

What Future Conceptual and Social Innovations?

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Abstract

Social innovation is seen as comprehending or being associated with conceptual innovation, making human communication and social interaction more transparent and efficacious, access to knowledge more direct. New concepts, for example for language or science, constitute gateways to a deeper understanding of reality and the consequent development of new intellectual and other tools. Making knowledge more widely available helps overcoming false intuitions, reduces privilege, and creates more level playing fields. What vistas for such conceptual innovation may we suggest?

Keywords: conceptual innovation, level playing field, social interaction, community

Homer wrote but two words, though very long ones, the Iliad and Ulysses. In his day, and for a long time, the idea of separating words had not been invented. It took even longer for punctuation marks to be introduced – conceptual innovations that we so take for granted that we do not reflect on them. The field of mathematics abounds with conceptual innovations that assist in our understanding the world, handling its problems and phenomena. Well into the 16th century, mathematicians used expressions such as *32.quad.p16.p1.quad.quad. æqualia 48.pos* for today's $32x^2 + 16 + x^4 = 48x$

A written language that is easier to read and a more efficient notation for mathematical equations have a common denominator: they make human communication more transparent and access to information more direct. Such transparency might be said to reduce barriers to entry; entry into the domains of written knowledge and mathematics, respectively. Human history has no lack of schools of thought that have tried to monopolize knowledge through the application of obscure or hermetic languages and notations. But it could also simply be that knowledge and competence are based on experience: tacit, hard to gain. Doing the opposite, enhancing transparency, thus has a strong ethical impetus, implying less privilege, while lowering barriers is associated with improved

conditions for entrepreneurship in a broad sense. This would entail entrepreneurship under the ordinary market regime but also new undertakings in domains such as art and science.

This essay will attempt to deal with a number of social innovations, including conceptual ones but not excluding phenomena like money or the patent institution.

Of Definitions and Interdependences

According to Wikipedia (2007), "social innovation refers to new strategies, concepts, ideas and organizations that meet social needs of all kinds – from working conditions and education to community development and health – and that extend and strengthen civil society." "Over the years, the term has developed several overlapping meanings. It can be used to refer to social *processes* of innovation, such as open source methods. Alternatively it can be used to innovations which have a social purpose – like microcredit or distance learning. The concept... overlaps with innovation in public policy and governance. Social innovation can take place within government, within companies, or within the nonprofit sector... [or] in the space between the three sectors."

In a book with "the social dimensions of invention and innovation" as its "central theme", Brooks (1982) classifies social inventions and innovations as market, managerial, political, or institutional. He stresses the fact that technological innovation often is accompanied by social innovation: the Apollo program was not just about space ships but also about a new managerial system. When distinguishing between "pure social inventions and innovations, sociotechnical system innovations, and pure technical innovations" he cautions that "there are no entirely pure types". In the first category, there are, e g, withholding taxes (requiring computers), the supermarket (requiring new types of check-out counters and stackable grocery carts), McDonald's (bag for French fries), government research contracts. Sociotechnical inventions and innovations take on a systemic nature, like the car with its gas stations, traffic controls, highways, and insurance – a description that easily leads to the concept of innovation systems, here a sectoral one rather than a regional or national.

According to Schön (1963), *concepts* are cognitive tools for coping with the world, for solving problems. While a given situation can be conceived in a variety of ways, it is always structured by way of concepts, which thus determine how a situation is perceived and framed. Concepts help us making sense of reality, new concepts to understand more of that reality – they are tools for our thinking and understanding.

A Cellular Mathematics World?

Many other innovations in mathematics besides the equation notation would qualify as conceptual breakthroughs, such as the invention of the *zero*, numeral systems – try division with Roman rather than Arabic numerals; calculus; and more. A fairly recent discovery is Gödel's incompleteness theorem.

The last half century has generated a number of branches of mathematics that still have a lot to contribute. Thom's (1972) catastrophe theory (Zeeman, 1977) de-

monstration the fundamental importance of the order in which events played out, the way taken from one state to another; Forrester's (1961; 1969) System Dynamics demonstrated the fallacies of intuition when counter-intuitive dependencies hold sway; Lorenz resuscitated and gave real impetus to chaos mathematics (Gleick, 1987), emphasizing the importance of initial conditions and providing the key insight that non-linear rather than, as was conventionally taken for granted, linear processes govern the world; complexity mathematics (Waldrop, 1992; Arthur, 1994; Kauffman, 1995; Holland, 1995) zoomed in on the onset of chaos, stressing, for example, path dependence in a development trajectory. This latter is not the same as the route dependence in catastrophe topology neither the same as initial conditions in chaos; it is about the importance of decisive events along the way, discernable only in retrospect, even if actors try to influence that very path. More recently arriving into the limelight is network mathematics (Barabási, 2002; Strogatz, 2003; Watts, 2003), like the other branches with broad applications in biology, industrial dynamics, infrastructure design, for example making that eponymous network the Internet more resilient.

We should, however, not expect to see any of these subjects introduced at high school level anytime soon, perhaps never. The point is rather that they give us a better handle on reality, correcting false understandings and misleading intuitions. The impact should be expected to turn up indirectly when various tools and concrete examples, case histories, enter the public domain. After all, "the butterfly effect" of chaos is a well enough established notion, partially thanks to popular culture. And the six steps ('degrees') to just everybody else, including a sought-for source of wisdom, the 'weak ties' of network mathematics, point both to accessibility and a level playing field.

Complexity mathematics concerns itself with a particular kind of complexity: systems of a vast number of components but of very few different types, interdependent through a few simple laws. Over time, such systems may evolve to display emergent behavior, that is, complex patterns evolve out of simple interactions in a way that is not accessible through a reductionist approach, biological life being a prime suspect. A radical proposal is Wolfram's (2002) 'new kind of science': he has run through a couple of hundreds of rules for generating patterns of cellular automata, in essence, rows of black and white squares on a square paper (or rather computer screen), generating new rows depending upon those rules. He suggests that there is an 'equivalence principle' between the cellular automata world of the computer and our physical universe, indicated by the fact that physical phenomena as well as patterns seen in nature find close resemblances in his automata world. If this radical, controversial idea turns out to be valid, we are in for a major shift.

Making Sense of Our Senses

Language has already been mentioned as an area for constant change and innovation. What about seeing? It took Brunelleschi to discover, in the 15th century, the vanishing point, and a new way of seeing and creating art was introduced. Perhaps it is time for other senses to become focal points for social as well as technical innovators? Our largest sense physically is our skin. There are attempts to create new sensations

by immersing the human body in a fluid, and then apply various ways of mechanically stimulating that body. Like with haptic uniforms, development is just in the beginning, and thus the verdict is still out whether such ideas will result in gimmicks or real experiential and perhaps cognitive breakthroughs.

We now know that there are five rather than four tastes, the fifth umami of particular importance to certain cuisines, notably the Japanese one. There is even the suggestion for a sixth taste, fatty acid. Our sense of smell, the human olfactory system, is proven to be of huge importance, yet little understood. A decade or so ago, it was discovered that we have a second sense of smell, an organ in the nose that detects smells that affect us without us being conscious of them. So we are affected without consciously knowing what is causing it!

One potent agent is a substance called the trust hormone (or even "the hormone of love"), oxytocin, which underpins social attachment, thus trust. One component of trust is social recognition; a sniff of oxytocin has proven to help increase people's ability to read others' emotions. A suggested application is developing a treatment for autism.

There is no agreed-upon mechanism for how our olfactory system functions, just competing theories, which means that the discovery, development, or proof of such an underlying mechanism would be of huge importance. This would affect smell-based industries, including fragrances and food, but it would also open up vistas for odor-based media. If the efficacy of smell in affecting our behavior is true, there is bound to be discussions about the potential for manipulation and the subsequent regulation needed. Better knowledge, better understanding will again create lower barriers to entry, to entrepreneurship in a renewed and expanded field.

New Foundations for Society?

A number of social innovations are regarded as institutional foundations for economic development from the 18th century and onwards: the incorporated company, the patent system, and the newspaper. Insurance and the scientific journal might also be mentioned. The patent system created incentives for investing in new ideas, the corporation allowed access to capital for the budding entrepreneur, and the newspaper became a safeguard for information related to access to business information as well as political.

With the advent of the Internet, it is hard to know where to start in suggesting profound repercussions. The field of scientific publishing, for one, is in upheaval, the peer review process sometimes shunted and new opportunities for working smoothly together over vast distances emerging; articles have been published with more than a thousand authors. Blogging, podcasting, RSS feeds, and other novelties have shattering effects on business models for print media and increasingly so for wireless ones. The balance between publishers, journalists, advertisers, and readers, listeners, or viewers is changing. Advertisers may even pay surfers for clicking on links. The long tail effect (Anderson, 2006), implying that products that find takers only few and far between get a better chance, is another reduced barrier effect.

One might regard the shareholders in an incorporated company as a community; the ones in a mutual insurance company or a consumer (or producer) cooperative constitute one. The Internet spawns self-organizing dynamic communities of many sorts. Users may communicate freely, making user experiences available almost instantaneously, creating pressure groups and joint purchasing teams. Again it is about reducing barriers, minimizing transaction costs, changing the playing field, often making it more level.

A particular type of community is that of open source programming – though now it is far from just computer programs that are produced jointly and then accessible for free; a German enthusiast is working on an open source car, environmentalists try to make energy meters more attractive. Talking of software, the portal for open source projects Sourceforge lists some 150.000 such projects (2007). To keep what has been created to be freely accessible from being "privatized", there is something opposite to the patent: copyleft in a pun on copyright, a license to use freeware for free as long as the one who amends or reconfigures it also allows her product to be freely used.

Content is generated the same way, with enthusiasts producing 'lenses' reflecting their interests and expertise; with people sharing links lists; with encyclopedias such as Wikipedia and the Open Directory produced collaboratively. Sly attempts to compromise the quality of such work, such as false Wiki entries, have caused much alarm and highlighted ethics issues. But the Internet also allows for establishing trust: eBay offers a rating system for people engaged in transactions, and there exists a TRUSTe system (2007) for creating grades of trustworthiness with regard to privacy protection. People who serve regularly as judges or raters may themselves be rated for competency and (lack of) bias; they may get promoted (or demoted) to different levels of karma, systems that in themselves are subject to research and thus evaluation.

Already in the 18th century, the marquis of Condorcet postulated that if a number of people individually had more than 50 per cent chance of answering a question or solving a problem, then their combined judgment would be more likely to be correct the larger their number. This eponymous "wisdom of crowds" (Surowiecki, 2004) is increasingly put to good use, such as when betting on the outcome of an election, the success of a movie, or the potential of a new product, where the precision of "collective" appraisals has surpassed that of individual "experts".

Every new election campaign demonstrates new ideas for electioneering in cyberspace. Howard Dean is associated with grassroots fundraising, demonstrating yet another instance of reducing barriers. Estonia was the first country to allow voting over the Internet; Sweden has opened an "embassy" in Second Life (2007).

Money, Cash, Transactions

It is an ascendant level of abstraction to go from cocoa beans or kauri shells to gold and silver and further to coins and then bills; bills which then are represented by bank accounts and debit and credit cards. Later developments include new financial instruments such as junk bonds and, at the other end of the scale, Grameen Bank's micro loans. A monetary transaction involves some exchange of products or services but such social interactions traditionally were more than just a mechanical act: a social

and cultural one. Negotiating and bargaining constituted part of this cultural interchange, the basis for bonding and long-term relations.

The fixed, advertised prices applied in much of the Western world constitute a relatively recent phenomenon, some two centuries old. It is a practice that has failed to take hold in large swathes of the globe. The growing importance of the Japanese economy created an awareness of a culture that does not hold transactions to be isolated events but rather part of long-term relationships, possibly even spanning generations. One question would be how such cultural differences might be mediated in future, in an ever more 'globalized' world.

Another question is whether the "fixed price" regime might turn out to be a historical parenthesis. Services such as eBay offer examples of how auctions might supplant those fixed prices. There are several ways to perform auctions, and tools such as "knowbots" might help automate bidding. It is a safe prediction that since the buyers' knowbots will be rule-based, the sellers' will be so too, and there will be a never-ending escalation of knowbots designed to profit from the weaknesses and preferences in the other party's knowbot. Much like the establishment of the TRUSTe system, or mutual disarmament in the field of military escalation, we might foresee a 'truce' meaning arresting escalation and the establishment of set procedures and "open knowbots".

"Real estate" in virtual space carries very real monetary value, and the annual market for avatars, role figures in online games endowed with powers gathered over time and with effort, on eBay, equals the GNP of a fair sized country. There is an exchange rate, equating Second Life Linden dollars with real life dollars.

Money allows much smoother transactions, in fact, a market economy; it allows the accumulation of wealth; and it does so because of its abstract nature – finally to credit cards. Or – finally? Going by the number of transactions, we still live in a cash society, and handling cash is a costly business. With electronic wallets, particularly in the form of mobile phones, sometimes with prepaid cards, transaction costs are dwindling rapidly – in many instances also allowing for contactless reading. This might make for any number of surprises and new selling and marketing gambits, possibly paid for by an important potential loss: that of anonymity. At any rate, reduction of transaction costs is yet another leveling of the playing field, offering new vistas for entrepreneurs and less costly arbitrage paid for by the needy.

Tradeoffs and Eyes of the Beholders

Technology, thus innovation, in and by itself is neither good nor bad; it's our application of it that counts. Such a statement disregards the radical critique of technology or the technological system of someone like Ellul (first in 1954). For him technology, or technique in French, encompasses also, for example, management tools and procedures, thus including a whole swathe of social innovation.

So we should not expect any global consensus on the value of social or conceptual innovation. Patents, just heralded as drivers for economic progress, have their strong critics. Money allows for the accumulation of wealth as well as for the smooth transactions just hailed. The utility of junk bonds and hedge funds is sometimes questioned,

credit card accounts may turn into traps.

Society is transformed in a process of cultural evolution where different "species" of innovation wax and wane. A social innovation such as the French revolution's compulsory military service (for men!) may only be functional in a particular social environment – serving for good or bad. Other social innovations, such as marriage, may develop new interpretations with cultural change.

A new concept may become a forceful war cry. Electronics companies did computer aided design before the catchphrase CAD existed but only when it had been established did ample budget allocations result – because now there was something to measure against: statistics, competitors, educational efforts. But like any false analogy, concepts can also lead astray: the "domino effect" provided a powerful metaphor not necessarily reflecting a real situation.

Concepts may be invented to sell a product, a service, or a political program, serving a particular group or course of action: think of democratic centralism. Orwell explored this terrain beautifully.

Overt versus tacit effects

The "modern concept of mathematics stresses the idea that man invents his mathematics... rather than discovers it", Hansen claims (1994). Regarding concepts, we might discuss whether they too are socially constructed. Some are whereas others help us understand nature. As we have seen, new concepts may trigger new technological or social innovations but they may also emerge after innovation has happened, to better explain, categorize, and give it further impetus, allowing innovation to reach new levels.

Memorizing without recourse to written language once called for relying on rhythm and rhyme; reading silently rather than aloud was another invention only slowly established. Like innovation in general, social and conceptual innovation necessarily are concepts with fuzzy demarcations. Novel tools, new frameworks of existence, changing ways of social interaction are bound to affect society's functioning, generating more or less spontaneous or consciously designed innovation. It has been suggested that social innovation capital be formally pinpointed (McElroy, 2002). Let us offer a few speculative examples of possibly emerging novelties.

- Darwinism is a powerful explanatory model for evolution: competition, procreation, mutation. It turns out to be a forceful model for other developments than biological evolution – the economy is one field of application. Interestingly, there are even physicists suggesting that our universe and the laws governing it have developed in a Darwinian way. For cultural evolution, Dawkins (1976) has suggested a counterpart to biology's gene, the meme. Memetics is a controversial subject but whatever its foundations, the Darwinian principle may profitably be applied to much of social and cultural evolution.
- More practical, mundane developments are those from economic life such as the mail order company, the department store, charter tourism, and the furniture that you buy in a kit to assemble yourself (we become "prosumers"; Toffler, 1980). Their counterparts in manufacturing, early on, would be Taylorianism, later mass customization, just-in-time and lean production. When future studies were

young, pioneers relied upon them to their advantage; when such studies became established, they entered the toolbox of necessary utilities. Thus new methods and tools will continue to be added to the means for surviving in competition. Again, a better understanding of underlying mechanisms make for a more level playing field and lower barriers to entry – for individuals, organizations, and concepts.

- "Economic man" is not the eponymous optimizer once believed. Simon (1957) highlighted that we rather opt for 'satisficing' than maximizing or optimizing; Kahneman, Tversky, and others have mapped a whole score of thinking traps that we are prone to be caught up in (Piattelli-Palmarini, 1993). Again, knowing is empowering us to avoid falling captive to false intuitions and also the spring-board for developing "simple heuristics that make us smart" (the title of a book to that end).
- The arrival of handheld electronic devices that induce us to shift frequently between different tasks is a development that might have profound effects. This is not the same as multi-tasking when we perform different tasks at the same time, some of them more or less automatic, not calling for our attention. No, cell phones, SMS-ing, e-mail, and so on call for moving rapidly from one attention framework to another, and then to another again. Such task-jumping has been found disturbing sleep and affecting IQ, the latter deteriorating from morning to evening. Social mores, tools, and indeed innovations may emerge in response.

This paper has attempted to provide a discussion of diverse, budding conceptual and social innovations, with a number of historical ones as a backdrop. Many will be associated with the Internet, with the creation of virtual worlds with their own inhabitants – avatars, sometimes – and economies, a few with mathematics. Items that are of increasing importance are factors relating to collaboration, often enough with "open source" and "copyleft" as guiding principles, and to the establishment of trust. Open knowledge and level playing fields seem to emerge as keywords but only if tools for accessing them are made universally available.

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