Epistemological Error and Converging Crises

A Whole Systems View

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Gregory Bateson said that we are 'governed by epistemologies that we know to be wrong' back in 1972. In the same book Bateson wrote: 'the organism that destroys its environment destroys itself.' Almost forty years later global ecological systems are in steep decline and converging crises make a deep evaluation of the underlying premises of our philosophical traditions an urgent imperative. This paper will suggest that the roots of the economic crisis are epistemological and that to correct this error whole systems thinking and ecological literacy will become increasing important in business management as well as in other disciplines. It will also suggest that the economic crisis opened new political space and has provided an opportunity for intervention. If we are brave enough to examine of the roots of our problems there is possibility for renewal.

A philosophy for management must reflect transdisciplinary knowledge to stay relevant and capable of adapting to current conditions. The economics crisis of 2007-2009 needs to be understood as feedback from a system that has lost its capacity to understand and manage its own processes. Our failure to think in terms of whole systems and to recognize the ecological basis for prosperity is a consequence of a particular reductive worldview. Management practice must expand the scope of its inquiry to gain insight. This paper will suggest that the roots of the economic crisis are epistemological and that to correct this error ecological literacy will become increasing important in the practice of business management. Ecological stability is necessary for material wellbeing and economic stability but current management and business practices do not reflect what we know about complex systems or environmental science. Business models follow abstract economic theory based on mechanistic thought but ignore ecology, the basis on which wealth is created. The current trajectory of economic growth creates strains on the ecological system, which in turn weakens our capacity to create economic security. These stresses can only lead to deepening crises within economic and ecological systems, and while economic collapse is painful - ecological collapse is terminal. To avoid this dire scenario, we need to recognize that feedback from the economic system will be significantly faster than feedback from the ecological system, which has evolved over a period of millions of years and has significant inbuilt buffers.

Epistemology defines how we know what we know. Alfred Korzybski said 'the map is not the territory' which reminds us that our ideas about reality are not the same as reality itself. The notion that the dominant epistemological position is a poor reflection of reality has been described in detail by cultural commentators in multiple fields (Bertalanffry 1969, Bateson 1972, Orr 1992, Capra 1997, Sterling 2001, Meadows 2008). Our understanding of reality leads to a particular type of practice in business, finance, culture, education and politics. When our ideas conflict with the way that the world actually works, we make dysfunctional systems. We are now faced with an epistemological tradition that works for building clocks and cars, but not for understanding or managing complex systems. This reductive worldview conflicts with the highly complex ecological systems on which we depend. While this position has been rehashed over the past few decades in progressive circles, whole systems thinking is still marginal. Consequently, the economic system and business practices do not reflect philosophical or geophysical imperatives. The hegemonic reductive position prevents appropriate responses to maintain ecological homeostasis while also damaging economic stability in the shorter term. An ecologically literate epistemological position must start with the recognition of: 1-complexity, 2-limits (i.e. geophysical constraints, or carrying capacity) and crucially it must start putting these insights into 3-practice.

1. Complexity

The economic system and the ecosystem are both complex systems that cannot be entirely understood through reductive analysis. Instead we must recognize the hierarchy, dynamics and interdependence at work between these two systems. The economic system needs to be understood as a subsystem of the ecological system. Ecological economist Herman Daly has been describing this relationship for over four decades. It is evident that the ecosystem existed for millions of years before humankind invented the modern economic system and will exist in some form whatever becomes of our civilization. Tragically, mainstream economists have refused to recognize this relationship and our economic system is not designed with respect to this basic fact. We are now hitting ecological limits on many fronts; approximately 60% of the ecosystems are in decline worldwide according to the Millennium Ecosystem Assessment.[1] Our failure to organize the economic system and manage our businesses with respect to ecological limits is seen by many as a cause of converging environmental, social and economic crises.

1 Millennium Ecosystem Assessment 2005 'Ecosystems and Human Well-being'. Washington Island Press 2005 pp1

Herman Daly recently explained in a report to the UK Sustainable Development Commission, 'the closer the economy approaches the scale of the whole Earth the more it will have to conform to the physical behavior mode of the Earth.'[2] Our failure to recognize that economic prosperity depends on ecological wellbeing has developed from a reductive habit of mind that is unable to understand the relationships between complex systems. This has led to a state where we are quickly destroying the possibility of long-term prosperity.

Failure to recognize systemic conditions means that we have designed financial systems with a dangerous lack of resilience. Herman Daly describes the economic crisis as a result of the overgrowth of financial assets relative to growth of real wealth. Referring to Noble Prize winner Frederick Soddy's 1926 book, *Wealth, Virtual Wealth and Debt: The Solution of the Economic Paradox*, Daly explains that;

> Soddy pointed out the fundamental difference between real wealth – buildings, machinery, oil, pigs – and virtual wealth, in the form of money and debt. Soddy wrote that real wealth was subject to the inescapable entropy law of thermodynamics and would rot, rust, or wear out with age, while money and debt – as accounting devices invented by humans – were subject only to the laws of mathematics. Rather than decaying, virtual wealth, in the form of debt, compounding at the rate of interest, actually grows without bounds.[3]

In the same article Daly describes various reasons that financial assets have become so disconnected from real assets, leading to the absurd pyramiding of wealth that led to the economic crisis.

We should consider the economic crisis of 2007-2009 as a warning. A narrow frame of mind and commitment to economic indicators over all other types of feedback leaves us ill prepared to deal with complex systems. We have created a global financial system focused on profit, financial accumulation, and especially increasing GNP. Robert Kennedy described the lunacy of the system obsessed with GNP in back in 1968:

> Too much and for too long, we seemed to have surrendered personal excellence and community values in the mere accumulation of material things. Our gross national product, now, is over $800 billion dollars a year, but that gross national product – if we judge the United States of America by that – counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities and the television programs that glorify violence in order to sell toys to our children. Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile.[4]

Forty-two years later GNP is still the dominant economic indicator. Professor Roderick Smith describes the consequences of world GDP growth;

> … relatively modest annual percentage growth rates lead to surprisingly short doubling times. Thus, a 3% growth rate, which is typical of the rate of a developed economy, leads to a doubling time of just over 23 years. The 10% rates of rapidly developing economies double the size of the economy in just under 7 years. These figures come as a surprise to many people, but the real surprise is that each successive doubling period consumes as much resource as all the previous doubling periods combined. This little appreciated fact lies at the heart of why our current economic model is unsustainable.[5]

Fritjof Capra and Hasel Henderson explain that GNP was not created to be used in such an simplistic and dangerous fashion; the creator of GDP national accounts, Simon Kuznets 'warned in 1934 that such a limited, one-dimensional metric should not be used as an index of overall social progress.'[6] GDP remains one of the most powerful examples of the manner in which reductive thinking creates havoc with complex systems.

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2 Sustainable Development Commission 'A Steady-State Economy'. London: Sustainable Development Commission 2008 pp1

4 *Ibid.*

5 Robert Kennedy quoted in Fritjof Capra and Hasel Henderson. 'Qualitative Growth'. London: The Institute of Chartered Accountants in England and Wales. 2009. pp4

6 Roderick Smith, 'Carpe Diem: The Dangers of Risk Aversion'. Lloyd's Register Educational Trust Lecture. 29 May 2007. www.raeng.org.uk/news/publications/list/.../Lloyds_Lecture_booklet.pdf pp17

6 Capra and Henderson, pp6

We are living with dysfunctional mental maps that do not reflect the complexity of systemic conditions. Our framework focuses narrowly on economic indicators and this is how the system is designed to establish value. An economic system that placed value on ecological stability, resilience, equity, wellbeing or happiness would be designed and managed in a very different manner. A narrow focus on profit excludes a holistic appraisal of values and encourages short-term thinking and waste of ecological and human 'resources'. Even our language becomes distorted around the narrow focus of profit, as we know that neither nature nor people are inherently 'resources' but have value in their own right outside of their function as a source of profit. The nature of the economic system is to grow and consume everything to suit it needs; our language, our values, our ideas about what can and cannot be an economic transaction. The emphasis on profit in an international capitalist system based on infinite growth is that transnational capital will continue to grow and swallow up everything in its wake until there is nothing left to use. Evidence will take the form of lost species, destroyed rainforests and a stable climate system – complex ecological systems that have evolved over millions of years that are being destroyed in a manner of a few decades.

2. Limits

The economic crisis of 2007-2009 provides a unique opportunity to create the kind of economic system and business practice that could plausibly sustain a civilization over the long term. A new model of business practice that acknowledges ecological limits and shifts to qualitative rather than quantitative growth is possible. Presently we are shrinking the available bio-capacity on which we depend 44 per cent faster than nature can regenerate what we consume and reabsorb our waste. Furthermore, the UK's footprint has grown such that if the whole world wished to consume at the same rate it would require 3.4 planets like Earth.[7] Daly describes the need for a 'system that permits qualitative development but not aggregate quantitative growth. The remaining natural world no longer is able to provide the sources and sinks for the metabolic throughput necessary to sustain the existing oversized economy—much less a growing one.'[8] The new economics foundation's recent 'Growth Isn't Possible' report explains how economic growth is constrained by the finite nature of the planet's natural resources (biocapacity). The report compares the concept of 'infinite growth' to how growth functions in nature by focusing on the growth of a hamster:

> From birth to puberty a hamster doubles its weight each week. If, then, instead of leveling-off in maturity as animals do, the hamster continued to double its weight each week, on its first birthday we would be facing a nine billion tonne hamster. If it kept eating at the same ratio of food to body weight, by then its daily intake would be greater than the total, annual amount of maize produced worldwide. There is a reason that in nature things do not grow indefinitely.[9]

Herman Daly points out that growth's first, literal dictionary definition is 'to spring up and develop to maturity' and 'thus the very notion of growth includes some concept of maturity or sufficiency, beyond which point physical accumulation gives way to physical maintenance.'[10] At maturity growth must give way to 'a state of dynamic equilibrium.' The nef report describes dynamic equilibrium as a term typically found in discussions of population biology and forest ecology but used within the context of economics it refers to a system which exists within ecosystem limits but where there is constant change, shifting balances and, evolution.[11]

The UK government's Sustainable Development Commission (SDC) published its 'Prosperity without Growth?' report in 2009 which declares that growth was 'always unstable ecologically. It has now proven itself to be unstable economically.'[12] Author Professor Tim Jackson describes the dilemma wherein 'the modern economy is structurally reliant on economic growth for its stability'[13] but,

> The myth of growth has failed us. It has failed the two billion people who still live on less than $2 a day. It has failed the fragile ecological systems on which we depend for survival. It has failed, spectacularly, in its own terms, to provide economic stability and secure people's livelihoods. Today we find ourselves faced with the imminent end of the era of cheap oil, the prospect (beyond the recent bubble) of steadily rising commodity prices, the degradation of

8 Global Footprint Network, 2009. 'Ecological Footprint Standards'. Oakland: Global Footprint Network. 2009 <www.footprintnetwork.org/.../Ecological_Footprint_Standards_2009.pdf>, pp11

9 Herman Daly. 'A Steady-State Economy'. London: Sustainable Development Commission. 2008. pp1

10 Andrew Simms, Dr Victoria Johnson and Peter Chowla, 'Growth Isn't Possible'. London: new economics foundation. 2010, pp4

11 *Ibid.* pp4

12 *Ibid.* pp121

13 Tim Jackson, 'Prosperity Without Growth?' London: Sustainable Development Commission. 2009. pp5

14 *Ibid.* pp5

> forests, lakes and soils, conflicts over land use, water quality, fishing rights and the momentous challenge of stabilizing concentrations of carbon in the global atmosphere. And we face these tasks with an economy that is fundamentally broken, in desperate need of renewal. In these circumstances, a return to business as usual is not an option. Prosperity for the few founded on ecological destruction and persistent social injustice is no foundation for a civilised society.[14]

The report describes the relationship between economic growth and political stability, provides an analysis of the nature of the dilemma and has solid policy recommendations. Unfortunately, the fragmented nature of government departments is such that more powerful wings effectively ignore the warnings of the SDC and quantitative economic growth remains hegemonic within public policy.

The critique of growth in Fritjof Capra and Hazel Henderson's recent report 'Qualitative Growth' for The Institute of Chartered Accountants uses explicit ecological metaphors. Capra and Henderson describe how as living systems mature their growth processes shift from quantitative to qualitative growth. This report draws on the historical reasons that quantities have been prioritized over qualities in the history of Western thought and posits that a new systemic understanding of life makes it possible to formulate a scientific concept of quality. This new ecological literacy is based on the 'development of complexity theory, or nonlinear dynamics, which is a mathematics of patterns and relationships.'[15] The report explains that;

> Instead of assessing the state of the economy in terms of the crude quantitative measure of GDP, we need to distinguish between 'good' growth and 'bad' growth and then increase the former at the expense of the latter… From the ecological point of view, the distinction between 'good' and 'bad' economic growth is obvious. Bad growth is growth of production processes and services which externalise social and environmental costs, that are based on fossil fuels, involve toxic substances, deplete our natural resources, and degrade the Earth's ecosystems. Good growth is growth of more efficient production processes and services which fully internalise costs that involve renewable energies, zero emissions, continual recycling of natural resources, and restoration of the Earth's ecosystems.[16]

3. Practice

An integrated ecologically literate epistemological position is now an essential foundation for durable businesses and a stable economic system. Ecological literacy is defined by Fritjof Capra as the understanding of the principles of organization that ecosystems have evolved to sustain the web of life and an essential step on the road to sustainability.[17] The ecological economists quoted above have mapped economic solutions to the current predicament. It is necessary to redesign our management processes so that they function in an ecologically sustainable fashion. Ecological literacy implies whole systems thinking, an engagement with complexity, and recognition of geophysical limits. These and other principles must quickly be learned and put into practice. Yet individuals have known as much for decades so the questions is; 'why has this knowledge remained so marginal?' I will end this paper with a few thoughts on why whole systems thinking and ecological literacy as not yet been adopted, why now might be the time for these ideas to finally make some progress, and contribute some suggestions for embedding ecological literacy into both education and business management.

Significant barriers to change plague the field of sustainability. In *States of Denial* Stanley Cohen claims that a capacity to deny disturbing facts is the normal state of affairs for people in an information saturated society. Furthermore, people will often accept a proposition without accepting the implications. For example we accept that climate change is happening and we might also accept that each of us needs to reduce our personal carbon emissions, but we do not accept the implications that traveling on a plane is no longer an ethically benign activity. In the complex fields of ecological sciences and sustainability, we are locked into collective patterns of behavior and have adapted strategies to avoid accepting the implications of climate change and other environmental threats. There is evidence that increasing information may actually intensify denial strategies. Climate communications specialist George Marshall explains that the idea that "if only people knew, they would act" is a relic of Enlightenment faith in the power of knowledge.[18] The value / action gap describes the gulf between our values and the way that behave. For many researchers interested in behavioral change the problem lies in crossing the gap that divides our awareness of environmental threats from our capacity to take appropriate action. Fortunately educators

15 *Ibid.* pp5
16 Capra and Henderson, pp8
17 *Ibid.,* pp9
18 Fritjof Capra *The Web of Life.* London: Harper Collins.1997. pp201
19 George Marshall,'Denial and the Psychology of Climate Apathy'. *The Ecologist*, November 2001

and researchers concerned with sustainability have made progress. There is also historical precedence that saw deep-seated attitudes change dramatically, i.e. the women's and the civil right's movements. Our society has witnessed radical social change in the past when we evolved new moral codes and changed power dynamics, laws and institutions accordingly.

An approach with the potential to transcend the notorious value/action gap is transformative learning. Developed during the feminist movement in the 1970s, transformative learning has been documented by over 150 doctoral dissertations, hundreds of scholarly papers and dozens of books over the past four decades.[19] Although transformational learning was not developed explicitly to deal with environmental education, it provides relevant conceptual tools to inform a learning process for ecological literacy. What transformational learning offers is the potential to help individuals with deeper learning processes than are traditionally engaged in formal education. Communications theorist and anthropologist Gregory Bateson first described learning levels in 'The Logical Categories of Learning and Communication.'[20] Sustainability educator Dr. Stephen Sterling's interpretation of Bateson's work maps the trajectory from no learning to deep learning levels and transformation:

> Level A- No change (no learning: ignorance, denial, tokenism)
> Level B- Accommodation (1st order - adaptation and maintenance)
> Level C- Reformation (2nd order learning - critically reflective adaptation)
> Level D- Transformation (3rd order learning - creative re-visioning)[21]

Sterling maintains that learning for sustainability must transcend the transmissive learning approach because information alone does not necessarily lead to change. He explains that 'not only does it not work, but too much environmental information (particularly relating to the various global crises) can be disempowering, without a deeper and broader learning processes taking place.'[22] Sterling maintains that most education aims to replicate current worldviews; 'mainstream discourse on education, operating within the dominant social paradigm, takes place within certain parameters of validity: that is, within Learning 1.'[23] Research in this field demonstrates that epistemic learning or 3rd order learning is necessary to address the epistemological error of the current paradigm.

In an attempt to move from theory to practice, our institutions, organizations and businesses must be managed from an ecologically literate perspective. The university is central to the practical understanding of the triple crises of ecological, social and economic sustainability and has a responsibility to create ecologically literate professionals. Management practice could be transformed through these insights. Professor Peter Reason in an inaugural lecture described the role for managers:

> Ecological thinking, systemic thinking, placing our work in its wider context must be at the heart of our practice. Management is an important discipline, for without good management practices of all kinds we will not be able to manage the hugely complex ecological-industrial system we will need to create. Living sustainability at the edge of our biosphere's limits will demand a quality management beyond any we can imagine. But let us never forget that management, like all human disciplines, is an extension of ecology (Berry, 1999:84). Do we teach our students the basic principles of ecology, about carrying capacity, the laws of thermodynamics, limits to growth, appropriate scale, steady state economics? Do we ask them to consider the impact—for better and for worse—of so called world class business on the less fortunate global citizens? Do we ask them to think creatively about the nature of management as a discipline in these conditions? One of my final year undergraduate students writes that she is astonished that she has reached this stage in her career without having been taught about any of these ecological issues.[24]

Educator David Orr explains that education now requires a 'fundamental transformation of our concept of learning relative to the health of the biosphere.'[25] For learning institutions willing to rise to the challenge there is an opportunity. In the same way universities nurtured the women's movement in the 1970s, universities could now create space for transformational learning for ecological literacy.

Communications theorist and anthropologist Gregory Bateson said that we are 'governed by epistemologies that we know to be wrong' back in 1972.[26] In the same book Bateson wrote: 'the organism

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20 Kitchenham, 'The Evolution of John Mezirow's Transformative Learning Theory', Journal of Transformative Education. Vol 6, No 2, April 2008, pp120

21 Gregory Bateson, *Steps to an Ecology of Mind*, Chicago: University of Chicago Press. 1972, pp279

22 Stephen Sterling. *Sustainable Education*. Totnes: Green Books, 2001. pp78

23 *Ibid.* p19

24 Stephen Sterling. *Whole Systems Thinking as a Basis for Paradigm Change in Education*, (doctoral thesis, University of Bath. 2003), pp110

25 Peter Reason. Justice, Sustainability, and Participation. Inaugural Professorial Lecture, School of Management, University of Bath. Published in Concepts and Transformations 7(1), 7-29, 2002. pp14

26 David Orr, *Down to the Wire*. Oxford: Oxford University Press. 2009, pp176

27 Bateson, pp493

that destroys its environment destroys itself.'[27] Almost forty years later global ecological systems are in steep decline and converging crises make a deep evaluation of the underlying premises of our philosophical traditions an urgent imperative. We have continued to plunder global environmental systems despite the fact that we knew that we were destroying our resource base for well over five decades. Collapse of historical civilizations is well documented (Tainter 1988, Diamond 2005, Homer-Dixon 2007). Within popular culture, cataclysmic collapse has even developed into a perverse voyeurism meme, now a theme used to sell designer clothes and a new genre of disaster movies. It is not an idea to be handled blithely, yet it is a possibility that must be confronted to build the will and the resolution to enable the transformation that is now urgently needed. The economic crisis opened new political space and has provided an opportunity for evaluation and intervention into assumptions that maintain the status quo. Within this space we could create the capacity to shift our understanding of the economy and our entire relationship with the natural world.[28] A transformation depends our capacity now to reconfigure systems capable of sustaining economic, social and ecological systems over the longer term. If we are brave enough to examine of the roots of our problems there is possibility for renewal. Communications consultancy Smartmeme describe the moment when 'seismic events can trigger mass physic breaks: moments when status quo stories no longer hold true, and a critical mass of people can't deny that what is happening in the world is out of alignment with their values.'[29] This paper aims to address this intellectual territory. It is possible to build sustainable futures; scores of research documents and practical projects demonstrate how to address some of the most intractable problems within our economic model and business practice. This paper posits that the reason that business and hegemonic institutions continually perpetuate dangerous business practice is because they persist in following an outdated and thoroughly inadequate reductive epistemological position. The 2007-2009 crisis will be the first of many in a long spiral if we are unable to address this fundamental philosophical problem.

Bibliography

Bateson, G., Steps to an Ecology of Mind. Chicago: University of Chicago Press. 1972

Bertalanffy, L., General System Theory. New York: George Braziller. 1969

Berry, T. The Great Work: Our Way into the Future. New York: Bell Tower/Random House, 1999

Canning D. and Reinsborough, P. Re:Imagining Change. San Francisco: PM Press. 2010

Capra, F., The Web of Life. London: Harper Collins. 1997

Capra, F. and Henderson, H. "Qualitative Growth'. London: The Institute of Chartered Accountants in England and Wales. 2009

Cohen, S. States of Denial: Knowing About Atrocities and Suffering. Cambridge: Polity Press, 2001

Diamond, J. Collapse. London: Penguin. 2005

Daly, H. The Crisis. *Adbusters*. 19 Nov 2008. On-line: https://www.adbusters.org/magazine/81/the_crisis.html

Daly, H. 'A Steady-State Economy'. London: Sustainable Development Commission, 2008

Homer-Dixon, T., The Upside of Down. London: Souvenir Press. 2007

Jackson,T. 'Prosperity without Growth?' London: Sustainable Development Commission. 2009

Simms, A., Dr Johnson, V., and Chowla. P., 'Growth Isn't Possible'. London: new economics foundation. 2010

Marshall, G., 'Denial and the Psychology of Climate Apathy'. The Ecologist, November 2001

Meadows, D., Wright, D. ed., Thinking in Systems. London: Earthscan. 2008

MA Board of Reviewers. 'Millennium Ecosystem Assessment (2005) - Living beyond our means: Natural assets and human wellbeing'. Washington: Island Press. 2005

Smith, R. 'Carpe Diem: The Dangers of Risk Aversion'. Lloyd's Register Educational Trust Lecture. 29 May 2007

Orr, D., Ecological Literacy. Albany: State of New York Press. 1992

Orr, D., Down to the Wire. Oxford: Oxford University Press. 2009

Reason, P., 'Justice, Sustainability, and Participation'. Inaugural Professorial Lecture, School of Management, University of Bath. Published in Concepts and Transformations 7(1), 7-29, 2002

Sterling, S. Sustainable Education. Totnes: Green Books, 2001

Sterling, S. 'Whole Systems Thinking as a Basis for Paradigm Change in Education'. University of Bath. 2003

Tainter, J. The Collapse of Complex Societies. Cambridge: Cambridge University Press. 1988

WWF, 'The Living Planet Report 2008'. Switzerland: WWF. 2008

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28 *Ibid,* pp457

29 Doyle Canning and Patrick Reinsborough. *Re:Imagining Change.* San Francisco: PM Press. 2010. pp46

30 *Ibid.* pp47