



Maastricht University

*Leading
in Learning!*

Innovation for Inclusive and Sustainable Development

Luc Soete

6th Annual Conference of the Academy of Innovation and Entrepreneurship,
Oxford, 29-30 August, 2013

Outline

- The title of this conference reminds me of Lisbon 2000 and the European Lisbon strategy: an attempt to integrate knowledge development, innovation and competitiveness, with social policies and inclusion and subsequently sustainability.
- Leave it to you to assess the success of this strategy...
- It seems particularly difficult to combine, to harmonize those three different policy aims. Natural focus seems to direct itself towards technological competitiveness and innovation. Hence I very much welcome this conference: we need insights from other countries than Europe
- Focus of my talk will be on what all this implies for S&T, research and innovation:
 - Research and knowledge as we knew it – a short overview of my rather personal vision on shift from S&T to innovation;
 - Innovation studies and positivism: from creative destruction to destructive creation;
 - A couple of examples and their implications for long term development;
 - A new innovation development paradigm: : “you never innovate alone...”



1. Research as we knew it

- The strong focus on industrial R&D is from a historical perspective a relatively recent phenomenon. Long before, experimental development work on new or improved products and processes was carried out in ordinary workshops.
- “Technical progress” was such that experience and mechanical ingenuity enabled many improvements to be made as a result of direct observation and small-scale experiment. Patents were taken out by "mechanics" or "engineers" who did their own "development" work alongside production or privately. This type of inventive work still continues to-day and it is essential to remember that is hard to capture it in official R&D statistics.
- What became distinctive about modern, industrial R&D was its scale, its scientific content and the extent of its professional specialisation. Joel Mokyr calls “tight” S&T...
- Older arts and crafts technologies continued to exist side by side with the new "technology". But the way in which more scientific techniques would be used in producing, distributing and transporting goods led to a gradual shift in the ordering of industries alongside their “technology” intensity.
- Thus, typical for most developed and emerging industrial societies of the 20th Century, there are now high-technology intensive industries, having as major sectoral characteristic the heavy, own, sector-internal R&D investments and more low-technology intensive, more craft techniques based industries, with very little own R&D efforts.



Industrial technology policy

- In many policy debates, industrial dynamism became associated with the dominance in a country's industrial structure of the presence of those high-technology intensive sectors.
- In Europe it led to an obsession with national technological competitiveness. European integration is ultimately a history of success and failure of industrial policy with as central driver: the pursuit for scale economies
 - European problem one of scale (going back to M. Abramowitz in the 50's, see also Jan Fagerberg) from the origin of the European Community for Steel and Coal to sun-rise industries Microelectronics
 - Focus on sun-rise industries starting with Davignon for political but also economic reasons
- The European, so-called Barcelona 3% R&D/GDP target e.g., arose primarily from concerns that Europe's industrial R&D appeared to lag far behind that of the other technologically leading countries such as the US and Japan.
- The assumption was that more R&D carried out in Europe would be a crucial factor behind Europe's attempt at becoming the most competitive region in the world. Obvious that R&D as an investment cost target is somewhat of an odd policy target. More important is the question what the results are...



“New” characteristics of innovation

- Shift in the nature of knowledge accumulation: from industrial, “tight” research to more undetermined outcomes, trial and error research;
- Traditional industrial R&D was based on:
 - Clearly agreed-upon criteria of progress, and ability to evaluate ex post
 - Ability to “hold in place” (Nelson), to replicate, to imitate
 - A strong cumulative process: learn from natural and deliberate experiments
- Still the case in many manufacturing sectors from automobiles, to consumer electronics, chemicals but even here tightness is becoming more difficult with the increase in complexity
- “New” technological change appears more based upon:
 - Flexibility, hence difficulty in establishing replication;
 - Trial and error elements in research with only “ex post” observed improvements. Problems of continuously changing external environments: over time, across sectors, in space; difficulty to evaluate E.g. In many IT-intensive sectors (education, health, mobility, safety, business) efficiency improvements remain complex “stories” only to be told ex post;
 - Particular role of users in the R&D process itself and much larger role for entrepreneurial, “creative destruction” based innovation ;
 - “Codified” parts of knowledge easy, but difficult to appropriate the efficiency improvements leak quickly away, tacit parts much more difficult, imitation never complete.



2. Innovation studies and positivism

- What has characterized the innovation literature over the last twenty years or so, as the concept became fashionable amongst policy makers and the business community alike, has been *positivism*.
- Just like the old Guinness advert, “*Innovation is Good for You*” appears the common feature of most innovation studies over the last decades.
- In the Guinness case though, this was actually correct. A pint of Guinness a day compares to an aspirin a day in the prevention of blood clots and the risk of heart attack. Unlike other beers, Guinness contains antioxidants like those found in red wine and dark chocolate.. In its wisdom, Guinness though decided to stop its “*good for you*” marketing campaign in Ireland which had primarily consisted of offering free beer to blood donors in blood donor clinics. The company did not want to be identified with a health company. Maybe innovation scholars should do the same thing...



Innovation studies evidence

- At the micro-level, failure rather than success appears the most common feature of innovation processes to such an extent that more could be learned from innovation failure than from innovation success stories.
- At the technology case study level a substantial literature emerged in the 80's highlighting technological failure inspired by Brian Arthur and Paul David's notion of the possibility of a long term "locking in" of society in technological inferior trajectories.
- And similarly one also knows since the 80's and 90's that at the policy level there are numerous policy trade-offs in the design of policy instruments between innovation support and the speed of diffusion. See also the discussion here on Thursday between Helga Nowontny, Konstantin Novoselov, Edward Astle, Nicole Grobert and Davide Iannuzzi on research excellence.
- Finally at the macro-economic level, the destructive nature of new technologies and innovation processes in e.g. of employment or skills terms has been emphasized in many studies since more or less the beginning of the industrial revolution...



Innovation as creative destruction and as destructive creation

- So why is it that innovation has always become identified with positive change? E.g. the employment creation potential, or rather lack thereof in Europe, was a central concern in Europe's Lisbon strategy; a strategy which tried to merge social with innovation policies but which in implementation became ultimately totally biased towards innovation.
- At a societal level, innovation is generally represented by a Schumpeterian process of "**creative destruction**" renewing society's dynamics and hence leading to higher levels of economic development and welfare – destroying a few incumbents to the benefit of many newcomers;
- However, could it not also be that now and then the exact opposite pattern might be dominant: a process of "**destructive creation**" – innovation benefiting a few at the expense of many – becoming dominant leading ultimately to lower levels of welfare.



Characteristics of “destructive creation”

- A common feature appears its short-termism; its easy, free rider nature; and its dependency on networks whereby the regulatory framework governing the network provides sometimes the major source for innovation.
- The core reason why such patterns of “destructive creation” appear to have blossomed over the last ten to twenty years is closely related to the advent of new, digital Information and Communication Technologies (ICT). ICT has allowed for a dramatic growth in opportunities for the fragmentation of service delivery: what has become known as the long tail of product and service delivery differentiation.
- Doing so ICT has had major growth and welfare increasing effects allowing for the satisfaction of consumers’ wants along the demand curve. New “versions” of services have emerged and have been behind the rapid growth of many new varieties of services.



Regulation driven innovation

- However the emergence of such service differentiation has also led to opportunities for cherry picking: for selecting profitable segments of demand which were essential though for the “full” service delivery. As a result, many features of “universal service” delivery associated with the previous network service delivery have come under pressure. Their quality of delivery has become of lower quality or in the worst case has even become discontinued. In network services it has increasingly become expensive to be poor.
- At the same time, existing network regulators were neither well-prepared nor informed about the many new digital opportunities. On the contrary deregulation and/or liberalisation led to new products or service delivery, inspired by the change in regulation and exploiting more fully the new digital opportunities of product differentiation, with in some cases negative societal externalities or even systemic failures.



3. Three cases of destructive creation

- Three examples of such patterns of “***destructive creation***”:
 - first our ecologically unsustainable, innovation-led consumerism growth path;
 - second financial innovations as the case *par excellence* of “destructive creation”; and
 - third, and not surprisingly given the nature of the current sovereign debt crisis in Europe, European monetary integration and the euro. After all, I witnessed the birth of this institutional innovation in Maastricht at first hand.
- In each of these cases the solution will have to be found in strengthening society’s capacity to develop innovations of the welfare enhancing “***creative destructive***” type.



a. Innovation, planned obsolescence and unsustainable consumption

- A close look at the way innovation in consumer goods might have led our societies to a conspicuous consumption path of innovation led “destructive creation” growth.
- In most modern growth models, the decision to invest in research and development is driven by the prospect of monopoly profits on the incremental value that new vintages provide. In short, innovation goes hand-in-hand with value creation.
- Yet one can also imagine an opposite pattern: a process in which innovation actually destroys the usage value of the existing stock of durable goods and as a result induces consumers to have to repeat their purchase.
- Example: Emilio Calvano’s model of 2007



Calvano's formal model

- Calvano's formal analysis shows that "*destructive creation*" leads to higher profits whatever the innovation costs. On second thoughts, this shouldn't come as a surprise. "*The power to wreck the value of old versions of a product ends up serving restoring profits*".
- There is effectively no mechanism to take into account an optimal timing of innovations in regard to the destruction costs of all sorts of affected capital.
- The analysis presented by Calvano highlights the fact that the phenomenon of "*destructive creation*" is rather widespread and has been very much induced by the emergence of new ICT consumer goods.
- Easy and cheap ways in which existing usage value can be destroyed is through e.g. product design and restrictive aftermarket practices, and in the extreme case through so-called "planned obsolescence" limiting on purpose the life span of particular consumer goods.



A rather pervasive process

- It is actually surprising in how many areas processes of “*destructive creation*” exist that hinder prolonged usage and induce customers to migrate continuously to newer models.
- The most extreme and widespread case would be new product design in e.g. fashion clothing or shoes destroying existing output, but there are of course many other forms and sorts of restrictive aftermarket practices which can be found in many ICT related sectors such as software writers limiting backward compatibility, or electronic goods manufacturers ceasing to supply essential after-sales services or spare parts for older products (smart phones, mobiles, iPods, iPads). See the legal case brought against Apple in 2003 with respect to the planned obsolescence of the battery life of the batteries in the iPod.
- Paul David termed this, the innovation fetish Imelda Marco syndrome “in memory of a famous instance of the uncontrollable, obsessive accumulation of more and more pairs of women’ shoes (another, richly documented fetish object).”

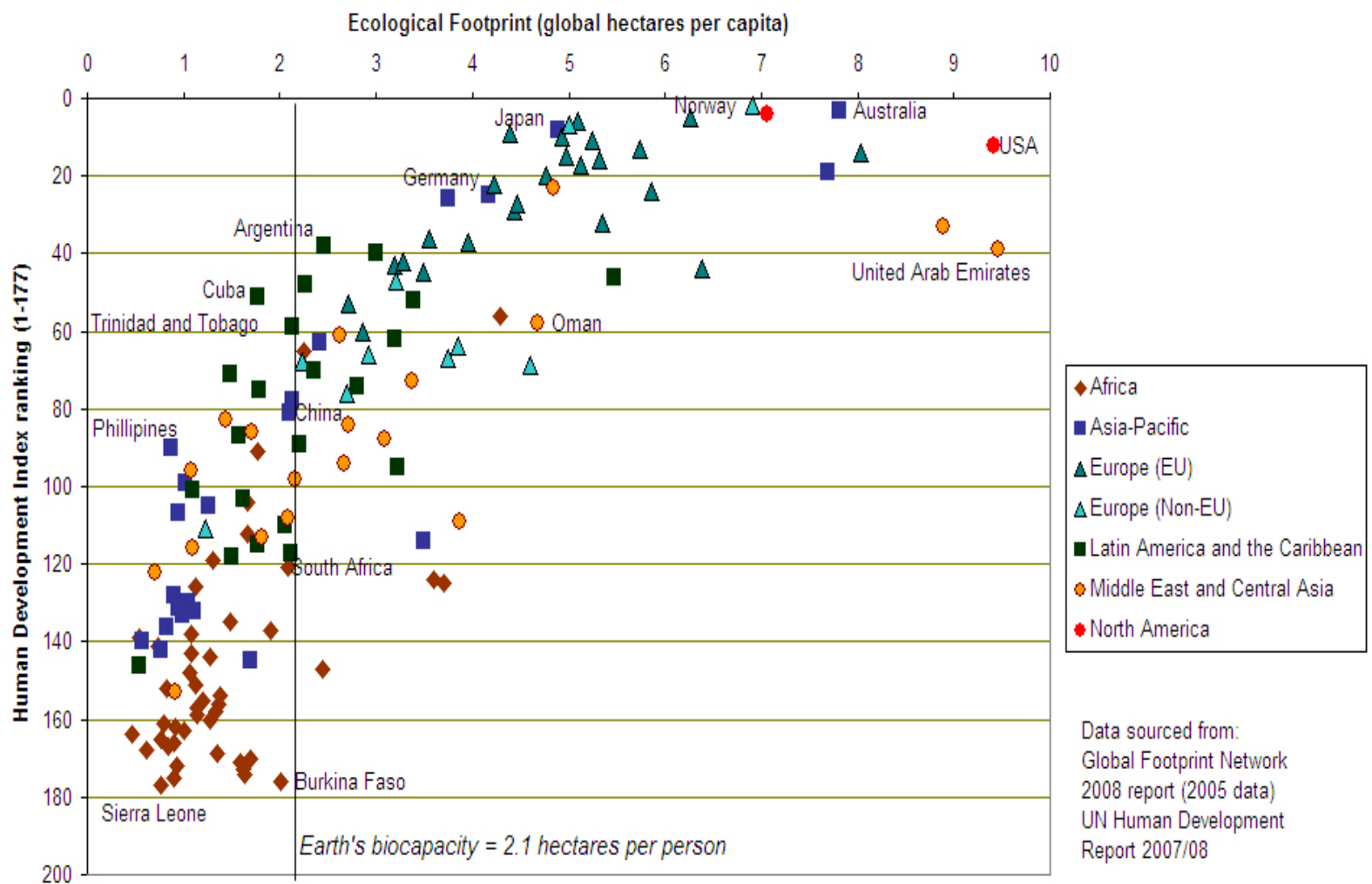


Conspicuous innovation growth

- This “*conspicuous innovation*” consumption growth path which in its environmental impact and ecological footprint is not only unsustainable in the developed world, it’s increasingly so at the global level.
- Warrants a shift in the process of research and innovation:
- Traditionally consumer product innovation has been driven by *professional use* demand directed towards the tip of the income pyramid: the long tail of product quality, professional use improvements.
- While this has offered growth expansion opportunities to firms thanks to rising income inequality in developed and emerging economies, it is economically unsustainable: search on the part of the business community in the absence of Keynesian global redistribution policies for long tails elsewhere (remember Ford’s T-model):
 - At middle income levels, youngsters, elderly, etc.
 - At low income, bottom of the pyramid (BoP) innovations (Prahalad), local grassroots innovation (Anil Gupta).



Human Welfare and Ecological Footprints compared



b. From financial innovations to systemic failure

- Financial innovations have actually been described as innovation of the “destructive creation” type and have by now been well covered in the popular economics literature.
- There is a close link with digital information technologies, which opened up new product/service opportunities. To quote Greenspan: *“recent regulatory reform, coupled with innovative technologies, has stimulated the development of financial products, such as asset-backed securities, collateral loan obligations, and credit default swaps that facilitate the dispersion of risk... These increasingly complex financial instruments have contributed to the development of a far more flexible, efficient, and hence resilient financial system than the one that existed just a quarter-century ago.”*
- It remains striking fact how little value has been created, as opposed to the increased systemic risks...



c. The euro as institutional innovation

- Probably the most dramatic institutional innovation with probably the most devastating impact on the well being of many Europeans is of course the introduction of the euro... An institutional innovation of economic integration representing the final act, the cherry on the cake of economic integration: the roof on a European house of which the foundations had been laid with the introduction of the Single Market, but with as yet no walls.
- At first sight, it remains difficult to understand how as a result of a by and large externally induced financial crisis, the current sovereign debt crisis became a crisis of the euro area countries.
- In most European countries public debt has been funded from its inception by and large *domestically*. “Solvency is in the eye of the counterparty”: when the counterparty to assess the society’s solvency is the society is itself, it will in general be in the vital interest to keep “rolling the debt”.
- In this sense the Euro as an institutional innovation implied that national public debt would increasingly become transnational, European owned.



4. An emerging innovation development paradigm?

- The conspicuous consumer product innovation has been driven by *professional use* demand directed towards the tip of the income pyramid. In a global setting, this has offered growth expansion opportunities to firms thanks to rising income inequality in developed and emerging economies.
- In the long term though this is likely to be an unsustainable process: high income market penetration offers too little innovation monopoly rents:
 - Need to strengthen the international implementation of IPR;
 - But with major problems of transfer pricing, parallel imports will remain in crucial areas for welfare (health, education, nutrition).
 - Disappearance/hollowing out of middle classes
- Search on the part of the business community in the absence of Keynesian global redistribution policies for long tails elsewhere (remember Ford's T-model):
 - At middle income levels, youngsters, elderly, etc.
 - At low income, bottom of the pyramid (BoP) innovations (Prahalad), local grassroots innovation (Anil Gupta).
 - All challenges for new entrepreneurship.



New research challenges: development insights

- Developing markets appear to raise some of the most motivating research/innovation challenges:
 - Autonomy, unwired to high quality infrastructure (energy, water, roads, terrestrial communication);
 - Low education hence necessity of simplicity in use;
 - No maintenance/repair facilities, so intrinsic need for long term sustainability;
 - Extreme income inequalities with strong needs in urban slums and poor rural villages, but barely any current purchasing power;
 - High living risks, so low willingness to invest or borrow money in the long term.
- All these features appear also and increasingly of particular value to consumers in developed countries:
 - Autonomy of high quality infrastructure as “freedom of movement”;
 - Shift in the democratization of innovation: from the needs of sophisticated, beta users to the needs of (digital) illiterates;
 - Need for zero maintenance and ecological sustainable: cradle to cradle;
 - Downsizing the scalability of selling goods in large quantities;
 - Relevance of new financial products such as micro-credit and micro-insurance in poor urban areas.



Innovation for development

- While developed countries' applied research is becoming globally driven, the most challenging research questions are often taking place within development contexts.
- Innovation for development should ultimately give more emphasis to local knowledge communities: strategic alliances emerging between such local communities and private and public research laboratories in the development of BoP laboratories, not part of traditional high tech R&D centres.
- Innovation process will often be reversed, starting with the design phase which will be confronted most directly with the attempt to find functional solutions to the Southern users framework conditions.
- There is a growing role in international research partnerships for NGOs, as initiators of research for development projects and organisations with a wealth of user knowledge, local community expertise and not-for-profit interest which gives a "voice" to needs at the bottom of the income pyramid where markets are invisible.
- Feedback from BoP users and from design developers upstream towards applied research is new example of reverse transfer of technology (from South to North), re-invigorating and motivating the research community in the developed world "in search of relevance."



Conclusions

- Knowledge sharing shifts the attention away from the purely technological aspects of research to the broader organisational, economic and social aspects which are today in many cases a more important factor behind innovation. This is reflected to some extent in the much greater popularity of the term innovation today than R&D
- Innovation is at the same time as relevant to poor countries as it is to rich countries. This holds a priori for countries with large, young populations where the potential for innovation, once users/consumers are identified as source of innovation, can easily be enhanced.
- In a growing number of areas the over-concentration of research expenditures in the Northern world leads to a too slow spreading of knowledge
 - In case of **Energy saving technologies** policy issue is fast “proiferation” of knowledge
 - Need for multi-disciplinary research programmes on “**appropriate innovation**”: Local food production, local energy efficiency, water management, transport, logistics, urban mobility, migration, etc.
- Need for adjustment of financial systems to focus much more on local knowledge impact.



Thank you for your attention!

Luc Soete

Universiteit Maastricht

l.soete@maastrichtuniversity.nl



UNITED NATIONS
UNIVERSITY



UNU-MERIT