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# Fabrication and Falsification of Scientific Research – a Challenge for Legislators or an Irrelevant Issue?<sup>2</sup>

## Abstract

The article addresses the problem of fabrication and falsification of scientific research in the context of the role that lawmakers can play in combating this practice. Legislators may establish organisational units specialising in combating scientific misconduct (also referred to as ‘research misconduct’), having the authority to, for instance, to conduct investigations or recommend penalties. A researcher who commits such misconduct may face not only disciplinary, but also civil, administrative or criminal liability. The article discusses the results of a survey asking 70 Polish academics about their opinion on the role of legislators in countering fabrication and falsification in research. The findings show, for example, that respondents mostly support disciplinary responsibility for such misconduct (81%), and also believe that legislators should combat this practice using ‘soft’ measures, such as promoting codes of ethics in research (70%). Half of those surveyed wanted such behaviour criminalised. According to almost half of the respondents, the Polish legislator does not combat such misconduct effectively.

**Keywords:** science, scientific misconduct, fabrication and falsification of research, legal liability of researchers.

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## Introduction

Although defining the concept of science poses many difficulties for anyone attempting to do so, and philosophical disputes over the essence of scientific research remain unresolved, science remains not only an exceptionally effective tool providing us with knowledge about reality, but also enjoys a highly privileged position, a cult-like status – especially in the Western world. This may be due to two reasons. First, the development of science was a necessary condition for the emergence of the modern welfare state. Second, the supreme value of our civilization is truth, which in turn is the sole purpose and objective of science.<sup>3</sup> Unfortunately, not all researchers act in line with this value. The advantages that science brings, such as social esteem and the profitability of certain research projects, lead some scientists to conclude that it is better to abandon the truth for personal gain. To this end, they engage in various abusive practices – for example, in attributing other people’s research to themselves.

Plagiarism is fraud, but it does not affect the validity of the scientific research itself. The case is different with misconduct involving falsification or fabrication. This kind of arbitrary, wilful interference in the research process leads to false results, and thus not only undermines the value of truth, but most importantly harms science as a system since other researchers may use such results in their projects, remaining unaware of their (in)validity for a long time.<sup>4</sup> The harmfulness of such practices is even greater due to the fact that this is not a marginal, negligible phenomenon. According to a meta-analysis published in 2009, nearly 2% of researchers surveyed were to have admitted to such fraud, and 14% confirmed that they were familiar with cases of such fraud committed by their colleagues.<sup>5</sup>

Falsification or fabrication in science is strictly condemned not only in the scientific community, but also in the rest of society. However, a scientific fraudster

<sup>3</sup> Cf.: A. Szczęsna, *Etyka publikacji naukowych – materiały szkoleniowe*, “Forum Bibliotek Medycznych” 2010, 3/2(6), p. 27 and B. Wolniewicz, *Filozofia i wartości*, Vol. I, 2. ed., Warszawa 2021, pp. 74–75.

<sup>4</sup> For example, a study conducted in 2022 shows that despite the fact that Scott Reuben, who fabricated clinical trials, had his articles removed, his papers were still cited by other scientists – as many as 360 times between 2009 and 2019. See: I.S. Szilagy, G.A. Schitteck, C. Klivinyi, et al., *Citation of retracted research: a case-controlled, ten-year follow-up scientometric analysis of Scott S. Reuben’s malpractice*, “Scientometrics” 2022, 127, pp. 2613–2614.

<sup>5</sup> D. Fanelli, *How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data*, “PLoS ONE” 2009, 4(5): e5738, pp. 4–6.

is not only subject to public scrutiny, but can also face legal liability – sometimes involving very serious consequences. Hence, the question of how legislators can and should counter such practices may be of interest to lawyers. There may be many solutions to this problem, but their pursuit should take into account not only the effectiveness of the means chosen, but also their compatibility with the constitutional freedom to conduct scientific research.

One way to address this issue could be through opinion polls. An example is a survey conducted and published in 2018 by Justin T. Pickett and Sean P. Roche.<sup>6</sup> The authors asked a representative sample of American adults about their attitudes toward the falsification and fabrication of scientific research and about the selective presentation of results, as well as the legitimacy of the legislator's use of particular sanctions against scientists who commit such fraud.<sup>7</sup> The results showed that as many as 66% of respondents were in favour of criminalisation of falsification and fabrication in science.<sup>8</sup>

The purpose of this article is to present the results of a survey which – like the publication of said authors – concerns the legal liability of scientists who engage in misconduct. Its aim was to obtain the opinions of academics on the role that legislators can play in countering practices involving the falsification or fabrication of scientific research. The research was conducted in the period of 7–14 November 2022 using Microsoft Forms.<sup>9</sup> The research sample was a group of 70 Polish academics employed at the time at Kozminski University in Warsaw.<sup>10</sup> The presentation of the results will be preceded by a discussion of systemic solutions against the phenomenon of scientific misconduct. The paper offers also a definition of the concepts of fabrication and falsification of scientific research and addresses the specifics of the legal responsibility of scientific fraudsters using the example of several high-profile scientific scandals.

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<sup>6</sup> J.T. Pickett, S.P. Roche, *Questionable, Objectionable or Criminal? Public Opinion on Data Fraud and Selective Reporting in Science*, "Science and Engineering Ethics" 2018, 24.

<sup>7</sup> Ibidem, pp. 154–157.

<sup>8</sup> In the case of selective presentation of results, a smaller group of respondents (37%) was in favour of criminalisation. Ibidem, pp. 157–158.

<sup>9</sup> Although it should be pointed out that one respondent provided their responses on 28 October 2022 as an exception.

<sup>10</sup> As an aside, it can be said that the link to the electronic questionnaire was sent to each academic's individual e-mail inbox, and participating in the survey required using a university account. Moreover, the possibility of resubmitting responses was disabled.

## Legal liability of scientific fraudsters

Although scientific fraud is nothing new and the attempts to define it were already made by the famous 19<sup>th</sup> century mathematician Charles Babbage, the systemic fight against it has only recently begun.<sup>11</sup> When US psychologist Stephen Breuning was criminally prosecuted in the late 1980s for fabricating psychopharmacologic treatment studies using public funds, prosecutors said it was the first time a scientist faced criminal prosecution for scientific fraud.<sup>12</sup>

It was more or less when the governments of some Western countries launched their policies of combating scientific misconduct. In 1993, the Office of Research Integrity (ORI) was established in the United States and given the authority to counter research misconduct – but only in the case of research projects funded by the Public Health Service (PHS), or research projects for which such funding was requested.<sup>13</sup> For example, PHS-funded institutions are required to notify ORI of the initiation of proceedings against scientific misconduct. ORI has the right to monitor the course of such proceedings, but also to be informed of the outcome of such proceedings.<sup>14</sup> This institution has the right to independently investigate the initiated cases of scientific misconduct, as well as to recommend specific sanctions to the PHS – such as deprivation of the right to receive research grants or the obligation to retract already published scientific articles.<sup>15</sup>

At that time, the problem of scientific misconduct was also addressed in Denmark. The autumn of 1992 saw the establishment of the Danish Committee on Scientific Dishonesty, whose activity focused on medical science, while its competence was primarily limited to clarifying cases and reporting the findings to employers or to relevant authorities.<sup>16</sup> The DCSC was replaced in 2017 by a new institution, the Danish Committee on Research Misconduct, whose members – unlike those of its predecessor – no longer represent only medical science.<sup>17</sup>

<sup>11</sup> A. Kohn, *Falszywi prorocy – oszustwo i błąd w nauce i medycynie*, Warszawa 1996, p. 17.

<sup>12</sup> J. Bales, *Breuning pleads guilty in scientific fraud case*, "Science" 1988, 242, pp. 27–28, [after:] T. Witkowski, *Zakazana psychologia*, Vol. I, *Pomiędzy nauką a szarlatanerią*, Wrocław 2015, pp. 50–51.

<sup>13</sup> Ch.B. Pascal, *The Office of Research Integrity Experience and Authorities*, "Hofstra Law Review" 2006, 35(2), p. 795 and pp. 797–798.

<sup>14</sup> S.B. Katz, C.C. Claiborne, *Lines and Fields of Ethical Force in Scientific Authorship*, [in:] H. Yu, K.M. Northcut (eds.), *Scientific Communication, Practices, Theories, and Pedagogies*, New York 2017, p. 45.

<sup>15</sup> *Ibidem*.

<sup>16</sup> H.H. Brydenscholt, *Podstawy prawne działalności Duńskiego Komitetu ds. Nierzetelności w Nauce*, "Zagadnienia Naukoznawstwa" 1999, 2(140), p. 267 and 276.

<sup>17</sup> C.S. Petersen, <https://forskerportalen.dk/en/the-danish-committee-on-research-misconduct/> (access: 15.09.2023).

The systemic combat against the practice of scientific misconduct required an adequate definition of the idea in question. In the United States, the US Federal Policy on Research Misconduct divided research misconduct into three types of practices: fabrication, falsification, and plagiarism.<sup>18</sup> This classification, abbreviated as FFP offences, has been adopted in many codifications of ethics in scientific research.

This classification is used, for example, in *Kodeks Etyki Pracownika Naukowego* [EN: *Code of Ethics for Researchers*], the content of which is the responsibility of the Research Ethics Committee at the Polish Academy of Sciences, and which is to be issued under a statutory regulation provided for in Article 39(3) of the Act on the Polish Academy of Sciences.<sup>19</sup> Importantly enough, the concept of falsification – but not fabrication – of scientific research has been used by the legislator in the acts that regulate the disciplinary responsibility of academic faculty members, i.e. the Law on Higher Education and Science, the Act on the Polish Academy of Sciences, and the Act on Research Institutes.<sup>20</sup> It can be therefore said that these concepts belong not only to legal language, but also to the language of the law.

Falsification of scientific research is understood as the act of manipulating the data used in the research process or omitting such data altogether, thus affecting the veracity and validity of the results obtained. Falsification means also an act of concealing or omitting the results obtained in the research process. Fabrication of scientific research, on the other hand, is considered to an act that involves completely making up data accepted in the research process or presenting results not obtained through a reliable research process.<sup>21</sup>

In practice, it is not so easy to distinguish between falsification and fabrication. For example, Dong-Pyou Han, an American scientist of Korean descent, in an effort to prove the effectiveness of an HIV vaccine he was researching, committed the

<sup>18</sup> <https://ori.hhs.gov/content/chapter-2-research-misconduct-office-science-and-technology-policy> (access: 15.09.2023).

<sup>19</sup> *Kodeks Etyki Pracownika Naukowego*, Edition III, appendix to Resolution No. 2/2020 of the General Assembly of the Polish Academy of Sciences of 25 June 2020, p. 12, [https://instytucja.pan.pl/images/2020/kodeks/Kodeks\\_Etyki\\_Pracownika\\_Naukowego\\_Wydanie\\_III\\_na\\_strone.pdf](https://instytucja.pan.pl/images/2020/kodeks/Kodeks_Etyki_Pracownika_Naukowego_Wydanie_III_na_strone.pdf) (access: 15.09.2023) and Act of 30 April 2010 on the Polish Academy of Sciences (uniform text in the Journal of Laws of the Republic of Poland of 2020, item 1796 as amended).

<sup>20</sup> See: the provisions of Article 287(2)(5) of the Act of 20 July 2018 – Law on Higher Education and Science (uniform text in the Journal of Laws of the Republic of Poland of 2023, item 742, as amended), Article 112(3)(4) of the Act on the Polish Academy of Sciences, and Article 56(3)(4) of the Act on Research Institutes of 30 April 2010 (uniform text in the Journal of Laws of the Republic of Poland of 2022, item 498).

<sup>21</sup> See the definitions provided in the following documents: *Kodeks Etyki Pracownika Naukowego...*, p. 12 and *Kodeks Narodowego Centrum Nauki dotyczący rzetelności badań naukowych i starania o fundusze na badania*, appendix to NCN Board Resolution No. 39/2016 of 11 May 2016, p. 15, [https://www.ncn.gov.pl/sites/default/files/pliki/uchwaly-rady/2016/uchwala39\\_2016-zal1.pdf](https://www.ncn.gov.pl/sites/default/files/pliki/uchwaly-rady/2016/uchwala39_2016-zal1.pdf) (access: 15.09.2023).

act of enriching rabbit blood with human HIV-neutralising antibodies.<sup>22</sup> His behaviour appears to have fulfilled the criteria of falsification, as the actual result of his research was rabbit blood that did not contain such antibodies, which he then enriched. Thus, he manipulated one of the research materials. However, the fraud committed by this researcher was so far-reaching that it is difficult to talk about conducting any research at all.

Luckily, Dong-Pyou Han only managed to commit one such fraudulent act before the truth about his research came to light. It happens, however, that a researcher who is found to have committed an act of misconduct has managed to publish many studies including falsified or fabricated data beforehand. An example of such a situation is the case of Diederik Stapel, a Dutch social psychologist, who, according to the findings of the committee investigating him, was alleged to have committed fraud in as many as 55 publications.<sup>23</sup> As found in the report of the aforementioned committee, the misconduct of the Dutch scientist was to involve both fabrication and manipulation (and therefore falsification – O.S.) of data.<sup>24</sup>

The case of Jan Hendrik Schön, a German physicist, who was even expected to win a Nobel Prize for his semiconductor breakthroughs, was quite similar. It turned out that he committed fraud in his publications, where he intended to show that he had succeeded in creating field-effect transistors using organic particles that normally do not conduct electricity.<sup>25</sup> The report of the committee that was established to investigate the publications of the said physicist shows that as many as 16 of the 24 Schön's publications analysed contained some kind of fraud.<sup>26</sup> The authors of the report pointed out that the fraud mainly involved replacing, modifying or deleting data, which made Schön's practice fit to be classified as falsification of scientific research.<sup>27</sup>

The behaviour of the abovementioned researchers has not remain neutral to their legal situation. Their legal liability did not end with just dismissal. Dong-Pyou Han was convicted of the crime of fraud and sentenced to a term of 57 months of imprisonment, and was ordered to pay more than \$7 million in damages to the

<sup>22</sup> *A Notice by the Health and Human Services Department on 12/23/2013*, 78 FR 77467, pp. 77467–77468. <https://www.federalregister.gov/documents/2013/12/23/2013-30424/findings-of-research-misconduct> (access: 15.09.2023).

<sup>23</sup> *Flawed science: The fraudulent research practices of social psychologist Diederik Stapel*, 28 November 2012, p. 25, [https://www.tilburguniversity.edu/sites/default/files/download/Final report Flawed Science\\_2.pdf](https://www.tilburguniversity.edu/sites/default/files/download/Final%20report%20Flawed%20Science_2.pdf) (access: 15.09.2023).

<sup>24</sup> *Ibidem*, pp. 31–32.

<sup>25</sup> <https://www.dw.com/en/scandal-rocks-scientific-community/a-646321> (access: 15.09.2023).

<sup>26</sup> *Report of the Investigation Committee on the Possibility of Scientific Misconduct in the Work of Hendrik Schön and Coauthor*, September 2002, pp. 2–4, [https://media-bell-labs-com.s3.amazonaws.com/pages/20170403\\_1709/misconduct-review-report-lucent.pdf](https://media-bell-labs-com.s3.amazonaws.com/pages/20170403_1709/misconduct-review-report-lucent.pdf) (access: 15.09.2023).

<sup>27</sup> *Ibidem*, p. 11.

aggrieved grant giving organisation.<sup>28</sup> Diederik Stapel had to face criminal proceedings for misappropriating public funds, but he reached a settlement with prosecutors,

under which he was obliged to e.g. perform 120 hours of community service.<sup>29</sup> Jan Hendrik Schön, in turn, lost his doctoral degree, which was taken from him by his alma mater – the University of Konstanz.<sup>30</sup>

The above cases show that the perpetrator of fabrication or falsification in science can face not only disciplinary, but also civil, administrative, or even criminal liability. What matters here in particular is that the type of legal liability depends primarily on the specific circumstances of the case, such as the subject of the research, how the research project was funded, or the degree or title held by the perpetrator. Dong-Pyou Han, for example, was convicted not directly of falsifying his research, but of the crime of fraud. Had it not been for the grant application in which he cited unreliable research, he would not have faced such severe legal liability.

There is a risk, therefore, that a misconducting scientist can avoid legal consequences if, for example, the research they have falsified or fabricated is not externally funded or does not deal with areas of special concern – such as pharmacology. This problem may be the reason for the current discussion on the need to criminalize FF offences.<sup>31</sup> However, it should be taken into account that not every fraud in science is equally harmful. For instance, fabricating or falsifying data concerning clinical trials is far more dangerous than manipulating historical data. The complexity of this issue calls for a detailed examination of the need for and legitimacy of enacting appropriate laws aimed at countering such practices. A certain attempt to address and solve this problem is made in the survey the results of which are presented below.

## Survey results

First, respondents were asked whether the law should counteract the practice of falsifying or fabricating scientific research. The question aimed, in essence, to prevent anyone who disagrees with any interference on the lawmakers' part in

<sup>28</sup> <https://www.justice.gov/usao-sdia/pr/former-iowa-state-researcher-sentenced-making-false-statements> (access: 15.09.2023).

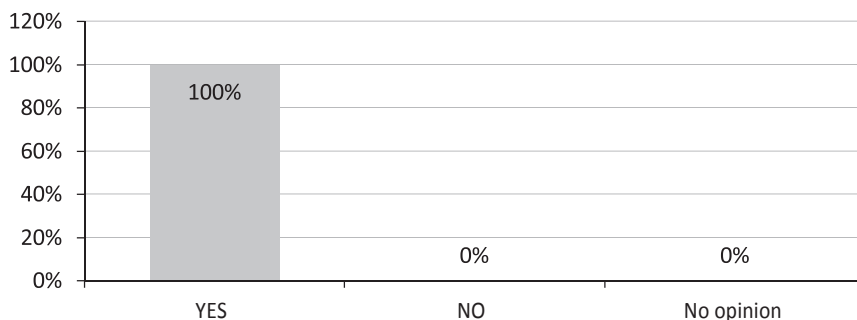
<sup>29</sup> <https://retractionwatch.com/2013/06/28/diederik-stapel-settles-with-dutch-prosectors-wont-face-jail-time/> (access: 15.09.2023).

<sup>30</sup> G. Vogel, <https://www.science.org/content/article/jan-hendrik-sch-n-loses-his-phd> (access: 15.09.2023).

<sup>31</sup> See, for example, W. Bülow, G. Helgesson, *Criminalization of scientific misconduct*, "Medicine, Health Care and Philosophy" 2019, 22, and Z.A. Bhutta, J. Crane, *Should research fraud be a crime?*, "British Medical Journal" 2014, 349.

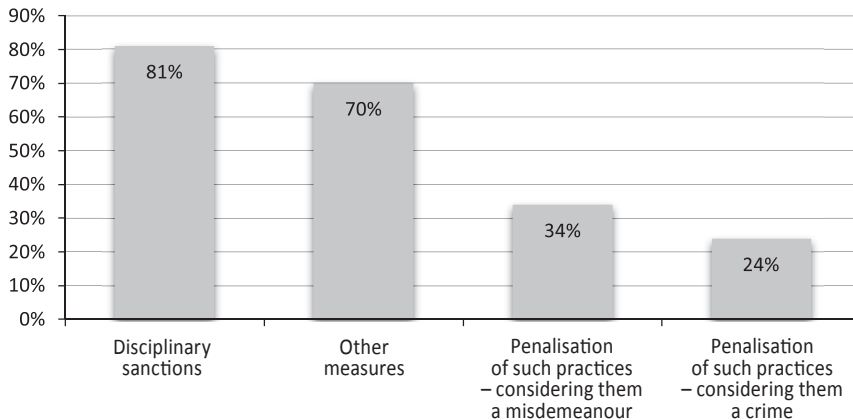
this regard from taking part in the survey. It turned out, however, that the respondents agreed unanimously with the suggestion that falsifications or fabrications in science should be combated using legislation.

**Figure 1.** Do you think that the law should counteract the practice of fabricating or falsifying scientific research?



Source: authors' own work.

**Figure 2.** What measures do you think the legislators should use to combat the practice of fabricating or falsifying scientific research?



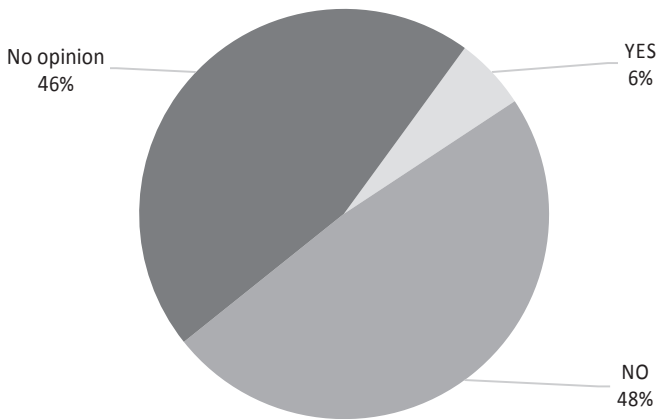
Source: authors' own work.

The second question concerned the specific measures that the legislators should apply to counter falsification or fabrication in scientific research. The answer to this question – unlike to the previous one – was a multiple-choice answer. The vast majority of respondents spoke in favour of the legislators' use of disciplinary sanctions (81%). A slightly smaller percentage of respondents thought that the legislators should use "other measures" – which the survey illustrated with such examples as public institutions organising training on research ethics, issuing and



promoting codes of ethics in science and research, or funding public campaigns addressing the issue in question (70%). More serious sanctions, i.e. criminalising the falsification or fabrication of scientific research – whether through a misdemeanour<sup>32</sup> or criminal law – were favoured by a much smaller group of respondents. The percentage of those in favour of these solutions was 34% and 24%, respectively. But it needs to be pointed out that the percentage of all respondents who favoured either of the two forms of criminalisation of the practices in question amounted to 50%.

**Figure 3.** Do you think that Polish law is effective in counteracting the practice of fabricating or falsifying scientific research?



Source: authors' own work.

The purpose of the next question was to obtain respondents' opinions on the effectiveness of Polish law in countering practices involving the falsification or fabrication of scientific research. According to almost half – i.e. 48% – of the respondents, the Polish legislator does not combat such practices effectively. The percentage of respondents who had no opinion in this regard was just slightly smaller, amounting to 46%. Among the academics surveyed, the least numerous group were those according to whom Polish law is an effective solution against falsification and fabrication in science. Only 6% of respondents chose this answer.

The next – and final – question, this time an open-ended one, could only be answered by those respondents who chose a negative answer when answering the previous question. Thus, the sample involved in this part of the survey was 34 academics, who were asked what Polish lawmakers should do to counter falsifi-

<sup>32</sup> In the Polish legal system, criminal law distinguishes between criminal offences and misdemeanours (which implies different types of legal liability of the perpetrator).

cation and fabrication in science more effectively. The responses received varied, but it's possible to notice a few dominant trends. The statements quoted below have been quoted word for word, without correcting any errors.

The first trend observed was the view that falsifications and fabrications in science should be criminalised. So, for example, among those surveyed there were statements such as that the legislator “Should impose criminal liability (...)” or that there should be “Legislation criminalising fabrication or falsification of research (...)” in place, or that it is necessary to “Make fabrications and falsifications a crime and punish them by depriving the perpetrator of degrees and titles.”

Some of those surveyed claimed that in addition to establishing appropriate regulations, what matters is also effective enforcement thereof. It was stated, for example, that “It is not enough to adopt relevant regulations. It is important to enforce them consistently.”, “First and foremost, sanctions should be inevitable.”

Another view concerned extra-normative factors – such as the legal awareness of individual scientists and researchers, their ethics or culture. And there were such responses as “(...) not only the legislator and laws have an impact on the scale of fabrication of research results, but also the academic culture and the ethos (work ethics) of researchers and scientists (...)”, “It is a matter of (...) legal culture of academic communities, and in this context it is important to promote attitudes and hire the right people.”

Some respondents said that the excessive bureaucratisation of science or the ineffective system of evaluating researchers based on their publication scores posed a significant problem. According to one interviewee, it is necessary to: “De-bureaucratise science, especially the social sciences. Much of the corruption in Poland and abroad is due to the ‘publish or perish’ policy – which is still proliferating despite the minister’s assurances. Red tape leads to corruption in every area.” Another interviewee pointed out that it was necessary to “Stop constructing evaluation systems for faculty and universities based on scores for publications and give more freedom to science instead.”

An isolated response, but one that was significant enough to be worth citing, was the opinion expressed by one respondent that it is necessary to “Share the details of misconducting scientists across public media after a fair investigation with sources confirming their misconduct.” The solution proposed here actually exists in the United States, where the aforementioned ORI has the right to publish on its website the details of scientists who have been sanctioned for committing misconduct in publicly funded research.<sup>33</sup>

<sup>33</sup> It should be emphasised that the details of misconducting scientists are published only for the duration of the sanctions imposed on them. As of the time of writing of this paper (15.09.2023), there are 36 pending. See: [https://ori.hhs.gov/content/case\\_summary](https://ori.hhs.gov/content/case_summary) (access: 15.09.2023).

## Conclusion

To conclude, Polish academics had no doubt that the problem of falsification and fabrication of scientific research should be combated by enacting appropriate laws. They were unanimous in this regard. But it should come as no surprise that the community had some diverging opinions when it came to pinpointing specific legal measures. Proven solutions – such as disciplinary sanctions or the use of soft measures, meaning e.g. the publishing of or promoting codes of scientific ethics – appeared to be most popular. The criminalisation of falsification and fabrication in science has found far fewer supporters, especially when it comes to the demand to consider such practice a crime. Nevertheless, half of those surveyed favoured either form of penalisation, whether by criminal or misdemeanour law.

This standpoint resonates with another view expressed by almost half of the academics surveyed – a view that the Polish legislator does not effectively combat the practice of falsifying or fabricating scientific research. Polish law does not provide for all the measures that the respondents were asked about. Hence, some of the respondents made demands for changes in Polish law that they believe could improve the situation in this regard. Thus, it was proposed to criminalise such conduct.

This article can serve as a prelude to conducting further, more extensive research on the problem of combating such practices through legislation. This means a research project that would be conducted on a more representative survey group, and would also address a broader spectrum of legal measures that can be applied in the fight against this phenomenon. The studies by J.T. Pickett and S.P. Roche – mentioned in the introduction – can be a good example to follow.

The weakness of the surveys presented is that they are qualitative rather than quantitative. Moreover, they are limited to academics only, so they do not take into account the opinion of other researchers. What matters here is also the fact that the respondents' answers are primarily concerned with specific types of legal measures, rather than specific sanctions or other solutions.

Conducting further research in this area is important because it can contribute to a more effective fight against falsification and fabrication in science. It is certain that such practices cannot be completely eliminated. However, adopting the right regulations, in line with the freedom of scientific research, can lead to minimising the negative impact that scientific misconduct brings. The lack of adequate legislation in this regard carries the risk of impunity for misconducting scientists, and thus the loss of credibility of science itself, which is surely something no scientist wants.

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