

Current State and Management of Scientific Research: Knowledge Advance or Ethical Deficit?

A Critical Overview on Scientific Overproduction and Indefinite Growth Paradigm

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Abstract

The mission of scientific research is currently contaminated with distortions that undermine its credibility and compromise its fruitfulness.

The main question is: are scientific projects, fundraising activities, papers and scientific findings interrelated? Does innovation need the frenzy of activities that leads to the overproduction of scientific papers? Or are we simply witnessing one of the worst consequences of globalisation, with desperate researchers forced to publish for survival rather than to pursue the advance of knowledge?

This paper examines the environment of scientific research with its current rules and operating mechanisms.

Overproduction of papers is examined in light of the indefinite growth paradigm, which was invented by economists and politicians to ensure big business to some large multinational enterprises.

No natural phenomenon shows a monotonically increasing trend. Indefinite growth and indiscriminate productivity are deceptive chimeras, and those who let themselves be overwhelmed by it risk falling seriously ill.

It is time to significantly reduce the production of often useless (if not harmful) scientific articles, and to give science back its status of process and scientists their professional dignity.

The anomalies I will refer to include:

i) an abnormally high and frenetic production of scientific articles (where are quality and innovation?),

ii) a wide mass of studies of little relevance that seem to respond solely to the publish or perish blackmail;

iii) unheard-of but proven cases of plagiarism and fraud.

Creative work, such as that of researchers and professors, should not be guided and controlled by market rules.

I argue that what scientific research bodies and universities need is a work environment inspired by ideals of plurality, solidarity and eclecticism.

Contributing to the advancement of knowledge remains an extraordinary intellectual and ethical adventure. However, subjection to market rules creates distortions, with risks and consequences for all humanity.

Introduction

Science is a Sacred Cow is the title of a 1950 book by chemist and entomologist Anthony Standen [1]. The author argues that some scientists and teachers have «inflated egos» (certain of their superior wisdom and virtue) or «a fabulous collective ego, as inflated as a skilfully blown piece of bubble gum». This irreverent book was widely reviewed and even praised by Albert Einstein.

A 1950 editorial note in *Life* (an American magazine) states: «With tongue-in-cheek hyperbole, [Standen] suggests that a group that takes itself so seriously deserves some serious skepticism».

Standen, in fact, asserted that the scientists he was referring to are mostly dull and pompous and now and then they should be laughed at. Unfortunately, he argued the general public stood in awe of them, even when they talked Latinised nonsense.

Already in 1950, then, a breach was opened in the compactness of science as a granitic and inviolable corpus of knowledge that aims to preserve and increase itself. Nowadays, moreover, scientists are often turned into media personalities. While they increasingly crowd the news (e.g., television, newspapers, social media), it is unclear whether they are asked to provide solutions to social problems, thereby replacing politicians, or if politicians empower scientists with reporting facts that legitimize policies imposed on populations. In either case, said science would appear to overcome doubt and precaution, which are at the heart of the scientific method and deontology. Science is not a producer of certainties led by unblemished and fearless professionals (namely, researchers, scientists). Does it make sense for scientific research bodies, particularly academics, to influence policy on contingent social and political issues? Should scientific research not be disconnected from political and commercial purposes? Reflections and second thoughts on this fundamental and fantastic profession are definitely urgent.

Many shadows and only a few lights mark the current path of science, as emphatically evidenced over the last years. In the last three decades, we have witnessed the following epistemological changes concerning science:

- from a scientific method adopted to guide managers and management (formal debut in 1911, with *The Principles of Scientific Management* by Frederick W. Taylor [2]) to the mercantile management of science,
- from science addressing politics to politics incorporating science,
- from science intended as a mission for public interest to science subjected to market rules for profit.

While we are facing an unprecedented situation, the trend of scientific paper overproduction was born a long time ago. Scientists are under enormous pressure in order to manufacture papers that are mostly useless to the progress of humanity, since the current working conditions, reminding that of assembly line, allow neither reflection nor intuition. Considerations on socio-political and ethical aspects of scientific research are sadly commonly neglected, so that it is not ethics that establishes the priorities and determines the limits.

This paper examines the dark side of science, which operates by distorting and sometimes also perverting the genuine advance of knowledge. Gianfranco Pacchioni, author of “The Overproduction of Truth” [3], argues that, under the weight of its immense productivity, modern science is heading for a collapse. In their recent paper titled “Slowed canonical progress in large fields of science”, J. S. G. Chu and J. A. Evans [4] wrote:

«In many academic fields, the number of papers published each year has increased significantly over time. Policy measures aim to increase the quantity of scientists, research funding, and scientific output, which is measured by the number of papers produced. These quantitative metrics determine the career trajectories of scholars and evaluations of academic departments, institutions, and nations» (Web of Science dataset used, analysing papers published between 1960 and 2014 inclusive).

Does it make sense for public scientific research bodies, particularly universities, to follow these trends and the influence of contingent social and political issues? Does it make sense that public scientific research bodies are subjected to market rules? Considerations on socio-political and ethical aspects of scientific research are commonly neglected, although scientific results strictly depend upon the vision that any scientist has of him/herself, of the natural and social world and of his/her profession with related repercussions and, particularly, social responsibility.

Starting a bibliographical research on a given scientific topic can be discouraging, since some thousands documents can be detected by the database employed. A refined selection of documents is nearly always possible, of course, but the overload remains and a critical investigation is necessary aimed at understanding why the reason for the massive increase of scientific articles over the last thirty years. Are we dealing with an increment in scientific sensitivity? A significantly greater number of researchers, than in the past, is currently engaged? If so, to what end? Or, has the internet simplified and intensified the connection between people, providing a huge growth of relevant scientific results arising from international collaborations?

Over the last three decades we have witnessed a constant and rapid increase in the number of scientific papers published in highly specialized and peer-reviewed journals around the world. This fact can be observed and evaluated according to different perspectives. One can appreciate this growth associating the number of scientific papers to the quality, variety and abundance of the recent scientific thought, thereby arguing that many papers are the

obvious and linear consequence of many innovative scientific ideas that impact on social activities and the quality of life. On the other hand, one could ask oneself how the scientific environment, with its peculiar working mechanism and rules, has recently changed. A recent paper [5] examined the growth rate of science publication between 1907 and 2007, recording significant differences in various scientific fields (natural sciences, social sciences, engineering, and so on) and a general difficulty of analysis mainly due to the variety of communication forms (conference proceedings, full articles, short communications, monographies, reviews, and so on) and to databases organisation.

Visiting the backstage of research laboratories may reserve a few surprises to non-experts. Sadly, today scientists are forced to multiply their capacity to publish in order to obtain prestige, power, ordinary research funds and jobs (including tenures, promotions, grants, etc.) for themselves and their collaborators.

Scientific articles are currently used as a tool to regulate temporary employment (a huge skilled and underpaid workforce), recruitment and career progression. In this sense, one is setting up a generation of scientists that are enslaved to the papers they must churn out, i.e. whose institutional aim is shifted from scientific research to publication.

Current science is subservient to politics and used to build domain strategies. “Publish or perish” is the locution coined to describe the pressure in universities and other research institutions to rapidly and continually publish papers to sustain or develop careers, recruiting and funding.

Categorising, ranking, evaluating and, above all, counting publications has become the dominant international way of managing scientific research topics, funding and researchers. This is a sterile and manipulative exercise. Single researchers, as well as the corresponding affiliating institutions, are evaluated by the administrators on the basis of the number of papers produced per year. Furthermore, additional credit points are allocated to those scientists who bring funding to their institution, which penalises those who do not. While a researcher can be unable to generate any original scientific ideas, they can progress their careers by regularly producing papers and finding funds. Here, the key question is: *findings or funding*? Funding for research findings is an obvious recipe, but innovation requires serenity and lucidity beyond huge amounts of funding. Scientists are distracted from in-depth study by the necessity to get funded, which is bad for innovation, because it distracts from reflection, from the courtship of intuition. In lucky cases, papers quickly produced in an assembly line are mannerist products, mere applications of codified disciplines diligently written by professionals of science, obedient to the diktat of the moment. In the many unlucky cases, however, the papers are merely useless repetitive exercises written by who is pressed to do so to survive.

According to Benjamin Disraeli «A University should be a place of light, of liberty, and of learning»; instead, it has become a place dominated by market interests and overwhelmed by waste, blackmail, and exploitation of temporary workers. In my opinion, we are witnessing an epochal and very dangerous systematic distortion, whose main aspects can be summarised through the following points aimed at distinguishing among:

- outstanding scientific research based on an insight that reveals what was previously in the shadows,
- ordinary and diligent collection of data easily interpretable within established scientific paradigms (concepts, theories, models, practices),

- errors in data collection (experimental design step), in measurements, and/or interpretation (modelling step) due to ignorance, naivety or hurry,
- real deceptions based on false data, or biased elaboration of data, and other aberrations [6].

Attention: distortion is going to turn into a drift, so a serious shift towards slowness and decency, with a recovery of the sense of public institution disconnected from accounting logic and profit, is urgent.

The criteria/policies of the scientific journals: writing a scientific paper

Scientific overproduction is strictly correlated with the hypertrophic proliferation of specialized journals.

The glut of scientific reports from scientists – tyrannised by their affiliated institutions and, therefore, driven by the need and the urgency to publish –has allowed journals to proliferate dramatically (a oncogenic-like phenomenon) and to assume behaviours that are as arbitrary as they are tyrannical. Scientific overproduction allows specialised journals to choose and discard.

A range of criteria are adopted, such as, scientific quality (methodological rigor, statistical adequacy in data treatment, innovation, and so on) in the showcase and others in the backstage. Beyond the papers' intrinsic quality, which remains difficult to evaluate, journals are committed to creating the most diverse acceptance barriers by imposing extremely heavy conditions on authors. Formatting a paper according to a journal's specific guidelines and completing a submission on its website can be very demanding. Instructions for authors on how to prepare a manuscript for submission includes a series of editorial follies whose purpose would appear to be finding formal reasons to reject articles. Here is a sample of these instructions:

- running title: an abstract of the paper title, with limited number of words allowed,
- structured abstract: a mini-article subdivided into micro-paragraphs, with limited number of words allowed,
- graphical abstract: a relevant image visually showing the content of the work,
- audio summary: the abstract of the abstract, acoustically showing the content of the work, with limited number of words allowed,
- phonetic spelling of name and surname of the principal investigator in view of the audio summary (the summary is also singing or only read?),
- cover letter: an extended version of the abstract addressed to the editor of the journal to highlight the merits (field of investigation covered, novelties, aims, etc.) of the paper,
- requests to each author to disclose private information, more or less pertinent to the paper, but specially related to funding (such as public engagements),
- request to specify the particular type of contribution to the paper by each author,
- stringent rules for tables, figures, captions, text (with limited number of words allowed), references (system of citation imposed), all of which to be strictly observed in view of submission without any guarantees of acceptance: a leap in the void that costs plenty of work and energy, to be repeated elsewhere in case

of rejection.

Homologating work formats and the themes of scientific research means to flatten the differences in the worldviews of individual scientists, which represses their creativity. What seems absurd is that journals require rigid and mandatory adherence to a standard editorial format for the preparation of the text to be submitted. Also, the list of references must be drawn up in accordance with editorial guidelines. Much time is lost in drafting a text according to editorial standards. In the event of rejection, the author has to start anew to match the guidelines of a different journal. Could the substance or content not be distinguished from the form in the first instance?

Furthermore, authors of scientific papers ignore the identity of reviewers, but reviewers generally know both the author's identity and affiliation – this is one of the unacceptable distortions of this odd social environment. When will scientists be allowed to operate in double blind conditions to ensure real parity as well as disinterested and unbiased evaluation?

In short, only the largest research groups, supported by multiple contributions from different subjects who bring together various type of skills, are able to face the demands of most journals; and this is one the primary methods of paper selection. Hence, only those who can count on strong support can stay in the publication rat-race; while only those who have access to financing can engage runners (researchers) and equipment (places, libraries, instruments, reagents, PC, subscriptions, etc.) suitable to enter the race. To survive in this jungle of rules, standards and formalities, then, a scientist is forced to become a fund manager, an accountant, a clerk typist, an IT specialist as well as a dynamic and smart networker whose aim is to tour the world to collect information, consent and alliances at various conferences and academic gatherings.

The indefinite growth paradigm

Until we continue to think obsessively in terms of growth – economic, scientific, etc. – we will have to compare the academic condition to oncological diseases growing worldwide. The fact that scientists are falling into such a cognitive trap is beyond paradoxical. The growth paradigm was invented by economists and politicians to enhance production and (mostly unnecessary) consumptions. Biologically indefinite growth is nonsense and is, at best, an anticipation of death. The paradigm of indefinite growth, much vaunted in economic and political terms, is mere deception: no natural phenomenon is indefinitely increasing (as far as it is known today), since each is characterised by:

- a latency phase,
- a growth phase,
- a stability phase,
- a decline phase until extinction.

With regard to biological phenomena, the larger and more complex the living organism, the more rapidly it decays and dies out. Then, imposing to the society's members the indefinite growth paradigm as a virtuous reference (as a desirable horizon) implies inducing *oncogenic thoughts* and, thus, *overt cancer*. This is a vulgar deceit, also useful to sell antineoplastic drugs, maybe as a consequence of some concluding remarks drawn as a result of fraudulent clinical trials [7].

Indefinite growth and indiscriminate productivity are deceptive chimeras, manipulative and harmful paradigms: those who fall for it and let themselves be overwhelmed risk falling seriously ill. Moreover, increasing the rhythm of publications is like progressively exceeding the consumption of sweets: it is an addiction! The craving of papers follows the same rules as the craving of sweets or cocoa: it is an illness, a psychological dependence dopamine-mediated. Sadly, many people are prone to be deceived by the myth of competition, probably because it intercepts survival mechanisms to which each one is ancestrally trained beyond logic, culture or ethics. The divisive logic that makes us believe that everyone survives at the expense of the sacrifice of others (due to a shortage of resources, for example) is powerful and those who are interested in and stress people (including researchers) to unbalance the markets know this very well. Let us now continue to examine those basilar aspects of science together to the currently distorted ones.

The analogy between scientific and cellular overproduction

Now, let us pause and reflect. The 2014 document by the World Cancer Report [8] gives a comprehensive overview on worldwide disease. It emerges that cancers figure among the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths in 2012.

Moreover, the number of new cases is expected to rise by about 70% over the next two decades. These data show that humanity is living in an antibiological way, that implies thinking and behaving in a dysfunctional way to the vital mechanisms. Let us examine some causes of this. Why wonder about the constant increase of oncological diseases in the world when scientists are currently producing *impressive masses* of scientific articles – published on a constantly increasing impressive masses of journals – for purposes unrelated to the real progress of science and humanity? Any behaviour characterised by a hypertrophic base is the result of people acting in a society characterised by an unhealthy, compulsive and often senseless tendency to the overproduction (scientific, industrial, crafts, and so on), such as cancer cells in an altered metabolism. And all this because it was built a society based on the sale of objects and on craving for profit. The keyword is, in fact, *alteration*: we are witnessing the decline of a category exhausted by competition in the struggle for survival that ignores (at least partially) that it is being manipulated to be silenced. Scientists currently are:

- obsessively focused on trivial details to give technical meaning to a publication of a certain scientific field,
- jailed in sterile competitions with their peers to grab a keynote or a lecture in a congress, for a grant, for a funding, for a contract, and so on,
- kidnapped by captious intellectual speculations around details that distract from the search for new ways, new models, new concepts, new explanations of phenomena under study,
- possessed by the narcissistic demon to predominate in their field of expertise.

But, where do we want to go? This situation is particularly serious and significant for scientists who are university professors, because they neglect their teaching commitments to devote him/herself full time to scientific research, fundraising and publication activities that allow them to justify their presence within the University and, therefore, their salary. In her 1990 book, Page Smith [9] claims that:

- the well-known *publish or perish* dictum and blackmail generates useless

research and articles, while leading professors away from their students in the pursuit of tenure,

- academic fundamentalism, the refusal of professors to acknowledge ideas that do not fit their own agenda, is on the rise,
- universities are becoming increasingly dependent on government and big business as these entities award more research grants.

There is confusion between the publication as a means of communication and dissemination of novel knowledge from publishing as an act for its own sake.

The scientific overproduction (as well as the one recordable in other sectors) is similar to a cellular hyper-proliferation.

For each thing exists a state of balance (a normo-trophic state), one of deficiency (a hypotrophic state) and one of excess (a hypertrophic state). Excess as well as deficiency are debilitating states and bring with them only destruction enlivening competition for survival, what activates the metabolic pathways of distress (increasing free radical production and specific hormones levels, as that of cortisol and epinephrine) until the appearance of tumours to chronic inflammation and immune disorders. As well-known [10], in fact, cortisol suppresses immune function and also many types of cancer are recognised having a dis-immune origin.

Several diseases that are defined by chronic inflammation result in significantly increased risks of cancer, such as colon cancer in patients with ulcerative colitis [11, 12]. [Cortisol](#) has a direct effect on shrinking the thymus and inhibiting white blood cell production and activity. [Cortisol](#) suppresses the ability of white blood cells to secrete chemical messengers (interleukins and interferons), so the different varieties of immune-system cells become unable to communicate with each other in a way that would allow them to more effectively fight off infections. Moreover, [cortisol](#) can actually act as a signal towards many immune-system cells to simply shut off and stop working (that is, the cells die). In this murky atmosphere of competition and protagonism, in which the race for survival is masked by search of excellence, specialised journals wallow at low cost on the work of scientists stressed and forced into a senseless assembly line (of Tayloristic taste) against all logic and decency.

Cancer cells are full of bioactivity and vigour, but they kill the organisms within which they develop. So it is, in my view at this moment, the world of scientific research and papers. The overproduction of unnecessary, mannerist and repetitive papers is an unequivocal sign of ethical and cognitive decline, and of lack of creativity. This is the current dark side of science: not simply kinky but distinctly dark, noxious. How many scientists are aware of this? How many scientists are interested in this? How many scientists are aware of their real task and mission on the Earth? How many scientists are aware of being working inside a misleading network which aims to marginal objectives, typically mercantile, with respect to that of the progress of humanity? How many scientists have the time and the courage to reflect on these issues?

The peer-review scam

The instrument to which the scientific community delegated – naively – the custody of the scientific quality is compromised, as documented by the paper [13] appeared on Nature in 2014. Already in 2006, Donald Gillies [14] argued against what he named a Research

Assessment Exercise (RAE), moreover explaining that such a tool was introduced in 1986 in the UK by Margaret Thatcher and continued by Tony Blair, thus revealing a political interest connected to. Afterwards, peer review was introduced in other countries and it is now worldwide accepted and used to make decisions for publications in specialised journals. Peer review is the assessment process at the heart of current science: unfortunately, distortions of the process contaminates the sector [13, 15] and we cannot be sure that the quality of the articles is guarded by the peer reviewers hired free of charge from journals between expert researchers.

John Bohannon – a biologist and science journalist based at Harvard University – in his 2013 article published on Science [16] shows the result of his investigation. In September 2013, he submitted a fake scientific article to a large number of fee-charging open-access publishers, revealing that less than 40% were living up to their promise of rigorously peer-reviewing what is published. This approach was criticised by some commentators as well as by some publishers of fee-charging journals, who complained that his sting only targeted one type of open-access journal and no subscription-based journals, damaging the reputation of the open access movement.

As stated by Donald Gillies [14]: «Thus a great deal of taxpayers money will be spent on an exercise whose likely effect is to make research output worse rather than better. Only one conclusion can be drawn from this, namely that RAEs should be abolished rather than introduced».

Richard R. Ernst, the Nobel Prize in Chemistry 1991, wrote [17]: «And as an ultimate plea, the personal wish of the author remains to send all bibliometrics and its diligent servants to the darkest omnivore black hole that is known in the entire universe, in order to liberate academia forever from this pestilence. And there is indeed an alternative: Very simply, start reading papers instead of merely rating them by counting citations».

Science/technology vs process/product

Confusion between science and technology is going to kill the content, the mission and the investigation method of science. Science is a process that can, sometimes, give rise to a product: confusing process and product can damage humanity survival and wellness so as its progress. Moreover, making scientific research is different from simple accumulation of data according to a given reference scientific model: the aim of science is to produce new interpreting models of the phenomenal reality by the way of development of a new conceptualisation. Other is technical application of scientific principles or simple strategy to augment the number of papers on the basis of which are decided funding criteria as various indicators of scientific activities.

Current researchers are simple slaves of papers, obsessed by the need of publication to achieve the characteristics to compete for international or national specific funding.

It is time to stop this perverse chain that confuses the evolution of scientific thought with the products derived from it overtime as operating and applicative consequences.

The rush to publish produces artefacts of good (errors) or of bad (fraud) faith and increases the power of the specialised journals (constantly increasing). David M. Markowitz and Jeffrey T. Hancock of the Cornell University (USA), in their paper titled “Linguistic Traces of a Scientific Fraud: The Case of Diederik Stapel” [18] wrote «This research supports recent

findings that language cues vary systematically with deception, and that deception can be revealed in fraudulent scientific discourse».

The incidence of fraud in scientific publications is such that it has even urged linguists to work to succeed in revealing the deceptive article from the details of the linguistic fabric. On the other hand, R. Grant Steen and co-workers published an article titled “Why Has the Number of Scientific Retractions Increased?” [19]; authors wrote: «The increase in retracted articles appears to reflect changes in the behaviour of both authors and institutions. Lower barriers to publication of flawed articles are seen in the increase in number and proportion of retractions by authors with a single retraction. Lower barriers to retraction are apparent in an increase in retraction for “new” offenses such as plagiarism and a decrease in the time-to-retraction of flawed work».

The evolution of scientific thought – as a process – is sacrificed on the altar of the product, productivity and profit, because researchers are delegated fund raising for the maintenance of membership. The movement of research funding is regulated by the projects and the testimony of the research work is entrusted to publications: for these reasons, the research products most frequently expressed are scientific articles and patents. This is acceptable in the context of an intellectual and ethical honesty that knows moments of bewilderment.

The experimenter expectancy effects

The [Rosenthal](#) effect is the name for a theory which posits that the expectations of an experimenter concerning the results of an experiment may have an unconscious effect which directs the results of said experiment toward the expectation of the experimenter [20]. In too many cases, current scientific research is built on the confirmation of something. Karl Raimund Popper: «It is easy to obtain confirmations, or verifications, for nearly every theory – if we look for confirmations. Confirmations should count only if they are the result of risky predictions... A theory which is not refutable by any conceivable event is non-scientific. Irrefutability is not a virtue of a theory (as people often think) but a vice. Every genuine test of a theory is an attempt to falsify it, or refute it» [21].

The Rosenthal (or experimenter/expectancy) effect is recognised as physiological in scientific research (as in other fields), but the rush (or really the urgency) to publish pushes to get results mostly classifiable into existing and consolidated models. The Rosenthal effect is much more active in scientists, also because they struggle every day on the same things (related to their expertise), sometimes losing lucidity. Moreover, scientists are guided by the burning hope to obtain something relevant to stand out and emerge (and this easily produces artefacts or junk) or to avoid to be fired. The equivocal use and abuse of the scientific method and its results has led over time to the coining of the term *scientism*, which is the alarming reflection of situations determined by arbitrary decisions, assumed as a function of theorems passed off as scientifically founded but, in reality, mere fruit of opinions. Scientists are not geniuses or superheroes, but fallible human beings with their beliefs and prejudices: it is therefore useless and harmful to overestimate their abilities and above all to stress them with hurry, competition and precariousness. All this if you want an equity society for interpersonal harmony and psychophysical health.

If, instead, one wants a society of alarmism and emergencies built on the problems and behaviours determined by fears, then it is useful to label and demonise as antiscientific everything that adverse the despotic technocratic power exercised through sanitary and technological control of people.

Compulsive assessment to stimulate sense of competition

With the obsession for the rankings one can create competition to tire and distract scientists with the struggle for survival. Scientists are evaluated by their affiliation institution, journals are ranked with bibliometric criteria and indexes. The obsessive idea of being involved in a dichotomy between loser and winner distorts the research path of scientists. The use of bibliometric indicators as the impact factor is also criticised [22]. Obsession for international ranking of journals and universities is aimed at disseminating malevolence and to discriminate, not to ensure quality, as someone likes to believe or induces others to believe. Competition is a cliché, a myth, a trap for the mind.

Society is inundated with half-truths and misconceptions about the economy and finance in general and free enterprise in particular. It is time to stress cooperation, not competition. Competition is a toxic driving force to stimulate commitment in people: it forces them to identify any medium to survive to pressing requests, thus artefacts of any type may arise to pollute the society. The idea of competition is drummed into us at school. From sports to exam quizzes, it's about competing with others. Instead of guiding pupils to do their best, one pushes to convince them to do better than other pupils do. It is all good for us, we are told, it gives us an incentive to improve and it fits us for the wider world of work. Competition leads to unified network science that deprives the scientific path of the contributions deriving from the slowness and space granted to inertia prodromal to intuition. Obviously, laboratories are full of competent, passionate, and motivated researchers, we are now focusing on the functioning mechanism of their work, of market tendencies, not of individuals (often crushed by the insane pressures of their employers).

Funding activities and scientific discoveries relationship

Huge amount of funds runs around scientific research, and this can induce reflections: are we assisting a useful intellectual exercise or to a specific form of business astutely masked by a microscope? The big concentration of fund distributed with the label of the pure or applied scientific research gives rise to lobby communities (centres of power) and this compromise the correct selection of either topics, methods or researchers all over the world, thus creating a restricted number of scientific groups able to control and monitor the funds distribution so as the specialised journals policies. Karl R. Popper: «It is a myth that the success of science in our time is mainly due to the huge amounts of money that have been spent on big machines. What really makes science grow is new ideas, including false ideas» [23]. Moreover, scientific research is not simply a field of application of the human intellect, in fact, as Albert Einstein wrote: «The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honours the servant and has forgotten the gift». The rush to publish is in contrast with the calm and clarity that are needed to find out something really new and useful for humanity. There are no exceptions to this rule.

Cui prodest?

Just a simple but crucial question: «*Cui prodest?*». Who benefits from such an overproduction of scientific papers? To science as a process of knowledge production? To the many public and private scientific institutions? To the publishers? To the governments? Many answers are possible. Surely, it benefits the publishers and all those interested in acquiring personal power (nurturing their CV) acting as editors, guest-editors, and being members of editorial boards. And also the big volume of publications related to conference proceedings is involved in the business of science. The leaders of the research institutions

are happy to use the publications to direct selections for hiring and career's advancements. Moreover, publications are discriminant – in appearance – in regulating fluxes of funding paid by public or private financiers of scientific research.

That of the scientist is a creative job, mainly based on imagination and intuition, i.e. irrational mental activities. Science is built on conceptualisation and on modelling (few journals are strictly focused on these basic aspects of science), an overproduction of experiments and calculations simply planned to publish is useless, expensive, and also often harmful for society, particularly as to the biomedical sector of scientific investigation [7], but not only.

Quality and quantity are variables inversely proportional. William Ellery Channing:

«It is not the quantity but the quality of knowledge which determines the mind's dignity».

To avoid misunderstandings, inverse proportion is when one value increases, as the other decreases. The big growth of the quantity of scientific papers is strictly related to the collapse of the scientific quality –that rising by creativity for innovation producing new ideas for old interrogatives or problems – even in absence of frauds. On the other hand, even bibliometric indices are only summary records related to the volumes of consultation, nothing connected to quality. Karl R. Popper:

«It is not his possession of knowledge, of irrefutable truth, that makes the man of science, but his persistent and recklessly critical quest for truth» [24].

Searching for the confirmation of something substantially known, or which is believed to be known, is different from searching for something new, but the second does not guarantee funding neither big amounts of papers, which are, on the other side, strictly correlated according to a simple arithmetic principle.

Moreover, the perverse mechanism for assessing the quality of the research based on counts of articles must be stopped, thus allowing scientists to conduct their investigations without the rush to publish any intermediate (often rough or incorrect) result.

We live with the misfortune of scientists captured by the compulsive urge to perform measurements in order to quickly record publishable data. The imprisonment of these scientists is sanctioned by the priorities established by the entities (often government) recruiting them to procure funds and ensure the international prestige mode that allows access to hosts prominent in the world rankings of research institutions. Pure madness and crimes against humanity unaware. No scientist should be subjected to the stressor to discover something on an established scheduled time: this is bullying, since it is a nonsense approach to this profession, and those responsible for the mechanism must be prosecuted legally. In a world that produces problems and promotes catastrophes, flourishes a science screwed on itself, built on distorted paradigms and guided by deviant incentives. The scientist who cultivates solutions to the horrors of the world is moved from his/her authentic mission to increase knowledge and works only on the distortions artificially imposed on the planet by dominant lobbies interested in conserving and increasing their power by subjugation. Here is who it is convenient for.

Conclusions

Planning the degrowth of human activities to reprogram the social regulation allowing to restart on the paradigm of cooperation (instead of insisting on sale of objects, competition, and cannibalism predatory) and leaving that of unlimited growth is dramatically urgent: concepts and example must come from the holders of knowledge, scientists in the first place.

Knowledge and human beings are not commodities: distorting and bending the work of scientists for profit is a crime against humanity.

Stopping the production of useless, expensive and sometimes harmful scientific papers is very urgent to restore dignity to scientists allowing them to engage in activities of study not finalised to the financing of their institutions but only to conceptualise and model natural phenomena of interest for humanity. Only human consciousness is steadily growing, albeit very slowly.

It is essential and urgent untying public research institutions by cash needs and budget, so that the researchers can study and experiment without wasting their time on porter, clerk and accountancy jobs. In doing so, moreover, they would eliminate the tensions and conflicts caused by competition for funding and need to publish at any cost to prove that they deserve them.

Today's scientists confuse, or pretend to confuse for convenience, a measurement with a discovery, the diligent accumulation of data with innovation.

Henri Poincaré:

«Science is built up of facts, as a house is with stones. But a collection of facts is no more a science than a heap of stones is a house».

Nowadays, data science is often intended as a method to extract information from a cluster of data (the *facts* to which Henri Poincaré refers), nevertheless, a general abuse of data (and of output coming from data analysis) is identifiable in current science. Asking to testify one's work as a researcher to the sound of publications is to perpetrate a deception against defenceless humanity and against those who would like to operate honestly and publish only *meaningful and ethical-based results* of their scientific path.

The vast majority of scientific papers contain simple data collection and commentaries: measurement results are accumulated and are then framed within consolidated reference theories and interpreted and commented on according to purposes that are primarily contingent on reaching a publication supporting careers, recruiting and funding. Even barbers, tailors, surveyors, salesmen, plumbers, and carpenters should strenuously publish in accredited international journals the diligent results of their daily work. And, moreover, all commercial receipts should be published in the (perhaps nascent?) international research journal "*Tickets and Invoices*" (founded today by myself for the joyful occasion), that would not disappoint the readers for the importance and variety of its articles. In the same way, a bartender could publish periodic reports on his current business resulting from statistical processing of his/her tax receipts and paid bills in the international journal "*Tickets and Invoices*": if s/he does not do so, it is only because fashion is not still launched and because s/he is afraid that such a paper could end up in the hands of the tax authorities and get

him/her into troubles. However, according to this type of society based on deception, competition and profit, I presume that whoever will found the international and trendy abovementioned journal *"Tickets and Invoices"* will have great success and overbooking of papers.

What we are arguing about has remote origins, it is not simply the mirror of a current decadent society which does not spare even the sector of scientific research, commodified and exploited. Enrico Fermi (the 1938 Nobel Prize in Physics) wrote:

- «There are only two possible conclusions: if the result confirms the hypotheses, then you have just made a measure; if the result is contrary to the assumptions, then you have made a discovery»,
- «The profession of the researcher must return to his tradition of research for the love of discovering new truths. Because in all directions we are surrounded by the unknown and the vocation of the man of science is to move forward the frontiers of our knowledge in all directions, not only in those that promise more immediate compensations or applause».

Let it be clear once and for all: the overabundance of scientific papers is the indisputable and evident sign of scientific mediocrity, careerism, lobbyism, and exhibitionism. Accumulation of data (from measurements or surveys) is different from scientific speculation for innovation. But overproduction requires an overabundance of data (very easy to acquire, nowadays), better if also suitable for frightening, surprising or amusing depending on the social needs to be faced.

Science is simply collapsing on itself, being the victim of a manipulative governance that spreads competition and a paradigm of indefinite growth (inexistent) to divert the course of the discoveries by tiring the scientist and placing them in the rank of manager, accountant, clerk, cashier, and often handyman too. Stephen R. Covey: «Management works in the system; leadership works on the system», and a scientist is a leader, not a manager and not a janitor.

Slaves of the papers, wake up yourself! Work to innovate, not to repeat a worn-out gregarious protocol. You are currently simple clerks and accountants of a research institution whose main goal is the research of funds, rather than of scientific novelties for increasing knowledge. When humanity will show an ethical-based interest for knowledge we will assist to a new age of science that will bring generous fruits in terms of innovation with significant relapses on health and wellness.

Who animates from behind the scenes the phenomenon of disturbing proliferation of scientific articles to tire and manipulate scientists by stopping humanity's progress? A humongous production of scientific articles is not necessarily a sign of originality, neither of ingenuity nor of creativity nor of commitment, since in many cases the experimental work and that of drafting the text is subdivided among many people organised in assembly lines for the production in series, exactly as happens for objects leaving industrial chains (Tayloristic assembly line). Not surprisingly, the issues addressed by the most productive and funded research groups are almost always highly repetitive and unfold over decades working mostly with the "variations on the theme" approach (jargon that I borrow from the language of music).

The products of scientific research are not necessarily scientific results, even less

significant.

The products of scientific research cannot be subjected to metric evaluations of any kind.

Scientific articles cannot be counted either placed in rankings: these are only senseless operations of bad taste for the exercise of power and to manipulate the attention towards certain topics of scientific investigation (as those of biomedical or energetic fields).

Finally, no scientist should be subjected to the stressor to discover something on an established scheduled time: this is bullying, since it is a cruel approach to this profession, and must be legally pursued.

In this connection, the format in which current scientific research is organised and harnessed all over the world is a nonsense aimed at getting tired and overstressed scientists within the stimulus of competition for survival. Creative work, such as that of the researcher and university professor, cannot be guided and controlled by mercantile and clerical principles. The time of the pirates is not over yet, deception and robbery still guide the current society; however, by eliminating competition, expectations, the command-control paradigm and profit from the equation of scientific research, it can foster openness to the growth mentality [25], proactive confrontation for the common good and lateral thinking for creativity. What scientific research bodies and universities need is an ethical-based workplace guided by ideals of plurality, solidarity, inclusion and eclecticism unrelated by profits.

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