Insight

Sustainability & Smartness: A Tale of Two Slogans

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Authors

M Bruce Beck - Professor and Eminent Scholar at the University of Georgia, Director and Founder of the International Network on Cities as Forces for Good (CFG) in the Environment, and Chair, Management Board, Sustainability Group, International Water Association (IWA).

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SUSTAINABILITY & SMARTNESS:

A TALE OF TWO SLOGANS

At the close of 2011, sustainability and environmental advisor Tony Juniper asked "Will 2012 be the year of the R word?" (www.guardian.co.uk/sustainable-business). He meant R for Resilience. It may have been so. I for one had a conversation in 2012 in which I was told that R was (somehow) easier to define than the S word (for Sustainability), hence its purported advantage. It is perhaps a brave new journal, then, that would launch itself in 2013/4 with the S word first and foremost in its title.

LABELS AND SLOGANS

Having reflected further on this – see the discussion on [water security (Beck and Villarroel Walker, 2013a)](water-security) and [Nexus security (Beck and Villarroel Walker, 2013b)](nexus-security), I believe the matter of the S word *versus* the R word is one of "definition slip", as opposed to plain *ennui*, or, worse, fashion and "neophilia". Which is to say, we recognize there can be, respectively: understandable frustration, in trying to get a good job done; disengagement (to our consternation) from a job no longer considered worth the effort; and newness for the sake of newness in what the job actually is. As rough evidence for this last, witness the search for the novelty of the Smart city (another S word), and how it has been overtaken in ever more rapid succession by that for the digital city, then the intelligent city, even the algorithmic city. And as if this were not enough, there are further ongoing searches: for liveable cities, water-sensitive cities, nexus-secure cities, and so on, perhaps too the antifragile city. Why not? Why not take immediate advantage of a word newly coined by Taleb (2012) for his recent, and most interesting, book ([see the book review](book-review))?

Looking back, and to provide perspective, I first encountered the phrase Sustainable City sometime around 1988. I recall my surprise and my scoffing at the notion. Significantly, I do not recall any prior such slogan. Returning to the present, the concept of the sustainable city could subsume all its progeny, from smart to antifragile. And yet, at one and the same time, it should be enriched by them and be prompted to change and evolve as a result of their coming into being.

So let us opt for definition slip as the reason for questioning now our deep commitment over the past quarter of a century to the S word for Sustainability. Thus, if it is just too difficult to hammer out an "operational" version of the principles of sustainability — if we have simply not got it "right" — perhaps we could allow slippage towards resilience, as a more tractable concept and principle for fashioning policy and guiding practical management. That, however, is something of an illusion. Liao (2012) has indeed said just so:

> With growing popularity, the term resilience is increasingly being used vaguely such that it is becoming like the word sustainability, i.e., having a diluted and unclear meaning.

How we label our aspirations for the form and function of the city is not unimportant. Just think of the practical impact of sustainability itself, no matter how vexed the term. Yet the lack of tight guidance in proceeding from the vagueness of the headline slogan to the detail of a specific, actionable policy or innovation — the lack of an operational definition, in other words — can unsettle some of us. Likewise, re-labeling and re-packaging "old" policies and innovations under a new label can be just as unsettling for others. These things are unsettling because some of us, as action-oriented individuals, wish to be given the new prescription for doing (and sooner rather than later). Whereas others — "thinkers", let us call them — presume they might one day know more about what is in a word, sufficient to write out the new prescription. The trouble is, the prescription cannot be expressed once and for all. My attempt at writing such eventually came to prescribe the obligation to delete and replace some of the prescription's line items, from time to time (Beck, 2011). These things should be equally true of resilience and smartness, and doubtless all the other labels.

But the quite special and defining problem with sustainability is that it is so massively multi-disciplinary and so urgent, in a way we can all apprehend, regardless of its vagueness. Every one of us can lay claim to "owning" it, which is good. Absent tight guidance, however, each can articulate his or her idiosyncratic grasp of it in practice, which is very probably not so good, if not plain bad.

So where are we in taking hold of this S word, as it were, and wrestling it to the floor?

BECOMING SUSTAINABLE: UNENDING QUEST

In sum: "Sustainability is an Essentially Contested Concept".

With these words, Thompson (2011) chose to title his opinion piece on my own labors in writing a _Sustainability Concepts Paper_ (Beck, 2011): nine years of work, more than 160 pages of dense text. There is no _one_ way of defining sustainability, nor will there ever be. We are not going to get it right

once and for all. Its frustrating and messy contestation will not (should not) be ground into insignificance by any search for efficiency and elegant consensus.

After the first five years of drafting and re-drafting the *Concepts Paper*, when I abandoned the vain hope of writing something about sustainability on behalf of an entire Association (the International Water Association (IWA)), this was a liberation. I knew enough by then to realize that even the proposition of sustainability as a profoundly plural and essentially contested concept, would itself be hotly contested. For surely, should there not be but one view of sustainability? And should it not be discoverable and clearly expressible? In the end, I could only write of Sustainability as *I* (first person and very singular) saw it. Did I make a cardinal mistake in this? Go forth, readers of this journal: discover and express the one true sustainability! The bulk of my *Sustainability Concepts Paper* needs contesting, with commensurate bulk.

The S word, as in Sustainability, is *not* a spent force. For all the vagueness of the celebrated single-sentence exhortation of Brundtland, it has still the power to achieve change "on the ground", just as has Aldo Leopold's almost tautological one-line phrasing of his land ethic, from some four decades or so before Brundtland.

"Always Learning, Never Getting It Right" — Thompson's words again, from his landmark paper "Man and Nature as a Single But Complex System" (Thompson, 2002). Of course, we should fully expect what each of us understands by sustainability to be enriched and evolve (albeit slowly) in the years and decades to come. A very large part of such enrichment, in my opinion, will come from further developments and implementations of Holling's (1996) notion of *ecological* resilience (as opposed to what he calls engineering resilience). And it should also come, again in my opinion, from better, more effective, pragmatic frameworks for trading off costs and benefits of policy actions and technological innovations among the traditional sectors of water, energy, food, forestry, waste-handling *and* — the non-traditional economic sector of ecosystem services (Beck *et al*, 2012).

If these opinions seem vague, dispelling such woolliness would lead me inexorably down the path of another nine years' work and another 160+ pages of dense text. May we be spared that.

What about the other S word?

Smart Bulls in China Shops

You might well suppose I am fixated on cities. To reassure you otherwise, I do recognize that they are not the only "actors" having an impact on the sustainability of water quality and ecology, for the worse

and *for the better*. Industry — and agriculture in particular — are the other two, possibly more significant, dimensions of man's interaction with the aquatic environment. I invite you to conceive of all three as indeed actors or agents in the watershed: cities, industry, and agriculture "moving about" in the landscape. Nevertheless, I shall close what follows by privileging the role of cities, once again.

In their seminal paper, Rees and Wackernagel (1996) persuaded us to picture the city as a large animal grazing in its pasture. They proceeded to elaborate the now remarkably successful and dramatic index of the urban ecological footprint; and we should be concerned with how to lessen it. My wish is to head in a slightly different direction, however.

Think instead of the metaphor of "bulls in china shops": cities, in other words, crashing about, destroying their environment, including its fragile water quality and ecology. Bulls, we know, are hardly the most intelligent of beasts. The challenge for the engineer is that of how to "rewire" the city's metabolism and its infrastructure such that the bull (the city) may be gifted with intelligence — S for Smart, in fact — together with deftness and nimbleness of metaphorical movement about its environment. The conjecture is that the city could deploy all its intelligence and dexterity in doing the environmental good for others that they, lacking these gifts, especially in respect of agriculture, cannot do for themselves. The bull (the city) might cease to break the china (its fragile environment). Better still, it might expand the shop's operations, to become a net generator of ecosystem services. Imagine cities metaphorically "walking on air", going beyond the restoration of a zero ecological footprint.

Tilting at missions impossible, while yet acknowledging their impossibility, can be a creative process. How indeed, then, might the city be re-engineered such that it may become a [force for good in the environment](#)? For I titled my *[Sustainability Concepts Paper](#)* ["Cities as Forces for Good in the Environment: Sustainability in the Water Sector" (Beck, 2011)](#).

PRACTICE: ALMOST STRANGER THAN CONCEPT

To be specific, consider the following thought experiment.

Suppose the purpose of the city's wastewater infrastructure were redirected towards recovery of a "perfect fertilizer". And suppose further, if successful in this, the recovered fertilizer could be deployed in the agricultural sector, or the energy sector (as input to biofuel production), *or* the ecosystem service sector — as nutrient supplements to be dispensed prudently to the aquatic environment, not just for restoring ecosystem services, but to enhance them.

This is no joke. Computational proof exists (Beck *et al*, 2010; Beck, 2011). This is not some fanciful excess of either computational or conceptual conjecture. It is happening in practice. Phosphorus is today recovered from the city wastewater treatment plant in Durham, Oregon, USA (Force, 2011). Some of it is bagged, transported across the US-Canada border, and dumped (still bagged) — and for the good! — into the streams of Vancouver Island, there to restore declining salmon populations (Pellett, 2010; Beck, 2011). Think of the issue of such nutrient supplements as the complement of what stream ecologists seek to achieve in manipulating the built environment for reconstructing the environmental flows of the natural environment (Richter *et al*, 2006; Beck, 2011).

Practice can surely re-shape concepts. Where, therefore, is the economic analysis (the theory; the concepts) allowing us to determine whether the perfect fertilizer is best transferred to the energy, or the agriculture, or — and here is the rub — the ecosystem services sector? What exactly, moreover, does "best" mean, in terms of social legitimacy, economic feasibility, and environmental benignity?

DELIVERING FAST ON BECOMING SMART

All this, I submit, is very strongly a function of a historic change of paradigm in the way we view "waste"water management (Larsen *et al*, 2013): from the prosecution of nutrients as pollutants to be got rid of; to coveting them as resources to be gainfully (and profitably) recovered (Beck *et al*, 2013). There have been other historic changes of paradigm in previous centuries, over the second half of the 19th Century and across the early decades of the 20th Century: from cesspools to sewers; and from non-piped to piped supplies of potable water (Geels, 2005, 2006). But they have taken 80-90 years to come to pass. Do we have as many decades to become much less unsustainable in our ways? Might not then the Smartness of our computational models, I ask, and the abundant, if uncertain, foresight they can generate — that S word once more — enable us to compress the span of the transition towards greater sustainability? For without question, these computational models signal a dramatic technological difference between the turn of the 20th to the 21st Century and that of the 19th to the 20th Century. Can there be smartness in becoming sustainable more swiftly?

For nearly four decades, roughly from 1970 to about 2008, I harbored the fond imagination of an intelligent, smart way of managing the quality of the aquatic environment: that what would be done in the city (with its wastewater infrastructure) would be exquisitely attuned to the current status of its surrounding aquatic environment. Above all, this would be achieved exceedingly smartly in *real time*, given our growing saturation in the Information Technology (IT) innovations we have increasingly come to expect. The smart, nimble city would act decisively, positively, and quickly to compensate for the transient ills and misdeeds of the less agile, sluggish agriculture.

If there is such smartness today, I judge it is making the city something of a pantomime donkey, still stumbling misguidedly around the stage of its environment (Beck, 2011): high intelligence in its forelegs, with ever more real-time monitoring (if not control) of water treatment, supply, and distribution on the "upside"; dumbness in its hind legs on the "downside", where to this day operation of the sewer network and wastewater treatment plant seems almost wilfully to resist having some intelligence and deftness of movement knocked into it. At least, that is my take on Mollerup *et al* (2013). This is salutary and quite discouraging. Is there much point in being able to observe in ever more impressive real-time wireless detail what is going wrong with the system, when there is no power to change the course of unfolding events — no levers of real-time control to pull? No matter how smart the city might be, deftness of its metaphorical movement is *not* a function solely of IT innovations.

If one reads between the lines of Beck (2005), a sense of disillusion about the contemporary state of "smart real-time this", "smart real-time that", and "smart real-time the other" was already evident, as it was in looking back to the youthful exuberance of Young and Beck (1974). Optimism in that 2005 paper, it must be said, resided in looking forward to sustainability.

If I sound skeptical about real-time smartness, indeed I am. But this is an Opinion piece. I welcome — sincerely — a comprehensive rebuttal of my skepticism about this second S word, standing, as it does, for the as-yet-unfulfilled promise of IT-fueled smartness, in particular, in sustaining water quality and ecology.

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