

## **Dies Lecture: Science in the global “Participatory Knowledge Society”**

Luc Soete, January 10<sup>th</sup>, 2014<sup>1</sup>

Science, and more broadly academic research, has had a rough time last year. I probably should add now this week...

End of last year, Alexandre Afonso, a lecturer at King's College London wrote an interesting blog<sup>2</sup> entitled “*How academia resembles a drug gang*”.

When I took over from Gerard Mols, I referred back to an earlier column I had written in the local newspaper De Limburger in which I compared the management of a university to the management of a zoo. And I quote – I have to be careful now and make sure to quote my own previous publications for fear of being accused of self-plagiarism and as I do not know whether self-plagiarism applies also to translations, I prefer to quote the original text – “*Je hebt een reeks verschillende bijzondere dieren in huis - de hoogleraren - elk met heel bijzondere kenmerken. Sommigen zijn eerder vredelievend, zelfs schattig, hebben een hoog aaibaarheidsgehalte. Anderen zijn dan weer schichtig en blijven het liefst in hun academisch hok... Het managen van een zoo is complex: je inwoners hebben allemaal verschillende behoeftes en voorkeuren: sommigen kun je samen laten hokken in eenzelfde tuin of gebouw - een faculteit, een departement, een instituut - anderen moet je juist apart houden.*”<sup>3</sup>

Not having a real zoo here in Maastricht but quite a number of drug runners, I must admit that Afonso’s analogy between academia and a drugs gang appears much more interesting than my zoo analogy. Afonso was inspired by Steven Levitt and Stephen Dubner’s Freakonomics and the chapter entitled “*Why Do Drug Dealers Still Live with Their Moms?*” In the case of drug gangs the income distribution is typically extremely skewed in favour of those at the top, with rank-and-file street sellers earning below a living wage: that’s why they still live with their moms. “*If,*” and I quote now from Afonso, “*you take into account the risk of being shot by rival gangs,*

<sup>1</sup> The grey shaded texts have not been pronounced during the Dies lecture because of lack of time.

<sup>2</sup> See <http://alexandrefonso.wordpress.com/2013/11/21/how-academia-resembles-a-drug-gang/>

<sup>3</sup> From Soete, L. “Universitaire managementwijsheden”, *Dagblad De Limburger*, 13 november 2010

*ending up in jail or being beaten up by your own hierarchy, you might wonder why anybody would work for such a low wage and at such dreadful working conditions instead of seeking e.g. employment at MacDonald's. Yet, gangs have no difficulty in recruiting new members. The reason for this is that the prospect of future wealth, rather than current income and working conditions, is the main driver for people to stay in the business: low-level drug sellers forgo current income for (uncertain) future wealth... It is of course very unlikely that they will ever make it (their mortality rate is insanely high) but they're ready to "get rich or die trying". With a constant supply of new drug sellers... ready to be exploited, drug lords can become increasingly rich without needing to distribute their wealth towards the bottom. In short, a continuous expanding mass of rank-and-file "outsiders" ready to forgo income for future wealth, and a small core of "insiders" securing incomes largely at their expense..."*

Sounds familiar, no?

As Afonso highlights: *"Even if the probability that you might get shot in academia is relatively small (unless you mark student papers very harshly), one can observe similar dynamics."*

More seriously, I believe that we still haven't realized how dramatically the science and research system has changed over the last decade. How much science has been in transition for some time now.

With the easiness of digital access, the reproduction and re-use of scientific knowledge, Isaac Newton's "standing on the shoulders of giants" has received a dramatic impulse. To "re-quote" the historical parable from Paul David and Dominique Foray which I have already used a lot – "re-quote self-plagiarism" doesn't seem to fall under self-plagiarism so I will not indicate here where precisely I have used this quote already.

Paul David and Dominique Foray compared across history, the experiences of two research scholars: one living today Rachel, *"an imaginary young engineering postdoctoral student working in a Stanford University laboratory"* – Paul's daughter

happened to be called Rachel – and one living in the seventeenth century Rachid  
“an astronomer from the beautiful town of Fez”

“Rachid invented a new telescope and wanted to transmit the details of his discovery to colleagues in Cordoba, Padua and Salamanca. This was an arduous task because this kind of knowledge had not yet been codified at the time and he had to copy all of his plans and notes by hand. Rachid then entrusted his precious documents to the northbound caravans, in the hope that they would one day be delivered to his colleagues. There was little certainty of that happening...

...situations in which knowledge is basically memorized and passed on by word of mouth (accompanied by somewhat incomplete papers intended to assist recall), [is problematic] because the circle of effective users typically remains confined to direct, personal contacts. Moreover, as that circle is widened, there is an increasing risk of the content becoming distorted in the course of oral transmission and successive copying. Only recurring communications back-and-forth among each of the pairs participating in such a network of transmission would operate to limit the propagation of "copying errors". The likelihood of that occurring, however, diminishes as the number of links in the human chain of communications increases. Hence, there are physical limitations preventing expansion of the community of people who can harness new knowledge, and possibly further improve upon Rachid's design. Knowledge flows have existed throughout history, but, as a rule, they have been few and far between and relatively feeble....

As for Rachel, let us say that she invented a small robot, working out the engineering details with the help of a computer-aided-design (CAD) program. Wishing to inform her community, she quickly produced the relevant documents and plans with the help of graphic design software. The files were then copied and dispatched as email attachments to a list of selected addresses. Within seconds, they were received by dozens of laboratories throughout the world and hundreds of researchers could begin reproducing the knowledge and sending back their comments, criticisms and suggestions. Knowledge codification and transmission costs here were very low (i.e. Rachel's marginal costs of codifying and transmitting the knowledge in question,

given the fixed infrastructure, and her training costs). So too were those of its reproduction. Indeed, this is the case when the invention itself remains within the framework of knowledge with which the community's members are familiar: the people receiving the file have "learned to learn" this kind of knowledge and the attached document provides a detailed learning programme."<sup>4</sup>

As David and Foray illustrate neatly, we have witnessed a dramatic transformation in the organisation, sharing, networking, accessing and production of knowledge over the last centuries and in particular the last decades. The most recent shift from simple Internet technologies to WEB 2, has led to what some have called "e-science" or what Jean-Claude Burgelman and David Osimo have called "science 2.0" with new forms of scientific output, such as nano-publications, data and code; a vertical disintegration of the value chain; a greater role for inductive methods (everything becomes a Genome Project); a scaling up of serendipity at global level with big linked data, collaborative annotation, social networking and knowledge mining detecting unexpected correlations on a massive scale; better science with reproducible and truly falsifiable research findings; an earlier uncovering of mistakes; more productive science reusing data and products, crowdsourcing of work and reducing time-to-publication<sup>5</sup>. These changes have accelerated the transformation of the way research is carried out.

Two stand out which I would like to highlight here:

First, the explosion of scientific institutions in 'new' centres of the world as part of the globalisation of science. China, but also India play here a central role having today already the biggest STEM student population, and likely to have in the near future a much larger STEM research population than Europe or the US. Overall at the world level, there are today operational the largest amount of active scientists ever. These scientists are all confronted with the organisational science 2.0 changes just mentioned, and the huge need for more, alternative platforms to publish, pushing the scientific process to deliver faster. It is here that Afonso's analogy of the academic

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<sup>4</sup> David. P. and D. Foray, "An Introduction to the Economy of the Knowledge Society," *International Social Science Journal* (UNESCO), 2002, 171:9, p.6-7

<sup>5</sup> See amongst others; Jean-Claude Burgelman, David Osimo, Marc Bogdanowicz, Science 2.0 (Change will happen...), *First Monday*, July 5<sup>th</sup>, 2010, Vol 15:7.

job market with a drug gang brings to the forefront the rapidly expanding mass of young researchers at the world level and the relatively shrinking core of insiders. Academic systems more or less everywhere in the world rely on the existence of a continuous supply of “outsiders” ready to forgo wages and employment security in exchange for the prospect of an uncertain security, prestige, freedom and reasonably high salaries that tenured positions entail.

This increase of input into the global academic system looking for output and recognition is one of the main drivers why the system as we knew it is being challenged. Most insiders who control this “market”, and also the measurement of the quality of the output (“excellence”) and thus reputation have been hired at a time when no such competition existed, whereby one may wonder if they themselves would have been hired if similar market conditions had been in place. As I put it myself in another recent blog: *“De vraag stelt zich echter in hoeverre de hogere onderwijs wet van Bowen “de kosten worden bepaald door de beschikbare middelen” ook niet in toenemende mate geldt voor wetenschappelijk onderzoek. Zo is de totale geldmiddelenstroom naar onderzoek in het hoger onderwijs de laatste dertig jaar enorm gegroeid. Gemeten als percentage van het BBP, is de middelenstroom bijna verdubbeld. En juist zoals in het geval van Bowen’s oorspronkelijke hogere onderwijs wet ligt ook deze aangepaste versie nu aan de basis van een wereldwijde wedloop in onderzoekreputatie tussen universiteiten: een wedloop in internationale rankings gebaseerd op de omvang van onderzoeksmiddelen, de aantallen publicaties en de aantallen citaties. Daarbij speelt succes en behaalde reputatie uit het verleden een hoofdrol... Een schril contrast met de internationale ranking van ondernemingen waar vernieuwing aan de wereldtop eerder de regel is... waarom zou de bron van nieuwe wetenschappelijke kennis steeds uit dezelfde, oude instellingen dienen te komen?”<sup>6</sup>.*

Ultimately, there is no reason why e.g. the old age of a university would remain a competitive advantage for research or for its current academic reputation, once the outsider-insider dualisation of the academic labour market is fully recognized. We

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<sup>6</sup> Soete, L., “De wet van Bowen”, *Trends*, 28 november 2013

might well witness in the near future much more radical processes of creative destruction with new young players challenging the protected insiders.

The second radical change is the democratisation and participation of knowledge challenging us as academic community having had for Centuries privileged access to scientific facts and wisdom. And while we might have had to deal increasingly with financial accountability – think of the current Dutch IBO process – what we are confronted with today is of a totally different “participatory” nature.

Last September, the American popular science magazine “Popular Science” decided to shut off readers’ comments. As the online content editor, Suzanne LaBarre<sup>7</sup> wrote and again I quote: *“Comments can be bad for science. That's why... we're shutting them off. It wasn't a decision we made lightly. As the news arm of a 141-year-old science and technology magazine, we are as committed to fostering lively, intellectual debate as we are to spreading the word of science far and wide. [Shortened] The problem is when trolls and spambots overwhelm the former, diminishing our ability to do the latter. That is not to suggest that we are the only website in the world that attracts vexing commenters... We have many delightful, thought-provoking commenters.*

*But even a fractious minority wields enough power to skew a reader's perception of a story, recent research suggests.”* And LaBarre to refer to some of the outcomes of research led by the University of Wisconsin-Madison also reported in in a New York Times op-ed<sup>8</sup>:

*“Uncivil comments not only polarized readers, but they often changed a participant's interpretation of the news story itself... Those exposed to rude comments... ended up with a much more polarized understanding of the risks connected with the technology. Simply including an ad hominem attack in a reader comment was enough to make study participants think the downside of the reported technology was greater than they'd previously thought... [End of Shortening of quote]*

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<sup>7</sup> <http://www.popsci.com/science/article/2013-09/why-were-shutting-our-comments>

<sup>8</sup> See Brossard, D. and D. Scheufele, This story stinks, *NYT Sunday Review*, March 2<sup>nd</sup> 2013.

*If you carry out those results to their logical end, commenters shape public opinion; public opinion shapes public policy; public policy shapes how and whether and what research gets funded--you start to see why we feel compelled to hit the "off" switch... A politically motivated, decades-long war on expertise has eroded the popular consensus on a wide variety of scientifically validated topics. Everything, from evolution to the origins of climate change, is mistakenly up for grabs again. Scientific certainty is just another thing for two people to "debate" on television. And because comments sections tend to be a grotesque reflection of the media culture surrounding them, the cynical work of undermining bedrock scientific doctrine is now being done beneath our own stories, within a website devoted to championing science."*

*"There are plenty of other ways to talk back to us, and to each other: through Twitter, Facebook, Google+, Pinterest, livechats, email, and more. We also plan to open the comments section on select articles that lend themselves to vigorous and intelligent discussion. We hope you'll chime in with your brightest thoughts. Don't do it for us. Do it for science."*

LaBarre's frustration finds undoubtedly a lot of sympathy with many of us.

This extreme reaction highlights the problem we, as academic community are and will be increasingly confronted with in the "**participatory knowledge society**", if you would allow me to use this term. As Lex Bouter, my ex-colleague at the VU, likes to emphasize: the democratisation of science has meant that our authority has been waning: "*wetenschap is ook maar een mening*".

We are also challenged here by the (social) media with their need for quick, simple and, if I may add, scoring responses. Uncertainty, complexity, a probability of a finding doesn't fit well with those needs. One is looking for two minute answers, put in black and white terms, with no room for doubt. As Anne Glover, the European Commission's Chief Scientific Officer, puts it<sup>9</sup>:

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<sup>9</sup> Glover, A. et al. "Science for an informed, sustainable and inclusive knowledge society", Policy paper by President Barroso's Science and Technology Advisory Council, Brussels, August 29th, 2013.

*“Due to the complexity, uncertainty and ambiguity of contemporary knowledge construction, knowledge claims are often contested and leave ample room for different interpretations. Knowledge often increases the experience of uncertainty rather than reducing it. This has led to the problematic belief... that all truth claims are more or less arbitrary and driven by personal or institutional interests rather than factual insights.”*

How to respond to this challenge?

Retract in our elitist world as the editor of Popular Science felt obliged to do? Or embrace the participatory knowledge society as I'm sure Robbert Dijkgraaf would suggest? We probably would all want to opt for the latter, but mathematics and physics is rather different from life sciences, climate change or social sciences: the participatory barriers are of a very different nature. And participation remains something we should as academic community also cherish, try to benefit from.

My economic colleague Marcel Canoy, one of the eight authors of an article in NRC, which has become known in the social media as the NRC8, put forward the idea of introducing compassion (*“mededogen”*) in communications with the media when confronted with populism, as he describes the opinion piece on which he and his colleagues, including our colleague Aalt Willem Heringa, responded. Let me quote from his recent opinion piece in het FD, the economic quality newspaper of the Netherlands.

*“Populisme... trekt zaken bewust uit hun verband. Het leidt ogenschijnlijk tot verwoede debatten, maar het welles-nietes karakter staat werkbare oplossingen... in de weg. Boe!-roepers hebben een uitlaatklep, maar omdat populisme niet oplossingsgericht is, werkt het zelfversterkend... De combinatie van sociale media en de dunne marges waaronder de geschreven pers moet opereren, maakt het mogelijk voor populistten om media effectief in te zetten. Steeds vaker zien we het volgende patroon: eerst verschijnt een ronkend artikel in een om lezersaantallen smachtende krant, vervolgens fungeren sociale media als geoliede ophitsmachines en tot slot gaan de praatprogramma's eroverheen.*

*Het blijkt verleidelijk – ook voor mij – om populisten met gelijke munt te betalen en hun geschriften weg te zetten als feitenvrije ondergravingen van ordentelijk bestuur. Maar dat zou het gevoel van een ‘samenzwering van de elite tegen het volk’ kunnen versterken. De strijd kan beter gevoerd worden door de onderliggende onvrede te adresseren en door met mededogen te reageren...”<sup>10</sup>*

In the ESB economics blog, Canoy explains further what he exactly means with “mededogen” or “compassion”<sup>11</sup>.

*“Mededogen duidt op het empathische vermogen je te verplaatsen in een ander en daarbij mildheid te betrachten.... een zekere afstand kunt nemen van jezelf, je eigen interpretaties van waarnemingen, je oordeel, mening of eigenbelang. Omgekeerd: hoe minder je daarin slaagt, des te gekleurder (want zelfgerichter) je beeld van de wereld wordt.”*

Compassion: an interesting concept to reflect upon in the way we, as academic community participate ourselves in the participatory knowledge society. While compassion might seem at first sight very much at odds with the typical scientists’ search for the truth without any compromise, let alone compassion for others, it might well hold interesting features in re-establishing trust between science, the media and the public at large.

In my first talk to the largest research community at our universities: the PhD fellows, back in October 2012, I made a strong plea for less exaggeration in research writing – we are a scientific community. We do ultimately not need marketing jargon to present our results, or to highlight the importance of our findings, or trying to convince with superfluous words, or boasting oneself. You’ll undoubtedly all recognize the examples of spin and boasting as quoted in Cummings and Rivara<sup>12</sup>: “the[se] findings... open up a new frontier,” “this study represents the first unequivocal demonstration,” “uses the largest sample size,” “provides strong new evidence,” “is one of the most detailed . . . studies,”

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<sup>10</sup> Canoy, M. Populisme en mededogen, *FD*, 6 januari 2014

<sup>11</sup> <http://www.economie.nl/weblog/populisme-en-mededogen#sthash.EzGqvK7e.dpuf>

<sup>12</sup> Cummings, P., Rivara, F., Spin and Boasting in Research, *Arch Pediatr Adolesc Med.* 2012. doi:10.1001/archpediatrics.2012.1461.

Researchers should present evidence so others may understand and judge it. If findings are lucid and powerful, words to persuade are superfluous. In short a call to resist immodest chest-thumping, very similar to Canoy's notion of "compassion"....

End of Dies lecture

Well, I hope from this perspective that you will also have some compassion here and now with me trying to bring this academic celebration to a good end also time wise.

A long session indeed in which we are...