s use perpetuates a reality and their use realizes a self-fulfilling prophecy (Ferraro et al., 2005). To explain, a reflective user may use a metaphor but also desire to be open and free flowing regarding their conceptualizations. However to be totally free-flowing is counter to our understanding of individuals and their conceptualizations, their paradigms. Wherein paradigms are constructed from our assumptions and in turn metaphors and these are key to our sensemaking (for example see; Balogun & Johnson, 2005; Gladwin et al; 1995 and Weick, 1995). Thus to change our paradigms requires us to challenge our sense of the world and this change is not resistance free it takes time, as explained by Kuhn (1996).

Metaphors when used denote a particular pattern of thinking and behavior that is consistent with a paradigm. Further to enable acceptance and increase the value of a particular metaphor, the mode implied by the metaphor is likely to be followed. In this regard any one metaphor’s implications become the norm, a self-fulfilling prophecy (Ferraro et al.,

2005). For example as Ferraro et al., (2005) outline, a study by Liberman, Samuels and Ross (2003) shows that when the same economic game is called the Community Game as opposed to the Wall Street Game, mutual cooperation is the rule for participants as opposed to their pursuit of narrow self-gain. Likewise when the game is called the Wall Street Game as opposed to the Community Game the opposite is true. Similarly, Ferraro et al., (2005) outline how when the Black and Scholes option pricing theory was first introduced it did not accurately predict option prices. However through time its accuracy increased as it became the norm for pricing. Thus the theory was ultimately deemed a success, however that success was realized because “people and organizations acted as if the theory were true, which made its predictions come true” (Ferraro et al., 2005, p.13). Thus metaphors may offer a short cut but they also realize distortions that can become self-fulfilling prophecies.

As such while a metaphor can facilitate new understanding and bring disparate groups together around a common problem. The difficulty will be that the subject under discussion is no longer viewed with a plurality; rather the metaphor will act as a form of linguistic hegemony that realizes a conceptual hegemony and the perpetuating of a particular reality. Thus aspects of distortion and self-fulfilling prophecy and a particular reality are some of the central concerns regarding the use of the metaphor ‘natural capital’ as a conceptual shortcut for nature and its systems, when considering the actions and strategies of organizations. The use of natural capital is likely to guide and perpetuate a reality that is underpinned and guided by economic rationality. While economic rationality may or may not be desirable, its advance realizes unintended consequences, as will be discussed later.

## **Cultural Psychology and Phenotype**



Cultural psychology argues that the “self is born of the interaction between the person and a set of culturally derived beliefs, values, institutions, customs and practices” (Heine & Lehman, 1999, p.916). Thus our notion of who we are and our continuance in so much as we know ourselves in the morning and have a sense that we are the same person that went to sleep the night before (Markus & Kitayama, 1991); that person is, according to cultural psychology, derived from a relational perspective through our interactions with our culture. It is argued that “one culturally universal motivation is to view oneself as an authentic member of one’s culture” (Heine & Lehman, 1999,, p.923).

Cultural negotiation regarding one’s sense of self also highlights a fluidity in our sense of self, in that we may have “more than one possible conceptual representation, depending on the cultural meanings brought to bear” (Cousins, 1991, p.125) and their interpretation. Thus any one individual could and can be “observed to project multiple, inconsistent, self-representations” (Ewing, 1990, p.251) that are context dependent and may shift depending upon an individual’s definition of the situation. In this regard, individuals may construct a series of self-representations (Ewing, 1990) that are likely to be “embedded in a particular frame of reference, culturally shaped and highly contextual” (Ewing, 1990, p. 273). Further as the context shifts and individuals negotiate the changing context they are likely to implicitly redefine themselves and others during the course of an interaction. Thus “people can be observed to project multiple, inconsistent, self-representations that are context dependent and may shift rapidly” (Ewing, 1990, p.251)

Consequently an individual’s sense of self in any given context is reflexive negotiation within particular context wherein the self-construct is argued as being a “constellation of thoughts, feelings, and actions concerning one’s relationship to others and the self as distinct from others” (Singelis, 1994, p.581).

As a person's self-construal is a negotiation with context, different self-construals can coexist depending on whether one is discussing themselves as an individual, interpersonally or in a group (Brewer & Gardner, 1996). A basic model of the individual is that we have a private self, a public self and a collective self (for example see; Brewer & Gardner, 1996; Singelis, 1994; Triandis, 1989). Where the private self is based on cognitions that involve traits and behaviors of the person, our dreams and continuous flow of thoughts and feelings which are private and cannot be directly known by others (Markus & Kitayama, 1991); the public self concerns cognitions of the generalized other's view of the self and the collective self, cognitions concerning a view of the self that is found in a group setting (Singelis, 1994). The key with this model is that the self is a "mediating variable between culture and individual behavior" (Singelis, 1994, p.581) and the three aspects of the self are the "universe of cognitions from which an individual draws" (Singelis, 1994, p.581) in any particular situation. The argument then proceeds that a particular aspect of self (private, public or collective) will be accentuated depending on the development of that particular aspect. For example if an individual primarily samples the private self primarily then an individual will display independent tendencies; whereas if the collective and public self are sampled an individual is likely to display more interdependent tendencies (Singelis, 1994,).

It is important to note that any individual can display both independent and interdependent self-construal. Wherein a "dynamic equilibrium that fluctuates with changes in the... [metaphorical]...distance between self and others" (Brewer & Gardner, 1996, p.91) impacts the self constructed. It is argued that culture has an impact on the relative development of the private or public/collective self (Triandis, 1989) and thus a tendency for which cognitions are drawn upon (Brewer & Gardner, 1996). As such, collectivist or sociocentric cultures will encourage the development of cognitions that draw upon the public or collective self and in turn an interdependent self-construal, whereas individualistic cultures

will encourage and develop cognitions that inform the private self and in turn an independent self-construal.

In this regard it has been argued that that non-Western cultures (Asian, Indian, Hispanic) promote sociocentric and an interdependent self, whereas Western cultures promote individualism and an independent self (for example see; Heine & Lehman, 1999; Cousins, 1991; Ewing, 1990; Markus & Kitayama, 1991). Thus it is argued that culture impacts the development of self in order that one (private, public/collective) is dominant over others because of cultural values, belief systems and socialization (Brewer & Gardner, 1996). In Western nations the self construct is “biased systemically toward casting the self in an unrealistically positive light” (Heine & Lehman, 1999, p.915) wherein positive things are more likely to happen to the individual and negative things to others. Further in western cultures greater emphasis is placed on individuals being competent and self-sufficient and as such in order to bridge the gap between these cultural ideals and an individual’s actual standing a positive emphasis is placed on personal capabilities (Heine & Lehman, 1999). In sum Geertz (1974, p.31) argues the western conception of self is someone who is “bounded, unique, a more or less integrated motivational and cognitive universe, a dynamic center of awareness, emotion, judgment, and action organized into a distinctive whole and set contrastively both against such wholes and against its social and natural background”.

In contrast it is argued that non-Western cultures are interdependent and do not display self-enhancing biases, rather individuals in these cultures display unrealistic pessimism, bad things happen to them and good things to others (Heine & Lehman, 1999). Thus contrary to westerners who internalize success and externalize failure, non-Western cultures do the opposite. Further the self is served in non-western cultures when “individuals feel that they are being accepted by their groups” (Heine & Lehman, 1999, p.916). Thus there is an emphasis on fitting in and how behavior impacts relations with others (Heine & Lehman,

1999). In short non-Western cultures are more sociocentric as opposed to individualistic or egocentric (Gardner, Gabriel and Lee, 1999) and in nonwestern cultures individuals are “less concerned with asserting themselves” (Cousins, 1991, p.130). In sum, the interdependent self is “more connected and less differentiated from others...[and]...people are motivated to find a way to fit in with relevant others, to fulfill and create obligation, and in general become part of various interpersonal relationships” (Markus and Kitayama, 1991, p.227).

While these differences have been observed and tested (for example see; Heine & Lehman, 1999; Cousins, 1991; Markus & Kitayama, 1991), it is important to note that as indicated, the observation of these types are also reinforced through the self-fulfilling prophecy unleashed by actual and ideal type discrepancies in cultures (Heine & Lehman, 1999). Where, for example, in Western cultures the ideal is to be a competent individual and thus in order to bridge the gap between this ideal and the self’s actual understanding, the individual espouses self-enhancing biases (Heine & Lehman, 1999). Similarly in non-Western cultures the ideal is to fit in and as such individuals in non-Western cultures are “more significantly authenticated when they focus on their inadequacies and limitations” (Heine & Lehman, 1999, p.923) and fitting into the group, than when they tend otherwise. Further any one individual is not bounded to a particular independent or interdependent construal, the construct is dynamic and changeable depending upon context, albeit one is likely to be dominant over the other and in this regard it is important not to reify culture and assume it has a homogenizing effect on individuals.

This basic outline of cultural psychology theory allows us to understand that the construct of self and in turn our behavior is impacted by culture and in turn metaphors and their implications. Consequently it reinforces how humans are not in the words of anthropologist Tim Ingold “bounded entities set aside from their surroundings” (Ingold, 2011,

p.xv). Rather humans are “a nexus of creative growth and development within an unbounded and continually unfolding field of relations” (Ingold, 2011, p.x).

This type of conceptualisation, where everything is a field of relations enables us to consider humans as a bundle of intrinsic and extrinsic attributes, a process, a phenotype -a negotiation at the nexus of a relationship between our genetics and context (Ingold, 2011). Consequently we are not an outcropping of genetic code (Ingold, 2011) separate to all that surrounds us but rather we are a field of relationships between our genetics and our surroundings, physical, biological and cultural. In common parlance we are neither nature nor nurture, we are both and neither is separable from the other.

The challenge of this processional understanding and model of humans is that our language matters and the metaphors we use matter. Not purely because they have an impact upon the world around us, but also because they reflect back on us and impact our construct of self.

### **Natural Capital**

In 2011, the United Kingdom’s government department for food, environment and rural affairs (DEFRA) argued in a report that the concept of natural capital should be put “at the center of economic thinking and at the heart of the way the way we measure economic progress nationally” (DEFRA, 2011, p.4). Similarly, in 2013 a report released by the Association of Chartered Certified Accountants (ACCA), Fauna & Flora International and the accountancy firm KPMG identified natural capital as a material issue for organizations and that accounting for it “is paramount” (ACCA, 2013a, p.4). Similarly another report by the ACCA on integrated reporting in 2013 outlined how different capitals (financial, manufactured, intellectual, human, social and relationship, and natural capital) are the stores of value that are the “basis of an organization’s value creation” (ACCA, 2013b, p. 1). Thus

given the call for the embrace of different types of capital and natural capital in particular, it would appear that such an embrace is inescapable. Thus, no matter whether we are concerned or not with the morality of ascribing economic value to nature it would appear that the game being played is economic and we have to accept it (Pearce, 1998).

Victor (1991) argues that since the 18<sup>th</sup> and 19<sup>th</sup> century writers such as Smith, Ricardo, Malthus and all classical economics have been concerned with the limits to economic growth imposed by nature. However it was only in the second half of the twentieth century that the concern re-emerged more fully, alongside a general resurgence in environmental awareness. During the 1970s, 80s, and 90s a key proponent of the concept of natural capital was Herman Daly who defined it as “stock that yields the flow of natural resources - the population of fish in the ocean that regenerates the flow of caught fish that go to market, the standing forest that regenerates the flow of cut timber” (Daly, 1996, p.80). Alternatively it has been defined by Costanza et al., (1997) as “trees, minerals, ecosystems, the atmosphere and so on” (Costanza et al, 1997, p.254), while Porritt (2006) states that “natural capital is the basis not only of production but of life itself” (p.113). A more recent definition outlines that:

“Natural capital is the stock of capital derived from natural resources such as biological diversity and ecosystems, in addition to geological resources such as fossil fuels and mineral deposits. It provides the ecosystem products and services that underpin our economy and provide indirect benefits to business” (ACCA, 2013a, p. 6)

Although not a comprehensive review of definitions, key to note is that natural capital is not just stuff for example a resource such as lumber, rather it is multifunctional and includes the flow of life itself and in so doing evolution is caught up within the categorizations.

The consideration of the multiple functions of natural capital led Ekins (1992) who labels natural capital as ecological or environmental capital, to outline four key functions of

natural capital. The first is the provision of raw materials for production. The second is the absorption of wastes. The third is life support functions such as climate regulation and oxygen production. The fourth concerns the humans' perceptions of the beauty of the world surrounding us, for example a vista. However it is important to note that flow of services from the ecosystems requires the function of the whole system (Costanza & Daly, 1992). Consequently, although the concept of natural capital attempts to disaggregate a system into components, the challenge is that the "the structure and diversity of...[a]...system is an important component" (Costanza & Daly, 1992) of whether the natural capital has and is providing value. Building upon this, Costanza and Daly (1992) outline how there should be consideration given to natural capital and natural income as they are the stock and flow components of a system respectively. Building upon this, Costanza and Daly (1992) argue that there are two broad types of natural capital; renewable and non-renewable. Where renewable is active and uses solar energy, for example, ecosystems that can be harvested. While non-renewable natural capital is passive of which fossil fuels and minerals are examples.

Underpinning the concept of natural capital is an additional concept of weak and strong sustainability. A way into this concept is to consider how given the understanding of natural capital as indicated above, no other form of capital is independent of natural capital. For example, manufactured capital or human capital is not independent of natural capital it is reliant upon it (Victor, 1991). Alternatively, an oil deposit can be depleted and burned or an area of wilderness developed, thus natural capital is converted. However, once these actions are taken it "effectively impossible" to recreate the original natural capital" (Victor, 1991, p.202). In this regard, weak and strong sustainability alludes to substitutability between natural capital and other types of capital. Turner (1993) identifies four different types of sustainability ranging from very weak to weak, to strong, to very strong, where very weak is

complete substitutability and very strong assumes no substitutability. Costanza and Daly (1992) argue that very weak sustainability, complete substitutability, is not a practical assumption as human made capital is not a perfect substitute for natural capital and vice versa; especially because if this was the case we would have little requirement to produce anything. Similarly, manufactured goods (manufactured capital) in order to grow requires more of the thing (natural capital) that it is supposedly a substitute for. In this regard, a common agreed position is that natural capital is partially substitutable but not completely substitutable by different forms of capital. Wherein the transformation of natural capital up to a point of irreversibility does realize some human welfare benefit, for example up to the point of the fish stock in the oceans collapsing, there is a benefit in humans having more fishing nets. Given this, natural capital is not just considered as a category of capital that sits alongside other capitals, it is generally considered a master set of which other capitals are subsets.

Having outlined some of the basic understandings of natural capital, the next section will discuss some considerations for us as humans in utilizing the concept of different capitals, and in particular the concept of natural capital.

## **Discussion**

This paper has moved through a number of areas in order to build a platform for discussion. First it outlined some of the basic theory of metaphors and how metaphors are essentially shortcuts that enable but also distort. Further in their use they can realize consequences upon behavior. Second the paper outlined some of the basic theory of cultural psychology in order to highlight how our language, our metaphors, can also impact our understanding of ourselves, particularly through the application of a phenotype model and an understanding of humans as processes of negotiation. Third the paper outlined some of the



basics regarding understanding natural capital. In light of those three areas, this section of the paper will explore some of the challenges of utilizing natural capital as a concept. The final section of the paper will offer some closing thoughts and considerations.

As indicated, in western societies it is generally accepted that the extant paradigm is a neoclassical economic one that prioritizes economic theory and monetary outcomes above all else (for example see, Davis, 2009; Egri & Pinfield, 1996; Gladwin et al, 1995; Khurana, 2007). Similarly, it has been argued that we live in an unavoidably harsh world of economic choice (Pearce, 1998) and in this vein, natural capital is an important metaphor and concept to indicate the importance of nature to human society and in turn business (Ekins, et al., 2003). Further that the terminology fits the paradigm, and in a broad sense the language of business, undoubtedly allows individuals and in particular business people to “approach the relationship between nature and economy in a new way with familiar economic terms” (Akerman, 2003, p. 436). However this metaphorical move while enabling the issue of environmental degradation to be discussed in the boardrooms of business also impedes more radical opportunities for dealing with the challenges of environmental degradation. Principally because as Akerman (2003) highlights, the terminology of natural capital and its conceptual baggage moves nature to a category where it is managed as any other economic asset would be. Consequently, we are moved to consider the management of natural capital, which is in turn the management of nature as any other economic issue and thus manageable through asset management principles. As such through the use of such a concept we will monetize nature and arguably pursue a form of natural capitalism, wherein the “the natural capital of ecosystem services – [are] properly valued” (Hawken et al., 1999, p. 146). While such a move may be unavoidable, such movements do create a number of challenges.

First, as indicated previously Ekins (1992) has outlined four functions of natural capital one of which is life support functions. Similarly, Daly (1996) discusses how natural

capital provides ecosystem services and Porritt (2006) argues that it is the basis of life itself. In this regard, it is important to realize that, as discussed, natural capital is a master set of which all other capitals are a subset. However more fundamental than this is that humans do not stand apart from natural capital, we are a subset of it. Consequently, while we consider ourselves as separate to natural capital in terms of our management of it. In turn we are managing ourselves. Going further, evolution is a fundamental component of life processes. Thus in managing natural capital we are also managing evolution of ourselves and that which surrounds us for example other life forms. This may not necessarily be a concern, as it is argued that we currently live in the Anthropocene (Crutzen, 2006), wherein humans are the primary shapers of the world around us. However, in actively managing nature through economic terms, we are likely to realize consequences for the evolution of systems and other life forms, as facilitated by the concept of natural capital, which will follow a particularly economic path. Thus, the life forms surrounding us will be those that we can identify as being economically valuable. Those that are not identified as such and or do not meet the necessary investment hurdle rates will be allowed to wither. Although, throughout our history there have undoubtedly been elements of such management in our actions, for example the farmer eradicating a crop pest. The challenge is that a full embrace of natural capital brings the foundation of life and nature into the economic manager's fold. Thus decisions will be made regarding economic usefulness and in turn this will impact evolutionary processes and thus what evolves. And while the implications of such management cannot be foretold, the challenge is that such power will be in the hands of economic managers, individuals who at this stage are not necessarily trained for such a responsibility.

A second challenge that flows from the above is that the value of an ecosystem depends upon its value to us as human beings. However, ecosystems are complex, non-linear and not necessarily isolatable and they do not necessarily behave in a smooth and linear

fashion of input, process and output (Pearce, 1998). For example, Pearce, (1998) discusses how beyond certain thresholds an ecosystem can flip into a new state of being and in so doing move from being valuable natural capital to non-valuable natural capital. For example through global changes in temperature via rising carbon dioxide levels, a forest may become a desert, due to changes in rainfall patterns. Thus, a system that was valued according to its instrumental value to humans within a particular locale can due to changes that are perhaps not locally imposed be in a short space of time relatively worthless. Likewise the change could make a system of low value, suddenly higher value. No matter which, the challenge is that such changes require an understanding of the complexities of ecosystems and all their interactions. Whether and if humans, let alone economic valuation systems can allow for such complexities and thus accurately value natural capital's components is a subject of debate (Beer, 1974; Pearce, 1998; Costanza & Daly, 1992).

A third challenge is that in the absence of substitutes as conventional economics values scarcity. For example an increasingly scarce resource becomes increasingly valuable (Victor, 1991). In this regard, an economic manager may decide to run down a natural capital asset in order to increase its value. In so doing, as per the categories of natural capital, that manager is running down life support systems and life itself and creating scarcity in order to increase the value of the particular asset. In this regard, the economic manager is arguably and knowingly making a rational economic decision, a rationality that is perhaps not available to the manager who does not account for and value natural capital. However the moral basis for such a decision is purely economic and based on debits and credits. In this regard, economic hegemony is extended and the opportunity to challenge such a decision is reduced, as the rightness of the decision is not contestable from an economic perspective.

Building upon this, a core argument for the advent of natural capital is that humans are not a scarce resource, rather the services provided by nature are. A recent report on natural

capital outlined how the cost of the loss of pollination by bees and insects to the UK economy was 1.8 billion pounds (ACCA, 2013a). Consequently losing this natural capital value will mean that in order to produce the outputs facilitated by pollination will cost the UK economy 1.8 billion pounds. However, an organization that wished to control pollination services and perhaps privatize the profits from these services would be incentivized to destroy bees and insects involved in pollination; as this would provide them with the market opportunity from which to launch their own service. This same opportunity exists for numerous ecosystem services such as the production of oxygen. These aspects which are life giving and enhancing are thus moved into an economic framework, where the economically rational decision to take from an asset value maximization perspective might be to destroy life providing 'free' ecosystem services, in order that the service can be privatized. To build the case further is worth considering that the economic value of global ecosystem services are estimated to be an average of \$33 trillion dollars per year relative to a global gross national product, at the time of calculation, of \$18 trillion dollars (Costanza et al, 1997). At the level of economic management, \$33 trillion dollars of free goods is a vast incentive for privatization and monopolization. As a monopoly on life giving ecosystem services is an opportunity for maximizing profits, an assumption of the dominant paradigm.

The challenges above attempt to highlight how the transforming of nature into a form of capital will enable nature to be "acquired, dismissed, or even traded, for instance in mergers and acquisitions, with little consideration for anything except presumed corporate profitability and shareholder wealth" (Ferraro, et al, 2005, p.19). In this regard, concerns about nature are reduced to cost benefit analyses, willingness to pay and economic rationality wherein nature becomes a commodity to be traded with regard only to the legal owner's self-interest (Ferraro et al., 2005).

A final consideration is that valuing natural capital requires unitization of that which operates systemically (Pearce, 1998). Ultimately this unitization advances a mechanistic and dualistic worldview, which is counter to the systemic and monistic view that is argued as being a requirement for the realization of sustainable outcomes (for example see; Gladwin et al; 1995). Thus the concept of natural capital and in turn multiple capitals implies in the broadest terms, that those areas of concern can be separated, isolated, observed and analyzed. In turn natural capital is an isolated concern relative to other forms of capital such as human capital. The challenge of such labels are that they are atomizing reality, splitting it into separate concerns, and that it is perpetuating a fractured epistemology (Gladwin, et al. 1995) which in turn perpetuates a misalignment of our knowledge relative to our reality. The splitting of reality into different forms of capital perhaps facilitates us into thinking that nature and any other form of capital can be managed through economic theory and that we have the tools to do this (Costanza & Daly, 1992).

Nevertheless, while the challenges of economizing nature drags with it some challenges, the metaphorical train that is natural capital will rumble on, not least because as KMPG, the accounting firm and others argue chief financial officers need to understand their organizations' natural capital risks and opportunities, the issue is material (ACCA, 2013a),

### **Closing Comments**

This paper has moved through a number of areas, in order to develop its arguments and to close it will attempt to bind these areas into their impact upon us as human beings. As indicated, it can be argued that we live in a world of economic rationality and as such even if we do not like the economic game it is one that has to be played (Pearce, 1998, Turner, 1993). In this regard, perhaps the placing of instrumental value on nature through the concept of natural capital is necessary in order for humanity to tackle environmental degradation and

thus realize the intrinsic value that is being lost through such degradation. Thus natural capital is a necessary outcropping of intrinsic concerns about nature, in order that nature can be discussed at the table of economic managers. In this regard, the putting of a dollar value on natural capital will transform the global price system and inevitably raise prices (for example see; Costanza et al., 1997). Further this raising of prices is perhaps a necessary result, as in a world where the dominant paradigm is economic; price signals are key forms of communication. A raised price for everything may be a necessary requirement in order that humanity raises its consciousness regarding our co-dependence with all that surrounds us. However, through reference to the theory of metaphors, the use of such terminology and concept will perpetuate a form of understanding that facilitates a self-fulfilling prophecy (Ferraro et al., 2005 and Morgan 2012). Thus while a discussion of natural capital makes sense in a world where the dominant social paradigm is economic, at the same time, such thinking reinforces the paradigm and advances it. As the extension of capital concepts to nature and for example humans and society via concepts of human and social capital ensure that it makes sense to only ever discuss and manage these areas through economic concepts as “to do otherwise is to violate a powerful descriptive and prescriptive expectation” (Miller, 1999, p.1053), Thus all that becomes a capital becomes a commodity to be traded and the power of decision is handed to economic managers, whose parameters of success are returns and performance of the capital assets in dollars and cents. In so doing, the metaphor denotes rational behavior that in turn creates a context. A context that informs a cultural psychology understanding of ourselves wherein, the context is economic and thus we enforce and reinforce an understanding of ourselves as economically rational calculative agents; where ultimately the optimum agent is likely to be an economically efficient green consumer (Akerman, 2003).

Thus an economic value will be placed on everything, including life itself. At one level placing an economic value on life is not an unusual idea, for example, a human life has been valued, at least as a statistical life, at approximately nine million dollars (Viscusi & Aldy, 2003). However knowing the price of everything for example; the economic price of the birds singing, trees shedding leaves in autumn and a landscape while perhaps necessary in an economic world ultimately rubs away at our understanding of ourselves. Thus, to build on the phenotype model of humans introduced earlier, our interactions with the world around us will be continually informed by price signals and our summation of different categories of capital, natural, human, intellectual and social to name just a few. Thus we will value ourselves not as an emergent whole, but rather as the monetary sum of our categories of capital. As such we may not understand ourselves as being wise (Hoad, 1996), as denoted by the etymology of the terminology sapiens within our species label homo sapiens. We may begin to transform into homo economicus (Costanza & Daly, 1991) and not deal in sense but in cents where our morality is distilled to the credits and debits of economic utilitarianism. And while the hope might be that, as Costanza & Daly (1991) argue that homo economicus will not be a neoclassical pure individualist who considers themselves bounded and separate from the world around them; but rather is a homo economicus that is social and practices altruism. The challenge is that either individual will in perhaps knowing the price of natural capital take on greater responsibility for it, but also at the same time likely give up sense for cents.

### **Closing Quote**

*“We always shape our values in significant measure in accord with our notion of the kind of universe that we live in, and this drives our sense of duty. Our model of reality implies a model of conduct” (Rolston, 1992, p.143)*





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