"Preliminary thoughts on Slow Science"

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The recent global pandemic has been a dreadful event for the scientific community in several ways. Of particular importance is the massive departure of youth researchers from the academic system. This "great resignation" is not restricted to academics but a widespread tendency, especially in professions affected by the burden of the pandemic such as healthcare workers (Avitzur, 2021). Whilst the pandemic breaks this news to the general public, the struggles faced by early career researchers are not new, but the by-product of a dysfunctional system and toxic workplace culture.

Here are some key points that would be important to deepen.

1/Science is unfair and precarious

First, by precarity, we imply, of course, economic difficulties. Conducting research is a job and should be paid as such. Consequently, it is worrisome to see the multiplication of self-funded PhD positions, insufficient funds that lead PhD students to fall into poverty, countless work hours, and the exploitation of unpaid internships (Woolston, 2022). This politics of human exploitation is not acceptable and should not be allowed and is particularly unfair for the most precarious. Science is a common good and should not be used for profit maximisation (Kenway et al., 2004). Yet, the current grant allocation contributes to inequalities (Bol et al., 2018), adding to the burden of researchers already struggling with difficulties based on gender, ethnicity or socioeconomic level (Viner et al. 2004; Watson et al., 2022; Wennerås & Wold, 2000), and does not foster developing a slow science approach.

2/ Science within the neo-Schumpeterian economics

The recent pandemic stresses the problematic orientation of research funding according to industrial innovation (Watermeyer, 2016). Whilst we do not deny the importance of technology in progressing our understanding of the world, we are at risk of falling into the "technofix" trap (Jongsma & Sand, 2017). This anchorage of research into a neo-Schumpeterian economics seeking for constant innovation contributes to the precarious situation of young researchers. Accumulation of knowledge is good but we are now facing information overload with scientific publications crucially overgrowing. Though this statement is not new and questions the role of science in society, it reflects the tension and current entanglement between academics, industrial and political agenda (Bernal, 1939; Polanyi, 1967). Furthermore, the burden of this situation lies on the shoulders of early career researchers who are required to learn more, faster and with resource scarcity due to disengagement from public agencies in research in several countries (Berg, 2015).

3/ Publish or perish, the tyranny of the metrics

The struggle faced by early career researchers in contributing to this accumulation of knowledge is reflected in the pressure to publish ground-breaking research in high-impact journals. Whilst peer-reviewed journals and academics should both tend to improve scientific practices by sharing protocols and results, the current system reinforces an unsustainable pace (Ziman, 1969). Since the academic job market bases its metrics of success in publication rates, individuals are incentivized in publishing pieces of research that follow the neo-Schumpeterian imperative of constant innovation. Therefore, research dedicated to improving reproducibility is prejudiced (Stoevenbelt, 2019). Furthermore, senior researchers who already reached a certain notoriety are more likely to benefit from the current rewarding publishing system, reducing the chances for early career

researchers to reach the metrics required to obtain tenured-position (Hicksa et al., 2015). This competition between senior and younger generations of researchers illustrate the current scarcity of resources in conducting research and is not restricted to the academic system.

4/ What are the potentials solutions: Equity, transparency and openness

This gloomy picture could be brightened, but cannot rely solely on individual efforts. A reform of research practice is necessary, and several lines of solutions already exist:

- *Equity*: Metrics to assess research practices should not be based on productivity but on other criteria, such as quality and open science practices. Science is a common good and as such should be accessible to everyone. International public investments rather than private interests need to be reinvested in research. First, by making research accessible and affordable to everyone, and second, by increasing funding in unprofitable areas.
- *Transparency and openness*: favour collaboration rather than competition. Instead of favouring individual achievement, we need to shift to collective reward, not only at the group or university levels but at the society level. As societies are more connected than ever, we need to promote transparency and collaboration. Open access repositories provide a good start to sharing data and material across and above institutions.

To summarise, whilst we endorse the need for slow science, our goal is to emphasise that this transformation could hardly occur within the current framing of research in the academic system. We identified several important issues that need to be addressed before considering individuals' capacities to adopt slow science practices, such as the funding and publishing systems, both playing a key role in how research is currently handled. We acknowledge that these issues are structural and generalizable and that other colleagues have already started to reflect/alert on the dysfunctional nature of the current system such as the Open Science Movement or the Leiden Manifesto for research metrics. Therefore, we would like to invite those interested in participating in a collective effort to design practical proposals and solutions to overcome the current disheartened situation of science.

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