

# PUBLICATION AND COLLABORATION ANOMALIES IN ACADEMIC PAPERS ORIGINATING FROM A PAPER MILL: EVIDENCE FROM A RUSSIA-BASED PAPER MILL

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## Abstract

Paper mills represent an offer or on-demand writing of fraudulent academic manuscripts for sale. Recent investigations by research integrity experts have shown the infiltration of the academic literature with paper-mill production (Bik 2020, Schneider 2020, Schneider 2021). To date, paper mills have been detected due to suspicious submission process (COPE Council 2021, Grove 2021, Day 2022) or due to anomalies in the paper, falsification/fabrications in images and data (Christopher 2018, Else & Van Noorden 2021, van der Heyden 2021), and similarities between texts, f.e. the usage of common templates (Byrne & Christopher 2020, Cabanac et al. 2021, Else & Van Noorden 2021, Heck et al. 2021, RSC 2021).

Paper mills offering co-authorship slots in papers submitted to international journals is a rather new phenomenon in Russia. They appeared as a response to the new regulatory framework of 2011-2012, setting new criteria for research evaluation, including publications and citations in international journals indexed in Web of Science and Scopus and setting nationwide indicators. Among these companies, “International Publisher” LLC offers co-authorship for sale on the website. The goal of our present study was to identify papers originating from the paper mill “International Publisher” LLC and analyse the predictors of fraudulent papers.

The data were obtained from two main sources. First, since 2019, we collected the offers of “International Publisher” LLC published on the 123mi.ru/1 website. Second, the titles of papers were also provided in the contracts published on the website. A total of 1009 paper and their

titles offered during 2019-2021 on the 123mi.ru website were analysed to detect auctioned papers published in journals. Each title from an offer was manually searched in Google, Google Scholar or Scopus. Some of the titles were found in Russian, so they were translated with Google Translate before the search.

The study allowed us to identify at least 434 papers (including one preprint, one duplication paper and 15 republications of papers erroneously published in hijacked journals) that are potentially linked to the paper mill. Further evidence of suspicious provenance from the paper mill is provided: matches in number of co-authorship slots, year of publication, country of the journal, country of a co-authorship slot and similarities of abstracts. These problematic papers are co-authored by scholars associated with at least 39 countries and submitted both to predatory and reputable journals.

The success of the paper mill “International publisher” LLC is connected with the collaboration strategy with journals. The study allowed to detect dishonest collaboration with journals or editors, submissions to low-quality or predatory journals for which the rate of acceptance is rather high. This paper mill also applied “one paper-one journal” principle, e.g., submission of a problematic paper to an individual legitimate journal only once. It doesn’t allow to detect a fraudulent paper by an individual journal.

This study also demonstrates collaboration anomalies and the phenomenon of suspicious collaboration in questionable papers and examines the predictors of the Russian paper mill. The analysis showed irregularities between

the sample and common organization of science in Russia, providing further evidence of questionable provenance of the sample papers: a) suspicious collaboration between scholars affiliated with different organizations; b) topics of paper not corresponding to the specialization of the co-authors and their previous work; and c) the average number of co-authors in the sample being larger than it is typical in Russia,

and vice versa, the number of solo papers being significantly smaller.

The value of co-authorship slots offered by “International Publisher” LLC in 2019-2021 is estimated at \$6.5 million US dollars. Since the study analysed a particular paper mill, it is likely that the number of papers with forged authorship is much higher.

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