

# Mutual Learning Exercise (MLE) on Research Integrity

## Incentives Thematic Report No 2



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## **MLE on Research Integrity: Incentives – Thematic Report No 2**

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## **Incentives**

### **Thematic Report No 2**

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## Table of Contents

1	INTRODUCTION .....	3
2	SCOPE.....	4
3	LANDSCAPE.....	6
3.1	Definition of the problem .....	6
3.3	Unintended Consequences .....	12
3.4	Incentives in European Guidelines.....	13
3.5	Evidence of use of incentives in the EU .....	14
4	LESSONS .....	19
5	CHALLENGES.....	20
6	CONCLUSIONS AND RECOMMENDATIONS .....	21
6.1	Conclusions.....	21
6.2	Policy recommendations .....	22
	REFERENCES .....	24

## List of tables

Table 1	Examples of activities that could be incentivized (columns) and potential recipients of incentives (rows). .....	8
Table 2	Examples of activities to promote, prevent and set incentives for RI, by MLE participants. 15	
Table 3	Core questions for a SWOT analysis of incentives to promote and reward RI. ....	20

## List of Figures

Figure 1	Pictorial representation of the spheres of influence within the academic research system .	6
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## 1 INTRODUCTION

On July 10th 2018, country representatives met in a Scoping Workshop for the Mutual Learning Exercise (MLE) on Research Integrity (RI) and agreed on four priority topics:

1. Processes and structures for the RI,
2. Incentives for RI,
3. Dialogue and communication about RI,
4. Training and education for RI.

This Thematic Report addresses the second priority topic - **Incentives** for RI – and was developed from a Challenge Paper developed with the aim of helping MLE participants prepare for the Second Working Meeting that took place in Athens, GR, on the 12th and 13th of March 2019. The overall scope of this topic was defined in the Kick-off Meeting that took place on the 14<sup>th</sup> of November 2018 in Brussels, where representatives of all the 14 participating countries (Austria, Bulgaria, Denmark, Estonia, Finland, France, Greece, Ireland, Lithuania, Luxembourg, Moldova, Norway, Spain, and Sweden) shared information about RI framework in their countries and discussed their learning objectives.

## 2 SCOPE

During the Scoping workshop and Kick-off meeting, participating countries expressed an interest in comparing and sharing practices, experiences and proposals on how to encourage good research practices at the institutional and individual level. In particular, it was decided that possible objectives of the MLE on incentives might include:

1. To compare approaches to promote and encourage the adoption of research integrity and/or open sharing policies at the institutional level, including:
  - a) Incentives to implement RI policies
  - b) Incentives to comply with RI requirements
  - c) Research performance evaluation criteria
2. To compare approaches to promote and encourage research integrity and/or open sharing of data and methods amongst individual researchers and lab leaders, including:
  - a) Incentives to implement good research practices and/or sharing of data and methods
  - b) Incentives to train and be trained in RI
  - c) Research performance evaluation criteria
3. To share experiences, successful and unsuccessful, of setting either positive rewards (e.g. badges, criteria for promotion, prizes and awards) or punitive sanctions. In particular, sharing experiences about:
  - a) Whether to require mandatory compliance rather than optional compliance with research integrity and data sharing standards
  - b) Methods of verification of institutional and individual compliance with research integrity and Open Science
  - c) Assessing the effectiveness of policies in improving research practices
4. To gain a deeper understanding of possible intended and unintended consequences (costs and benefits) of:
  - a) Specific research integrity policies
  - b) Specific data sharing requirements

One of the overarching priorities that emerged in the first Kick-off meeting was that participants might have different understandings about what is meant by "incentives" in the context of research integrity and how incentives relate to the mission of national Research Integrity Offices.

The topic of incentives in science is indeed very broad and rather complex and diversified, as it encompasses not just questions about research integrity and ethics more broadly, but also questions pertaining to human psychology and to the sociology of science. In the context of an MLE that aims to agree on actionable outcomes, this breadth constitutes in itself a major initial challenge to address.

Therefore, the Challenge Paper prepared on this topic included, in the "Landscape" section, a review of the topic aimed at articulating the concept of incentives in the context of research integrity, in order to focus and thus facilitate the dialogue that took place at the Working Meeting (Section 3.1). Again following the structure of the Challenge Paper, this thematic report will subsequently discuss the multifaceted problem of incentives, which can be positive as well as "perverse", and the risk of unintended consequences, in relation to relevant and recent academic literature (Sections 3.2 and

3.3). It will subsequently review major recent policy reports, to highlight the current expectations placed on institutions to promote and incentivize research integrity (Section 3.4). These definitions and documents offer the background to discuss any lessons learned (Section 4) and challenges that were considered by the MLE (Section 5). Finally, the report summarizes conclusions and recommendations that were agreed upon in the course of the work meeting (Section 6).

### 3 Landscape

#### 3.1 Definition of the problem

*What do we mean by incentives?*

In the context of research integrity, incentives are typically, indeed almost exclusively, discussed in connection with research performance evaluation criteria. Whereas the risk of “perverse incentives” in the research system is certainly important, and discussed in this report, the role of incentives in science is much broader.

A useful way to define in a general sense the concept of incentives in research integrity is in antithesis to the concept, more commonly discussed, of “sanctions”. Whereas the latter aim to change behaviour with the threat of a penalty – penalty that comes in the form of a cost paid in terms of career, social reputation, finances or even personal freedom - the former intend to encourage desirable behaviours by offering rewards of the same nature. That is, rewards in the forms of benefits to career, reputation or even financial benefits.

*Who has the power to issue incentives?*

The act of setting incentives to foster research integrity may appear fundamentally as a “top-down” approach to encourage desirable outcomes. It is “top-down”, because incentives have to be set by actors who have not just leadership status but also power to enact change.

However, the power to enact change in the scientific system is rather diffuse, because it is manifested in multiple forms and it can be expressed at multiple levels of the social and organisational system in science. Furthermore, the flow of information in the scientific system is not unidirectional and hierarchical, because each actor has the potential to influence, to some extent, all other actors with which it interacts.

The effect of incentives can thus operate horizontally and “trickle down” to all levels below, and can also diffuse upwards in the system, to any extent that higher levels are accountable to, and rewarded by, lower levels. Therefore, the relations of influence between actors in the scientific system may be best imagined as a set of concentric and porous circles, as suggested in Figure 1.

Figure 1 Pictorial representation of the spheres of influence within the academic research system



Rather than constituting a rigid hierarchy, the levels are concentric and interconnected. Outer layers have greater potential for leadership and influence in setting incentives, but are typically not immune from the expectations and assessments at lower levels. Therefore, each actor may affect the incentives set for other actors

As suggested in Figure 1, inter-university and/or national institutions dedicated to research integrity have the greatest potential for leadership and influence. By setting standards and rewards, they can incentivize desirable behaviours on multiple actors in the system.

*What aspects of research integrity can be incentivised?*

Just as there is a shared and interconnected responsibility for setting the right incentives, there are diffused and diversified roles that actors can play in promoting RI and therefore in setting the right incentives as well as benefitting from them. By playing different roles in the system, actors assume different levels of leadership and responsibility, each with its own potential for change. In order of increasing generality, these roles and responsibilities may include:

- 1) Conducting research with integrity, responsibility, transparency and accountability
  - a. Special efforts in sharing data and methods
  - b. Special efforts in ensuring the robustness, credibility of results
- 2) Supporting good research practice amongst colleagues
  - a. Collaborative, communicative behaviours
  - b. Efforts made to aid one's laboratory or community or research field to improve methods and practices
- 3) Fostering an environment supportive of research integrity
  - a. Setting up structures that aid promotion and awareness
  - b. Creating events and initiatives to encourage open discussions
- 4) Seek training for oneself and actively training colleagues in research integrity
- 5) Actively promoting RI and preventing, reporting and amending behaviours that constitute research misconduct
  - a. Special efforts in aiding self-correction, e.g. helping uncover flaws of a commonly used methodology or ensuring the correction or retraction of flawed publications.
  - b. Correcting or retracting one's own flawed work.

This is a non-exhaustive list of commendable activities that could be rewarded by incentives, and other more detailed activities could be devised. Notably, most of the commendable activities above could be conducted by multiple actors in the system, as Table 1 illustrates.

Table 1 Examples of activities that could be incentivized (columns) and potential recipients of incentives (rows).

	Conduct research with integrity, responsibility and accountability	Support good research practices amongst colleagues	Foster an environment supportive of research integrity	Seek training for oneself and actively train others in research integrity	Actively promote RI and prevent, report and amend research misconduct
<b>Trainees</b>	X	X		X	X
<b>Senior r.</b>	X	X	X	X	X
<b>Lab lead</b>	x	X	X	X	X
<b>School/dept.</b>		X	X	X	X
<b>University</b>		X	X	X	X
<b>Inter-univ.</b>			X	X	X
<b>Funding</b>				X	X

Examples of general types of commendable activities are given in relation to which of the entities listed in Figure 1 could enact them. As the table suggest, most actors could be incentivized for most of the suggested activities.

*What kinds of incentives can be offered?*

In an academic research context, actors at all levels are motivated and rewarded firstly by increased professional recognition and influence, and secondarily by the prospect of material or financial gains. This is arguably the case not just for active researchers, but also for professionals who play a structural role in research, and for institutions that host, fund or promote research.

In practice, mainly four kinds of incentives for research integrity have been implemented to date:

**1) Informal acknowledgement:**

The scientific community can informally, but nonetheless concretely, bestow a higher standing to individuals who best exemplify the ethos of science. For example, studies have shown that scientists who self-retract their own articles once they find flaws in them – an act that undoubtedly signals high research integrity – receive private and public expressions of admiration by colleagues<sup>1</sup> and, at least according to some analyses, might even enjoy a boost in citations to their non-retracted articles.<sup>2</sup>

**2) Formal acknowledgements:**

Badges, awards and other symbolic but official signs of recognition represent a more tangible and objective signal, that may more strongly promote desirable outcomes. An example of formal acknowledgement of research integrity are the “badges” that the journal Psychological Science, in collaboration with the Centre for Open Science, has started to “pin” on articles as a formal acknowledgement of openness in sharing data and/or materials.<sup>3</sup>

<sup>1</sup> Hosseini, M., Hilhorst, M., de Beaufort, I. & Fanelli, D. (2018).

<sup>2</sup> Hicks, D., Wouters, P., Waltman, L., de Rijcke, S. Rafols, I. (2015)

<sup>3</sup> Kidwell, M. C. *et al.* (2016).

### **3) Formal honours and other marks of prestige:**

Granting exclusive access to prestigious roles and positions is, in addition to being a "badge" of honour, a concrete and tangible reward that promotes directly an actor's career and profile. Individuals may be rewarded by gaining access to important academic positions, whereas institutions are rewarded by acquiring new and greater leadership roles.

### **4) Material access to resources:**

Research grants and monetary awards such as the Nobel Prize are amongst the strongest forms of reward in science, because they bring all the forms of recognition listed above, and in addition give actors the means to expand their activities or improve their financial status.

Programmes that fund activities related to research integrity may be seen as such a form of incentive. A prime example of this approach is offered by The Netherlands. Following the lead (initiated many years before) of the United States, The Netherlands has devoted considerable funds to often neglected forms of research, such as replication studies,<sup>4</sup> and to various programs of research on research integrity (see the Netherlands Research Integrity Network, [www.nrin.nl](http://www.nrin.nl)). Grants for research on research integrity are not directly rewarding good research practice, but arguably incentivize RI indirectly, by promoting more interest and understanding of the phenomenon and increasing the prestige and visibility of the topic.

More direct financial incentives to "do the right thing" are offered, for example, by the Centre for Open Science in its pre-registration challenge: authors who pre-register a study on the COS website (and then have their protocol reviewed and approved, and subsequently conduct the study and publish the results) are rewarded with a bonus of \$1000.<sup>5</sup> The initiative was reported to have met with considerable success and has so far attracted over 3,000 participants.<sup>6</sup> Whether this had any effect on the quality of the published research remains, however, to be assessed.

## **3.2 Perverse Incentives**

The need that is currently felt to re-set positive incentives is largely a response to the perception that current incentives in research are misaligned with research integrity, and therefore need correcting. As will be discussed below, even though this perception appears to be incorrect in many factual details, it finds continuing justification in the competitive nature of science and in the dramatic changes that the scientific method and system is undergoing today.

*Are pressures to publish and misused bibliometrics threatening research integrity?*

There have been long-standing concerns that undesirable side effects may be brought about by excessive pressures to publish and misguided attention paid to a researcher's quantity of publications rather than substantive importance. Although such concerns had been expressed for at least a century,<sup>7</sup> they have risen over the last few decades, in response to an increasingly bureaucratic and managerial approach to research performance assessment, which tends to be based on simplistic indices of productivity and citation metrics.

The notion that growing competition and pressures in research are causing an epidemic of fabricated, falsified, biased, sloppy and irreproducible research is extremely common in the contemporary research integrity literature.<sup>8</sup> Probably as a consequence of this scholarly diffusion, this idea is also widely believed by academics in general, as suggested by a survey that the journal

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<sup>4</sup> Vrieze, J.(2017).

<sup>5</sup> Center for Open Science. Preregistration Challenge: Plan, Test, Discover.

<sup>6</sup> Mellor, D. (Center for O. S. Looking Back on the Prereg Challenge and Forward To More Credible Research. (2019).)

<sup>7</sup> Garfield, E. (1996).

<sup>8</sup> Fanelli, D. (2018).

*Nature* run amongst its readers<sup>1,9</sup> Belief in a link between pressures to publish, competition and research integrity failures is explicitly expressed in at least 40% of Research Integrity policies in European universities,<sup>10</sup> and has driven revisions of research policies. For example, the latest Protocol for Research Assessments in The Netherlands, for example, no longer includes, as one of its criteria, the total number of articles published.<sup>11</sup> In another example, the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) had revised its policies in 2010 to prevent scientists to list, in their CVs attached to grant applications, more than five publications. This policy intended to send a "signal against the growing trend to generate numerical indicators [...] which in the view of the DFG places researchers under great pressure to publish and has led to falsifications in publication lists".<sup>12</sup>

Empirical evidence, however, offers no conclusive support to concerns that pressures to publish and bibliometric evaluation may be undermining research integrity. Indeed in some cases empirical evidence appears to refute them. For example, multiple recent studies have assessed, directly or indirectly, some of the effects that a publish-or-perish culture is said to generate. In particular, they assessed whether there has been an undue proliferation of trivial and fragmented publications produced by a "salami slicing" of research results. Contrary to what this scenario would predict, evidence suggests that academic articles are getting longer and more complex.<sup>13</sup> Furthermore, several studies have failed to observe a significant association between measures of productivity and impact of authors and proxies of scientific misconduct, such as the risk of having papers retracted,<sup>14</sup> the risk of reporting over-estimated results,<sup>15</sup> and the risk of improperly manipulating images.<sup>16</sup> Finally, whereas it is true that academics co-author more articles today than in the past, they are not more productive on a fractional basis: the number of first-authored articles and that of fractional productivity have remained stable since at least the 1950s.<sup>17</sup>

These findings are not necessarily refuting the notion that pressures to publish create perverse incentives, but suggest that the problem might be more nuanced and complex than normally stated. For example, multiple lines of evidence suggest that authors may have responded to pressures to publish primarily by co-authoring more articles,<sup>18</sup> and it is possible that the main unwanted effect of pressures to publish is not a "salami slicing" of results, but a "salami slicing" of collaborations, and other forms of questionable authorship practices.

Moreover, surveys consistently report that scientists are dissatisfied and frustrated with the system of incentives that, whether or not it directly impacts research integrity, it is unlikely to favour the production of high quality, reliable and reproducible research.<sup>19</sup> It is in response to these concerns that manifestoes such as the San Francisco Declaration on Research Assessment (DORA)<sup>20</sup> and the Leiden Manifesto<sup>21</sup> were born, offering guidance to the responsible and nuanced use of metrics in assessing researchers.

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<sup>9</sup> Baker, M. (2016).

<sup>10</sup> Aubert Bonn, N., Godecharle, S. & Dierickx, K. (2017)

<sup>11</sup> *Protocol for Research Assessments in the Netherlands*. (2015)

<sup>12</sup> DFG. DFG Modifies Rules for Publication Lists. (2014).

<sup>13</sup> Vale, R. D. (2015).

Rodriguez, A. R., Casadevall, A., Cordero, R. J. B., Alvarado-Torres, J. K. & de León-Rodriguez, C. M. (2016).

<sup>14</sup> Fanelli, D., Costas, R. & Larivière, V. (2015).

<sup>15</sup> Fanelli, D., Costas, R. & Ioannidis, J. P. A. (2017).

<sup>16</sup> Fanelli, D., Costas, R., Fang, F. C., Casadevall, A. & Bik, E. M. (2018).

<sup>17</sup> Fanelli, D. & Larivière, V. (2016).

<sup>18</sup> Papatheodorou, S. I., Trikalinos, T. A. & Ioannidis, J. P. A. (2008).

<sup>19</sup> Tjeldink, J. K., Verbeke, R. & Smulders, (2014).

<sup>20</sup> DORA. San Francisco Declaration on Research Assessment. (2012). Available at: <http://www.ascb.org/dora/>.

<sup>21</sup> Hicks, D., Wouters, P., Waltman, L., de Rijcke, S. Rafols, I. (2015)

As it may often be the case with other RI policies, the solution is unlikely to lie in a drastic reduction or elimination of quantitative metrics and publication expectations, and it rather lies in striking a healthy balance - a balance whose optimal value is likely to vary across disciplines, countries and even institutions. It is rather telling, in this regard, that the aforementioned DFG relaxed its stringent rules in 2014, following criticisms from researchers and peer-reviewers. It now allows scientists to list up to ten publications in their CVs, to accommodate the need of diverse subjects.<sup>22</sup>

### *Perverse incentives beyond pressure to publish*

Quite independently of pressures to publish and misuse of bibliometric indicators, perverse incentives have long been understood to constitute the unwanted side effect of competition. Science is and always was a competitive enterprise, whose structure of rewards follows a "tournament model", in which a small number of "winners" will enjoy great honours, benefits and resources.<sup>23</sup>

The competitive nature of science is not negative *per se*. Quite to the contrary, competing for success is one of the prime motivators that drive the work of scientists forward, encouraging innovation, efficiency and even self-correction. However, the by-product of competitiveness is that little attention is going to be paid to anything that is not immediately beneficial to success. Ethical requirements, standards of rigour and transparency, openness to sharing data and methods, all risk being trampled in the race to the top, if and to the extent that such trampling is perceived to be of minor consequence.

This overarching and ever-present concern justifies and inspires the numerous recent proposals to expand performance assessment criteria. For example, the proposal of the ACUMEN consortium, which suggested to consider multiple dimensions and measurements by flanking metrics with measures of expertise and influence and a narrative statement by the applicant.<sup>24</sup>

Another example is the report on the Culture of Scientific Research issued by the Nuffield Council on Bioethics in 2014, which suggested various actions to promote research integrity, cultivate an ethical environment, and assess the track record of researchers with broader criteria, and promote standards of high quality in research.<sup>25</sup>

### *Science as a changing enterprise*

Even setting aside the issue of competition in science altogether, a powerful argument to re-align incentives in the research system comes from noticing how the system itself is being re-shaped. Like many other institutions and practices of modern society, science is being radically transformed by ever more powerful information and communication technologies. These technologies permit the conduction of projects of unprecedented size and levels of complexity. Scientists with diverse types of experiences and expertise can collaborate across the globe, without ever meeting in person or physically interacting in any way. Data sets of previously unimaginable sizes can be stored and analysed in seconds, using extremely sophisticated computational methods that are continuously evolving. These transformations open exciting new opportunities for research, but at the same time create new challenges for research integrity and reproducibility. The subsistence of such challenges is acknowledged by relevant international documents and guidelines, for example the Montréal statement on Cross-Boundary Research Collaborations.<sup>26</sup>

In this context of radical and rapid developments, setting positive incentives to encourage the adoption of new and better practices seems an essential mission of leaders at all levels of the scientific system. This was the objective, for example, of The Amsterdam Call for Action on Open

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<sup>22</sup> DFG. DFG Modifies Rules for Publication Lists. (2014).

<sup>23</sup> Necker, S. (2016).

<sup>24</sup> Community Research and Development Information Service. Academic careers understood through measurement and norms.

<sup>25</sup> Nuffield Council on Bioethics. The culture of scientific research in the UK. Nuffield Council on Bioethics.

<sup>26</sup> WCRI. Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations. (2013).

Science (2016), which saw in Open Science an opportunity to transform not just scientific communication, but also the way "we evaluate, reward, incentivize science"<sup>27</sup>

It should also be noted that, in addition to being better supported by evidence, this vision of science as an evolving enterprise, that is being empowered by new technologies and that faces new challenges to research integrity offers a much more compelling and inspiring narrative, compared to that of a "scientific crisis"<sup>28</sup>

### **3.3 Unintended Consequences**

If lack of regulation risks setting perverse incentives, excessive or misguided regulations may unintentionally hamper scientific progress or even be ethically problematic in and of themselves.

An example of unintended consequences of research integrity policies is offered by the case of DFG, discussed above in section 3.2. This case is also an example of how dialogue and flexibility allowed an institution to take relatively rapid remedial actions.

A more recent, and emblematic case that is still hotly debated in the literature is that of online public data sharing in research. On the one hand, concerns for the transparency and reproducibility of research results have inspired multiple institutions to set in place requirements for sharing research data. On the other hand, growing concerns have been expressed for the risk that mandatory data sharing may lead to breaches of ethical principles of data anonymity and protection rights for research subjects. Furthermore, an excessive rewarding of data sharing could unwittingly create new perverse incentives,<sup>29</sup> by discouraging scientists from collecting large and complex data sets in favour of recycling publically available ones, thus stifling real innovation and feeding a new class of "data parasites".<sup>30</sup>

Another vivid example of controversial ethical regulation arose in the context of clinical trial registration. In 2017, the US National Institutes of Health promulgated a new regulation that classified all brain imaging studies as clinical trials, thereby requiring from them very high standards of registration and data reporting. The requirements were hotly contested by neuroscientists, who perceived them to be a stifling financial and human cost, unnecessarily imposed on studies that present no specific risk for human health and no specific ethical risk for research subjects.<sup>31</sup>

The example of brain imaging studies regulation points to a general risk that policy makers and ethicists are always called to consider when creating new regulations. No matter how well intentioned and important it is, every new layer of regulation imposed on research is, by definition, an added cost that detract resources from research itself, slows down progress and may ultimately discourage innovation altogether. It is therefore clear that an optimal balance needs to be struck between efforts to foster, promote and enforce research integrity standards and the need to protect the freedom, independence and unburdened creativity of researchers.

It may be argued that incentives to promote research integrity are a non-compulsory form of intervention, and therefore may be less at risk from unintended consequences. However, they are not immune from potential downsides. Firstly, because every human being and every institution operates under limited resources, and therefore any activity comes with an opportunity cost. In other words, all the time, energy and finance that incentives are able to direct towards a particular RI activity are subtracted from other activities, which include research activities in general as well as other activities that are relevant to RI and ethics. Therefore, it is imperative to ensure that the

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<sup>27</sup> The Netherlands EU Presidency. Amsterdam call for action on open science. (2016)

<sup>28</sup> Fanelli, D. (2018).

<sup>29</sup> Bierer, B. E., Crosas, M. & Pierce, (2017).

<sup>30</sup> Longo, D. L. & Drazen, (2016).

<sup>31</sup> Reardon, S. (2017).

incentives being set are meeting a reasonable balance of costs and benefits. Secondly, and more subtly, new incentives are, as we said before, typically set from the top. Unless incentives are determined after thorough consultation with stakeholders and are subsequently monitored for their effects, they may fail to respond to actual needs and may even hinder research integrity and progress.

### **3.4 Incentives in European Guidelines**

The most important and recent documents set an unambiguous mandate for researchers and research institutions to promote research integrity and set positive incentives.

*The European Code of Conduct for Research Integrity 2017*,<sup>32</sup> for example, states that research institutions and organizations should "promote awareness and ensure a prevailing culture of research integrity" (pp5), that "Research institutions and organisations reward open and reproducible practices in hiring and promotion of researchers" (pp5), that "Researchers, research institutions and organisations ensure access to data is as open as possible, as closed as necessary, and where appropriate in line with the FAIR Principles (Findable, Accessible, Interoperable and Re-usable) for data management." (pp6), and concludes that "In their most serious forms, unacceptable practices are sanctionable, but at the very least every effort must be made to prevent, discourage and stop them through training, supervision and mentoring and through the development of a positive and supportive research environment" (pp9).

Equally explicit is the *Roadmap* drawn by Science Europe in 2013,<sup>33</sup> which clearly explains that "Addressing research integrity requires a holistic approach, given the linkages with other aspects of the research system, such as access to publications and data, research careers, evaluation, peer review, and research collaboration" (pp21).

The Roadmap recommends that national institutions "Collaborate in developing appropriate incentive measures for scientists to archive and share their data, by promoting data management plans and support for research data collection" (pp10). These recommendations are justified on the grounds that preventing misconduct "includes developing appropriate incentives for fostering a culture of integrity, and setting high standards for researchers and institutions. All aspects of the research process – from funding, through employment contracts, peer-review processes and collaborative projects, to handling research data and publications – should take integrity issues into account. All sanctioning measures must be underpinned and preceded by pedagogical efforts aimed at instilling a culture of integrity, and at preventing the occurrence of cases of research misconduct" (pp22).

The recent *Bonn-PRINTEGER Consensus Statement*,<sup>34</sup> produced in the context of the PRINTEGER consortium project, also recommended a greater use of incentives to promote and foster research integrity. "Taking into account that indicators change the system through the incentives they establish, university leadership should adopt policies of good practice for responsible research assessment" and they refer to the aforementioned Leiden Manifesto as an example of guideline to follow. The statement adds that "National research policy makers should similarly be aware of potential effects of making university funding strongly dependent on a narrow range of indicators related to, for example, international peer-reviewed publications or patents" (pp1027-1028).

With regards to the mandate to "Open Up research", the statement expresses an awareness of possible unintended consequences and takes a balanced perspective by stating that "Data should be made available, potentially after a grace period of exclusive access for the organisation generating the data" (pp1029).

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<sup>32</sup> ALLEA. European Code of Conduct for Research Integrity. (2017).

<sup>33</sup> Science Europe. Science Europe Roadmap.

<sup>34</sup> Forsberg, E. M. *et al.* (2018).

A perception that incentives in research may be misaligned is also frequently expressed in institutional policy documents. University guidance documents on research integrity and misconduct, for example, were found to contain sentences in which productivity and/or competition were indicated as possible causes of integrity failures in at least 7 out of the 18 cases examined.<sup>35</sup>

### **3.5 Evidence of use of incentives in the EU**

Despite the existence of a mandate for institutions to incentivize good research practice, examples of concrete incentives to promote research integrity in institutions appear to be still rare. This fact is illustrated most clearly by the results of one of the work packages of PRINTEGER, which issued the report "*Managing research integrity: An assessment of best practices from the organisational literature*".<sup>36</sup> As the title suggests, the main objective of this package was to identify European research organizations that had already implemented exemplary strategies. Despite being able to rely on background inventories, European surveys and new case studies documented in other work packages of the same project, the authors of the study reported to have been "unable to identify good case examples at the organizational level". Therefore, instead of describing actual examples, the report offers a general overview of the issue, and concludes that "Regarding leadership practices, knowledge is needed on the type of leadership and managerial structures that facilitate research integrity. While a considerable amount of research has been done on integrity more generally, the big question is how the general managerial knowledge should be applied in the context of governing research" (pp21).

Similarly, the report failed to identify case studies for successful or unsuccessful promotion of open science practices and concluded that "we need to understand how the policy efforts impact researchers and also how the policies can be implemented most successfully. For instance, how does the policies relate to, and possibly clash with, different measurement systems across academia which do not take open science into account?" (pp21).

Although the use of incentives is still rare, its antecedent, in the form of a more general promotion of awareness of research integrity, is pursued by several European organizations. This was suggested by results of the report *Research Integrity Practices in Science Europe Member Organisations*,<sup>37</sup> based on a survey conducted in 2014. It covers 33 different organizations for 27 countries (RCUK responded on behalf of 7 Research Councils in the United Kingdom, each of which is a member organization). Research integrity practices were surveyed by the Working Group on Research Integrity, which adapted a survey instrument used by the Danish Agency of Science, Technology and Innovation in a previous survey, conducted in 2012 among members of the European Network of Research Integrity Offices (ENRIO) and a few other countries.

Activities to promote awareness of research integrity were reported by 20 Member Organizations (MO), and included activities such as "raising awareness within the organisation itself, communicating about the importance of research integrity through presentations, publishing articles in the general press, or organising courses and workshops. In some instances, participating in training by researchers is mandatory in order to be funded" (pp14).

Data about the MLE participant countries mirrors the picture offered by European surveys. Table 2 reports preliminary data, obtained by online resources or by consultation with representatives of the participant countries. Although this data is preliminary and not an exhaustive list of all activities and initiatives presently being discussed, it lists several activities aimed at promoting and preventing via awareness and communication. However, it shows a paucity of activities that are explicitly aimed at rewarding good research practices. Furthermore, whereas a few countries have implemented or

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<sup>35</sup> Aubert Bonn, N., Godecharle, S. & Dierickx, (2017).

<sup>36</sup> Breit, E., Forsberg, E.-M. & Vie, K.-J. (2018)

<sup>37</sup> Science Europe. (2016).

are considering plans to have compulsory compliance with research integrity practices or training, only a few are considering incentives proper, i.e. positive awards that may inspire other actors.

Table 2 Examples of activities to promote, prevent and set incentives for RI, by MLE participants.

Country	National or inter-university RI body	Promoting RI and Preventing RM	Incentives for RI	Web source
<b>Austria</b>	Austrian Agency for Research Integrity	Various activities, including: <ul style="list-style-type: none"> <li>• Advising</li> <li>• Training</li> <li>• Development of policy documents</li> <li>• Establishment of and contribution to working groups and networks</li> </ul>		oeawi.at
<b>Bulgaria</b>	Committee on Academic Ethics			
<b>Denmark</b>	Danish Agency for Science and Higher Education	The Agency facilitates an exchange of experience between the various research institutions as part of the Agency's promotion of research integrity.		ufm.dk
<b>Estonia</b>	Estonian Research Council (ETAg)	ETAg has organized several workshops and seminars for the whole community during past years.		etag.ee
<b>Finland</b>	Finnish National Board on Research Integrity (TENK)	The National Board's activities focus on various national and international specialist tasks and networking, with a view to improving the culture of research integrity. This includes counselling researchers and postgraduate students, as well as other preventative work.  TENK has created a network of Research Integrity Advisers. Since the start of 2017, TENK has trained more than 100 advisers in more than 60 research organisations to provide low threshold, personal advice on research integrity.		tenk.fi
<b>France</b>	French Office for Research Integrity (OFIS)	The OFIS has three missions: <ul style="list-style-type: none"> <li>• To serve as a common platform of expertise</li> <li>• To act as an Observatory reporting and spreading information about Scientific Integrity</li> <li>• To provide support for all the French actors willing to share their resources and good practices.</li> </ul>		
<b>Greece</b>	National Deontology Committee for Clinical Trials (NDCCT); National Bioethics Commission (NBC); institutional Research Ethics &	Codes for Research Ethics & Deontology are mandatory for each research institution Consultation, advising, opinions and topic-related guidelines issued by NBC and related research ethics bodies Networks regarding the promotion & training in RE & RI: EARTHnet (Ethical Aspects in Research & Technology for Human)	Formal awards that recognize ethical and integrity practices demonstrated in research. For example, Bodossakis Foundation's Scientific awards for "contribution to the international	

Country	National or inter-university RI body	Promoting RI and Preventing RM	Incentives for RI	Web source
	Deontology Committees (REDC); RCR-Greece (Network for Responsible Conduct of Research in Greece)		promotion of Greece through their work and ethics ”.	
<b>Ireland</b>	National Research Integrity Forum (NRIF)	<p>Activities coordinated by the Forum include:</p> <ul style="list-style-type: none"> <li>Monitoring international developments and policy in the area of research integrity, and making appropriate recommendations for adjustments in research integrity policy and practice in Ireland;</li> <li>Communicating the importance of research integrity to the Irish research community and to the general public.</li> </ul> <p>This includes several public seminars and workshops enabling public discussion and sharing of national and international good practice.</p>	<p>Three national research funders (Science Foundation Ireland, the Health Research Board and the Environmental Protection Agency) require researchers funded by their programmes to complete research integrity training, as part of Terms and Conditions of funding.</p> <p>University College Cork has developed a Digital Badge in Responsible Conduct of Research, designed and targeted towards research teams working together to discuss and explore key RI issues of relevance to their disciplines.</p>	
<b>Lithuania</b>	Office of the Ombudsman for Academic Ethics and Procedures	<p>Activities of the Office include:</p> <ul style="list-style-type: none"> <li>Advising (e.g. FAQ, private)</li> <li>Training</li> <li>Development of topic-related guidelines (e.g. about codes of ethics)</li> <li>Analytical studies related to a specific topic (topic-oriented country reports)</li> <li>Establishment of topic-specific working groups</li> </ul> <p>Networking with the Lithuanian University Rectors’ conference, the Lithuanian University of Applied Sciences Rectors’ conference, other governmental bodies, such as the Research Council of Lithuania, the Ministry of Education, Science and Sport and, when needed, with international stakeholders (e.g. ENRIO)</p>	<p>Plans are being discussed about:</p> <ul style="list-style-type: none"> <li>Establishment of ethical approval procedure in doctoral studies and research projects’ funding</li> <li>Awards for the best initiative/activity in and essay on academic/research integrity are planned from the next year</li> </ul>	<a href="http://www.etika.gov.lt">http://www.etika.gov.lt</a>
<b>Luxembourg</b>	Luxembourg Agency for Research Integrity (LARI); Luxembourg’s	<p>Activities of LARI include:</p> <ul style="list-style-type: none"> <li>A system of Coaches who provide support, encouragement, and guidance as researchers progress along their project path, and helps them produce</li> </ul>	Yearly, the FNR give 4 awards (5000€ each) for robust research.	<a href="http://lari.lu">lari.lu</a>

Country	National or inter-university RI body	Promoting RI and Preventing RM	Incentives for RI	Web source
	Fonds National de la Recherche (FNR)	robust, ethical research. The Coaches are trained by LARI. <ul style="list-style-type: none"> <li>A free ethics consult service to researchers of all levels (Faculty, staff, students) who are affiliated with its member organizations.</li> <li>LIH provides a statistics consultation service.</li> </ul> FNR provides several training sessions in scientific communication to ensure communication is ethical (unbiased).		
<b>Moldova</b>			<ul style="list-style-type: none"> <li>Special rules are in place linking evidence of RI to:</li> <li>Calls for the position of members in the scientific sections of the Academy of Sciences of Moldova</li> <li>Call for the position of full /corresponding member of the Academy of Sciences of Moldova</li> </ul>	
<b>Norway</b>	National Research Ethics Committees (Etikkom)	Activities contributed by Etikkom include: <ul style="list-style-type: none"> <li>Curating an open-access anthology on RI</li> <li>A yearly conference is organized for teachers and people responsible for RI at the different institutions.</li> </ul> The recent Code of Conduct for Research Integrity adopted by Ministry of Research has a pro-active approach, focussed on education and creating a culture of quality		<a href="http://www.etikkom.no">www.etikkom.no</a>
<b>Spain</b>	Ethics Committee of the Spanish National Research Council - CSIC	Since 2015, there is a National Statement of Scientific Integrity signed by the major research institutions: the CSIC, the Confederation of Scientific Societies (COSCE) and the Council of Spanish Universities (CRUE). Accordingly, these institutions should adopt codes of good practice, they should promote, define, implement and disseminate clear policies for scientific integrity, and they must assume an essential role in making their staff members aware of and sensitive to ethical matters, and in training their staff in ethical professional practices.	Names of the institutions that sign the declaration are published in the COSCE and in the websites of the signatory institutions.	<a href="http://www.crue.org/">www.crue.org/</a>
<b>Sweden</b>	Group on Research Misconduct at Ethical Review Appeal Board	The Swedish research council (VR) is currently working on an Ethical policy to inform and promote good research practice among the grants applicants.		

Country	National or inter-university RI body	Promoting RI and Preventing RM	Incentives for RI	Web source
		The ethical policy covers <i>the research that is funded, the application process and the funding decision process.</i>		

The table reports a suggestive, and not exhaustive, list of activities related to promoting RI, preventing RM and setting incentives for good research practice, by inter-university institutions operating the countries participating to the MLE.

## 4 LESSONS

Although it had failed to identify case studies of incentives being implemented, the PRINTEGER report highlighted examples of innovation that are moving in that direction. The country of Norway, in particular, was indicated as leading the way with its new research ethics law enacted in May 2017, which places greater legal responsibility on research organizations to both handle cases of misconduct and to prevent and promote research integrity. As the report in question documents, this legislation was inspired by the belief that building a culture of integrity in an institution requires "managerial attention, a systematic approach, training of everyone involved in research (also students), and competence of all individuals involved – also internal and private sector collaborators" and that "research ethics must be integrated in all phases of the research activities, including planning, execution and publication."

Other work packages of the PRINTEGER project have offered new ideas on how RI could be incentivized. In particular, the WP V report "Tools for research leaders and managers: addressing and stimulating integrity in research organisations"<sup>38</sup> suggests to use three tools derived from the Organizational Science literature:

1. Integrity Café, which aim to create "a safe atmosphere to motivate open conversation and reflection". Inspired by the model of World Café, the Integrity Café aims to create a relaxed and friendly atmosphere to discuss matters of integrity in an institution in small groups. The integrity café relies on the following elements: 1) set the context, deciding who should take part and why; 2) create a hospitable space by arranging lighting and furniture appropriately; 3) explore questions that matter, by identifying thought-provoking questions and examples; 4) encourage everyone's contribution; 5) connect diverse perspectives, encouraging people to move between tables, or even giving a structure to the groups that then changes over the night (e.g. first tables all of students, all of professors, then mingle); 5) listen together for patterns and insights; 6) harvest by sharing common themes discovered with the rest of the room.
2. Value visioning workshops, which are interactive team-building exercises to create visions and images that embody the values and ideals of the organization.
3. Ethics reflection workshops, which may take many forms but always with the central objective "to facilitate a systematic dialogue and reflection"

They also suggest a number of "content" tools, which include topics such as "local integrity officer role", "employee appraisal conversations", "ethics guidelines", "work environment mapping", "quality assurance system" and especially "Managerial assessments of performance criteria".

Other tools to promote and incentivize research integrity may be produced within the on-going project Standard Operating Procedures for Research Integrity (SOPs4RI), which aims to "stimulate transformational processes across European research performing organisations (RPOs) and research funding organisations (RFOs)" in order to offer guidelines and tools to promote RI, and adopt appropriate incentives and novel sanctions.

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<sup>38</sup> Breit, E. & Forsberg, E.-M. Tools for research leaders and managers: addressing and stimulating integrity in research organisations. (2018). Available at: [http://printeger.eu/wp-content/uploads/2019/01/D5\\_2-Tools-for-research-leaders-and-managers.pdf](http://printeger.eu/wp-content/uploads/2019/01/D5_2-Tools-for-research-leaders-and-managers.pdf). (Accessed: 1st March 2019)

## 5 Challenges

In light of the literature reviewed above and of the information gathered about participating countries, the following challenges were identified as priority areas to discuss and share experiences about.

### 1) Which activities related to research integrity can be incentivized?

Whereas much of the discussion surrounding incentives in academia verges around the misuse of metrics and a culture of pressures to publish, there may be a variety of activities that contribute directly or indirectly to research integrity that could be encouraged by means of incentives (examples are offered in Table 1 and further ideas of activities are described in the Lessons section).

### 2) What types of incentives can be implemented?

Institutions within the participant countries have several options to consider, which include not just re-thinking research evaluation criteria, but also giving prizes, grants, and special positions and roles.

### 3) What may be the unintended consequences of a given activity-incentive?

Each combination of activity (following question 1) and incentive (following question 2) presents potential benefits and costs, the balance of which is likely to vary from country to country, discipline to discipline, and perhaps even from institution to institution. As suggested in the original list of priorities of this MLE, participants were invited to consider how these new ideas would compare to the more traditional approach based on compliance, leading to a final, secondary question:

#### a. What advantages and disadvantages would such incentives have compared to compulsory regulations?

To guide and aid the dialogue and exchange of ideas and experiences, participants could examine each idea for its pros and cons using a SWOT (Strength, Weaknesses, Opportunities and Threats) analysis. Table 3 illustrates the logic of this analysis.

Table 3 Core questions for a SWOT analysis of incentives to promote and reward RI.

	Advantages/ desirable outcomes	Disadvantages/challenges/unintended consequences
<b>Internal</b>	<p><b>Strengths:</b></p> <p>What makes this activity-incentive particularly suitable, applicable, and useful for your organization?</p>	<p><b>Weaknesses:</b></p> <p>What makes this activity-incentive unfeasible, impractical or unlikely to yield the desired outcomes, if it were implemented by your organization?</p>
<b>External</b>	<p><b>Opportunities:</b></p> <p>What makes this activity-incentive particularly suitable, applicable, and useful for your country?</p>	<p><b>Threats:</b></p> <p>What makes this activity-incentive unfeasible, impractical or unlikely to yield the desired outcomes, if it were implemented in your country?</p>

By sharing experiences and reflecting on the strengths, weaknesses, opportunities and threats of possible activities and incentives, participants to the MLE enjoyed an opportunity to develop and assess new ideas for initiatives and activities to implement in their respective organizations and countries.

## 6 Conclusions and REcommendations

### 6.1 Conclusions

The discussions and experiences shared during the dedicated MLE meeting brought to the fore the transformative power that positive incentives can potentially have, as well as the challenges inherent in adopting them.

MLE participants agreed that multiple institutions and actors within each country's research and academic system could implement powerful incentives with great potential effectiveness and relatively little costs. Such incentives could take, for example, the form of:

- Symbolic awards in recognition of RI activities (training, coaching and deliberation) or evidence of particularly commendable behaviour. Such awards could come in the form of annual ceremonies, formal recognitions, certifications or badges, and could be given not just to individuals but also, for example, to institutions that have shown special dedication and effectiveness in handling challenging cases of RM.
- Credit systems. For example, countries could institute "research integrity credits" given to academics who take active part in RI meetings and symposia or even those who act as whistle-blowers. Alternatively, individuals and institutions could be encouraged to build their "integrity portfolio", which includes integrity activities and performances such as training received, teaching activities, coaching, deliberation, active participation in events and initiatives and experience in managing cases and initiatives.
- Research Integrity Oath. The RI equivalent of the Hippocratic Oath that medical practitioners take, it would represent a more positive and psychologically compelling incentive than the integrity compliance statements that some institutions currently require from researchers who receive research funding. The Oath would be part of the socialization process not just for scientists, but all actors in the research system, and would commit them to RI not just in academic research, but also in private and commercial R&D activities, collaborations between academia and private partners, advisory roles in governmental organisations, contributions to public debate, and more.
- Public rankings based on criteria relevant to RI. Aimed in particular at institutions, these rankings could follow criteria including: the presence, quality and transparency of integrity policies; activities to promote RI and to foster an environment that supports RI; and activities of training, coaching and teaching. The resulting rankings could be published on national or European web platforms.

If on the one hand it was agreed that positive incentives are an overlooked tool to promote and strengthen RI, on the other hand it was noted that compulsory requirements and "soft" (self) regulations remain a necessary component of research policies of any country and institution. Rules and regulations are not only obviously necessary to prevent and correct the most egregious forms of RM, but may also contribute to meeting, indirectly, the objectives intended by positive incentives, for example by drawing attention to RI matters and thereby fostering awareness and dialogue.

An exemplary case study, in this regard, was offered by the experience of Ireland. In Ireland, even basic forms of training in RI struggled to receive adequate attention, until such training was made mandatory by major funding organizations in the country (see Table 2). Following this innovation, the environment in the country is rapidly changing, and positive awards for training and other RI activities are starting to find fertile terrain for implementation. The concept of badge as a positive incentive is now explicitly implemented by some Irish institutions.

A leading example of experimenting with new forms of RI incentives is offered by University College Cork (UCC), in Ireland. Since 2016, UCC has been engaged in multiple pilot projects to develop digital badges, which are awarded to staff and students in recognition for their extra-curricular

training and activities in areas of relevance.<sup>39</sup> One of the pilot projects consisted in the development of a “Digital Badge in Responsible Conduct of Research”. To obtain the badge, researchers and students have to engage in multiple interconnected training activities, including an online module on research integrity, three workshops (respectively, on the nature and context of misconduct, principles of good data management, and reproducible research), recommended readings and a reflective writing exercise. Currently still in a pilot phase, this and similar badges could become an official certification of RI expertise and training for academics, students and beyond.

Several relevant experiences were also shared to illustrate the risk of unintended consequences of positive incentives and well as regulations. In France, for example, the 2015 National Chapter of Activities regulation, signed by over 36 institutions, has led to the formation and enrolment of over 100 RI officers with advisory and supervisory roles on all matters of RI. However, the initiative has met with only partial success because institutions have recruited these RIOs mainly amongst professors emeriti. If on the one hand this choice helped ensure that RIOs were free from direct conflicts of interest, on the other it made them less directly connected to the university and often not as available and easy to contact as would be required.

Other examples of unintended consequences that MLE participants shared came from the experience of ethical regulations. In Greece, ethical regulation of animal research incurred some backlash from scientists, because two distinct and uncoordinated bodies were both responsible to review and regulate the same issues, causing an unnecessary bureaucratic burden that stifled and slowed research projects. Frictions between research ethicists and researchers were also experienced by the Research Council of Norway, which requires that the ethical assessment of research funding applications be part of the assessment of methodology and research excellence. Whilst this policy has the obvious benefit of making ethical thinking an intrinsic part of the research process, it also potentially exposes the grant selection process to an added element of arbitrariness and politicization, because ethical standards are not always clearly defined or universally endorsed, particularly for what concerns the choice of research topics. These and similar experiences related to research ethics, and therefore not necessarily to RI, but represent cautionary tales for all forms of research regulation.

Overall, participants agreed that a fine balance needs to be struck between imposition through regulations, soft regulations and positive incentives. The ideal proportion in which these three different tools are used is likely to differ depending on the level within the research system they are relevant to (e.g. departmental, institutional, national) and is also likely to differ depending on country and time. The balance to be struck at the national level, in particular, might require a careful assessment on behalf of legal experts, in order to operate a clear distinction between the three types of RI incentive. Furthermore, it was agreed that unintended consequences need to be prevented and addressed by maintaining an open and constructive dialogue with the research community and all other stakeholder concerning RI initiatives.

## **6.2 Policy recommendations**

In light of the dialogue at the MLE meeting, the following recommendations for RI policymaking emerged as consensual:

- 1) Compulsory regulations and “softer” policy requirements should to be complemented with positive incentives.** The latter may take the form of informal or formal incentives, for example of the kinds outlined above, and could aim to reward actions and activities including: training, coaching, creating research environments that support dialogue and transparency, innovative methods of assessment of research performance and impact, and open science activities.
- 2) The effects of any incentive or regulation should be closely monitored, to ensure the achievement of desired effects and detect the possible occurrence of**

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<sup>39</sup> UCC. Digital Badges.

**unintended consequences.** Monitoring activities ought ideally to include the collection of data, but it is essential that an open dialogue is maintained with the research community and all other relevant stakeholders, whose feedback and experiences should be collected and addressed with a spirit of constructive collaboration.

- 3) RI systems should be able to flexibly respond to the emergence of unintended consequences.** Whether in the form of positive incentives, or compulsory regulations, being open to revision is an ethical imperative for research ethics and research integrity structures. This follows not solely because new initiatives may have unintended consequences, but also because old initiatives may no longer adequately respond to the needs of the research community, whose practices, methodologies and cultures are in constant evolution.
- 4) Research on the impact of RI incentives and policies should be fostered and sustained.** Such support would come, first and foremost, by the collection, in each country, of relevant documentation on new RI interventions that are introduced and on data, qualitative or quantitative, on their results and effects. This information should be shared to any extent possible, when not published in the form of scientific reports and peer-reviewed studies.

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This thematic report provides lessons learned from the Mutual Learning Exercise (MLE) devoted to research integrity. The focus of this report is on setting incentives to promote and foster research integrity. The document starts with a review of the topic aimed at articulating the concept of incentives in the context of research integrity, in order to focus and thus facilitate the dialogue that took place at the Working Meeting. It subsequently discusses the multifaceted problem of incentives, which can be positive as well as "perverse", and the risk of unintended consequences, in relation to relevant and recent academic literature. The report then reviews major recent policy reports, to highlight the current expectations placed on institutions to promote and incentivize research integrity, it identifies core challenges to using incentives to promote good research practices across the EU, it summarizes the exchanges and discussions held at a dedicated workshop, and finally makes a set of policy recommendations on how to set incentives for research integrity across the EU.

*Studies and reports*