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Authors from the periphery countries choose open access more often

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## **Abstract**

In this article I analyse attitudes of academic authors toward open access and frequency of choosing open access publication venues by them. I characterize differences between authors based in the periphery countries and the core countries, with regard to choosing so called gold open access as a way of publishing academic articles. The data were obtained with an on-line survey. Emails containing links to the survey were sent to 107,296 scholars listed on the mailing lists belonging to De Gruyter Open, from December 2015 to January 2016. 1012 responses were received. Authors from the periphery countries publish their articles in gold open access more often. They also pay open access publication fees equally often as those based in the core countries. The reasons for that are complex, involving both their preference to publish in open access and the composition of publishing market in the periphery.

## **Highlights**

82.5% of authors from the periphery countries who published an academic paper in recent 3 years did it at least once in open access, which is true only for 63.7% of their colleagues based in the core countries.

The average researcher from the core countries published 20% of her/his work in gold open access (median), while it is as high as 46% for researchers from the periphery.

Authors from the periphery countries are more likely to perceive promotional advantage and citation advantage of open access, which translates into subjective importance of open access as a factor of choosing a publication venue.

Authors from the periphery pay article processing charges at least equally often as these

from the core countries.

## **Introduction**

Academic research might be seen as a centralized environment with a very clearly distinguished and geographically separated core and a periphery. Eugene Garfield, the impact factor's inventor, claimed in 1983 that "Western journals control the flow of international scientific communication almost as much as Western news agencies monopolize international news." (Garfield, 1983, following Guédon 2008). Several changes have occurred since that time in research communication system, but despite them, Western domination seems to be untouched. More recently, Jean-Claude Guédon discussed existence of arbitrary formulated "mainstream" of academic research. He claimed that in an "international competition" every scholar in the world is judged on the basis on his/her contribution to the "mainstream" (Guédon 2008). In the same article, Guédon applied global "core - periphery" division to an analysis of academic research environment, arguing that contributing to the "mainstream" is more difficult to those from outside of the central countries. He suggested that open access journals can be expected to cross the division between researchers working in centre and their colleagues in the periphery by bringing more visibility to works of the latter. This article aims to shed more light on the problem of actual publishing behaviours of authors from both the core and the peripheral countries.

The "core - periphery" division originates from the dependency theory and has been developed by the world system theory. Both of these theories indicate that the global core is specialized in capital-intensive, highly monopolized production, which is profitable, while the global periphery produces labour-intensive goods that are sold on competitive market, which limits their potential profits (Schortman, Urban 1992).

Analysing academic research from the perspective of world system seems to be a promising approach. Academic research is a capital-intensive activity and is concentrated in the same places of the world as other similar enterprises. What is more, as it was pointed out by Garfield in the sentence cited above, control on the rules of the production and distribution of academic knowledge is highly concentrated.

In this article I analyse attitudes of academic authors toward open access and frequency of choosing open access publication venues by them, and an influence that geographical location has on these attitudes and choices. Specifically, my goal is to

characterize differences between authors based in the periphery countries and the core countries, with regard to choosing so called gold open access as a way of publishing academic articles. The article is based on data from De Gruyter Open Author Research. Part of the results presented here was previously discussed on the blog belonging to the company (<http://openscience.com/what-do-academic-authors-think-of-open-access-de-gruyter-open-author-survey/>). The data from the research are openly available. ([https://figshare.com/articles/Key\\_Challenges\\_of\\_Research\\_Communication\\_-\\_De\\_Gruyter\\_Open\\_Author\\_s\\_Survey\\_2016/3425738](https://figshare.com/articles/Key_Challenges_of_Research_Communication_-_De_Gruyter_Open_Author_s_Survey_2016/3425738)) For the needs of this research gold open access work was defined as a academic work that was publicly available on a publisher's website in the time of research. Gold open access is therefore organized by publishers, in contrast to so called green open access, which is maintained by authors. Total share of gold open access articles in Scopus, the most comprehensive database of published academic articles, was calculated to be 16.2% in 2011, growing by 1 percent point annually (Laakso, Björk, 2012).

Defining the core and the periphery of the world is an interesting and non-trivial research goal itself, however, since it is not a central aim of this article, I decided to use one simple indicator to provisionally identify core and peripheral areas. Based on the World Bank data I assumed that periphery countries are these with Gross Domestic Product per capita less than or equal to 18,000 current US dollars in 2015, while core countries are these above a given line (<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>). Resulting division of the world is quite similar to these obtained by world-system researchers, with an exception of few rich oil countries, such as Qatar and Saudi Arabia, which are usually treated as peripheral countries, since their economy is based on natural resources mostly, and not on capital-intensive industries (Babones, 2015). In my division these countries are treated as the core countries, but this should have little effect on the analysis on the global scale, especially that researchers from these countries are not represented in an analysed sample.

[18000USD.png]

## Method

The data on authors' attitudes and experiences with open access were obtained with an on-line survey. The survey questionnaire is still available on-line.

(<http://survey2015.degruyteropen.com/>)

E-mails containing links to the survey were sent to 107,296 scholars listed on the mailing lists belonging to De Gruyter Open, from December 2015 to January 2016. 1012 responses were received, thus the response rate was 0.94%.

The fact that 99.06% of emailed researchers did not answer the survey suggests that these who answered probably have some extraordinary features. Most likely, they evince interest in the subject of the research (research communication) or an sympathy towards De Gruyter Open's brand. They should not be seen as a statistical representation of all researchers in the world.

Yet, to the best of my knowledge, there was no truly representative study on similar problem to the date, and the disclaimer above should be also applied to other studies of this kind. Response bias has resulted in an over-representation of authors who publish open access works. I was trying to diminish this effect at the stage of research design by avoiding the phrase "open access" in the invitation to take part in the research and in the introduction to the survey, despite this, a mentioned over-representation seems to be quite significant. 35.8% of articles published by our respondents in the years 2012-2015 employ gold open access model.

## Results

Out of 1012 respondents of De Gruyter Open Author Survey, 91 claimed to have no publishing output in the last 3 years, and 23 failed to provide valid answers about their recent publications. 898 respondents were classified as academic authors and the rest were excluded from the further analysis. 844 respondents published an academic article in last 3 years. The rest published only academic books or book chapters in a given period. 90.3% of researched academic authors are based in Europe (counted with Russia and Turkey). Non-European countries are represented by researchers working in Argentina, Australia, Brazil, India, Japan, Mexico, New Zealand, South Africa and United States of America.

[table01.png]

Researched authors were analytically divided into two categories. These living in countries where GDP per capita was less than or equal to 18,000, according to World Bank Data, and those from countries where this amount was higher.

898 academic authors were surveyed. Researchers from these group were asked questions about general opinions on open access and rights to reuse that their would like to grant to their readers. 364 researched academic authors work in the central countries, which is 40.5% of the sample. 519, thus 57.7%, are based in the periphery, while the remaining 15 live in countries for which there were no data about GDP.

The analysed sample contains 844 authors of academic articles. Questions about factors of choosing journal to publish a paper in etc. were asked to this group only. 486 surveyed article authors are based in the periphery and 345 in the core.

82.5% of article authors from the periphery countries have at least one gold open access paper in their portfolio, which is true only for 63.7% of their colleagues based in the core countries.

The average researcher from the core countries published 20% of her/his recent works in gold open access (median), while it is as high as 46% for researchers from the periphery. (For the whole sample the median is 33.3%.)

[summary\_core.png]

[summary\_per.png]

I have divided respondents into three groups based on their declarations – students (graduate and undergraduate), Early Career Researchers (ECRs), and Established Researchers. While in the periphery these who declared themselves as ECRs are the group with the highest median of gold open access share in recent articles output (N=66, median 55%), the median for their colleagues in the core countries is as low as 3.5% (N=112). ECRs are authors who are under the biggest pressure of rules of academic promotion. This pressure apparently has opposite effects in the global core and in the periphery.

Importantly peripheral authors have no preference for green open access. The survey contained a question about number of works submitted to open access repositories and I found no evidence that researchers from the peripheral countries use open access repositories more than the others.

To publish an article in gold open access, authors have to choose an open access journal (or at least a hybrid one). Thus share of gold open access papers in a researcher's portfolio results from her/his choices that employ many more factors than openness. To understand why publishing works in gold open access is more popular among researchers from less wealthy countries it is essential to analyse how authors make

decisions about where to submit their work to.

According to respondents, the most important factors for choosing a journal to publish an article in are: abstracting and indexing services that cover a journal, Impact Factor, chances for getting work published and quality of peer review. For authors from the periphery countries Impact Factor and abstracting and indexing services are even more important than to their colleagues from the global centre. (In both cases the median was 9 for the periphery and 8 for the core, on a 1 to 10 scale of importance.) Open access has the lowest median of importance, out of 9 analysed factors of choosing a journal. Yet, 10.4% of authors labelled open access as a “10 – extremely important” factor to them. 58.3% rate it with 6 or more on a 1 to 10 scale, thus to be precise, I would say that open access is important to researchers, but apparently there are more important factors. Furthermore, open access is more important to authors from the global periphery (median 7 for them and 6 for those from the core). Authors with more open access journals in their portfolio tend to treat open access as a more important factor of choosing a journal than others, however this effect is moderate (Spearman correlation of 0.35 for the whole sample, 0.29 for peripheral countries).

[factors\_of\_choosing\_journal.png]

The majority of surveyed academic authors shared positive opinions about open access. Though opinions on open access does not correlate with an actual share of gold open access articles in a researcher's portfolio, neither in the core countries nor in the periphery. 87.5% agree or strongly agree that “open access may have a positive influence on the chances of being cited”. Only a slightly smaller fraction believes that “the general public should have access to research”, 83.3% of surveyed researchers agree or strongly agree that “Open access makes it easier to promote an academic work”. Authors from the global periphery are even more likely to accept both the promotional advantage and the citation advantage of open access (in both cases the median is “Strongly agree” for authors from the periphery and “Agree” for those from the core). More authors from the periphery countries feel also that they are under pressure from colleagues or supervisors to publish in open access (median for the researchers from the core countries is “Disagree”, while for researchers from the periphery the median is in the centre of the scale - “Neither agree nor disagree”). Yet only perceived pressure from supervisors and colleagues seems to correlate with real frequency of choosing open access. And this correlation is quite weak and even weaker

for the periphery. (The Spearman correlation of 0.29 for all respondents, 0.3 for researchers from the core countries, 0.25 for these from periphery).

Perceived citation advantage and promotional advantage of open access seems to correlate only moderately with importance of open access as factor of choosing a journal to publish work in and is not directly linked to actual publishing behaviours.

Authors from the global periphery are more likely to accept liberal licensing that dominates open access publishing. Respondents were asked in the survey if they agree to grant their readers the right to translate their work, include it in an anthology, mine by a software in search for text and data or republish with a commercial company. Surprisingly, the majority of respondents refuses to grant any of these rights to their readers.

Lack of acceptance of re-usage rights is surprising, because all of these rights are granted to readers, without additional approval, on the basis of Creative Commons Attribution License, which is the most popular license among journals indexed by Directory of Open Access Journals (DOAJ, <https://doaj.org/>). Therefore, majority of open access authors should feel comfortable with it – but apparently they do not. Yet authors from the global periphery are significantly more likely to accept conditions of liberal licensing.

[table\_reuse.png]

Authors from the periphery countries seems to exhibit generally more positive attitudes toward open access publishing than their colleagues from more wealthy regions. Though differences in beliefs does not explain the huge difference in share of gold open access works in all works published by respondents from the periphery and from the core. The main factor that shapes publishing behaviours of all authors are well established, arbitrary criteria of quality, such as Impact Factor and abstracting and indexing services. Researchers try to balance them with chances of getting a particular work published in a given venue. The most possible explanation of the observed difference in publishing output is that, for various reasons, researchers from the periphery countries tend to publish in their “local” journals, which are open access for supply-side reasons. This hypothetical explanation will be expanded in the “Discussion” section.

## Article processing charges

Majority of journals indexed in DOAJ does not charge authors for publication, though this funding model has been popularized by very successful journals operating mostly in biomedical sciences, such as PLoS ONE. A fee that is paid by an author or her/his funders to cover publication costs of an open access article is called article processing charge (APC). 21.2% of article authors from the periphery countries paid one or more APC in a given period. This is true for 18% of their colleagues from the core. The difference between these groups is small, and probably insignificant, which is quite surprising. How authors from less wealthy countries find money to pay publication fees? Probably with some difficulties. And probably relying on their own pockets more often.

61% of researchers from the periphery who paid an APC claimed that it was quite difficult or very difficult for them to organise money for this goal. The same is true for only 43.8% of authors from the core.

Researchers were also asked if they expect to have access to any funds, their own or external ones, that might be spend on funding open access publication fees. Authors working in the periphery countries expect to have smaller access to money from grants intended to be spend on publication costs (10.4% vs. 15.9%), and they are equally likely to predict that they will have grant money that might be spend on unspecified goal (10.4% vs 11.3%). Yet 12.3% of authors from the peripheral countries are ready to treat their own money as a resource that may cover publication fees, which is true for only 5.7% of those based in the core countries. Supplementing funding with their own money lets authors from less wealthy regions pay open access charges as often as their richer colleagues do.

Of course, their resources are more limited anyway. When the median of the most recent APCs paid by authors from the core is 1,100 euros, for less wealthy countries it is “only” 300 euros. This is probably another evidence that researchers from the periphery target different journals than their colleagues from more wealthy countries.

## Discussion

Composition of what is considered as the “mainstream” in the global research is maintained by two privately held entities. The major one is Thomson Reuters, based in United States of America, that publishes Web of Science and calculates Impact Factor.



The second one is RELX Group operating from London, which owns Scopus. However, the dominance of Western-based private companies in the field of academic research is taking place not only in defining what is and what is not the “mainstream”. In 2013, half of the “mainstream” academic research (as defined by articles indexed by Web of Science) was published by 5 biggest publishers, all being commercial enterprises based in Western Europe and United States (Larivière, Mongeon, 2015). Western based commercial companies have accumulated the real control over the academic system, creating a quasi-monopolised market.

Interestingly, the oldest among influential university rankings, The Academic Ranking of World Universities, has been started in the global periphery. The ranking was published for the first time in 2003 by Shanghai Jiao Tong University, and has aimed to “assess the gap between Chinese universities and world-class universities” (Liu, Cheng 2005). It extensively uses Thomson Reuters indicators to assess global research institutions. As a result, in 2015, the top 100 of resulting ranking includes 51 universities from United States and 9 from United Kingdom. Russia is the only country outside of the core countries that is represented in the top 100 of this ranking, with Moscow State University occupying 86<sup>th</sup> position. Only 70 universities from top 500 of Shanghai Ranking are located in countries where GDP per capita less than or equal to 18,000 USD.

The existence of Shanghai ranking and its western orientated methodology is a proof that control over the rules of academic competition have been accumulated on the West to an extent that their arbitrariness has been forgotten by everyone. Factors that fostered this accumulation are various. However, all are connected to economical dominance. Research institutions need highly skilled labour, which is expensive in training. Access to literature, equipment and work needed to conduct a cutting edge research is also capital-intensive.

Economical dominance of United States after Second World War triggered cultural changes that support this dominance in feedback. By instance, it resulted in collapse of German and French as international languages, and in consequence it limited the number of people from peripheral countries that have an advantage of speaking *lingua franca*. Dominance of English language supported emergence of one, international publishing market, and its size encouraged commercial enterprises to enter academic publishing industry in search for profit. These enterprises quickly accumulated significant capital and have created an oligopoly which has lifted prices of journal subscriptions and made access to knowledge even more expensive (see also Guéron 2008). Thus, an economic and cultural dominance has been constantly enhancing its own

bases in a feedback.

Existence of international lists of “mainstream” journals creates pressure on all researchers in the world to publish in these journals. Yet, while for authors from the core countries the resulting situation is natural, it may create some dilemmas for these based in the periphery. Researches have suggested, for instance, that Chinese medical doctors still want to publish in journals that are published locally in their local language in order to reach their peers from the local community that they are part of (Li, 2014).

Researchers from the core countries belong to community that reads so called international journals. But researchers from the periphery may still want to reach audiences for whom language barrier, access barrier and some old habits are important. Therefore, a pressure to publish in Western journals only may make their career advancement more difficult.

Submitting works to journals based in the core countries might be also more difficult to researchers from the periphery. One of the reasons might be that writing habits and conventions coming from their native languages might be treated by English native speakers as an evidence of their discursive incompetence (Canagarajah, 1996).

For authors from the global periphery present in the analysed sample open access is the least important factor of choosing a journal to publish work in, while journal Impact Factor and abstracting services are the most important. These two factors favour “mainstream” journals that are usually published in the core countries. However, if set of all factors taken together forces peripheral authors to publish in their local journals, for many of them open access venues occur to be the best option. And this is also because open access journals are simply more popular among peripheral serials.

Indeed, the regional composition of journals indexed by Directory of Open Access Journals is quite surprising. Among 9,160 journals indexed in DOAJ the biggest group comes from Brazil (9.6% of all). 51.6% of all journals indexed by DOAJ are based in countries with GDP per capita less than or equal to 18,000 USD in 2015. 43.2% comes from regions above this lane. Remaining journals comes from countries that data about GDP 2015 were missing.

To understand reasons that trigger the popularity of open access among journals based in the periphery, it is worth to have a closer look at the world's leader in number of journals indexed by DOAJ. In Brazil, and to lesser extent in other Latin American countries, the main factor behind growth of a number of open access journals has been SciELO. SciELO is an open access publishing platform and indexing service. It was started in late 90s as one of the world's first open access publishing initiatives. SciELO has been

launched as a cooperation of two non-governmental organizations, but as soon as in 2002 it received support from the Brazilian governmental agency- CNPq, which was subsequently joined by other governmental bodies from various Latin American countries. In 2013 SciELO was indexing one thousand journal titles that publish more than 40 thousand articles per year (Packer, Cop, et. all 2014). As a result, no other region in the world has this level of adoption of open access journals indexed internationally as Latin America (Miguel, Chinchilla-Rodríguez and Moya-Anegón, 2011, following ibidem). From the very beginning SciELO was conceived as a project aiming to overcome very weak presence of developing country journals in the international indexes.

Another example of peripheral country that has a strong position in DOAJ is Poland, where 4.2% of all indexed journals comes from. Polish publishers were able to introduce almost half as many journals as these from much larger Brazil. According to report "Open Science in Poland 2014. A Diagnosis", 49.2% of academic journals published in Poland are open access. This is because Polish journal market relies mostly on direct public subsidies, which are more important source of funding for majority of journals than subscriptions or publication fees. The main factor that opened Polish journals was a governmental programme that offered additional subsidies available to open access journals only. This has resulted in opening both new and well established Polish journals. Open access journals are well represented also among the best serials published in Poland. Therefore, opening research communication in Poland might be seen as a political decision on governmental level, which was easy to execute in a publishing environment that has been dependent on direct public subventions. (Leśniak, Morys-Twarowski, et al., 2015).

Examples of Brazil and Poland show that in the periphery journals are opening thanks to public engagement in academic publishing. This might be seen as a conscious political strategy, aiming to diminish handicap of local journals on the competitive global market. However, this strategy is unlikely to take place in the global core countries, where the most important journals are privately held, and do not rely on direct public subsidies (while their customers are mostly public institutions).

In this context, it is interesting that authors from the periphery present in the analysed sample pay APCs at least equally often that these from the core countries. It suggests that even if public engagement is a main force behind the shift towards open access in the periphery, it does not exclude the possibility of development of APCs market there. Though, so called author-pays model is not the most popular neither for works published in the periphery, nor in the core countries.

Some additional analysis of local publishing markets in both peripheral and core countries should be conducted to check if they meet the pattern presented above. However, it exceeds the goals of this article.

## **Conclusion**

Authors from the periphery countries publish their articles in gold open access more often. The reasons for this fact are complex, involving both their higher preference to publish in open access and the composition of publishing market in the periphery. Majority of open access serials indexed by Directory of Open Access Journals are based in the periphery countries. In Poland and Brazil, two periphery countries with high number of open access journals, public involvement is a main force behind the shift of peripheral publishing to open access. Whether it is true for other peripheral countries is yet to be confirmed. Questions about goals and effects of public strategies supporting open access might be asked in future studies.

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