What is Behind the Shine? The Dark Side of Research Evaluation: A Conceptual Framework

Maya Lambovska [1]

[1] *University of National and World Economy, Department of Management, Sofia, Bulgaria*

Abstract **– Research evaluation (RE) is presently a widely discussed and prominent subject within the academic community. This article provides a conceptual framework that categorizes the dark side of RE and provides strategies to diminish it. At its core, this framework includes a generic model summarizing RE dark effects and anti-dark effects remedies and elucidating their relations. Four research questions were raised regarding the research interest in the dark side of RE, the nature of the dark effects of RE and remedies for them, their literature prominence, and whether it is possible to create a well-founded model for mitigating the dark side of RE. Theoretically, this framework is based on concepts of the philosophy of science. Methodologically, a structured literature review, methods of expert judgment, analysis and synthesis, and a sampler of 35 articles underpin it. Stakeholder and logical approaches were applied for classification. The suggested framework is the first in-depth attempt to elucidate the dark side of RE and how to mitigate it. In practical terms, the framework can be incorporated into university/government RE systems to "enlighten"/control their dark side, thereby improving the academic governance toolkit. It can also be used to develop subject-area/country-specific models for the dark side of RE.**

Keywords **– Higher education, academic governance, research evaluation, adverse effects, countermeasures.**

DOI: 10.18421/TEM124-67
https://doi.org/10.18421/TEM124-67

Corresponding author: Maya Lambovska,
Department of Management, University of National and World Economy, Sofia, Bulgaria
Email: mlambovska@abv.bg

Received: 28 July 2023.
Revised: 16 October 2023.
Accepted: 07 November 2023.
Published: 27 November 2023.

1. Introduction

Research evaluation (RE) has recently emerged as a hot topic for academia [1]. This topicality stems from the great importance of RE to academic stakeholders, both internal and external [2], [3]. For researchers, RE, mainly the publication output evaluation, is at the core of professional prestige and recognition, career growth, and tenure [4], [5]. For universities, rankings, reputation, and accreditation scores highly depend on evaluations of their publication activity, especially Scopus/Web of Science (WoS) publications [6], [7]. For funding organizations, research impact evaluation is now a worldwide tool to allocate public funding to universities and research projects [8], [9]. For governments, RE is one of the most frequently used instruments of national science policy [10]. For journals, there is a circular way of dependency between RE and journal reputation, according to [11]. Specifically, a journal's reputation is often defined based on its impact factor, metrics, and manuscript review process (quality evaluation) [11]. On the other hand, journal ranking is usually used to evaluate authors and institutions.

The review of Scopus/WoS literature on RE showed that researchers mainly focus on its positive effects [12], tools [13], country specificities [1], [4], [11] and research impact evaluation [6], [11], [12]. At the same time, researchers do not pay enough attention to the dark side of RE. In particular, a lack of comprehensive studies on the adverse effects of RE was found in the scientific literature. Similarly, the same applies to strategies aimed at mitigating these effects. Both adverse effects and countermeasures were mentioned in passing or separately in various studies devoted to RE [14] to [48]. Following Reed *et al*. concepts [12], the definition of RE should also cover RE adverse effects (often called, as here, "dark effects"). In addition, the adaptive management control system, including that of research management, necessarily responds to these effects by applying approaches/measures to overcome them, referred to here as "anti-dark effects remedies" or "remedies".

The absence of in-depth research on the dark side of (RE) stands out as a notable gap in the scientific literature. The aim of the study is to bridge this gap by creating a conceptual framework unveiling the dark side of RE and strategies to mitigate it.

In this vein, the main aim of this article is to develop a generic model for mitigating the dark side of RE that elucidates the dark effects of RE, anti-dark effects remedies, and the relations between them.

To this end, the following research questions (RQ) are raised here:

1. What is the research interest in the dark side of RE observed in Scopus/WoS databases?
2. What are the dark effects of RE and anti-dark effects remedies described in the Scopus/WoS literature?
3. What are the most literature-prominent dark effects of RE and remedies for them found in the Scopus/WoS?
4. Is it possible to develop a well-grounded model to mitigate the dark side of RE?

Theoretically, this study is based on the philosophy of science, stakeholder theory, logical approach and Scopus/WoS literature review. Philosophy of science defines a conceptual framework as a model, map, structure, or organization of concepts that represents, describes, and even visualizes a phenomenon in a simplified way [49]. Researchers perceive literature review as an integral part of conceptual frameworks [50]. Stakeholder theory is applied to support the idea that research policy, including research evaluation, should reflect the attitudes and values of stakeholders as this benefits them all [51]. More precisely, the stakeholder approach is used to classify the dark effects of RE and anti-dark effect remedies.

Methodologically, the structured literature review approach, descriptive statistics, expert judgment, analysis, and synthesis methods underpin this study.

2. Materials and Methods

This section describes the data, research tools, and research process of the present study.

2.1. Data

Data retrieved from Scopus/WoS before July 2023 were used in this study.

2.2. Research Toolkit

A structured literature review, stakeholder and logical approaches, analysis and synthesis methods, expert judgments, and descriptive statistics were applied.

2.3. Research Process

The creation of this conceptual framework unfolded in two phases. In Phase 1, the foundation of the conceptual framework was built. The Scopus/WoS literature was reviewed using a structured approach, expert judgment, analysis method and descriptive statistics. RQ1 and RQ2 were answered as a result. The review process went through the planning, conducting, and reporting stages. At the planning stage, a review protocol was written (Figure 1) based on study [52]. At the conducting stage, literature searches and selection were performed. The literature searches retrieved 673 papers, of which 289 were in Scopus and 384 in WoS (Table 1). They were checked for duplication. As a result, duplicate (indexed in both databases) papers were found. Duplicates were rejected for further consideration. That left 465 unduplicated papers. Their abstracts were carefully studied. As a result, 312 papers were deemed inconsistent with the research topic and excluded from the review. The full text of the remaining 153 papers was analysed in detail for relevance to the aim of this study. On this basis, 118 papers were excluded because they did not answer any of the research questions. At the end of that stage, the literature sampler of this study was formed. 35 journal articles, including references [14] to [48], were covered by it. At the reporting stage, the topicality of the RE dark side issue was explored (RQ1). Results were graphed through descriptive statistics (Figures 2, 3 and 4). RE dark effects and their remedies (both referred to here as "indicators") were retrieved from the sources of the literature sampler (RQ2). Results were tabulated by both effect/remedy and reference (Tables 2 and 3).

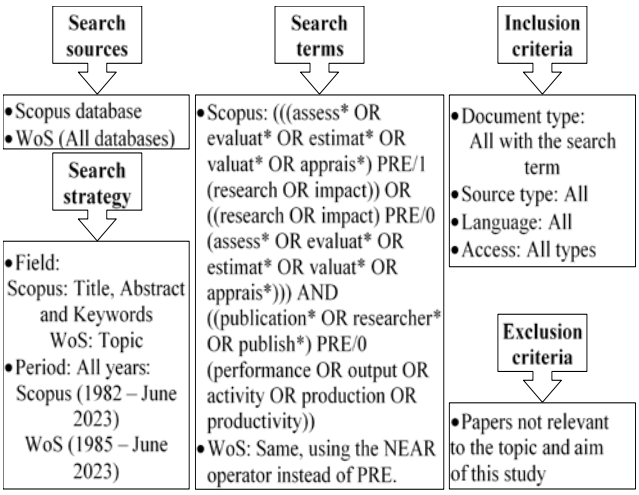

Figure 1. Protocol for the review

Table 1. Papers in Scopus/WoS indexed before July 2023

Papers	WoS	Scopus	Total
Retrieved	384	289	673
Duplicated			208
Unduplicated			465
Excluded first as a result of abstract analysis			312
Excluded second as a result of full-text analysis			118
Included in the literature sampler			35

In Phase 2, the conceptual framework was further elaborated and fully completed. The model for mitigating the dark side of RE was developed in this phase. RQ3 and RQ4 were also answered. The analysis and synthesis methods, stakeholder and logical approaches, expert judgment and descriptive statistics were applied. Phase 2 went through the analysis and synthesis stages. At the analysis stage, the phase 1 results were scrutinized using logic, expert judgments and the analysis method. Also, RE dark effects and anti-dark effects remedies were ranked based on their frequency of mention (RQ3). At the synthesis stage, the dark effects of RE and remedies for them were first classified by object/concerned subject (stakeholders).

Subject results were then broken down by stakeholder type. The relations between the two types of indicators were also outlined. All results from this stage were combined into a generic conceptual model for mitigating the dark side of RE (RQ4). Stakeholder and logical approaches, expert judgments and the synthesis method were applied at this stage.

3. Results

This section is divided into subsections under the research questions raised.

3.1. Research Interest in the Dark Side of RE (RQ1)

Research interest in the dark side of RE is explored here by:

- Year (Figure 2);
- Publishing source (journal here, Figures 2 and 3);
- Country (Figure 4).

According to the results by year, the dark side of RE has attracted interest in the last decade (Figure 2). This interest has become more noticeable since 2017. Peaks are in 2012, 2017-2018 and 2022-2023.

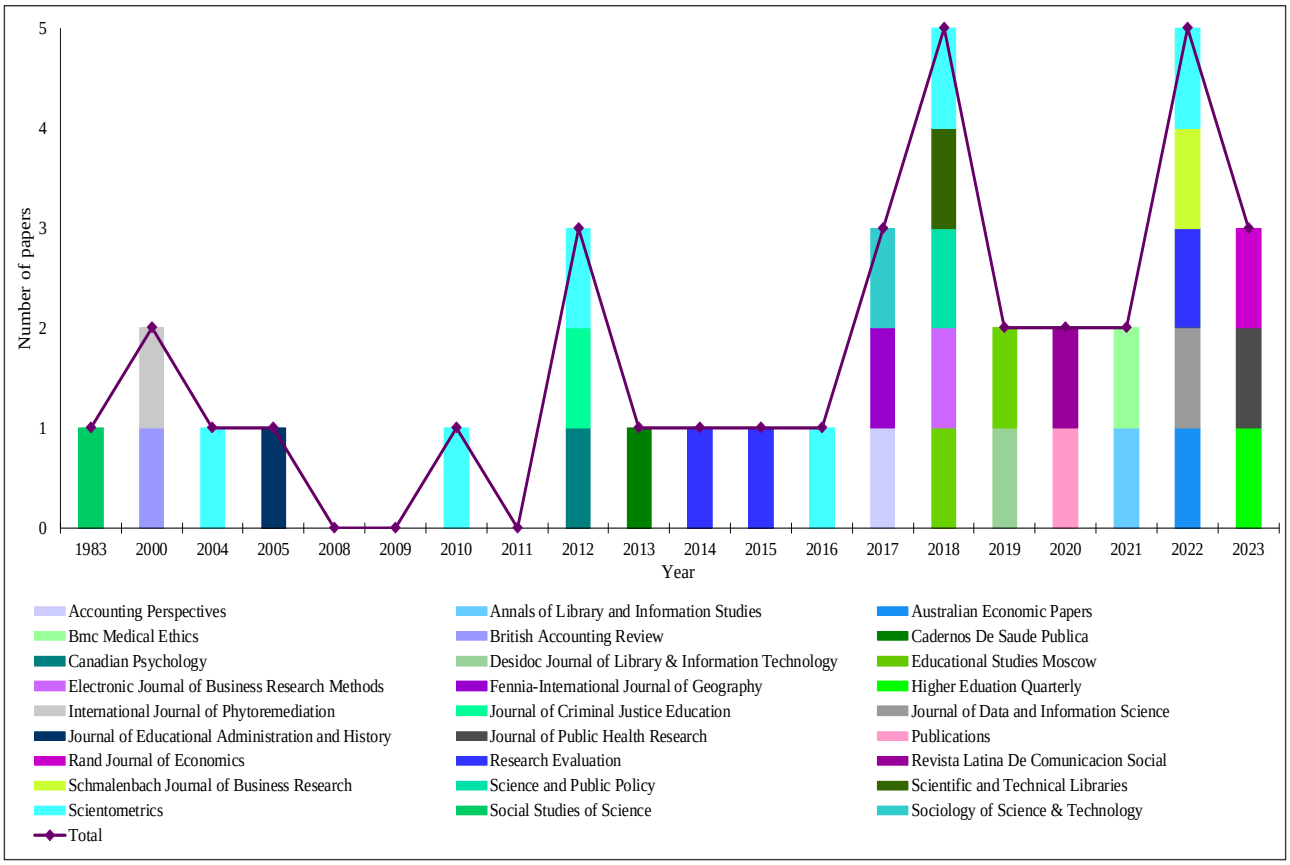

Figure 2. Breakdown of the sampler by year and journal

The articles within this literature sampler were published by 27 journals (Figure 3). Scientometrics (6 papers) and Research Evaluation (3) were the journals most interested in the studied topic.

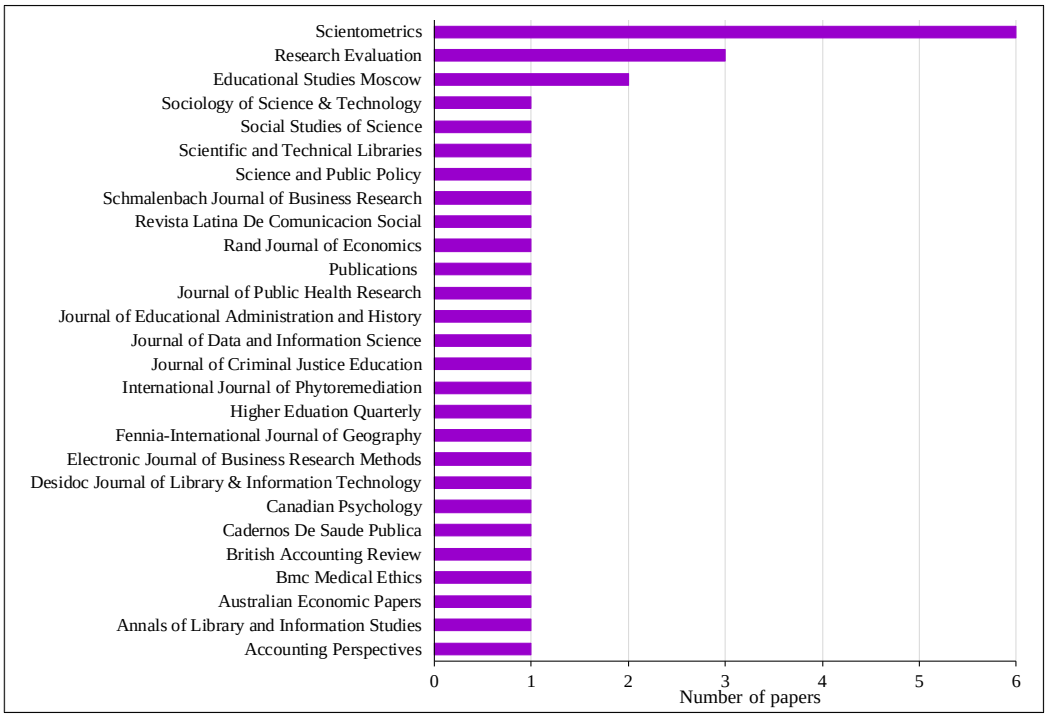

Figure 3. Distribution of the sampler by journal

The sampler covered theoretical and empirical studies. The most numerous were theoretical studies (6), defined as "unspecified" in Figure 4.

Empirical studies were conducted in 16 countries (Figure 4), with the most in the Russian Federation (RF, 5), the UK (4), New Zealand (3) and the USA (3).

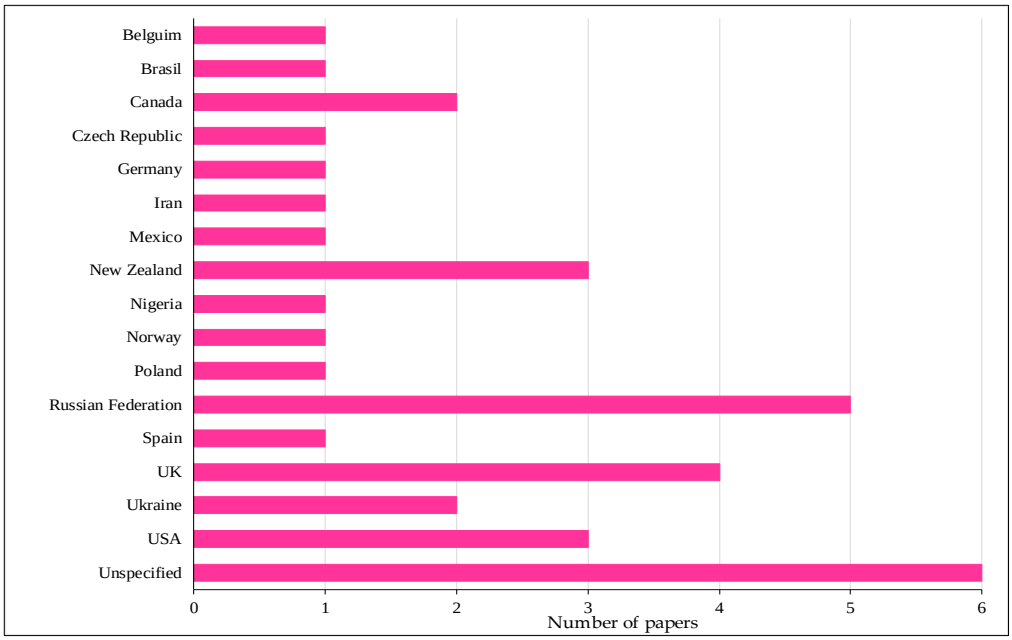

Figure 4. Distribution of the sampler by country

Answer to RQ1: There has been increased research interest in the dark side of RE in recent years, especially in 2017-2018 and 2022-2023 (Figure 2). Hence, the topic is up-to-date, not well-developed, and there is room for future elaboration. The primary publishing sources were the journals Scientometrics and Research Evaluation (Figure 3). Researchers from the RF, the UK, New Zealand and the USA were most interested in the topic (Figure 4).

Theoretical studies had the highest share in the sampler (Figure 4).

3.2. Dark effects of RE and Anti-Dark Effects Remedies (RQ2)

This subsection presents RE dark effects, anti-dark effects remedies and their sources found in the Scopus/WoS literature before July 2023 (Tables 2 and 3).

Both types of indicators were classified by object/subject and stakeholders. The original indicator titles found in the literature are used here.

The results about the dark effects of RE and anti-dark effects remedies are as follows:

1. Results for both types of indicators(Tables 2 and 3):

- Research was identified as the object of the dark side of RE, and 4 stakeholders as its subjects, including the publisher, the research funding organization, the researcher, and the university/ research organization.
- Both types of indicators were classified into 5 groups, 1 for the research and 4 for stakeholders.

Table 2. Dark effects of research evaluation found in the literature sampler

	Dark effect of RE	Reference number	Rank
1	**On research**		
1.1	***On research publications***		
1.1.1	Changed publishing types/locations	17 18 21 31 32 34 36 37 38 40 41 42	**3**
1.1.2	Focus on mainstream journal publication topics	17 18 35 42 46	**9**
1.1.3	Increased number of authors per paper	22 23 29 38 41 46 48	**7**
1.1.4	Repeated publications/citations for personal gain	19 31 35 39	**10**
1.1.5	"Salami" publications	23 30 37 42	**10**
1.1.6	Serial production of articles without innovation	23 30 31 37 42 48	**8**
1.2	***On research system***		
1.2.1	Bureaucratization of research activity	37 41	**12**
1.2.2	Decline in and non-stimulation of research activity	14 15 17 19 20 23 30 31 32 34 36 37 38 39 48	**2**
1.2.3	Instability or unpredictability of the research system	31 37	**12**
2	**On the publisher stakeholder**		
2.1	Corruption and nepotism of editors	31	**13**
2.2	Discrimination of non-English language journals	36 48	**12**
2.3	Methodological fetishism	41	**13**
2.4	Predatory publishers and dubious journals	30 32 34 35 38 48	**8**
3	**On the stakeholder of the research funding organization**		
3.1	Matthew effect	28 33 38 39 44	**9**
3.2	Unfair funding	27 28 31	**11**
4	**On the research stakeholder**		
4.1	***On researcher ambiance and well-being***		
4.1.1	Disturbances in the academic climate or researcher well-being	18 20 29 31 33 37 39 41 47 48	**5**
4.1.2	Infringed academic freedom	37 39 47	**11**
4.1.3	Pressure to publish	15 19 20 22 23 26 29 33 35 36 37 39 40 41 46 47 48	**1**
4.1.4	Unhealthy competition among researchers	18 23 36 37 41 46 47 48	**6**
4.2	***On researcher career***		
4.2.1	Disturbances in the academic profession	16 17 18 20 23 27 28 29 31 35 47	**4**
4.2.2	Diverting researchers from their other roles	18 29 37 39 40	**9**
4.2.3	Hyper-specialization of researchers	41	**13**
4.3	***On researcher publishing behaviour***		
4.3.1	Biases in researcher behaviour	24 30 32 35 38 39 48	**7**
4.3.2	Citing reviews, not original references	23	**13**
4.3.3	Data fabrication/publishing mostly positive results	23 46 48	**11**
4.3.4	Fraud and misconduct of researchers	23 30 35 37 39 46 48	**7**
4.3.5	Gift authorship	17 38 42	**11**
4.3.6	Increased self-citation	17 30 35	**11**
4.3.7	Mutual citation clubs and authorship exchange	23 30 31 41 42 43 45	**7**
4.3.8	Plagiarism	30 39 46 48	**10**
4.4	***On researcher-university relations***		
4.4.1	Lack of contribution to long term researcher-university relations	15	**13**
4.4.2	Unfair evaluation of researchers	24 25 27 31 36	**9**
5	**On the university/researcher organization stakeholder**		
5.1	Biased management conclusions	22 31	**12**
5.2	Diverting universities from their roles	16 21 40	**11**
5.3	Organizational myopia	34 36 37	**11**
5.4	Wrong/incomplete management decisions	22 31 33	**11**

Table 3. Anti-dark effects remedies found in the literature sampler

	Anti-dark effect remedy	Reference number	Rank
1	**For research, specifically the research evaluation system**		
1.1	***Coping approaches***		
1.1.1	Adjustments in the evaluation methodology/system	38 48	**3**
1.1.2	Aligning the evaluation system to specific disciplines/research areas	19 20 25 27	**2**
1.1.3	Combining quantitative and qualitative evaluation methods	31	**4**
1.1.4	Full transparency of evaluation processes	23	**4**
1.2	***Countermeasures***		
1.2.1	Adjusting the h-index to weight co-authorship	22	**4**
1.2.2	Breakdown by subjects and decomposition of bibliometric indicators	43	**4**
1.2.3	Emphasis on quality measures	16 17 23 30 34 36 39 40	**1**
1.2.4	Evaluation through the researcher's five most important works, contributing to science	23	**4**
1.2.5	Introducing the Balanced Scorecard as an evaluation tool	16	**4**
1.2.6	Introducing d-index & a web application for analysing author dependencies	25	**4**
1.2.7	Introducing a system of authorship best assessment	45	**4**
1.2.8	Multi-criteria measures using a tailored version of the 'benefit-of-the doubt' (BoD)	24	**4**
1.2.9	Normalizing standard measures and using relative metrics of evaluation	43	**4**
2	**For the publisher stakeholder**		
2.1	Restoring the collective intellectual status of journals	41	**4**
3	**For the stakeholder of the research funding organization**		
3.1	Aligning funding systems to specific disciplines/research areas	27	**4**
3.2	Changes to performance-based funding schemes	17	**4**
3.3	Ensuring consistency between clearly stated objectives and incentives of the funding scheme	17	**4**
4	**For the researcher stakeholder**		
4.1	***For researcher ambience and well-being***		
4.1.1	Active socialization organizational policy	37	**4**
4.1.2	Aligning workloads with researchers' expectations	47	**4**
4.1.3	Development of the academic environment	37 47	**3**
4.1.4	Introducing 'non-productive' time into academic timetables	29	**4**
4.2	***For researcher publishing behaviour***		
4.2.1	Collaboration (mainly international)	26 29 35 47	**2**
4.2.2	Educating researchers about the repercussions of scientific misconduct	46	**4**
4.2.3	Improving researchers' skills	15	**4**
4.2.4	Mentorship	29	**4**
4.3	***For researcher pay***		
4.3.1	Increasing incentive payments	15	**4**
4.3.2	Increasing the share of fixed wages to support intrinsic motivation	37	**4**
4.3.3	Introducing a correct incentive scheme	22	**4**
5	**For the university/research organization stakeholder, specifically its research management**		
5.1	Introducing positive motivational strategies	47	**4**
5.2	Overcoming side effects of administrative levers	37	**4**
5.3	Providing feedback to researchers and achievable performance goals	47	**4**
5.4	Rationale for the research evaluation framework	47	**4**

2. Results for the dark effects of RE (Table 2):

- A total of 36 RE dark effects were detected.
- RE dark effects on research (9 in number, row - r. 1) were divided into 2 subgroups: research publications (6, r. 1.1) and research system (3, r. 1.2).
- The groups of RE dark effects on the publisher, the research funding organization and the university/research organization stakeholders were not subdivided. They covered 4 (r. 2), 2 (r. 3), and 4 (r. 5) dark effects, respectively.

- The largest was the group of RE dark effects on the researcher stakeholder (17 dark effects, r. 4), broken into 4 subgroups: on researcher ambience and well-being (4, r. 4.1), researcher career (3, r. 4.2), researcher publishing behaviour (8, r. 4.3), and researcher-university relations (2, r. 4.4).
- RE dark effects on researcher publishing behaviour was the largest subgroup.
- The smallest group and subgroup were those of RE dark effects on the research funding organization stakeholder and researcher-university relations, respectively.

3. Results for anti-dark effects remedies (Table 3):

- 32 anti-dark effects remedies were found in total.
- Anti-dark effects remedies for the research evaluation system (13, r. 1) were subdivided into coping approaches (4, r. 1.1) and countermeasures (9, r. 1.2).
- The groups of remedies for the publisher, the research funding organization and the university/research organization stakeholders were not subdivided. They covered 1 (r. 2), 3 (r. 3), and 4 (r. 5) remedies, respectively.
- The group of remedies for the researcher stakeholder (11, r. 4) was broken into 3 subgroups: for researcher ambience and well-being (4, r. 4.1), researcher publishing behaviour (4, r. 4.2), and researcher pay (3, r. 4.3).
- The group of remedies for the researcher evaluation system and its subgroup of countermeasures were the largest.
- The smallest was the group of remedies for the publisher stakeholder.

Answer to RQ2: RE dark effects (36) and anti-dark effects remedies (32) were classified into 5 groups. One group was for the research as the object of evaluation. The others were for the stakeholders drawn from this Scopus/WoS literature sampler, including the publisher, the research funding organization, the researcher, and the university/research organization. RE dark effects on the researcher stakeholder and anti-dark effects remedies for the research evaluation system were most numerous. A detailed description of RE dark effects and anti-dark effects remedies is shown in Tables 2 and 3, respectively.

3.3. Literature Prominence of RE Dark Effects and Anti-Dark Effects Remedies (RQ3)

In this subsection, the most literature-prominent RE dark effects and anti-dark effects remedies are presented. Prominence is based on ranking the indicators by their frequency of mention in the literature sampler (Rank column, Tables 2 and 3).

Answer to RQ3: The most prominent indicators in this Scopus/WoS literature sampler:

1. For the dark effects of RE (Table 2):

- With mentions (m.) in 17 sources, the most prominent dark effect (1st rank) was pressure to publish (r. 4.1.3). The decline in and non-stimulation of research quality ranked 2nd (15 m., r. 1.2.2), and changed publishing types/locations ranked 3rd (12 m., r. 1.1.1).
- Two other dark effects were also frequently mentioned. These are disturbances in the academic profession (4th, 11 m., r. 4.2.1) and disturbances in the academic climate or researcher well-being (5th, 10 m., r. 4.1.1).

2. For anti-dark effects remedies (Table 3):

- Emphasis on quality measures (8 m., r. 1.2.3) was the most prominent (ranked 1st) anti-dark effects remedy.
- With 4 mentions, 2 remedies, aligning the evaluation system to specific disciplines/research areas (r. 1.1.2) and collaboration (mainly international, r. 4.2.1), ranked 2nd.
- The development of the academic environment ranked 3rd (2 m., r. 4.1.3).

3.4. Mitigating the Dark Side of RE – A Model (RQ4)

This subsection presents a model to mitigate the dark side of RE (Figure 5). The model captures and systematizes the indicators of RE dark effects and anti-dark effects remedies found in the Scopus/WoS literature sampler used here. In addition, it outlines the relations between the two types of indicators.

By nature, the model is generic. It summarizes all available information in the literature sampler on the studied topic without eliminating data at the author's discretion for expediency. The model does not account for the prominence of the indicators in the literature sampler. It also does not reflect subject area/country specificity.

In the model, RE dark effects and remedies for them were classified by both object/subject and stakeholder using expert judgement and stakeholder and logical approaches. Thus, 5 groups of results were formed for both types of indicators: for the research and the stakeholders of the publisher, the research funding organization, the researcher and the university. In addition, some groups were subdivided due to the different nature of their indicators. The indicators, their groups and subgroups are detailed in Tables 2 and 3. Further, based on the logical approach and methods of analysis and synthesis, the relations between the two types of indicators for each group were established and described in the model.

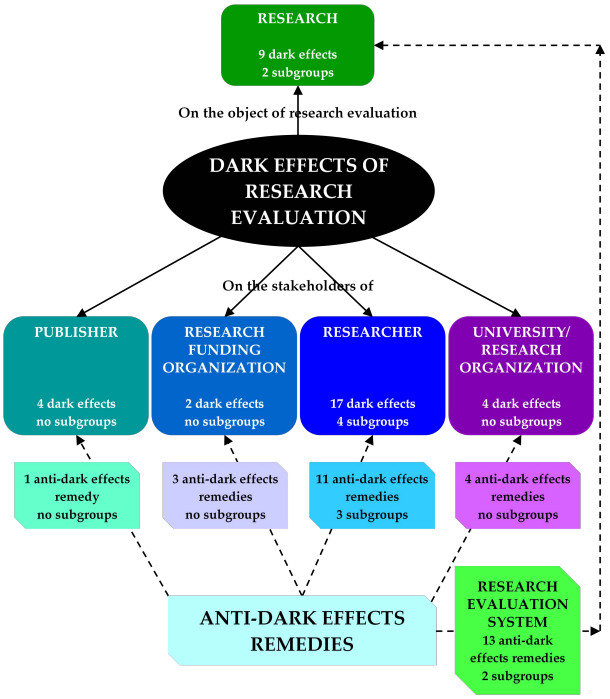

Figure 5. Model for mitigating the dark side of research evaluation

Answer to RQ4: It is possible to create a logically, theoretically, and methodologically sound model for mitigating the dark side of RE. Such a model was developed through this study (Figure 5). Theoretically, the model is based on concepts of the philosophy of science, stakeholder theory, logical approach and Scopus/WoS literature review. The methodological toolkit of the model covers expert judgments and methods of analysis and synthesis.

4. Discussion

A conceptual framework for the dark side of RE is presented in this article. The framework clarifies the state of Scopus/WoS literature before July 2023 on the studied topic (RQ1), systematizes indicators of RE dark effects and anti-dark effects remedies (RQ2), and explores their prominence in the literature (RQ3). The core of this framework is a generic model for mitigating the dark side of RE (RQ4). It summarizes the dark effects of RE and anti-dark effects remedies, and elucidates their relations.

Regarding RQ1: Three main factors underlie the growing research interest in the dark side of RE (Figure 2). The first is the high significance of RE to stakeholders of academia [2], [3], [5]. The second is the lack of in-depth research on the dark side of RE. Evidence is provided by the passing mentions of RE dark effects in the literature sampler used here . The third factor refers to the existing problems of evaluation tools, both quantitative [12], [13] and qualitative [3], [8], [11], [53].

Logically, Scientometrics and Research Evaluation were identified as primary publishing sources (Figure 3), as the topic of RE fits closely within the scope of these journals. The great interest of Russian authors in RE in recent years (Figure 4) stems from the intro of a country-specific research evaluation system for prioritizing science [33], [38], [48], [54]. The increased interest of authors from the UK, New Zealand and the USA (Figure 4) can be explained by the constant improvements in their RE systems introduced there long ago [17], [44], [47].

Regarding RQ2: This study summarizes the dark effects of RE and remedies for them, a research output not previously achieved according to the Scopus/WoS literature. Moreover, it classifies both types of indicators (5 groups, Tables 2 and 3), while no such classifications were found in the literature sampler. To a large extent, these research results form the basis of the model suggested here.

In general, the results for both types of indicators are logical. As expected, most indicators were captured in 2 groups - the research and the researcher stakeholder as the object and subject of evaluation. Indicator titles and stakeholder comprehensiveness were directly derived from the literature review and therefore need no comment.

An in-depth study of the results for RQ2 suggests the following main findings and recommendations. First, most RE dark effects on research can be viewed as direct or indirect consequences of RE dark effects on stakeholders. A particularly striking example is RE dark effects on scientific publications (increased number of authors per paper, repeated publications/citations for personal gain, "salami" publications, serial production of articles without innovation, r. 1.1.3-1.1.6, Table 2) as consequences of RE dark effects on researcher publishing behaviour (data fabrication, gift authorship, mutual citation clubs and authorship exchange, etc., r. 4.3, Table 2). Another prime example is the dependence of the research system's RE dark effects (r. 1.2, Table 2) on the university stakeholder's RE dark effects (r. 5.1, 5.3-5.4, Table 2).

Second, the ineffective research evaluation system can be identified as the main reason for the emergence of the RE dark effects. Typically, ineffectiveness arises when research evaluation systems are not subject-area/country-specific ([4], [16], [19], [20], [26], [32], [33], [35], [41], [42]) or are not balanced to specific public needs ([12], [15], [19], [26], [31], [38], [42]), do not account for the available scientific infrastructure ([3], [8], [32], [35], [46]) or place too much emphasis on quantity rather than quality ([14], [15], [17], [19], [20], [23], [30], [31], [32], [34], [36], [37], [48]).

Poorly formulated, implemented or distorted science policy, university or national, is another important cause of the RE dark effects ([10], [33], [38], [55]). Other reasons that can be pointed out address university, publisher or funding management issues ([7], [8], [14], [17], [22], [31], [33], [44]), insufficient scientific infrastructure ([3], [11], [35], [46]), poorly structured or outdated research systems ([8], [15], [22], [26], [30], [32], [34], [35], [38]), subject behaviour issues ([4], [5], [23], [27], [30], [32], [37], [39], [46]), etc.

Third, anti-dark effects remedies found in the literature sampler are primarily aimed at improving systems, namely the RE system (r. 1.1, Table 3) and its quantitative toolkit (r. 1.2, Table 3), the funding system (r. 3, Table 3), the university management system (r. 4.1, 4.3 and 5, Table 3). Emphasis on quality measures is also strongly recommended in the literature sampler (r. 1.2.3, Table 3) but without explicitly clarifying these measures. The other anti-dark effects remedies aim to foster good practices related to researcher publishing behaviour (r. 4.2, Table 3) and the quality of scientific journals (r. 2, Table 3). According to the author, the anti-dark effects remedies are correctly systematized in the relevant groups and suitable for mitigating the RE dark effects in the same-name groups.

Fourth, some very close or even partially overlapping titles of both RE dark effects and anti-dark effects remedies were found in the literature sampler. In this vein, an essential recommendation for developing specific models to mitigate the dark side of RE is to define clearly and distinguish the indicators, and for implementing the models is to account for indicators' mutual and hidden influences.

Regarding RQ3: As for the dark effects of RE (Table 2), the pressure to publish (also known as "publish-or-perish", ranked 1st) and the decline in and non-stimulation of research quality (2nd) emerged as the most prominent in the literature sampler used. These results fully confirm widespread views about the declining quality of scientific publications [4], [55] and the harmful impact of pressure to publish on research output and community [4], [5]. According to the author, these dark effects, especially publish-or-perish, are the main prerequisites for the high prominence of 3 other indicators: changed publishing types/locations (3rd), disturbances in the academic profession (4th) and disturbances in the academic climate or researcher well-being (5th). Further, as expected, the most literature-prominent dark effects of RE primarily address the research and the researcher stakeholder as the object and primary subject of evaluation.

Regarding the anti-dark effects remedies (Table 3), the results are logical, as the most prominent ones counteract the most prominent RE dark effects.

In this regard, the most frequently mentioned remedy, emphasis on quality measures (ranked 1st), is a countermeasure to the RE dark effect of declining research quality (2nd). However, it also counters the publish-or-perish dark effect (1st). According to the author, the same conclusions apply to the second-ranked anti-dark effects remedies - aligning the evaluation system to specific disciplines/research areas and collaboration. The third most literature-prominent remedy, the development of the academic environment, is directly aimed at diminishing the dark effect of disturbances in the academic climate or researcher well-being (5th).

Regarding RQ4: The model presented here summarizes the main results of this study on the dark side of RE, including the dark effects of RE, anti-dark effects remedies, and the relations between them. In it, both types of indicators were classified by object/subject and stakeholder. Indicators were detailed in response to RQ2 (Tables 2 and 3).

The model is generic. In this regard, it does not account for any specifics (country, subject area, etc.) and literature prominence of the covered indicators.

The proposed model for mitigating the dark side of RE can be used as a basis for further development of theory and practice on this topic. Also, the model can be a criterion for the effectiveness of the RE system. The fewer RE dark effects in a particular model and the more effective remedies for them, the more effective the respective RE system.

Limitations: The main limitations of this study address the review protocol used in it. These are primarily the Scopus/WoS databases as search sources and the search term used (Figure 1).

5. Conclusion

In summary, the proposed framework adds to the body of RE knowledge, specifically on its dark side. As far as available information suggests, this framework, especially the model it encompasses, is the first thorough and well-founded attempt to elucidate the dark side of RE, including how to mitigate it.

The expected practical implications are in two main directions. First, universities and governments can use the model developed here to enlighten and control the dark side of RE. Furthermore, they can incorporate the model into their RE systems. Second, the generic nature of the model and the results for the literature prominence of RE dark effects and remedies for them make it possible to develop any specific modifications to the model. These implications are valuable for academic governance at both the university and government levels.

Finding conceptual and methodological solutions to assess the influence of the dark effects of RE on academic stakeholder motivation, the effectiveness of RE systems, research quality, publication output, and researcher performance can be suggested as a future research agenda. Another important topic for future research is to create systems to monitor and control the dark side of RE to diminish its influence, i.e. to "enlighten" it. Research on these topics will contribute to improving academic governance at all levels.

Acknowledgements

This work was financially supported by the UNWE Research Programme (Research Grant No. 25/2023).

References:

[1]. Okon, A. E., Owan, V. J., & Owan, M. V. (2022). Mentorship Practices and Research Productivity Among Early-Career Educational Psychologists in Universities. *Educational Process: International Journal*, *11*(1), 105–126. Doi: 10.22521/edupij.2022.111.7

[2]. Angelova-Stanimirova, A. (2023). Critical Criteria for Evaluation of Scientific Research Activity in Science Direct. *KNOWLEDGE - International Journal*, *58*(1), 171–177.

[3]. Alfirević, N., Pavičić, J., & Rendulić, D. (2023). A Bibliometric Analysis of Public Business School Scientific Productivity and Impact in South-East Europe (2017-2021). *South East European Journal of Economics and Business*, *18*(1), 27–45. Doi: 10.2478/jeb-2023-0003

[4]. Raitskaya, L., & Tikhonova, E. (2020). Overcoming Cultural Barriers to Scholarly Communication in International Peer-Reviewed Journals. *Journal of Language and Education*, *6*(2), 4–8. Doi: 10.17323/JLE.2020.11043

[5]. Lambovska, M., & Todorova, D. (2021). 'Publish and Flourish' Instead of 'Publish or Perish': A Motivation Model for Top-Quality Publications. *Journal of Language and Education*, *7*(1), 141–155. Doi: 10.17323/jle.2021.11522

[6]. Bornmann, L. (2012). Measuring the Societal Impact of Research. *EMBO Reports*, *13*(8), 673–676. Doi: 10.1038/embor.2012.99

[7]. Gubaeva, M. M., Zyateva, O. A., Pitukhin, E. A., & Pitukhin, P. V. (2023). Promotion of Universities in the Rankings as a Result of Improving Management Efficiency. *Perspectives of Science and Education*, *61*(1), 740–752. Doi: 10.32744/PSE.2023.1.44

[8]. Ciurak, P., Mijač, T., & Wierczyński, G. (2021). An Overview of Science Evaluation in Poland and Croatia. *Management: Journal of Contemporary Management Issues*, *26*(2), 229–244. Doi: 10.30924/MJCMI.26.2.13

[9]. Staneva, D., Alexandrova, M., & Petkov, G. (2015). Quality Assessment Criteria and Their Role in the Development of a Successful Educational Project Proposal. *Periodica Polytechnica Social and Management Sciences*, *23*(2), 84–97.

[10]. Korytkowski, P., & Kulczycki, E. (2019). Examining How Country-Level Science Policy Shapes Publication Patterns: The Case of Poland. *Scientometrics*, *119*(3), 1519–1543. Doi: 10.1007/s11192-019-03092-1

[11]. Morales, E., McKiernan, E. C., Niles, M. T., Schimanski, L., & Alperin, J. P. (2021). How Faculty Define Quality, Prestige, and Impact of Academic Journals. *PLoS ONE*, *16*(10). Doi: 10.1371/journal.pone.0257340.

[12]. Reed, M. S., Ferré, M., Martin-Ortega, J., Blanche, R., Lawford-Rolfe, R., Dallimer, M., & Holden, J. (2021). Evaluating Impact from Research: A Methodological Framework. *Research Policy*, *50*(4). Doi: 10.1016/j.respol.2020.104147

[13]. Tyurin, A., & Shamshurin, V. (2023). Computerized evaluation of publication effectiveness using application programming interfaces of citation databases. *AIP Conference Proceedings*, *2605(*1). Doi: 10.1063/5.0110347

[14]. Anderson, D. L., & Tressler, J. (2014). The New Zealand Performance-Based Research Fund and Its Impact on Publication Activity in Economics. *Research Evaluation*, *23*(1), 1–11. Doi: 10.1093/reseval/rvt017

[15]. Antosik, L., & Shevchenko, E. (2018). Assessment of the Impact of an Effective Contract Introduction on the Publication Activity of a University Faculty: The Case of a Regional University. *Educational Studies Moscow*, *2018*(3), 247–267. Doi: 10.17323/1814-9545-2018-3-247-267

[16]. Bence, V., & Oppenheim, C. (2005). The Evolution of the UK's Research Assessment Exercise: Publications, Performance and Perceptions. *Journal of Educational Administration and History*, *37*(2), 137–155. Doi: 10.1080/00220620500211189

[17]. Buckle, R. A., & Creedy, J. (2022). Methods to Evaluate Institutional Responses to Performance-Based Research Funding Systems. *Australian Economic Papers*, *61*(3), 615–634. Doi: 10.1111/1467-8454.12263

[18]. Bujaki, M. l., & Mcconomy, B. J. (2017). Productivity in Top-10 Academic Accounting Journals by Researchers at Canadian Universities at the Start of the 21st Century. *Accounting Perspectives*, *16*(4), 269–313. Doi: 10.1111/1911-3838.12153

[19]. Carleton, R. N., Parkerson, H. A., & Horswill, S. C. (2012). Assessing the Publication Productivity of Clinical Psychology Professors in Canadian Psychological Association-Accredited Canadian Psychology Departments. *Canadian Psychology*, *53*(3), 226–237. Doi: 10.1037/a0027731

[20]. Copes, H., Cardwell, S., & Sloan, J. J. (2012). h-Index and m-Quotient Benchmarks of Scholarly Impact in Criminology and Criminal Justice: A Preliminary Note. *Journal of Criminal Justice Education*, *23*(4), 441–461. Doi: 10.1080/10511253.2012.680896

[21]. Cottingham, J., & Hussey, R. (2000). Publishing in Professional Accounting Journals: Academic Institutional Performance 1987-96. *British Accounting Review*, *32*(1), 101–114. Doi: 10.1006/bare.1999.0121

[22]. Crespo, N., & Simões, N. (2021). The Problem of Credit in Research Evaluation – The Case of Economics. *Annals of Library and Information Studies*, *68*(3), 225–229. Doi: 10.56042/alis.v68i3.40870

[23]. de Camargo, K. R. (2013). Produção Científica: Avaliação Da Qualidade Ou Ficção Contábil? *Cadernos de Saude Publica*, *29*(9), 1707–1711. Doi: 10.1590/0102-311X00115413

[24]. de Witte, K., & Rogge, N. (2010). To Publish or Not to Publish? On the Aggregation and Drivers of Research Performance. *Scientometrics*, *85*(3), 657–680. Doi: 10.1007/s11192-010-0286-5

[25]. Di Caro, L., Cataldi, M., & Schifanella, C. (2012). The D-Index: Discovering Dependences among Scientific Collaborators from Their Bibliographic Data Records. *Scientometrics*, *93*(3), 583–607. Doi: 10.1007/s11192-012-0762-1

[26]. Durodolu, O. O., Adeleke, A. A., & Ojo, J. O. (2019). Infometrics Growth Analysis of Medical Science Researchers in Nigeria during 2007 to 2016. *DESIDOC Journal of Library and Information Technology*, *39*(5), 215–221. Doi: 10.14429/djlit.39.5.14494

[27]. Fernandes, M., & Walter, A. (2022). Publication Behavior in Different Fields of Business Administration: From Anecdotal to Empirical Evidence. *Schmalenbach Journal of Business Research*, *74*(3), 265–306. Doi: 10.1007/s41471-022-00137-9

[28]. Fox, M. F. (1983). Publication Productivity among Scientists: A Critical Review. *Social Studies of Science*, *13*(2), 285–305. Doi: 10.1177/030631283013002005

[29]. France, A. (2018). Review of Factors and Activities Contributing to Proficient Academic Business Researchers. *Electronic Journal of Business Research Methods*, *16*(3), 117–127.

[30]. Glavcheva, Y. N., Kanishcheva, O. V., & Glavchev, M. I. (2018). Evaluating the Quality of Research Activities: Investigating into the Uniqueness. *Scientific and Technical Libraries*, *10*, 5–21. Doi: 10.33186/1027-3689-2018-10-5-21

[31]. Good, B., Vermeulen, N., Tiefenthaler, B., & Arnold, E. (2015). Counting Quality? The Czech Performance-Based Research Funding System. *Research Evaluation*, *24*(2), 91–105. Doi: 10.1093/reseval/rvu035

[32]. Guskov, A. E., Kosyakov, D. V., & Selivanova, I. V. (2018). Boosting Research Productivity in Top Russian Universities: The Circumstances of Breakthrough. *Scientometrics*, *117*(2), 1053–1080. Doi: 10.1007/s11192-018-2890-8

[33]. Guskov, A., Kosyakov, D., & Selivanova, I. (2016). Scientometric Research in Russia: Impact of Science Policy Changes. *Scientometrics*, *107*(1), 287–303. Doi: 10.1007/s11192-016-1876-7

[34]. Hladchenko, M. (2022). Implications of Publication Requirements for the Research Output of Ukrainian Academics in Scopus in 1999-2019. *Journal of Data and Information Science*, *7*(3), 71–93. Doi: 10.2478/jdis-2022-0016

[35]. Ianoş, I., & Petrişor, A. I. (2020). An Overview of the Dynamics of Relative Research Performance in Central-Eastern Europe Using a Ranking-Based Analysis Derived from SCImago Data. *Publications*, *8*(8). Doi: 10.3390/PUBLICATIONS8030036

[36]. Jones, M. (2017). Can Research Quality Be Measured Quantitatively? On Quality of Scholarship, Numerical Research Indicators and Academic Publishing - Experiences from Norway. *Fennia*, *195*(2), 164–174. Doi: 10.11143/fennia.66602

[37]. Kalgin, A., Kalgina, O., & Lebedeva, A. (2019). Publication Metrics as a Tool for Measuring Research Productivity and Their Relation to Motivation. *Educational Studies Moscow*, *2019*(1), 44–86. Doi: 10.17323/1814-9545-2019-1-44-86

[38]. Kosyakov, D., & Guskov, A. (2022). Reasons and Consequences of Changes in Russian Research Assessment Policies. *Scientometrics*, *127*(8), 4609–4630. Doi: 10.1007/s11192-022-04469-5

[39]. Kulikowski, K., Przytuła, S., & Sułkowski, Ł. (2023). When Publication Metrics Become the Fetish: The Research Evaluation Systems' Relationship with Academic Work Engagement and Burnout. *Research Evaluation*, *32*(1), 4–18. Doi: 10.1093/reseval/rvac032

[40]. Marston, C., & Ayub, A. (2000). Relationship between publications in selected journals and research assessment exercise rankings in 1996 for UK accountancy departments. *Accounting Education*, *9*(1), 93-102. Doi: 10.1080/096392800413672

[41]. Martínez-Nicolás, M. (2020). Communication Research in Spain (1985-2015). Institutional Context, Academic Community and Scientific Production. *Revista Latina de Comunicacion Social*, *2020*(75), 383–414. Doi: 10.4185/RLCS-2020-1432

[42]. Neff, M. W. (2018). Publication Incentives Undermine the Utility of Science: Ecological Research in Mexico. *Science and Public Policy*, *45*(2), 191–201. Doi: 10.1093/scipol/scx054

[43]. Persson, O., Glänzel, W., & Danell, R. (2004). Inflationary Bibliometric Values: The Role of Scientific Collaboration and the Need for Relative Indicators in Evaluative Studies. *Scientometrics*, *60*(3), 421–432. Doi: 10.1023/B:SCIE.0000034384.35498.7d

[44]. Qiu, Y. J. J. (2023). The Matthew Effect, Research Productivity, and the Dynamic Allocation of NIH Grants. *RAND Journal of Economics*, *54*(1), 135–164. Doi: 10.1111/1756-2171.12433

[45]. Saba, L., Porcu, M., De Rubeis, G., Balestrieri, A., Serra, A., & Carta, M. G. (2023). A New System of Authorship Best Assessment. *Journal of Public Health Research*, *12*(1). Doi: 10.1177/22799036221149840

[46]. Shamsoddin, E., Torkashvand-Khah, Z., Sofi-Mahmudi, A., Janani, L., Kabiri, P., Shamsi-Gooshki, E., & Mesgarpour, B. (2021). Assessing Research Misconduct in Iran: A Perspective from Iranian Medical Faculty Members. *BMC Medical Ethics*, *22*(1). Doi: 10.1186/s12910-021-00642-2

[47]. Weinstein, N., Haddock, G., Chubb, J., Wilsdon, J., & Manville, C. (2023). Supported or Stressed While Being Assessed? How Motivational Climates in UK University Workplaces Promote or Inhibit Researcher Well-Being. *Higher Education Quarterly*, *77*(3). Doi: 10.1111/hequ.12420

[48]. Yurevich, M. A., & Erkina, D. S. (2017). "Publication Rally": Direct Threat or Opportunity for Scientific Community? *Sociology of Science & Technology*, *8*(2), 104–116.

[49]. Plano Clark, V. L., Ivankova, N. V., & Yang, N. (2023). Frameworks for Conceptualizing Mixed Methods Research. In *International Encyclopedia of Education (4th Ed)*. Doi: 10.1016/B978-0-12-818630-5.11038-3

[50]. Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The Distinctions Between Theory, Theoretical Framework, and Conceptual Framework. *Academic Medicine*, *95*(7), 989–994. Doi: 10.1097/ACM.0000000000003075

[51]. Nedelko, Z., Potocan, V., & Alfirevic, N. (2017). Personal Values as a Building Block for Social Responsibility of Higher Education Institutions. In *Exploring the Influence of Personal Values and Cultures in the Workplace*. Doi: 10.4018/978-1-5225-2480-9.ch007

[52]. Page, M. J. et al. (2021). The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *Systematic Reviews*, *10*(1). Doi: 10.1186/s13643-021-01626-4

[53]. Lambovska, M. (2022). A Fuzzy Logic Model for Evaluating the Motivation for High-Quality Publications: Evidence from a Bulgarian University. *Management (Croatia)*, *27*(2), 87–108. Doi: 10.30924/mjcmi.27.2.6

[54]. Lambovska, M. R., & Raitskaya, L. K. (2022). High-Quality Publications in Russia: A Literature Review on How to Influence University Researchers. *Integration of Education*, *26*(2), 312–330. Doi: 10.15507/1991-9468.107.026.202202.312-330

[55]. Civera, A., Lehmann, E. E., Paleari, S., & Stockinger, S. A. E. (2020). Higher Education Policy: Why Hope for Quality When Rewarding Quantity? *Research Policy*, *49*(8). Doi: 10.1016/j.respol.2020.104083