Doctoral Education in Context

Perspectives from Africa

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CHAPTER 8

The role of doctoral supervisors in addressing the problem of predatory publishing in francophone sub-Saharan Africa

Kokouvi Edem N'Tsoukpoe

Burkina Faso is in West Africa, with a population of 22 million. It is home to 122 higher education and research institutions, including 7 public universities and 12 other public institutions, (DGESS/MESRSI, 2022). In 2020/2021, the total student population in the country was 190 218, with 36.6% female. In 2020/21 there were 3 600 doctoral candidates in Burkina Faso (1.9% of total enrolment).

Located in Ouagadougou, the **International Institute for Water and Environmental Engineering (2iE)** was established as a higher education and research institute in 1968-1970 by 14 French-speaking countries in West and Central Africa. It specializes in areas such as energy, water and sanitation, civil engineering and hydraulics, and sustainable development. 2iE currently has 1 500 on-site students, including 60 PhD candidates. The 2iE is a Center of Excellence of the West African Economic and Monetary Union (UEMOA), the Economic Community of West African States (ECOWAS), NEPAD and the World Bank.

1. Introduction

Publish or perish has become today the motto for success in any respectable research institute. This has given rise to various unethical publication practices in sciences including salami slicing (the incremental publishing of noncomprehensive papers on the same topic) and publication in predatory journals.

Predatory journals and publishers can be defined as journals and publishers that exploit the gold open- access model to profit from scholarly publishing in a dishonest way, without or with cursory peer-review, while charging publication fees to authors (Beall, 2016; Fovet-Rabot & CIRAD, 2021). This open access model exhibits a clear conflict of interest: the more papers the journal publishes, the more money it gets (Beall, 2017).

Since its introduction, the term 'predatory journals' has been a subject of debate, particularly considering the ongoing adaptation of journals accused of unethical practices. A reason for this is that these dubious, fraudulent, questionable, or pseudo-journals encompass a wide range of misconduct. Therefore, a move away from the term 'predatory' has been suggested and a distinction between 'deceptive' and 'low-quality' journals has been promoted (Eriksson & Helgesson, 2018). This view has been confirmed by a recent global study by the InterAcademy Partnership (IAP) (2022), who describe a spectrum of predatory behaviours ranging from "fraudulent journals" to "questionable quality journals" (InterAcademy Partnership, 2022, pp. 28–32). Another reason is that many academics, driven by the pressure to publish at any cost, are often fully aware of the nature of their dealings, resulting in a relationship that is less about predator and prey and more about a new and ugly symbiosis (Kolata, 2017; Darbyshire et al., 2020). For the sake of simplicity, the term 'predatory journals' is used in this chapter since it is directed at the global scientific community.

Universities and research institutes in sub-Saharan Africa countries are no exception to this phenomenon (Andoh, 2017; Mouton & Valentine, 2017). According to the study of Demir (2018) on researchers who published in predatory journals in 2017, the greatest number and share (84%) of researchers were from developing countries. Three African countries (Nigeria, Egypt and Kenya) are among the top 20, with Nigeria as the second highest contributor, just behind India. An earlier analysis of articles published in predatory journals in 2013 had already ranked India and Nigeria as the two countries with the highest contributions to predatory journals (Xia et al., 2015). Regarding Nigeria, besides various reasons indicated by Xia et al. (2015), the major reason behind the phenomenon is that academics are financially rewarded for publications, through academic promotion, in international journals regardless of the quality of the journal (Demir, 2018).

If no francophone countries in sub-Saharan Africa appear in the aforementioned studies, it is not because predatory publication practices are unknown in these countries. This absence is probably due first to the low publication output in these countries (see Figures 1 and 2), who face various challenges in research and innovation. Publications in sub-Saharan francophone countries counted

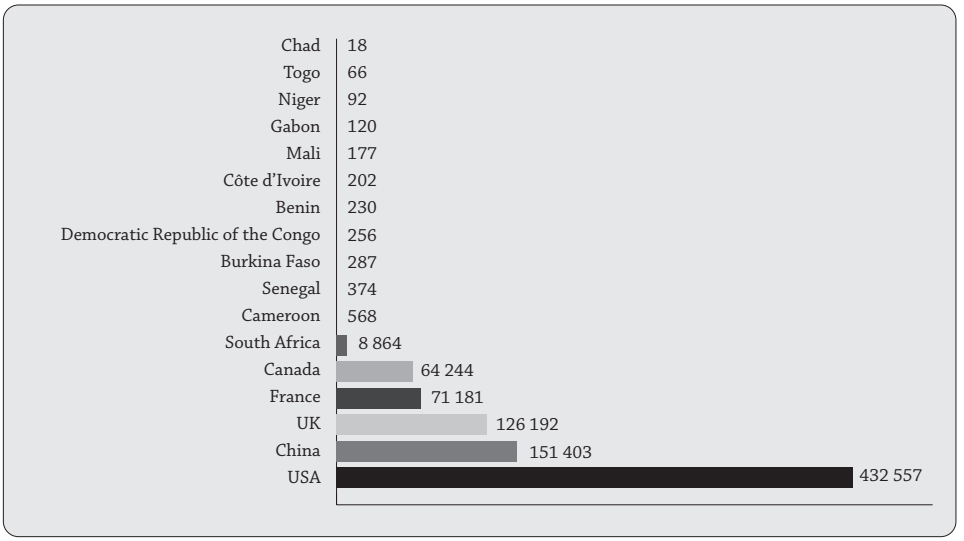
for only 0.01% of the worldwide publications in 2015 in journals indexed in the Web of Science and represent only 2.75% of publications in sub-Saharan Africa (Figure 2). Of course, predatory journals are not, a priori, catalogued in Web of Science but the very low number of publications from francophone African countries in this widely trusted citation database is an indicator of low publication output.

One also may infer that scholars from these countries prefer publishing elsewhere, including those who may see a form of neo-colonialism in the international publishing system which is heavily weighted towards North America, Europe and the English language (InterAcademy Partnership, 2022; Adomi & Mordi, 2003). It could also be that their publications mostly do not meet the generally accepted scientific standards, at least those of the leading scientific publishers and their academic partners.

Nevertheless, the publication output of the sub-Saharan Africa region has more than doubled during the period 2003-2012, according to a joint study of the World Bank and Elsevier (World Bank & Elsevier, 2014). Our discussion here is not about whether these standards or citation databases (such as Web of Science and Scopus) are relevant to the African context or not, a topic that is discussed elsewhere (Mavhunga, 2017; Piron et al., 2017). The point is how to make sure that contributions from sub-Saharan francophone countries, even small, are of a sufficient quality that would be useful for development. One possible way would be to promote scientific excellence and integrity by, for instance, tackling the issue of publication in predatory journals.

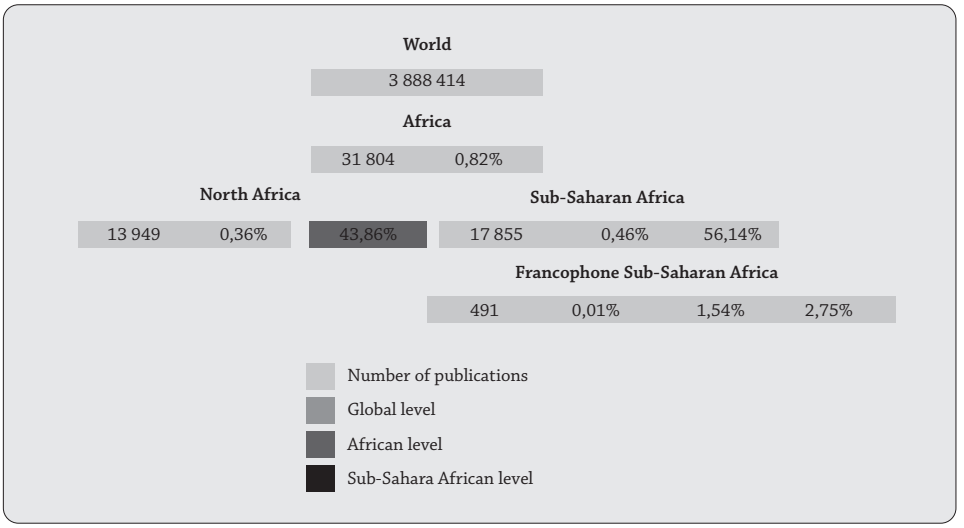
In francophone Africa, the African and Malagasy Council for Higher Education (CAMES), created in 1968 in the wake of the old Malagasy and African Common Organisation (OCAM) (Guèye 2008), is the institution in charge of coordinating the higher education and research systems in these countries with the ideal of harmonizing higher education and research in Africa. Among other things, CAMES ensures the evaluation and the promotion of academic staff, the lecturers-researchers (enseignants-chercheurs) of the 19 member countries in a harmonized system. In the two latest researcher promotion reports of CAMES in the "Mathematics-Physics-Chemistry" field(s), the assessment boards mention that there is a "net progress in the improvement of the quality of applications and this explains the performance of the results obtained" (CAMES / Comités Consultatifs Interafricains, 2016, 2018). While the quality of applications improves, one may wonder whether the relevance (to society) of the content of the presented works improves. Indeed, for a large part, the promotion and career management of teachers-researchers in this area is based on the number of publications (CAMES, 2018). In this way, publication has over

Figure 1: Number of publications in Web of Science from various countries in 2011



Source: Piron et al. (2017)

Figure 2: Number of publications in the world as inventoried in Web of Science in 2015



Source: Mboa Nkoudou (2016)

time become the purpose of research activity, with lower priority accorded to the content and the relevance of the research work.

In this context, predatory journals and publishers appear to be very attractive for a community of scholars in francophone Africa who often experience language barriers, besides the other challenges that they share with their African colleagues of anglophone countries. There is a danger that research can become an industry for publications and that it does not necessarily serve any public interest through contributions to socio-economic development. Predatory journals have offered academia in these countries the opportunity to publish low-quality research papers within a short time to meet the requirements for academic promotion. Although the extent of the phenomenon in these countries has not yet been investigated, the issue of whether publication in predatory journals is jeopardizing the efforts to improve quality of research is raised here.

African countries prioritize research and innovation in their development policies and strategies (African Union Commission, 2014; World Bank & Elsevier, 2014). African governments have fully acknowledged science, technology and innovation as pillars for the development of the continent and that knowledge production and dissemination are key factors for human capacity building and economic growth. Therefore, there is an increasing demand from stakeholders that research that is partly or fully supported by public funding should demonstrate its expected societal impact even if it is a small amount of funding (FONRID, 2013; Bornmann, 2013). These legitimate aspirations cannot be met by poor-quality research and an inefficient science information system. It is therefore urgent to find solutions to issues such as publishing in predatory journals to make enduring contribution and impact through science and innovation to the sustainable development of these countries.

As someone responsible for training and capacity building of PhD candidates at a doctoral school, my contribution in this chapter is mostly related to the context of PhD research and publication, including the role of doctoral supervisors in guiding their candidates to avoid predatory journals and to publish their research in appropriate journals. It is mostly influenced by my experiences in the science, technology, engineering and mathematics (STEM) departments of institutions in francophone sub-Saharan Africa. This STEM domain appears to be the most affected by the curse of scientific misconduct (Edwards & Roy, 2017) and publishing in predatory journals (Mouton & Valentine, 2017). Since the behaviour of the supervisors themselves is an important factor in doctoral students' enculturation into the principles and practices of the scientific community, it is also important to consider what determinants in

the environment of the supervisor affect their publishing behaviour and how this environment could possibly be changed or improved. Why do scholars in francophone sub-Saharan Africa publish in predatory journals? How could the issue be addressed and what could be the role of PhD supervisors in his regard? This chapter attempts to answer these questions considering the local context constraints and potentials and to provide insights for stakeholders, including supervisors, for practical implementation.

2. Why do academics in francophone sub-Saharan Africa publish in predatory journals?

Among various reasons underlying publication in predatory journals (Demir, 2018), two have often been mentioned by colleagues: (1) the low quality of research output, which means that it does not qualify for publication in reputable journals, and (2) the fact that publications are required for promotion. Although poor English language proficiency is recognised as one of the reasons leading to paper rejection in reputable journals (Joshi, 2014), it is not the primary reason.

This chapter does not aim to cover or examine extensively the reasons for the poor quality of the research system and output in francophone sub-Saharan Africa. Rather, it reviews some aspects directly related to PhD theses. There are numerous other reasons for the low-quality research output. First to mention are funding issues and how the long duration of PhD studies exacerbates this problem. It is hard to complete a high-quality PhD with limited and erratic funding, a very common situation in countries with limited funding available for research and development and with poor research infrastructure. Without funding from the state, research agencies, or universities, the studies of many doctoral candidates are funded personally or through the help of family. In many universities, PhD candidates have to pay laboratory fees for their annual registration, an amount that is ten to fifteen times the minimum wage (Université de Lomé, 2017; Université Abomey-Calavi - ED- SDI, 2020; Université Joseph Ki-Zerbo, 2021). Without any scholarship and funding, it is hard to expect high-quality research output. Some of the papers produced from such research eventually end up in predatory journals after multiple rejections by reputable journals. In institutions where students are provided with scholarships, most theses are undertaken without any funding for the research itself, so it sometimes happens that a candidate cannot complete the required experimental work.

The absence of funding has been shown to significantly affect the duration of PhD studies: students who benefit from scholarships are likely to complete their doctoral studies in a shorter time (International Association of Universities, 2011). In many higher education institutions in francophone Africa, the regulated time for the completion of a PhD thesis has been aligned to the regulated time in France (i.e. three years). This duration has been adopted by various higher education institutions in Africa without accounting for the differences in the research environments of France and that of most African countries. For a STEM research department, it may take more than two years to obtain and prepare the equipment for the experiments, mostly, but not only, due to procurement procedures which are relatively time-consuming and complex in francophone sub-Saharan Africa (Mkandawire & Association of African Universities, 2022; Bouvier et al., 2004) as compared to neighbouring countries. In 2021, for instance, it took me 10 months between the transmission of specifications to our procurement office and the delivery of a pyranometer, a simple device costing about EUR 300 and readily available for purchase online. I know a PhD student who has completed 3 years of PhD study without getting the equipment ordered at the beginning of her study period. Furthermore, during the study the equipment may need to be serviced or repaired by a service provider in Europe or the USA. That is another factor that impacts duration of study, especially in these times when security reasons prevent some providers from travelling to some areas of the continent, for example the Sahel region.

The capacity and workload of faculty members, who supervise PhD research, is another issue. Due to the reduced number of supervisors and the drastic increase in the need for supervisors, non-trained or insufficiently experienced young researchers find themselves in the position of supervisors along with a large number of teaching hours and services to be provided. They have to attend to activities that draw their attention away from scientific discovery and analysis so that their support to PhD students may become practically non-existent. Issues may then arise with the research methodology. The relevance of the research topics in the context of the literature may even sometimes be questioned.

Promotion concerns both PhD students and supervisors. In most countries in francophone sub-Saharan Africa, publication is required to obtain the defence approval for a PhD. Therefore, PhD candidates need to have a paper published during their doctoral study (Bureau Afrique de l'Ouest – AUF, 2014, p. 68; Université de Yaoundé II, 2018, p. 7; CERPP/Université Abdou Moumouni, 2020, p. 9; Université de Lomé, 2020; Institut 2iE, 2023). When the research output is poor, especially in a context where the number of years

to PhD completion is limited by limited resources, publication in predatory journals is seen as an attractive option. Some of the predatory journals publish articles within a very short time after submission (sometimes even within a few days (Kpenavoun Chogou, 2021; Avlessi, 2022)). It even happens that articles are reverse dated (i.e. the publication date precedes the submission date). The qualification system of CAMES (2018) has set a minimum number of publications for promotion to a higher level. For example, to become an assistant professor (*maitre-assistant*), a lecturer needs a minimum of two publications and a minimum length of service of two years. The only specification regarding the journals is that they need to be peer-reviewed journals. Predatory journals usually claim that they satisfy this requirement. So, with the option of a (very) short time from submission to publication offered by predatory journals, why would a candidate choose to publish in a reputable journal with high standards and the risk of rejection of their work? It is very easy to use the 'services' of a predatory journal.

To become associate professor (maître de conference), an assistant professor (maître-assistant) needs a minimum of five publications and a minimum length of service of three years as maître-assistant. Three of the articles need to be published in journals indexed in citation databases (e.g. the list of citation databases made available online by the STEM sections of CAMES (CAMES / CTS MPC & STI du CAMES, 2019)) and the other two only need to be published in peer-reviewed journals. When candidates are considered for promotion, it is not uncommon to see that almost all the publications were published in the year of application, as I and colleagues of mine have experienced while evaluating applications for promotion. Indeed, some months or weeks before the application deadline, applicants who have not achieved the minimum required publications + 1 article (to be on the safe side since one or more articles may be rejected for any reason during evaluation) will simply submit several 'papers', sometimes an extended abstract of a master's thesis with inconsistent results to predatory journals, instead of waiting for the next year to submit their application. Sometimes the first three authors would pay the publication fees and submit the papers that will then be published within a few days, irrespective of their quality. Because there is no published CAMES list of neither predatory nor accredited journals, publication in predatory journals has become a normal and quick way to promotion.

Since PhD students do not always have experience with rigorous peer-review process during their studies, their supervisors may convince them that high-grade journals are reserved only for institutes in developed countries.

Such students may then pass on that culture later in their own supervision of PhD candidates.

3. Recommendations to address the problem of predatory publishing by doctoral candidates

A number of measures to ensure doctoral dissertation quality or standards have been proposed in the literature. However, some may be hard to implement in our francophone Africa context due to the lack of resources (human and financial, material, i.e. time). In the following paragraph, we focus on measures mostly based on my own experience and from the literature study.

One of the first solutions is to raise the subject of predatory journals among researchers: "academics and students have to recognise that they have a responsibility to ensure that their own research and publication practices comply with the highest standards of quality and integrity in scientific research. This responsibility does not lie solely on government and agencies" (Mouton, quoted by Haq-Williams (2021:1). Pointing out the harm to science and to society in general caused by predatory journals (Fovet-Rabot & CIRAD, 2021) may be useful. Own its own, however, this solution is unlikely to be effective since publishing in predatory journals has become a form of science corruption in an environment with already worrying levels of science corruption (Edwards & Roy, 2017). In the same manner as the curse of corruption in general seems not to have been eradicated only by consciousness-raising and better knowledge, it would be hard to expect to solve the problems of science corruption without specific measures that deter or discourage people from choosing predatory publishers. Corruption is not unique to the academic world. The CAMES system has been severely criticised for high levels of corruption (Rahimy & Lalèyè, 2018). In addition, we should not forget that the sustainability of predatory publishing entities is supported by academia who may cooperate with them as 'editors', and members of their 'editorial boards', 'reviewers' or 'authors' even though supporting predatory journals has been clearly stated as a form of research misconduct (ALLEA, 2017). Public denunciation of the behaviour of individuals, as has been the case for plagiarism, might prove deterrent (Fovet-Rabot & CIRAD, 2021). One problem is that, sometimes, a person may be added as co-author to these kinds of papers without being informed, as predatory journals tend not to conduct author verification prior to the publication of articles.

To tackle the problem at the root, there is a need to attend to the causes, mainly the issue of poor research quality. Enhancing the quality of research in Africa is an issue that is beyond the scope of this chapter because it is a rather

broad issue, especially when it comes to research funding. A number of actions could however be undertaken without raising significant resources. These actions may be considered by the doctoral schools.

3.1 Duration of PhD study

Although there is pressure for shorter completion times (time-to-degree) globally (EUA-CDE, 2022), a rational discussion between doctoral schools and researchers in Africa and also with funding agencies is needed to agree on a reasonable and viable duration for PhD studies in Africa, depending on the research areas, instead of simply taking over the European, especially the French, practice. According to statistics of various universities in sub-Saharan Africa, full-time PhD students in these countries are likely to complete their studies within 4 to 5 years (International Association of Universities, 2011). In their proposal of ways to address academic corruption, Edwards and Roy (2017:51) noted, *inter alia*, "the overemphasis on quantitative metrics, competition for limited funding, and difficulties pursuing science as a public good". Pressure to shorten the duration of the PhD studies can have a negative effect on the achievement of these essential objectives.

3.2 Training and support for PhD candidates and supervisors

There is a serious need for sufficient training opportunities to be provided, especially when it comes to the transferable skills expected of a PhD holder. It would be ideal to incorporate these training opportunities into a credit validation system (CAMES, 2017, p. 19). According to the framework for doctoral school assessment and evaluation of CAMES (2017, pp. 7, 10), these transferable skills include the production of new knowledge and new scientific tools, the development of innovative solutions, solving complex problems, knowledge of communication and transmission, working in a team and in a network and adaptation to various professional contexts. It is particularly important to support PhD students in acquiring the following skills: writing skills, research paper writing, responsible research conduct, research project management, scientific English, research supervision. Skills training opportunities for their students would reduce the workload of supervisors so that they can focus on the content of the theses and methodology. The number of PhD students per supervisor needs to be capped, although this may be difficult in some institutions. Training for PhD supervisors is very important and the ability to supervise a PhD thesis should no longer be taken for granted based merely on

the fact that somebody holds a PhD. As the number of these doctoral graduates has significantly and rapidly increased in the African context (Mohamedbhai, 2014a; British Council, German Academic Exchange Service (DAAD) & African Network for Internationalization of Education (ANIE), 2018), there is a need for well-prepared doctoral supervisors in order to achieve quality human resources. The need for doctoral graduates who are well-prepared to face global challenges and to deal with the challenges and difficulties of this environment at African universities is critical. The fact that a significant part of the themes of these trainings are transversal means that they may be organised jointly by doctoral schools located in the same region. This could reduce the problems of resources and logistics.

3.3 Monitoring committee

A monitoring team, including external members to be added to the supervision team with the mandate of annually evaluating student progress, can be an important instrument to limit dropout and to shorten time-to-degree. It can also play a role in terminating the studies of students in cases where it is clear that the output is not going to be of sufficient quality within the specified period and when it is clear that the PhD candidate does not have the capacity to complete the study. It is better for our research system to have a lower number of high standard researchers instead of a large number of low standard researchers. However, terminating a PhD study may have legal complications, especially in the case of PhD students holding three-year contracts linking them as research fellows to a higher education institution. Another factor to be considered when a decision is made to terminate PhD study before completion is what to do when that study was funded as part of a larger research programme. Would the supervisor then be expected to complete the research in order to meet the contractual agreement with the funder?

3.4 Examination committee

Currently, supervisors propose examiners, but the selection and appointment of the members remain the sole responsibility of the doctoral school. The examination committee needs to be as objective as possible to guarantee an independent examination. According to a recent case reported by Darbyshire et al. (2020, p. 137),

> *a PhD examiner returned a PhD thesis containing multiple publications, because all of the included publications were published in predatory journals. […] Had this examiner not been diligent and meticulous enough to spot this duplicity and act upon it, a new PhD would have been created who assuredly did not deserve the highest of academic awards.*

It is important to make sure that from the time the examinations committee is appointed until the defence, there is no contact between the committee members and the PhD student or their supervisor regarding his submitted thesis. As proposed by the Association of Francophone Universities (Bureau Afrique de l'Ouest – AUF, 2014, p. 36), the head of the doctoral school may be assisted in the approval process by a 'thesis curator', an experienced researcher devoted to deeper evaluation of the examiner proposal and examination of the reviews of the rapporteurs (examiners). The supervisors may attend the defence but should not be part of the decision of the committee, they should even leave the jury room and not take part in the deliberation. Instead of requiring a journal publication as acceptable for the PhD defence, a practice that is shifting the responsibility of evaluating a PhD thesis from universities to journal editors, Kirchherr (2018) states as ideal that a PhD candidate would complete their PhD when they have made a difference in the real world. Because "a difference in the real world" may be difficult to evaluate or be understood in different ways (Esterhuyse, 2019, p. 13), especially when it comes to basic research, it is in the first place the supervisors who play a key role, and then also the examinations committee.

3.5 Price cap of the Article Processing Charge or no publication fee policy

The ongoing open access transformation leads to business models mainly based on article processing charges or publication fees as a revenue source for academic open access publishers (Jahn & Tullney, 2016; Schönfelder, 2020). As already mentioned, this open access model exhibits a clear conflict of interest since the more papers the journal publishes, the more money it gets (Beall, 2017). Predatory journals take advantage of this transformation by charging publication fees with no correlation to the editorial services offered since their target is primarily the collection of article processing charges from authors. Limiting the amount of money that could be 'invested' in a publication may be a way of achieving a more virtuous system. For instance, the German Research Foundation (DFG) as part of its funding activities for open-access funding at German universities imposes a price cap of EUR 2 000 per article

(DFG, 2021b). Between 2005 and 2015, the average payment was EUR 1 298 per article, based on data from 30 German universities and research organisations (Jahn & Tullney, 2016).

I would argue that it is unethical to pay up to EUR 2 000 as page fees for a publication in a journal, especially considering that such an amount represents more than 30 times the minimum monthly wages in most francophone sub-Saharan countries. This is the range of the amount of research grants offered by various regional agencies in West Africa (e.g. Association of African universities, 2017; ECOWAS Centre for Renewable Energy and Energy Efficiency, 2020). A capping of the maximum amount of page fees per article needs to be debated but the target should be to cover the costs associated with publication and not for journals to make profits. I suggest that a maximum cap of EUR 200 per article would be reasonable, based on the open-access publication fee of USD 200 applied by *Scientific African* (2022), an open access journal published by Elsevier for the Next Einstein Forum. This is line with the publication fee of EUR 150 per article charged by the Revue Africaine et Malgache de Recherche Scientifique, a consortium of nine journals published by CAMES (Service de la communication du CAMES, 2022a). Although it may not be feasible, because many high-reputation journals do charge page fees (not only predatory journals), but the supervisor may also even opt for not paying for any journal publication and allow PhD students to publish only in journals that do not charge for publications. This is a policy that the French National Centre for Scientific Research is currently promoting by inviting its researchers to no longer pay for publication (CNRS Info, 2022). To ensure fair access to the publications, the authors may publish in the existing free-of-charge open-access journals (these journals are mostly financially supported by research funding institutions) or archive online author accepted manuscripts when the papers are not published in an open-access journal.

3.6 List of predatory journals

A list of predatory journals may be kept and regularly updated by the doctoral school and only publications in the listed journals would be accepted as admissible for a PhD defence. As a first guide, Beall's list of predatory journals may be used. It could be refined in the framework of a dialogue with the researchers who are involved in the doctoral school. Alternatively, doctoral candidates could be encouraged to check a list of criteria for what is and is not considered a predatory journal before submitting a paper to any journal. At this stage, support from their supervisors is crucial. Before submission, it may be

necessary for the thesis supervisor to validate the journal, particularly when publication fees are involved. In case of funding requests for publication, even when it would come from research project funding, these checks need also to be performed by the thesis curator. It is also recommended that an evaluation agency such as CAMES and the universities themselves keep a regularly updated list of predatory journals.

3.7 List of accredited journals

After facing intense pressure from his employer, the University of Colorado, and fearing for his job, the famous librarian and associate professor, Jeffrey Beall decided to shut down his blog and related platforms (Beall, 2017). Beall, his colleagues and his university experienced constant harassment from publishers and standalone journals constantly tried various means of getting off the lists (Beall, 2017). Beall's experience illustrates the complexity of the decision to publish a blacklist, including legal challenges. So, instead of limiting the work to listing predatory journals, CAMES could consider drawing up a list of accredited journals for its different domains. This is an idea that has been implemented by various scientific communities worldwide, for example in France, especially within the social sciences and humanities community (HCERES, 2014), they have created a list in which journals are categorised and available online (HCERES, 2021a). For instance, the sub-community for economics and management adopted a list (HCERES, 2021b) that is an amalgamation of a list from the French National Centre for Scientific Research (Section 37 (Économie / Gestion) du Comité National de la Recherche Scientifique, 2020) and a list compiled by the French National Foundation for Companies Management Academic Education (FNEGE) (Collège scientifique de la FNEGE, 2019). The elaboration of the list of the FNEGE has built upon the strong foundations of other entities such as EJL (Netherlands), CABS (UK), VHB (Germany), ABDC (Australia), etc. (Collège scientifique de la FNEGE, 2019). Journals that do not belong to the list may submit an application for this purpose. Interestingly, local ('national') journals published in French are also included in this list and even in top positions. The HCERES list of the social sciences and humanities community includes 14.3% of journals published in French, although about 35% of francophone journals indexed in Scopus and Web of Sciences are not included in this HCERES list (Chartron & Le Guilloux, 2020).

On the African continent, South Africa (Department of Higher Education and Training (DHET), 2022) and Algeria (Université Mouloud Mammeri de Tizi-Ouzou & Direction Générale de la Recherche Scientifique et du Développement

Technologique (DGRSDT), 2021), to name only these, have also created lists of accredited journals that are annually updated, while Algeria is also keeping an updated list of predatory journals list (Université Mouloud Mammeri de Tizi-Ouzou & Direction Générale de la Recherche Scientifique et du Développement Technologique (DGRSDT), 2021). As in France, the South Africa's DHET also maintains a list of accredited South African journals, designed to promote and support high-quality local journals. Ethiopia has achieved very interesting results in its fight against predatory journals, by adopting a national journal evaluation and accreditation system that is used to promote scholarly publishing in Ethiopia with international standards (InterAcademy Partnership, 2022, p. 102). In Algeria, separate lists of the accredited journals accepting publications in Arabic and journals in Scopus accepting publications in Arabic are also provided, to underline the importance of publishing in the researcher's first language (Université Mouloud Mammeri de Tizi-Ouzou & Direction Générale de la Recherche Scientifique et du Développement Technologique (DGRSDT), 2021) and the associated necessary recognition, as it has been stressed by FNEGE in France (Collège scientifique de la FNEGE, 2019, p. 6).

On its website, CAMES has released tips on how to identify and avoid publishing in predatory journals (Service de la communication du CAMES, 2022b). Although CAMES has no 'blacklist' or 'whitelist' for journals, its STEM section has released a non-exhaustive list of indexation databases (CAMES / CTS MPC & STI du CAMES, 2019) where no publication in an indexed journal could be rejected, based on the quality of the journal. CAMES has a total of nine scientific journals (Service de la communication du CAMES, 2022c) for all of its thematic areas, published by the Conference of Rectors of Francophone Universities in Africa and the Indian Ocean (CRUFAOCI). None of these journals are recognised as indexed journals by CAMES. This situation calls for a strategy to promote these journals to support local scholarly publishing and also publishing in French. Because the editorial teams cover a large region, there is a large potential to quickly reach or maintain international standards in these journals. CAMES promotion programme candidates could be invited to publish at least one paper in this series.

Both 'black' and 'white' list approaches have been criticised (Beall, 2017; InterAcademy Partnership, 2022) in favour of a spectrum approach, because blacklists are disliked by publishers while whitelists have substantial limitations (Beall, 2017). However, I would argue that a 'black' or 'white' list approach could be relevant in the CAMES context where almost nothing has previously been established. Adoption of a spectrum approach that could provide opportunities

for dubious local journals to establish and implement internationally accepted scientific publishing standards could be the next step.

Beyond these reflections, the arguments of Altbach and de Wit (2018) are also worthy of consideration by higher education authorities in francophone African countries. They suggest that not all universities should be research-intensive institutions:

> *In the United States, for example, perhaps 200 out of more than 3,000 post-secondary institutions are serious research universities. The Russell Group of research-intensive universities in the United Kingdom has 24 members out of a total of some 140 total universities. And in Australia, the Group of Eight is only a small proportion of the higher education sector. Most universities that are not research-intensive should, and largely do, focus on teaching. Faculty members should be rewarded for good teaching and for service to society and industry and not for research.*

In francophone Africa the development and implementation of such a differentiated higher education system would require the creation of a parallel system to the current mandate of the CAMES. Such a differentiated system could separate a research career from a teaching career, which does not mean that teaching would not be supported by research. This idea has also been promoted by Mohamedbhai (2014b), former secretary general of the Association of African Universities (AAU). However, this would raise another issue: can we afford to sacrifice a part of our already very limited human resources for research to teaching only? On the other hand, by doing that we could have at least some people who are actually focused and devoted to scientific research with clearer and easier monitoring of progress in research and higher quality research output. However, further discussion of the debates on the research/teaching nexus (Tight, 2016) in higher education systems is beyond the scope of this chapter.

Incentives for academic career advancement mainly based on publications have led to questionable practices (Edwards & Roy, 2017). The evaluation of the research for a researcher's career advancement should be made via a 'summa scientifica', a kind of integration of the overall research contribution over a longer period (of at least ten years for instance), disregarding how many articles were published during that period. Furthermore, the introduction of a feasible system to monitor and record the societal impact of research in the field of STEM could also be considered. A first draft of these societal impact indicators may be drawn from the list of 'Faits observables' (observable facts)

in the assessment criteria of HCERES (French High Council for Evaluation of Research and Higher Education (HCERES), 2014). In this way, research evaluation would not in the first place be done by journal editors or publishers but by universities. This needs to be implemented throughout the career of the researcher in order to de-emphasise output in favour of outcomes, and privilege quality instead of quantity.

Doctoral supervisors can play a key role in addressing the problem of predatory publishing in francophone sub-Saharan Africa not only through guidance and monitoring with regard to predatory journals, but also in setting an example through their own publication behaviour and more broadly, their behaviour as scientists in all respects. An improvement of the CAMES research evaluation system would be very supportive for them, and to doctoral schools, who have to include the topic as a serious component of the training of Africa's future researchers.

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