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Drivers and Barriers for Open Access Publishing: From SOAP data 2010 to WOS data 2016

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A Estela

¿Ves, Momo? A veces tienes ante ti una calle que te parece terriblemente larga que nunca podrás terminar de barrer. Entonces te empiezas a dar prisa, cada vez más prisa. Cada vez que levantas la vista, ves que la calle sigue igual de larga y te esfuerzas más aún, empiezas a tener miedo, al final te has quedado sin aliento. Y la calle sigue estando por delante. Así no se debe hacer. Nunca se ha de pensar en toda la calle de una vez, ¿entiendes? Hay que pensar en el paso siguiente, en la inspiración siguiente, en la siguiente barrida. Entonces es divertido: eso es importante, porque entonces se hace bien la tarea. Y así ha de ser. De repente, se da uno cuenta de que, paso a paso, se ha barrido toda la calle. Uno no se da cuenta de cómo ha sido, y no se queda sin aliento.(...)

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1. Introduction

Since the creation of the *Journal Des Scavans* and the *Philosophical Transactions of the Royal Society* in the XVII century (Porter, 1964) scientific journals have been regarded as one of the most important channels for scholarly communication. The Open Access (OA) movement aims to make scientific outcomes freely accessible without any kind of restrictions. Such philanthropic aspiration is certainly inspired by the French Encyclopaedists in the 18th century. However it is only in the late 20th century with the birth of electronic networks and the popularization of the World Wide Web (WWW) that these new ways to circulate new scientific knowledge becomes a reality. This new medium was defined by some authors as *scholarly skywriting* (S. Harnad, 1990).

Authors are one of the main players in the OA movement. Without their willingness to circulate that knowledge OA would just be an illusion. This is the main reason because it is absolutely essential to learn not only about their attitudes and opinions on OA, but also about their real practice.

This PhD thesis follows up on previous studies aiming at finding out what a representative sample of researchers from all over the world and from all disciplines think about OA. To do so we are replicating the largest study of this type to date: the Study of Open Access Publishing (SOAP) (Dallmeier-Tiessen, et al., 2011).

1.1 The Open Access (OA) movement

Back in the 1960s high-energy physicists were eager to disseminate the results of their research. They would do so by photocopying (or rather "photo-offsetting") those papers ready to be submitted to journals and sending them by postal mail to colleagues all over the world. This movement was defined as the time as the "Open-Air" market (Goldschmidt-Clermont, 1965) although later became popular as "preprint" and "eprints" with the advent of the world wide web (WWW).

The WWW was born at the *Conseil Européen pour la Recherche Nucléaire* (European Laboratory for Particle Physics - CERN), one of the most important laboratories for particle physicists in 1991. In 1994 Stevan Hanard already proposed that all researchers "should self-archive their research articles to make them free for all online" (Stevan Harnad, 1994).

Following we present a number of events in chronological order that helped to define what today is known as Open Access.

1980s	The first experiments with scientific journal in electronic format date to the 1970s (Hiltz & Turoff, 1993; Senders, 1977). Once the WWW started to become more accessible to scholars around the world in the 1980s some journals/publishers launched electronic versions of their journals. Among them we find ***New Horizons in Adult Education***, launched in **1987** and believed to be the very first refereed scientific journal to be published in electronic format (Mackenzie Owen, 2007). ***Psycholoquy***, launched in **1989** is considered the first journal in electronic format to provide OA to all its contents (S. Harnad, 1990).
1991	The **arXiv** repository "a highly-automated electronic archive and distribution server for research articles" was created (Ginsparg, 1994). arXiv is a repository of electronic preprints of scientific papers in the fields of mathematics, physics, astronomy, computer science, quantitative biology, statistics, and quantitative finance, which can be accessed online. arXiv e-prints have evolved into an important facet of the scholarly communication in some disciplines, particularly for physics and astronomy (Gwynne, 2016). As of April 2017 there are more than 1, 250,000 preprints available in arXiv.
1994	In terms of monographs we find that the first self-sustaining book publisher to provide OA to its material was the **National Academies Press (NAP)**. This institution publishes reports issued by the National Academy of Sciences, Institute of Medicine, National Academy of Engineering, and National Research Council and is, at the same time, self-sustaining via book sales. In 1994 started to provide its books in electronic format as images and by 1997 the NAP had 1,000 reports available on their website. As of spring 2017 the NAP offers full OA to 8,500 titles in electronic format which can also be ordered in paper format for a cost (Jensen, 2007).
	Stevan Harnad posted the **"Subversive Proposal"** to an internet forum, calling on all authors of "esoteric" (non-trade, no-market) research writings to archive their articles for free for everyone online (in anonymous FTP archives or websites) (Schultz, 1996). This discussion led to the creation in **1997** of **Cogprints**, an open access archive for self-archived articles in the cognitive sciences and in **1998** to the creation of the **American Scientist Open Access Forum** (initially called the "**September98 Forum**" ("Subversive Proposal - Wikipedia," n.d.).
1996	**The Journal of Clinical Investigation**, first published in 1924, was the first major biomedical journal to start providing all its contents in OA in 1996 when "*the editorial board and ASCI decided to offer all content online without a barrier of any sort to all users*" (Varki, 1996).
1997	**Research Papers in Economics (RePEc)** is a repository of preprints of research in economics. The project started in 1997, but its precursor NetEc dates back to 1993 (Bátiz-Lazo, 2012). The information in the database is used to rank the more than 30,000 registered economists. By the end of 2016 there were more than10 million citations between records in RePEc with 2.3 million research pieces from 2,800 journals and 4,500 working paper series.

The so-called *serials crisis* has been present for several decades. This is an important issue for libraries budgets as the subscription prices for scientific journals increases at a faster rate than the inflation (Young, 2009). This makes almost impossible for libraries to renew all the journals in their collection on a regular basis. In 1997 an alliance of academic and research libraries and other organizations developed the **Scholarly Publishing and Academic Resources Coalition (SPARC)** to address the crisis and promote alternatives, such as OA. One of its first projects was to develop a fund to create a new publication model for academic journals wherein many libraries contributed to that fund, and from that fund, the contributors would create new publications on some model which lowered the costs of all journals (Groen, 2007).

1998 The **Journal of Medical Internet Research (JMIR)** is created. JMIR was the first open access journal covering health informatics, and the first international scientific peer-reviewed journal on all aspects of research, information and communication in the healthcare field using Internet and Internet-related technologies; a broad field, which is nowadays called "eHealth" (Eysenbach, 1999). JMIR is today ranked in Q1 by Impact Factor by Thomson Reuters as well as Scimago in medical informatics.

The concept of **hybrid journals** (authors paying a fee to allow free access to their articles in toll access journals) was first introduced in 1998 and the model was actually implemented in the **Florida Journal of Entomology** (Walker, 1998). During the period between 2007 and 2013 a strong sustained growth in the volume of articles published as hybrid OA was observed (Laakso & Björk, 2016).

1999 E-biomed was created in 1999 by the National Institutes of Health (NIH) in the US. It was intended as an OA electronic publishing platform “that would contain the content of many established journals as well as material that has not yet been peer-reviewed” (Macilwain, 1999). It evolved later to **PubMed Central (PMC)**, a repository that archives publicly accessible full-text scholarly articles that have been published within the biomedical and life sciences journal literature. As of April 2017 PMC contains 4.3M articles.

Also in 1999 **The Open Archives Initiative** is launched. This initiative was created to facilitate the interoperability between repositories containing digital content. Its technical infrastructure is based on the **Protocol for Metadata Harvesting (OAI-PMH)**, that allows archives to share metadata information (Lagoze & Van de Sompel, 2001).

2000 The first commercial OA journals publisher is founded: **BioMed Central (BMC)**. It was inspired by the original idea of PMC (Cockerill, 1999). In 2008 BMC is acquired by Springer Science+Business Media. As of April 2017 BMC publishes over 290 peer-reviewed journals in Biology, Clinical Medicine and Health.

Also in 2000 **ePrints** is created at the University of Southampton in the UK. EPrints is a free and open-source software package for building open access repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting. It's primarily used for institutional repositories and scientific journals.

2001 Harold Varmus (Nobel Laureate, Director, National Cancer Institute), Patrick O. Brown (Professor, Stanford University School of Medicine) and Michael Eisen (Assistant Professor, University of California, Berkeley) wrote ***"An Open Letter to Scientific Publishers"*** in which those signing pledged to "publish in, edit or review for, and personally subscribe to only those scholarly and scientific journals that have agreed to grant unrestricted free distribution rights to any and all original research reports that they have published, through PubMed Central and similar online public resources, within 6 months of their initial publication date." ("PLoS open letter," n.d.). The letter was signed by nearly 34,000 scientists from 180 countries. In 2001 **Public Library of Science (PLoS**[1]**)** became incorporated as a nonprofit organization and in 2003 officially became a publisher, launching its first Open Access journal (PLOS Biology[2]) in 2003. As of the end of 2016 PLOS journals have published more than 27,000 OA articles.

Public Knowledge Project (PKP) launches **Open Journal Systems (OJS**[3]**)**, an open-source software for the management of peer-reviewed academic journals (Willinsky, 2005). As of April 2017 10,558 journals are using OJS all around the world.

In 2001 Jisc (formerly known as the Joint Information Systems Committee) launches the Sherpa/RoMEO[4] services in the UK. These services show the copyright and open access self-archiving policies of academic journals. As of April 2017 the service covers over 22,000 journals.

2002 It is after the **Budapest Open Access Initiative (BOAI)** in 2002 when most authors agree that the Open Access movement is "born" (BOAI, 2002; Laakso et al., 2011; Laakso & Björk, 2016; Suber, 2012b; J. Xia, 2010). In the BOAI open access was defined as:
By "open access" to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited. (BOAI, 2002)

[1] https://www.plos.org/
[2] http://journals.plos.org/plosbiology/
[3] https://pkp.sfu.ca/ojs/
[4] http://www.sherpa.ac.uk/romeo/

The Massachusetts Institute of Technology (MIT) Libraries and Hewlett-Packard Labs release DSpace[5] (MacKenzie Smith et al., 2003). This open source repository software package is used for creating open access repositories for scholarly and/or published digital content.

2003

In April 2003 a group of people met at the Howard Hughes Medical Institute in the United States. The purpose was to discuss how to improve open access to scientific publications within the biomedical research community. The outcome of the discussion was the Bethesda Statement on Open Access Publishing. OA publications were defined as those that meet two conditions:

1. *The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.*
2. *A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).*

   (Patrick O. Brown et al., 2003)

[5] http://www.dspace.org/

It is also in 2003 following a Conference on Open Access held by the Max Planck Society in Berlin when the so called **Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities** emerges. In its definition of Open Access the Berlin declaration specifically mentions research outputs in all formats and shapes:

Establishing open access as a worthwhile procedure ideally requires the active commitment of each and every individual producer of scientific knowledge and holder of cultural heritage. Open access contributions include original scientific research results, raw data and metadata, source materials, digital representations of pictorial and graphical materials and scholarly multimedia material.

Open access contributions must satisfy two conditions:

1. *The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.*
2. *A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions) that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving*.

   (Max Planck Society, 2003)

These three definitions complement and inform each other and have been defined as the BBB definition of Open Access (Suber, 2012b).

The **Directory of Open Access Journals (DOAJ[6])** is launched by the Lund University in Sweden. DOAJ is a community-curated list of open access journals and aims to be the starting point for all information searches for quality, peer reviewed open access material. As of summer 2009, the Directory of Open Access Journals (www.doaj.org) contained a total of 4,220 OA journal titles (J. Xia, 2010). As of April 2017 this figure reaches 9,372 journals.

In 2003 **The Wellcome Trust**, a biomedical research charity based in the UK, made an announcement giving **official support to the provision of research through open-access routes**. In 2016 it launched an OA publishing platform[7] to allow Wellcome-funded researchers to rapidly publish any results worth sharing.

[6] https://doaj.org/
[7] https://wellcomeopenresearch.org/

2004	The **UK Parliament** (House of Commons) released a report in 2004 prepared by the UK Government Science and Technology Committee recommending that **Open-Access Provision through institutional self-archiving should be made mandatory for all journal articles resulting from UK-funded research** ("House of Commons - Science and Technology - Tenth Report," 2004).
	In 2004 the **Registry of Open Access Repositories** (ROAR at the time, ROARMAP[8] today) is created by EPrints at the University of Southampton in the UK. It is a searchable international Registry of Open Access Repositories indexing the creation, location and growth of OA institutional repositories and their contents. By Q1 2017 it had details about 858 OA policies from all around the world.
2006	Sherpa launches **JULIET**[9], a service to complement RoMEO which lists summaries of publishers' copyright transfer agreements as they relate to archiving.
2007	The **Hindawi Publishing Corporation**, founded in 1997, moved to a **complete open access model** on all of its journals (McClure, 2008). Later this year Hindawi entered into an agreement with the traditional publisher SAGE to jointly launch and publish a suite of fully Open Access (OA) journals. In 2017 Hindawi came to an agreement with Wiley (another fee-paying publisher) to take over nine titles from Wiley's portfolio to be published fully in OA.
2008	The **Open Access Directory (OAD**[10]**)** is launched a wiki where the OA community can create and support simple factual lists about OA to science and scholarship.
	The **Harvard Faculty of Arts and Sciences** voted unanimously to issue a **mandate for OA policy** .Professor Stuart Shieber explained at the time that cumulative price increases had forced the Harvard library to undertake "serious cancellation efforts" for budgetary reasons. Peter Suber declared that "it was the first university mandate for open access by default in the United States, and the first to be adopted by a faculty, rather than implemented by administrative fiat" ("Open Access," 2008).
	The **Open Access Scholarly Publishers Association (OASPA**[11]**)** is founded in 2008. An OA commercial publishers association, it has members in all scientific, technical and scholarly disciplines. In 2017 will celebrate its 9th conference and by April 2017 it has 107 members including commercial and scholar publishers as well as other commercial and non-commercial organisations.
	In 2008 took place the first edition of the **Open Access Week**[12].

[8] https://roarmap.eprints.org/
[9] http://www.sherpa.ac.uk/juliet/
[10] http://oad.simmons.edu/oadwiki/Main_Page
[11] http://oaspa.org/
[12] http://www.openaccessweek.org/

In 2008 the **European Commission** launched a pilot in seven areas of its 7th Framework Programme by **which all the outcomes of its funded projects must be deposited in repositories** (European Commission, 2010).

2009 The European Commission funded the **OpenAIRE** project to support the implementation of OA in Europe. It aimed to provide the means to promote and realize the widespread adoption of the OA Policy (Manghi et al., 2010). It was followed up by the OpenAIREplus project in 2011 and the OpenAIRE2020 project, started in 2015 and currently running. The OpenAIRE platform is a network of Open Access repositories, archives and journals that support Open Access policies. As of April 2017 the OpenAIRE platform provides access to almost 20M publications and 46K datasets from 2,877 data sources.

2010 The High Level Expert Group on Scientific Data publishes a report titled ***Riding the wave: How Europe can gain from the rising tide of scientific data*** (Wood et al., 2010).

2012 **The World Bank** announced the implementation of a **new OA policy** for its research outputs and knowledge products Policy for Research and Knowledge. At the same time announced the launch of the Open Knowledge Repository[13] and adopted a set of Creative Commons copyright licenses. As of April 2017 the repository had served almost 13M files.

The **Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP^3**[14]**)** is an international collaboration in the high-energy physics community to convert traditional closed access physics journals to OA, freely available for everyone to read and reuse. It was launched in 2012 by representatives from 29 countries. As of April 2017 among its membership there are 3,000 libraries, funding agencies and research institutions from 47 countries and intergovernmental organizations. Under the terms of the SCOAP^3 agreement, authors retain copyrights and the articles published will be in perpetuity under a CC-BY license. As of April 2017 SCOAP^3 has funded 14,784 articles.

The **UK Government** announced that it will make publicly funded scientific research available for anyone to read for free, accepting the recommendations in a report on OA by Dame Janet Finch, to be later known as the ***Finch Report*** (Finch et al., 2013).

The Higher Education Funding Council for England (HEFCE) announced plans to require open access to research submitted to the next Research Excellence Framework in 2014(Suber, 2012a).

[13] http://openknowledge.worldbank.org/
[14] https://scoap3.org/

	In 2012 the **European Commission** issued a **recommendation** encouraging all EU Member States to put public-funded research results in the public sphere in order to make science better and strengthen their knowledge-based economy (European Commission, 2012).
2013	The **US Government** mandated that all publications from taxpayer-funded research had be made **OA to read after a year's delay**. This measure was expanding a policy that has, until that moment, applied only to biomedical science (R. Van Noorden, 2013).
	The **Australian Research Council (ARC)** published an **OA policy** by which any publications arising from an ARC supported research Project must be deposited into an OA institutional repository within a twelve month period from the date of publication.
	In 2013 and following a petition signed by more than 65,000 people the **US Government expands its OA policy** to all federally funded research.
2014	The **World Health Organization (WHO) issues a policy** by which all articles or chapters published in non-WHO publications that are authored or co-authored by WHO staff or produced by individuals or institutions funded in whole or in part by WHO shall be made OA.
	The Netherlands government releases a plan to **achieve full OA to all its outputs by 2025** (OCW, 2014).
	The National Natural Science Foundation of **China** (NSFC), one of the country's major basic-science funding agencies, and the **Chinese Academy of Sciences** (CAS), which funds and conducts research at more than 100 institutions, issue a mandate by which researchers they support should deposit their papers within 12 months of publication (Richard Van Noorden, 2014).
	In 2014 two major funders from **the Indian Government**, the Department of Biotechnology (DBT) and the Department of Science & Technology (DST) from the Ministry of Science & Technology **issue a policy** requiring all funded research to be made OA.
2015	The **Bill & Melinda Gates foundation** issue an **OA policiy** for all its funded research outputs with a 12-month embargo, offering authors to cover APC when needed.
	The **Max Planck Digital Library (MPDL)**, part of the German Max Planck Society, launches the **OA2020 Initiative**[15] during the 12th Berlin Conference. Following the experience of SCOAP3, it aims at achieving a large-scale transformation of the current corpus of scientific subscription journals to an OA business model (Schimmer et al., 2015). In March 2017 the European Commission became the 75th organization to adhere to the initiative.

[15] https://oa2020.org/

2016	In 2016 the **European Commission** includes a **mandate** under Horizon 2020 following its OA pilot in 2007. All funded projects by which each beneficiary must ensure OA to all peer-reviewed scientific publications relating to its results. In this occasion OA to research data is also included in this directive (European Commission, 2017).
2017	In April OpenCitations, the Wikimedia Foundation, PLOS, eLife, DataCite, and the Centre for Culture and Technology at Curtin University announced the creation of the new **Initiative for Open Citations (I4OC[16])**. The aim of this initiative is to promote the availability of data on citations that are structured, separable, and open.

1.1.1 OA Types

Within the particular subgroup of research outputs object of this doctoral thesis (research articles) we can differentiate between two different types of OA publishing: the gold and the green routes.

In general terms we speak about **green OA** when we refer to final versions of papers deposited in repositories before being submitted to journals for consideration. That is before the peer-review process has takenp lace. Such papers are accessible by anyone free of charge. On the other hand we find research articles published by journals following a peer-review process. These are then laid out and made available free of charge for readers. In those cases we are talking about **gold OA**. These definitions were coined by Stevan Harnad (Stevan Harnad, 2005).

We could say that in the green OA case the final product that reaches the reader is that originally created by the author. There is no additional work involved. However in the case of gold OA there are a number of elements that get involved before the final product reaches the reader. The publisher needs to organize the peer review process, lay out the article, put together the journals that will make part of the issue, etc. All those aspects involve costs, both direct and indirect for the journal publisher. We could say that from the point of view of the reader the main difference between gold and green is the peer-review aspect.

If a researcher opts for the green OA route he/she can deposit a paper in different types of repositories: institutional, subject, national or research (Armbruster & Romary, 2009). All these options never involve any cost either for the reader or the authors.

In the case of gold OA journals we can also identify two different types of journals: full OA journals and hybrid OA journals. In the first type users can read all articles free of charge. In the second type only some articles are available free of charge (OA). To read the rest of contents of the journal the reader will need to be subscribed to the journal (either directly or through a library or institution) or pay to access.

[16] https://i4oc.org/

From the point of view of the author there are also two main types of journals: those in which authors are charged to publish and those in which costs are not held by authors. Those charges commonly known as Article Publishing Cost (APC) can be paid in different ways. Costs are not always necessarily covered by authors, there are options to cover them although they vary immensely depending on the country, type of institution, research grant, etc. (Suber & Peter, 2009).

1.1.2 OA Stakeholders

Scholarly communication is the system through which research is created, validated and disseminated to the scholarly community and preserved for future use (ACRL, 2003). One of its fundamental characteristics is that the system is created for the public good. To achieve its goals a substantial part is funded with tax-payers money. OA is one form of scholarly publishing and today an essential part of scholarly communication and is made up of a complex environment in which different stakeholders take part. In the following sections we describe those actors that play a role in the OA movement and how they interact between them. To do so we will follow Reinsfelder classification of OA stakeholders. We will elaborate on the different players, listing their positive and negative attitudes, awareness and actions towards OA publishing (Reinsfelder, 2012).

1.1.2.1 Authors

Often referred as researchers or scholars the authors are the initial source, the contents producers. Once the outcomes of their research are ready to be shared authors can opt to do so in two different ways, publishing it or sharing it directly. Going down the route of publishing (usually in books or journals) quite often means for authors getting other colleagues with similar competence to evaluate and validate (or not) their work (Richard Smith, 2006). Depositing in repositories (green OA) usually means that works do not go through a peer-review process.

Another important aspect for authors once they have shared (published) their research outcomes is the impact it makes on science. A widely spread way to measure authors influence today are biliometrics. One of the most widespread bibliometrics being used today is the Impact Factor, which can apply both to journals and authors themselves (Garfield, 2006).

Since the mid-1990s scholars started to swift their preferences from paper-based journals to the relatively new electronic journals. But not only in their roles as producers (authors) but also as consumers (readers) of scientific outputs (Odlyzko, Andrew, 1995). Already in the 21st century researchers started to see OA as something positive that could benefit the evolution of science (J. Xia, 2010).

On the negative attitudes towards OA on researchers we usually find conservative approaches, resistance to change (Benos et al., 2007), concerns about OA journals quality and reputation (McCabe & Snyder, 2005). To those we can add the slow pace for changes to happen in organizational cultures (Cook & Yanow, 1993).

From the OA awareness side we find how it has increased steadily in the last few years (J. Xia, 2010). On the downside, however, we can see that many authors are not aware of their publishing options with OA (Thorn et al., 2009) or their rights and obligations when dealing with copyright aspects (Swan, 1999; Thorn et al., 2009).

Looking at researchers practice in regards to OA publishing we can mention that scholars quite often embrace innovation in rapidly evolving environments, leading often to experiment with alternative forms of scholarly communication (Maron & Kirby Smith, 2008). We can also see how researchers often provide their services as editors or peer-reviewers of OA journals (Dallmeier-Tiessen, et al. 2011) and work proactively to find synergies with publishers and librarians.

On the negative side, though, we see how authors keep publishing in expensive, subscription-based journals. The reasons to proceed this way are many, but quite often when asked authors mention aspects as IF or the need to publish in the well-established journals in their fields (Dallmeier-Tiessen, et al. 2011) or the limited impact of the OA options available in the market (Henderson & Bosch, 2010).

1.1.2.2 Librarians

Librarians have been dealing with the *serials crisis* for more than four decades in which journal subscription costs have risen significantly faster than library budgets. Suber believes that "we're long past the era of damage control and into the era of damage" (Suber, 2012b). The estimation is that around 1% of the total investment in research is spent on subscriptions to scholarly journals, and most times this investment is carried out through libraries budgets (Bo-Christer Björk, 2017b).

The appearance of electronic journals and the later development of OA journals changed the way in which librarians had to deal with their usual tasks of acquiring, organizing and preserving information (Sreenivasulu, 2000). However OA also contributed to take a positive approach in this respect, helping also to disseminate knowledge more widely. Obviously we cannot omit the fact that OA provides the mean to deliver more information at a lower cost.

On the negative attitudes of librarians towards OA Reinsfelder mentions how their motivations differs from those of researchers (Maness et al., 2008; St. Jean et al., 2011). As it happens with researchers we can also mention the slow pace for changes to happen in organizational cultures (Cook & Yanow, 1993) or simply the uncertainty of a changing environment.

On the awareness side of things we can observe that many librarians are strong OA advocates. As mentioned earlier in this chapter they have a strong interest in promoting OA and making it happen. However, at the same time we find the exact opposite attitude, lack of awareness and/or interest in the OA agenda (Mercer, 2011).

Looking at librarians practice in relation to OA we can also mention the capacity of this profession to adapt to an almost constantly evolving scenario in scholarly communication, usually reflected in the development of new services (Levy & Roberts, 2005). The advent of the OA movement has certainly created frictions between researchers and librarians (mainly due to journal subscription cancellations) and between librarians and publishers (the serials crisis), but at the same time we cannot omit that these situations have provided opportunities to explore new relationships between those stakeholders (Guedon, 2001; Suber, 2003).

On the other some authors have run surveys among libraries and in some occasions have found low level of support towards OA publishing (Carter et al., 2007; Palmer et al., 2009; Way, 2010). Having such a long history of information provider we also see that in occasions there are librarians that mainly rely on publishers as suppliers of information (Henderson & Bosch, 2010).

1.1.2.3 Publishers

Publishers in scholarly communication can be classified in different ways. One possible approach could be a distinction between commercial and non-commercial publishers. In the first group we can find those that publish OA journals exclusively (e.g.: BioMed Central) and traditional publishers that used to publish mainly subscription-based journals and are embracing hybrid models (e.g. Elsevier).

Within the non-commercial publishers we can also distinguish two broad categories. On one hand we have Society Publishers, societies or organisations that publish their own journals (e.g. American Chemical Society). On the other hand we would have University or Academic Publishers (e.g.: Cambridge University Press).

There is yet another infamous “category” of publishers that has emerged to the shadow of the OA movement, and more specifically as a reaction to the APC business model: predatory journals/publishers. These are opportunists that approach researchers with the promise of providing editorial and publishing services associated to legitimate journals… provided that the authors pay for it. Newer scholars from developing countries are more exposed to become victims of this practice (Jingfeng Xia et al., 2015). The criteria for journals or publishers to be considered “predatory” is under discussion and some efforts to identify them are currently under discussion (Silver, 2017).

Commercial publishers seek profit, as any other company. Starting with the creation of Biomed Central in 2000 and following to the conversion of may journals to hybrid models we can certainly see this as a positive attitude towards OA from this stakeholders group (Laakso & Björk, 2012). We could also add their natural motivation to stablish sustainable business models, to which OA is not an exception (Boissy & Schatz, 2011).

The uncertainty about future developments obviously creates a negative attitude towards these new models. In the case of publishers this position is even more understandable if we compare scholarly communication to traditional markets for goods and services (Navin & Vandever, 2011).

Given their long tradition as one of the main actors in scholarly communication we cannot ignore the fact that publishers are well aware of all developments in OA publishing. Actually many of those innovations have their origin in publishers themselves (Greco, 2016).

Looking at publisher's action we can mention a number of facts that can be seen as positive gestures towards OA. Both OA born and traditional publishers have adjusted to the new scenario once OA became a reality. There has been many approaches to new business models and new services (Science Europe Working Group on Open Access to Publications, 2016) as well as efforts to develop new technologies to support this new environment and provide a better service to all stakeholders involved (Tenopir & King, 2008).

On the other hand we cannot ignore the fact that publishers have kept increasing journal subscriptions cost beyond the rate of inflation (Jones, 2016) even after OA started to appear as a credible alternative to traditional journal publishing models. At the same time publishers keep limiting access to journals or increasing embargo periods to allow authors deposit in repositories. Some authors have called this "walled gardens" (Barbour, 2015).

1.1.2.4 Institutions (Funders/Research organizations/Policy makers)

The fourth players in the OA publishing environment are those funding and/or managing research activities. We also include research administrators and policy makers in this same group of stakeholders.

Research organizations and funders have an obligation to disseminate and transfer the knowledge they generate as widely as possible (Lavis et al., 2003). Institutions have mainly two ways of promoting OA: through policies and mandates (Vincent-Lamarre et al., 2016) and by covering APC.

To the abovementioned willingness to disseminate knowledge we can also add a desire to increase the reputation and status of the organization as positive attitudes towards OA of this stakeholders group (Holley, 2009). We can also add that institutions are usually in favour of new ways of scholarly communication provided that quality levels are maintained (Odell et al., 2016).

On the negative attitudes of this group we note a similar one to the other groups: resistance to change. We also see that in the early days many institutions would refuse to recognize OA publications for tenure and promotion (Holley, 2009). In more recent times however this tendency has changed and it doesn't seem to be the case anymore (Odell et al., 2016).

Research administrators are aware of the issues that librarians need to face to maintain and update their collections (Reinsfelder, 2012).

On the positive actions that institutions take to promote OA we have already mentioned that many funders mandate authors to freely share the outputs of their research. We also need to add measure as including APC as part of their grants (Solomon & Björk, 2012b).

On the negative aspects some authors have mentioned that the power institutions have over faculty members is somehow limited (Holley, 2009; Martin & Samels, 2000).

1.1.3 OA Funding

If we only look at English language journals in Science, Technology and Medicine (STM), the annual revenues generated are estimated at USD 10 billion in 2013, (Ware & Mabe, 2015). The total annual estimated costs of journal publication is EUR 7.6 billion (Schimmer, 2015). At the time of paper journals subscriptions were probably the best way to ensure the printing and delivery of journals issues. Today practically all scientific journals have an electronic version. Costs for subscription of license-based journals are usually covered by libraries or individual readers.

In December 2015 there were more than 10,000 journals indexed in the DOAJ, from which 6,746 were searchable at article level. Between all these OA journals had $335 million in total revenues in 2015 (including APC).

In the case of OA journals (either full or hybrid) we find the following business models:

- Article Processing Charges (APC). Once an article is accepted for publication the author needs to cover the cost. Cost per article varies between publishers and disciplines and the estimation is that 49% of all OA articles require APC (Laakso & Björk, 2012). APCs typically range from EUR 1,500 and 2,500 and make up to 12% of institutions' total expenditure (Shamash, 2016).
- Community publishing. This model is usually found in the arts and humanities. Journals are entirely produced within academic institutions and published for free, only charging to those authors opting for printed issues. The costs are kept at the lowest possible level by the use of volunteer labour for peer review, editing and production (Kovacs, 2014).
- Sponsorship or advertising. Some OA journals rely on companies placing adverts or sponsoring issues or articles. This modality is more common in healthcare related journals (Polydoratou et al., 2010).
- Institutional subsidy. Institutions have an interest in disseminating knowledge; either produced by themselves or others and sponsors certain publishing ventures. This could be the case for research institutes newsletters or periodicals or university publishers. In this model the organizational structure is almost entirely based on voluntary work (Claudio-González et al., 2016).
- Hard copy sales. Many journals provide OA to its articles in electronic format and still send paper copies to libraries or even individuals (Kovacs, 2014).
- Institutional membership schemes. Some publishers offer institutional member schemes to reduce APC costs. These usually involved prepaid options (Ware & Mabe, 2015).
- Collaborative purchasing models. Some organizations and institutions provide funds to certain publishers so all their articles are converted to OA

for anyone to read. An example of this model would be SCOAP3 (Campbell et al., 2012).

- Offsetting model. Institutions agree with certain publishers to cover both subscriptions to and APCs. One example of this model is Springer Compact 17.

1.2 Justification for the study

As previously mentioned, authors are one of the key players in the OA movement. Therefore it is important to find out their opinions, but also their attitudes and their actions in respect to OA publishing. Since the movement sort of officially began in 2002 (BOAI, 2002) we can see how surveys to find their views started to proliferate.

The first proper OA survey is carried out between 2001 and 2002 (Swan & Brown, 2003). Since then there has been surveys to find out researcher's opinions, attitudes and practice in disciplines such as economics and law (Pelizzari, 2003), medicine, biomedicine and nursing (Abdekhoda et al., 2014; Fullard, 2007; Muñoz-García, 2013; Sánchez-Tarragó & Fernández-Molina, 2010; Schroter et al., 2005; Warlick & Vaughan, 2007), biosciences (Morrison et al., 2006; Thorn et al., 2009), information science (Johnson & Roderer, 2008a), psychology (Uhl, 2009), education (Coonin & Younce, 2010b), mathematics (Fowler, 2011), byzantine studies (Tsoukala & Sachini, 2011), business research (Coonin, 2011), physical sciences, engineering and mathematics (Cusker & Rauh, 2014). Other surveys have focused on certain countries such as South Africa (Beer, 2005), Germany (Eger et al., 2013a; Over et al., 2005), USA (King et al., 2006; Odell et al., 2014; Teplitzky & Phillips, 2016; University of California, 2007), India (Deoghuria & Roy, 2007; Singson et al., 2015), Australia (Austin et al., 2008; Kennan, 2007), United Kingdom (Sheridan Brown & Swan, 2007; Budden, 2011; Creaser, 2010; Nariani & Fernandez, 2012; Report et al., 2010; Zhu, 2017), Spain (Bernal, 2010b), Norway (Alemayehu, 2010), Argentina (Bongiovani et al., 2012), Finland (Harjuniemi & Lehto, 2012), France (Schöpfel et al., 2016) or New Zealand (White & Remy, 2016). The majority of these surveys are not really important mainly due to their small sample sizes.

The OA movement runs in parallel to globalization. Most probably this is the reason that has triggered many authors to issue surveys with an international and interdisciplinary orientation since the early days of OA. Examples of this could be the following: (Coonin & Younce, 2009; Cozzarelli et al., 2004; Eger et al., 2014; Frass et al., 2013; Hess et al., 2007; Nature Publishing Group, 2015a, 2015b, 2016; D. Nicholas et al., 2005; Rowlands et al., 2004; Solomon & Björk, 2012b; Swan & Brown, 2004c, 2005). Among them we also find the Study of Open Access Publishing (SOAP), a European Commission FP7 funded project that issued a survey answered by more than 38,000 researchers (Dallmeier-Tiessen, et al., 2011). The project partners were libraries (CERN and Max Planck Digital Library), research institutions (Science and Technology Facilities Council – STFC), OA publishers (BioMed Central) and traditional publishers (SAGE and Springer).

[17] https://www.springer.com/gp/open-access/springer-open-choice/springer-compact

Since then many new OA initiatives have aroused and institutions have issued mandates and policies to promote and support OA. It is therefore necessary to find out how things have evolved in the last six years. However one of the problems in those surveys is the absence of longitudinal studies based on surveys applying standardized protocols to allow how researcher's views are evolving. The only longitudinal study up to date runs until 2010 and is a quantitative summary of the results obtained up to that year (J. Xia, 2010).

This PhD thesis is set out as a longitudinal study to find out the evolution of opinions, attitudes and publishing practices in OA from 2010 to date, with the aim of filling the existing gap in the literature. In the following sections we present the objectives of this essay.

1.3 Objectives

1.3.1 General objectives

The general objective of our study is to find out the evolution of researchers' opinions, attitudes and practices in OA publishing since 2010 when the SOAP survey took place.

1.3.2 Specific objectives

As specific objectives we want to find out the following from researchers

- Awareness of OA publishing
- Opinion about OA
- Opinion of negative and positive aspects of OA
- Number of publications (non-OA and OA)
- Experience with APC
- Factors to select journals to which submit papers

We have focused our study on researchers that have published in journals indexed in the Web of Science. We have included researchers from all over the world and in all disciplines of knowledge.

1.4 Thesis structure

This PhD thesis is structured in the following chapters:

- Chapter 1 – Introduction. In this chapter we put the OA movement in context. We include a detailed timeline including events around OA ranging from the 1980s to early 2017. Then we discuss the different modalities of OA, the main stakeholders involved and the different ways to fund it. We then specify the justification for the study and include its general and specific objectives.
- Chapter 2 – We analyse all the surveys carried out since 2001 to find out researchers opinions, attitudes and practices in relation to OA publishing.
- Chapter 3 – Materials and methods. We provide details about the data collection used to build the sample in the SOAP study and explain how and

why we removed part of the answers for the purpose of this thesis. We then provide details for the data collection to build the sample in the survey carried out in 2016. We provide the questionnaires, detail the variables analysed and how the analysis is carried out.

- Chapter 4 – Results. We provide the results of the survey carried out in 2016 and compare them to the reduced SOAP study outcomes. This chapter is divided in three main categories:
    - Demographics. We present the results for all questions in our questionnaire looking mainly at three independent variables: discipline, seniority and region of the world.
    - Beliefs. We present awareness and opinions of researchers about OA. We also include a number of myths about OA, both negative and positive, and researchers' level of agreement or disagreement with them.
    - Practice. We present the number of OA and non-OA articles published by researchers in the sample, researchers' experience with APCs and the factors that researchers take into account when they select journals to submit articles to.
- Chapter 5 – Discussion. We interpret and describe the significance of our findings and compare them to the results of previous surveys.
- Chapter 6 – Conclusions. We expose the limitations of our study, synthesize our findings and make suggestions for further research.

2. Literature Review

The survey as a mean to obtain information about our environment has been widely used in Library and Information Science (LIS) in general and in scholarly communication in particular (Delgado López-Cózar, 2000). In the 1990s we observed how the usage of the internet expanded and the first scientific publications in electronic format were created. These changes triggered the need to understand author's opinions and practices, particularly in relation to these new ways to communicate the science (Okerson 1990).

One of the earliest surveys to introduce the concept of OA in 1994 asked researchers about their opinions on new publishing formats, its advantages or disadvantages or how things would evolve from that point onwards (Schauder, 1994). It is only in the late 1990s and early 2000s when the concept of Open Access as such begins to become familiar among researchers. The following table follows on Xia's longitudinal study on scholar's attitudes and behaviours on OA (J. Xia, 2010). We list the studies that have used surveys as a way to find out researchers' views including specific questions on gold OA publishing (

). We haven't included surveys focused on green OA and not including any question related to gold OA. We have also excluded surveys not including researchers among their respondents. We include the total number of respondents, the year in which the survey was issued, disciplines covered, countries or regions were respondents were based on and finally similar aspects researchers were asked about in the two surveys in which this PhD thesis is based: SOAP 2010 and WoS 2016.

Table 2-1 Survey-based studies to find out researchers‘ opinions, attitudes and practice towards OA publishing (2000-2015)

Paper	Sample size	Year represented	Subject area	Geographic coverage	Aspects covered
Björk & Turk, 2000	236	2000	Construction IT and Construction Management	International	publishing practice, opinion
Swan & Brown, 2003	1,246	2001/2002	Multidisciplinary	International	publishing practice, green OA
Pelizzari, 2003	62	2003	Economics and Law	Italy	green OA, opinion, publishing practice
Cozzarelli et al., 2004	210	2004	Multidisciplinary	International	APC
Schroter et al., 2005	28	2004	Medicine	International	OA awareness
Swan & Brown, 2004a	311	2004	Multidisciplinary	International	OA awareness, experience, opinion, green OA, APC
Swan & Brown, 2005	1,296	2004	Multidisciplinary	International	green OA, awareness, publishing practice
Beer, 2005	74	2004	Multidisciplinary	South Africa	awareness, publishing practice, green OA
Rowlands et al., 2004	3,787	2004	Multidisciplinary	International	OA awareness, opinion, publishing practice
Over et al., 2005	1,028	2004	Multidisciplinary	Germany	publishing practice, APC, OA awareness
Rowlands & Nicholas, 2005	5,513	2005	Multidisciplinary	International	publishing practice, APC, green OA
King et al., 2006	49	2005/2006	Multidisciplinary	USA	publishing practice, APC
Deoghuria & Roy, 2007	125	2006	Multidisciplinary	India	awareness, opinion, publishing practice
Fullard, 2007	145	2006	Biomedicine	South Africa	opinion, APC
University of California, 2007	1,118	2006	Multidisciplinary	USA	OA awareness
Warlick & Vaughan, 2007	14	2006	Biomedicine	USA	opinion, publishing practice, APC
Hess et al., 2007	688	2006	Multidisciplinary	International	publishing practice, green OA,
Kennan, 2007	202	2006	Multidisciplinary	Australia	publishing practice, OA awareness
Morrison et al., 2006	150	2006	Biosciences	Canada	OA awareness, green OA
Austin et al., 2008	509	2007	Multidisciplinary	Australia	publishing practice
Sánchez-Tarragó & Fernández-Molina, 2010	160	2007	Medicine	Cuba	awareness, publishing practice, green OA

Paper	Sample size	Year represented	Subject area	Geographic coverage	Aspects covered
Johnson & Roderer, 2008	581	2007	Information scientists	International	awareness, publishing practice
Sheridan Brown & Swan, 2007	2,250	2007	Multidisciplinary	United Kingdom	publishing practice, green OA
Creaser, 2010	2,122	2008	Multidisciplinary	United Kingdom	OA awareness, APC, green OA
Uhl, 2009	493	2008	Psychology	International	OA awareness
Thorn et al., 2009	1,368	2008	Biosciences	United Kingdom	APC, opinion, publishing practice, green OA
Coonin & Younce, 2009	918	2008	Multidisciplinary	International	publishing practice, opinion, APC
Coonin & Younce, 2010	309	2009	Education	Unknown	publishing practice, opinion, APC
Bernal, 2010	832	2010	Multidisciplinary	Spain	OA awareness, publishing practice, green OA
Alemayehu, 2010	43	2010	Multidisciplinary	Norway	green OA, OA awareness
Fowler, 2011	627	2010	Mathematics	international	publishing practice
Tsoukala & Sachini, 2011	158	2010	Byzantine studies	International	OA awareness, opinion
Bongiovani et al., 2012	532	2010	Multidisciplinary	Argentina	OA awareness, publishing practice
Dallmeier-Tiessen et al., 2011	38,358	2010	Multidisciplinary	International	opinion, OA awareness, publishing practice
Stone, 2010	114	2010	Multidisciplinary	United Kingdom	opinion, green OA
Nariani & Fernandez, 2012	20	2010	Multidisciplinary	United Kingdom	APC, publishing practice
Coonin, 2011	1,293	2010	Business research	USA	publishing practice, opinion, APC, green OA
Budden, 2011	71	2011	Multidisciplinary	United Kingdom	OA awareness, opinion
Muñoz-García, 2013	427	2011	Nursing	international	OA awareness, opinion, publishing practice, green OA
Solomon & Björk, 2012a	429	2011	Multidisciplinary	International	APC, publishing practice
Singson et al., 2015	100	2011/2012	Multidisciplinary	India	OA awareness
Harjuniemi & Lehto, 2012	211	2012	Multidisciplinary	Finland	opinion, green OA
Eger et al., 2013	2,151	2012	Multidisciplinary	Germany	OA awareness, publishing practice, opinion
Frass et al., 2013	14,769	2012/2013	Multidisciplinary	International	opinion, publishing practice, green OA, opinion, APC
Abdekhoda et al., 2014	163	2013	Medicine	Iran	OA awareness, opinion
Odell et al., 2014	247	2013	Multidisciplinary	USA	

Paper	Sample size	Year represented	Subject area	Geographic coverage	Aspects covered
Nature Publishing Group, 2015a	30,466	2013/2014	Multidisciplinary	International	publishing practice, APC
Schöpfel et al., 2016	432	2014	Multidisciplinary	France	OA awareness, green OA, APC
Cusker & Rauh, 2014	123	2014	Physical Sciences, Engineering and Mathematics	USA	publishing practice, opinion, APC
Eger et al., 2014	2,528	2014	Multidisciplinary	International	publishing practice, opinion
Rowley et al., 2017	7,936	2014	Multidisciplinary	International	publishing practice, opinion,
Teplitzky & Phillips, 2016	99	2015	Multidisciplinary	USA	APC, opinion
White & Remy, 2016	474	2015	Multidisciplinary	New Zealand	OA awareness, opinion, APC
Nature Publishing Group, 2015b	21,377	2015	Multidisciplinary	International	publishing practice, APC, OA awareness
Nature Publishing Group, 2016	Unknown	2016	Multidisciplinary	International	publishing practice, APC, OA awareness

The first survey we have taken in consideration was run in 2000 (Bo-Christer Björk & Turk, 2000). Although the concept of “open access” is still not mentioned as such it focuses on how the World Wide Web changed the way in which scholarly communication is carried out. The authors asked 236 researchers in the fields of Construction IT and Construction Management about their publication habits. Questions focused on how electronic publishing is different to traditional publishing and how authors faced those changes, not only from their roles as authors but also as readers.

One year later Swan & Brown did the first study with a 1,000+ sample on behalf of the Association of Learned and Professional Society Publishers (ALPSP) (Swan & Brown, 2003). Again, this survey purpose was to “*obtain their* [scholars’] *views on electronic publishing of learned journals*”, although the concept “open access” as such was still not mentioned. However concepts as depositing papers in repositories are already present in the questionnaire. The 1,246 researchers that responded to the survey were asked about their opinions on different aspects, including the fact that current and archive electronic versions of papers were available free of charge.

This study was followed up by a smaller one in 2004 that compiled 311 responses, made by 154 authors that had published in OA journals and 160 that had only published in traditional journals (Swan & Brown, 2004a) . Respondents were asked about different aspects such as their awareness of OA publishing, publishing practice on OA journals and in general, opinion as well as APC. These same authors run yet another survey in 2004 with 1,296 respondents, focusing this time on publishing practices and mainly on green OA (Swan & Brown, 2005). A third survey in 2007 commissioned by the Research Information Network and the Consortium of Research Libraries in the UK asked 2,250 British authors on their usage of library services (Sheridan Brown & Swan, 2007). The questionnaire included questions about their awareness of OA publishing.

Also in 2004 the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) commissioned a study to determine the publishing behaviour of DFG-funded researchers, particularly on OA aspects (Over et al., 2005). In total 1,028 German researchers were questioned about their publishing behaviour, awareness of OA publishing and their willingness to use their research funding to pay APC.

The other major OA survey issued in 2004 was commissioned by Ciber and had a sample of 3,787 senior authors from around the world and different disciplines (Rowlands et al., 2004). Researches were asked about their awareness of OA publishing, their publishing practices in general and in OA in particular and their opinions about future developments.

In 2005 and commissioned by the Publishers Association and the International Association of STM Publishers Rowlands and Nicholas asked 5,513 researchers about their behaviour, attitudes and perceptions of scholarly communication, including those related to OA (Rowlands & Nicholas, 2005).

The next large scale surveys were run in 2006. The University of California Office of Scholarly Communication and the California Digital Library eScholarship Program interviewed 1,118 scholars from the US on issues related to scholarly communication (University of California, 2007). Questions included their experience publishing in OA journals as well as depositing papers in repositories. Also in 2006 a joint study between a German and an American universities questioned 688 publishing scientists from different countries and subject areas exclusively on OA publishing aspects (Hess et al., 2007).

Already in 2007 we find a survey in the context of the Open Access to Knowledge (OAK) Law Project in which 507 Australian researchers from different disciplines provided their views on OA publishing (Austin et al., 2008). The survey focused on copyright issues in relation to green OA, but also on the reasons to publish (or not) in OA journals.

In 2008 *the Journal of the American Society for Information Science & Technology (JASIST)* started to give permissions to publishing authors to deposit preprints of their papers in repositories. Previous to this decision, in 2007, they asked 581 researchers among their published authors about their awareness and practical experience with the OA movement (Johnson & Roderer, 2008a).

In 2008 Creaser undertook two different surveys as part of a wider project investigating the effects and impact of open access to research outputs in the UK (Creaser, 2010). The institutional view was provided by academic librarians. The second survey collected the views from 2,122 British researchers on OA awareness, reasons to publish (or not) in OA journals and views on APC.

Also in 2008 the Biosciences Federation (BSF) in the UK run a survey with a 1,368 biosciences author sample (Thorn et al., 2009). Authors were asked about their opinions on OA publishing, their publishing practice in general and with green OA in particular as well as about their experience covering APC.

In 2008 Coonin and Younce surveyed published authors in OA journals in different fields: psychology, business management, women's studies, and music (Coonin & Younce, 2009). They found out the opinion of 918 authors on their publishing practices, their opinion on OA in general and their experience covering APC. This study was followed up by another survey in 2009, this time focused on 309 authors in OA journals specialized in Education (Coonin & Younce, 2010). In 2011 they run the same survey, this time focusing on American scholars publishing in Business Research, with a sample of 1,293 researchers (Coonin, 2011).

In 2010 we saw a number of surveys with relatively large samples. The Spanish National Research Council asked 832 Spanish researchers about their publishing experience with traditional journals as well as with OA journals and familiarity with green OA (Bernal, 2010b). Also in 2010 Fowler focused his survey on mathematicians (Fowler, 2011). 627 researchers were asked about their experience with both green and gold OA and how they compare to traditional publishing.

The largest survey to date, the SOAP survey, took place in 2010 (Dallmeier-Tiessen, et al. 2011). In total 38,358 researchers were asked about different aspects of OA publishing, explained in detail in other chapters of this thesis. Given that the full dataset of the SOAP study was made available under CC0 license other authors have provided re-analysis of particular subsets. This way we see an analysis of 532 Argentinian researchers from all fields of knowledge (Bongiovani et al., 2012) or another study that focused on 427 nursing professionals from all over the world (Muñoz-García, 2013).

Solomon & Björk have published a number of studies focusing specifically on APC (Bo-Christer Björk & Solomon, 2014; Bo Christer Björk & Solomon, 2014; Solomon, 2012; Solomon & Björk, 2012a) including a survey in 2011 in which they asked 429 authors from all disciplines and countries about their publishing practices in general and APC in OA journals in particular (Solomon & Björk, 2012a).

In 2012 a survey among 2,151 German authors from all disciplines aimed to find their awareness on OA publishing as well as their experience with both gold and green OA (Eger et al., 2013a). The same authors followed up with the same survey, this time surveying 2,528 scholars from Spain, Portugal, France, Italy, Turkey and Greece (Eger et al., 2014).

Between 2012 and 2013 the Taylor & Francis publishing group within their author community to find out their views on Open Access publishing and their level of involvement with it (Frass et al., 2013). The sample comprised 14,769 researchers and the questionnaire included aspects such as OA awareness, publishing practices, opinions on gold and OA and APC.

As part of a nationwide survey on scientific information and documentation conducted by the French National Research Center (CNRS) in2014, 432 French scientists (senior management level) were asked about their views on OA (Schöpfel et al., 2016). Among others they were questioned about their preferences towards green on gold OA, opinion on OA in general and ways to cover APCs.

The last large effort we are aware of on finding researchers' opinions on OA through surveys is that of the Nature Publishing group. So far it has run large surveys among their published authors three consecutive years. In the first one they compiled the views of 30,466 researchers in 2014/2015 (Nature Publishing Group, 2015a), 21,377 in 2015 (Nature Publishing Group, 2015b) and an still undetermined number of researchers in 2016 (Nature Publishing Group, 2016). These surveys cover aspects such as OA awareness, publishing practices and APCs.

The latest survey we are aware of was carried out in 2015 to assess the opinions of researchers at the University of Otago in New Zealand (White & Remy, 2016). The author compiled the views of 474 researchers on OA, their OA awareness, publishing practices as well as experience with APCs.

These surveys are complemented by smaller ones focusing on particular countries such as Italy (Pelizzari, 2003) (62 respondents) or particular disciplines such as

Medicine (Schroter et al., 2005) (28 respondents). In 2004 we also find a study with 210 respondents focused exclusively on APC (Cozzarelli et al., 2004) or another survey to 74 South African researchers (Beer, 2005).

In 2006 we found a number of surveys focused on researchers from particular countries, such as one carried out by (King et al., 2006) among 49 American researchers, another one by Deoghuria & Roy, 2007 with 125 Indian researchers, a survey focused on 145 South African biomedicine researchers (Fullard, 2007), 14 biomedicine researchers but this time from the USA (Warlick & Vaughan, 2007), another survey among 202 Australian researchers from all disciplines (Kennan, 2007) or a survey with 150 biosciences professionals from Canada (Morrison et al., 2006).

In 2007 and 2008 we found a study asking 160 health professionals in Cuba (Sánchez-Tarragó & Fernández-Molina, 2010) and another study asking 493 psychology professionals from all over the world about their OA awareness.

There are several smaller size surveys in 2010. Alemayehu mainly focused on green OA when asking 43 Norwegian researchers about their views (Alemayehu, 2010). Tsoukala put the focus on 158 Byzantine studies experts (Tsoukala & Sachini, 2011) and other authors mainly focused on British scholars: (Stone, 2010) asked 114 researchers and Nariani & Fernandez, 2012) did so with 20 respondents.

In 2011 (Budden, 2011) asked 71 British researchers from all disciplines about their OA awareness and opinion and another study focused on Indian scholars (Singson et al., 2015) had a 100 sample size.

In 2012 and 2013 we found three studies focused on scholars from particular countries. The first study was carried out by Harjuniemi & Lehto, 2012 and mainly focused on green OA, asking 211 Finnish researchers. Abdekhoda et al., 2014 put the focus on 163 Medicine researchers in Iran while Odell et al., 2014 did so with 247 researchers in all fields of knowledge.

Cusker & Rauh, 2014 asked 123 researchers from Physical Sciences, Engineering and Mathematics in the United States about different aspects of OA, including opinion, awareness as well as APC. Teplitzky & Phillips, 2016 also touched on APC aspects as well as opinions asking 99 researchers from all disciplines.

This review of studies based on surveys aiming to find out researcher's opinions, attitudes and practices towards OA showcases their nature. There is a wide variety of sample sizes (number of respondents), geographic origin (regionals, nationals and internationals) as we as their disciplinary ascription (specialized or multidisciplinary). A descriptive analysis of the projects listed in Table 2-1 (page 40) allows us to obtain a snapshot of these surveys:

- Size. Despite a quite heterogeneous range of sample sizes (from 14 to 38,358 respondents), there is a predominance of small-size surveys (half of them had less than 500 respondents and 70% less than 1,000).

- Geographic coverage. Most surveys are based on researchers from one country (60%). The largest number of surveys are located in the USA (7) and United Kingdom (5), followed by Australia (2), Germany (2), India (2) and South Africa (2). The most frequent type are international surveys (22).
- Subject coverage. Most surveys took a multidisciplinary approach (70%). Despite this fact, we can point out that only a few of them cover all disciplines in scientific knowledge. The areas with more specific surveys are life sciences, more specifically biomedicine (7).

We can also point out that this seems to be a hot issue. Two thirds of the surveys on OA have been published in the last decade. The latest ones were issued in 2016, as it happens with the one in which part of this PhD thesis is based on.

3. Materials and methods

In this study we present a descriptive longitudinal study of active researcher's opinions on Open Access publishing. We re-analysed a dataset from a previous study run in 2010 (SOAP 2010) and we contacted authors publishing in scientific journals indexed in international databases (WoS 2016).

We analysed the scientific community opinion on Open Access and in particular its evolution in the past 7 years. To do so we have used two different samples:

- The SOAP project study (Dallmeier-Tiessen et al., 2011), referred from now on as **SOAP 2010** and
- an ad-hoc sample obtained from the Web of Science database, **WoS 2016** from this point onwards.

3.1 Samples

3.1.1 SOAP data sample (2010)

Between April 2010 and November 2010 the SOAP (Study of Open Access Publishing) project run a large-scale self-administered survey for scientists in all disciplines and from all countries in the world. The aim of the study was to "*uncover the attitudes and experiences of scholars with open access publishing*" (Dallmeier-Tiessen, Darby, Goerner, Hyppoelae, Igo-kemenes, et al., 2011).

The survey was open and anyone willing to do so could participate. In order to reach researchers, the SOAP survey invitation was sent out in different ways. The main method was to use mailing lists of publishers participating in the project. Individuals were encouraged not only to fill the questionnaire but also to distribute it to whoever could be interested as well as to post the link on websites. It was calculated that between 1.2 and 1.5 million individuals were exposed to the survey. Some of the publishers participating in the project and distributing the survey link to their own authors did not provide the exact number of authors approached or the methodology used to select them mainly due to commercial constraints.

At some point during the data collection it was believed that an additional effort had to be done to compile additional answer in some fields with a relatively low number of responses. While the survey was running we analysed the taxonomy distribution of the answers received up to that point and compared it with the Journal Citation

Reports (JCR) journals distribution. The project hired Thomson-Reuters database to disseminate the link to the survey to a random set of authors within those fields. The invitation was sent out to 64,606 contacts from their database, conformed by researchers. Targeted fields were:

- Psychology
- Criminology
- Economics
- Astronomy
- Physics
- Earth Sciences

In order to differentiate between the source of answers (how the invitation to fill the survey reached the respondent) the SOAP 2010 project created so-called *collectors*. This is a feature offered by SurveyMonkey, the tool used to run the survey, that identifies which link the respondent clicked to reach the survey. The different collectors defined were:

- BMC - Biomed Central is an OA Publisher specialized in medical research and biology. All authors that had published an article in any of its journals were invited to fill the survey. The number of authors invited to fill the survey is unknown. This database also included people interest in OA or BMC activities.

- European Commission (EC) project coordinators and Marie Curie alumni. The EC sent the link to the survey to a mailing list formed by European Project coordinators, as well as present and past Marie Curie researchers. This list was mainly populated by researchers. The number of authors invited to fill the survey is unknown.

- Others. This collector was used somehow as a hodgepodge. It collected answers from SAGE marketing database (not necessarily conformed by researchers), different mailing lists, blogs, newsletters, etc. Anybody with the link to fill the survey was invited to do so. All those answers came through this particular collector. The number of authors invited to fill the survey is unknown.

- SAGE authors. Sage publications is a publisher mainly oriented to Social Sciences. Together with a second brand called Hindawi they also publish a number of OA journals in different fields. Sage and Hindawi authors were invited to fill the survey. The number of authors invited to fill the survey is unknown.

- Thomson-Reuters. At some point during the survey a low number of responses in certain areas was observed. The project acquired a number of randomly selected researchers email addresses from Thomson-Reuters.
- Springer authors. This is a more technical-oriented publisher. The estimated number of individuals reached was 249,000.

In the following table we are presenting the number of answers we received for each collector. We then present the ratio of active researchers in relation to the total number of answers. We also present the ratio of golden answers (researchers that have published at least one article, OA or not, during the last five years).

Table 3-1 Distribution of SOAP 2010 answers by collector

	Count of Collector	Active researchers	Researchers ratio	Golden answers	Golden answers ratio
BMC	9,916	9,298	94%	8,492	86%
EC	1,942	1,661	86%	1,423	73%
Others	8,199	7,014	86%	5,815	71%
SAGE	19,404	14,269	74%	9,747	50%
Springer	12,862	12,312	96%	11,114	86%
ThomsonReuters	2,227	2,164	97%	1,931	87%
TOTAL	**54,550**	**46,718**	**86%**	**38,522**	**71%**

After removing incomplete answer the project ended up with 53,890 valid responses to the survey, from those 46,006 were identified as active researchers. The project retained 38,538 answers to analyse, those authors that had published at least one research article during the previous five years and who answered at least one question about their opinion on the benefits (or its absence) of open access publishing in their respective research fields, these were defined as “golden answers”. The aggregated results of the survey were made publicly available (SOAP Project, 2011).

Later in this thesis we’ll discuss some biases identified in the original SOAP 2010 study. In order to try to remove, or at least to diminish those biases we worked with a reduced dataset in the current study. To do so we kept only the answers received from the EC, Springer, SAGE and Thomson Reuters collectors. This way we removed all people that did not receive a direct invitation (i.e., those who found the link in a blog and decided to complete the survey), as well as those who came from the BioMed Central mailing list.

After removing the mentioned data collectors and doing the adjustments in the taxonomy categories, we ended up with a final dataset of **26,540 responses**.

3.1.2 WoS data sample (2016)

In order to find out whether the situation had changed in the last six-year period we decided to replicate the SOAP study at present. To do so we contacted 80,969 authors listed in 63,890 bibliographic records (only journal articles and conference proceedings were included). We selected those records added to the Web of Science (WoS) service maintained by Thomson-Reuters during a period of two weeks during July 2016. WoS is currently one of the main tools used to produce citation impact indicators (Waltman, 2016). In 2015 a total of 6 million unique authors were indexed in WoS.

The original file containing 63,890 records was exported from WoS into an Ms Excel file. Fields like language, publisher, DOI, etc. were removed and we only kept the following fields:

- Author
- Email
- Source (Journal or Conference title)
- Document type (Journal article or Conference Proceeding)
- Author address
- Subject

We identified those records with more than one researcher email address and singled them out. In the end we obtained contact information for 80,969 different researchers. In order to reduce the number of questions to ask potential respondents we considered all authors as active researchers. We then assigned them to a discipline in our study according to the original bibliographic record (see annex I) and identified their country from their email address (see annex II) or from their correspondence address for certain domains where the country of origin was not identifiable.

We used the online survey creation tool SurveyMonkey (Liu et al., 2016) to collect responses to the survey. This same tool was created to send personalized survey invitations to the authors in our sample. We run the survey during a period of four months (July to October 2016). We followed up our initial invitation with one unique reminder to those that hadn't replied after a few weeks. We received 16,414 answers, and after eliminating mostly incomplete answers we ended up with **15,235** unique responses from WoS authors, an 18.82% response ratio.

In 2015 there were 6,177,365 unique authors in WoS. Our sample included 89,969 unique authors. With the 15,235 responses obtained (18.82%) and a confidence level of 99%, our confidence interval is ±0.34%.

3.2 Data collection: surveys

In the following section we explain the methods and techniques used in both surveys to collect opinions and practices of researchers from around the world in relation to OA publishing.

Online surveys are a widely used method to compile opinions and attitudes from reference populations in the XXI century (Guo et al., 2016). Both in the SOAP 2010 and the WoS 2016 studies we used the SurveyMonkey online survey tool (gold plan, allowing unlimited responses). This tool was selected as it offers a number of useful features for data collection: flexible questionnaires creation, contact information upload and classification and data export. In order to facilitate the comparison between the two studies we created set of questions for the WoS 2016 study including some identical questions from the SOAP 2010 project.

3.2.1 SOAP data collection (2010)

The SOAP project decided that the best way to maximize the number of answers to its survey was through a self-administered survey. The survey was distributed through project partners' contacts who were invited not only to answer the questionnaire, but also to post the link on websites as well as to invite others to do so. The invitation email and the questionnaire can be found in Annex III.

3.2.2 WoS data collection (2016)

The 80,969 researchers identified in the WoS 2016 sample were invited in July 2016 to fill the survey. The WoS 2016 sample was divided in categories depending on the main discipline of the researchers. We created collectors for each of those samples and the emails were sent in waves of up to 20,000 email addresses (a limitation imposed by SurveyMonkey) between late July and early August 2016. Between September and October 2016 we sent one unique reminder to those that hadn't provided an answer up to then. Such feature is available as part of our SurveyMonkey plan. In Annex III you can find the email sent out together with the content of the reminder. In brackets we indicate fields from the database that were used to personalize the invitation message.

Sending unsolicited emails asking to fill a survey has a number of disadvantages, such as a potential low rate response ratio (Fielding et al., 2008). This was the case of the WoS 2016 which received a number of emails asking to stop sending requests to fill the survey. Some of them were more polite.

> Thank you very much for your proposition.
>
> However, I am very busy during this period.
>
> Best regards,

While others users took a more drastic approach.

> When people waste others' time with unsolicited spam, I am sorely tempted to waste their time by providing spam responses to their survey.

At the same time 1,047 researchers expressed their interest in receiving the outputs of the study.

> I've done the survey. It's an interesting topic and I'd like to see the results of the survey when possible.

3.3 Variables

In both studies we looked at a number of variables in order to identify:

- Respondents' demography: field of work, age and country.
- Opinions as consumers of scientific research outputs.
- Practice as scientific research outputs producers, publishing habits.

In the following sections we explain how those variables were collected in both studies.

3.3.1 SOAP 2010

3.3.1.1 SOAP 2010 Questionnaire

The SOAP 2010 questionnaire was distributed to the participants in the SOAP 2011 survey (SOAP Project, 2011) and can be found in Annex II. A number of respondents were contacted to fill a follow-up survey. We won't present the follow-up questionnaire or results as it is not part of this study.

3.3.1.2 Demographics

3.3.1.2.1 Disciplines

In the SOAP 2010 study researches were questioned about their field of expertise. They were offered the possibility of adding a second field of expertise when answering the survey. For the purpose of this study we made some changes in the original categories grouping.

Table 3-2 SOAP 2010 disciplines redistribution

Original SOAP 2010 Study	SOAP 2010 Study re-analysis
Mathematical and Computer Sciences	Mathematical Sciences Computer Sciences
Historical and Philosophical Studies	Historical Studies Philosophical Studies

New categories were assigned to records depending on the information contained in the main research sub-field. In the end we obtained the following distribution of golden answers by disciplines and collectors.

Table 3-3 Distribution of SOAP 2010 golden answers by discipline

Discipline	Answers	Percentage of total
Agriculture and Related Sciences	1,111	3.2%
Architecture, Building and Planning	303	0.9%
Astronomy and Space Science	525	1.5%
Biological Sciences	4,280	12.2%
Business and Administrative Studies	1,409	4.0%
Chemistry	2,163	6.1%
Communication, Information and Library Science	587	1.7%
Computer Science	1,858	5.3%
Creative Arts and Design	205	0.6%
Earth Sciences	1,245	3.5%
Education	1,776	5.0%
Engineering and Technology	3,173	9.0%
Historical Studies	618	1.8%
Language and Literature Studies	823	2.3%
Law	278	0.8%
Mathematics	1,643	4.7%
Medicine, Dentistry and Related Subjects	4,394	12.5%
Philosophical Studies	558	1.6%
Physics and Related Sciences	1,967	5.6%
Psychology	1,999	5.7%
Social Sciences	4,274	12.1%
Total	**35,189**	

Please note that for the purpose of this thesis when producing results by discipline answers from those respondents that chose more than one discipline will be counted twice, one for each of the disciplines chosen.

3.3.1.2.2 Seniority

Another demographic variable we will be using when presenting results wase the respondent seniority. To do so we will look into the answer to question 4 (How many years have you been employed in research?). In the re-processed dataset we obtained the following answer distribution.

Table 3-4 Distribution of SOAP 2010 golden answers by seniority

Experience in research	Answers	Percentage of total
Fewer than 5 years	5,534	20.9%
5-14 years	10,846	40.9%
15-24 years	5,361	18.1%
25 years or longer	4,799	20.2%
Total	**26,540**	

3.3.1.2.3 Geographic distribution

In question 5 in the SOAP 2010 study (In which country do you work?) respondents were presented with a list of countries from which they had to choose one. In the results of the re-analysis carried out in this study we grouped those countries in regions to present the results. The exact correspondence between countries used in the original study together with the grouping carried out for this thesis can be found in annex II. The results in a later chapter will be presented using the following regional distribution.

Table 3-5 Distribution of SOAP 2010 golden answers by geographical region

Region	Answers	Percentage of total
Africa	551	2.1%
Asia	1,208	4.6%
Brazil	788	3.0%
China	1,035	3.9%
Europe	11,598	43.7%
India	1,030	3.9%
Middle East	1,862	7.0%
North America	5,882	22.2%
Oceania	959	3.6%
Russia	420	1.6%
South America	1,207	4.5%
Total answers	**26,540**	

We also analysed in detail answers received from researchers within the European region. To do so we identified from which regions within Europe responses were coming from. We obtained the following answers distribution.

Table 3-6 Distribution of SOAP 2010 golden answers by European region

European region	Number of answers	Percentage of total
Eastern Europe	1,410	12.2%
Northern Europe	1,109	9.6%
Southern Europe	3,147	27.1%
Western Europe	5,932	51.1%
Total	**11,598**	

3.3.1.3 Beliefs

One of the SOAP 2010 study aims was to try to understand researchers' views and opinions on Open Access not only when publishing their outputs, but also as consumers of information. To do so there were a number of questions in the survey focused on trying to understand Open Access awareness and perceptions. These were:

- Q8: Do any journals in your research field publish Open Access articles? Yes; No; I do not know.
- Q9: Do you think your research field benefits, or would benefit from journals that publish Open Access articles? Yes; No, I have no opinion; I do not care.
- Q10: When you are reading a journal article, are you generally aware whether it is Open Access or not? Yes; No.
- Q11. How do you know whether the article is Open Access? I had prior knowledge that the article or journal was Open Access; It is clearly indicated on the Web page linking to the article; It is clearly indicated in the article itself; Other.

In question 23 respondents were presented with a series of statements around OA frequently used by those either trying to "promote" the adoption of OA or by those warning about its dangers to scholarly communication. Researchers were asked about the level or agreement or disagreement around what the project called OA myths. These were:

Positive aspects of OA

- Researchers should retain the rights to their published work and allow it to be used by others
- Publicly-funded research should be made available to be read and used without access barrier
- Open Access publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research
- Articles that are available by Open Access are likely to be read and cited more often than those not Open Access

Negative aspects of OA

- Open Access publishing undermines the system of peer review

- Open Access publishing leads to an increase in the publication of poor quality research
- If authors pay publication fees to make their articles Open Access, there will be less money available for research
- It is not beneficial for the general public to have access to published scientific and medical articles
- Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication

In the results section of this thesis we will focus mainly on respondents opinion about OA (Q9 Is OA beneficial?) and the myths.

3.3.1.4 Practice

The SOAP project also had an interest in trying to understand what authors actually do when publishing their research and whether this is linked or not to their opinion around OA. To do so respondents were asked a number of questions around their publishing experience in general but also around their particular experience when publishing OA articles. These were:

- Q12: How many peer reviewed research articles (Open Access or not Open Access) have you published in the last five years? 0; 1-5; 6-10; 11-20; 21-50; More than 50.
- Q13: What factors are important to you when selecting a journal to publish in? Importance of the journal for academic promotion, tenure or assessment; Recommendation of the journal by my colleagues; Positive experience with publisher/editor(s) of the journal; The journal is an Open Access journal; Relevance of the journal for my community; The journal fits the policy of my organisation; Prestige/perceived quality of the journal; Likelihood of article acceptance in the journal; Absence of journal publication fees (e.g. submission charges, page charges, colour charges); Copyright policy of the journal; Journal Impact Factor; Speed of publication of the journal; Other (please specify).
- Q14: Who usually decides which journals your articles are submitted to? The decision is my own; A collective decision is made with my fellow authors; I am advised where to publish by a senior colleague; The organisation that finances my research advises me where to publish; Other (please specify).
- Q15: Approximately how many Open Access articles have you published in the last five years? 0; 1-5; 6-10; More than 10; I do not know.
- Q16: Has there been a specific reason why you have not published an article by Open Access? If so, please give your reason(s) in the textbox provided. Yes; No; Reason(s) for not publishing by Open Access.
- Q17: What publication fee was charged for the last Open Access article you published? No charge; Up to €250 ($350); €251-€500 ($350-$700); €501-€1000 ($700-$1350); €1001-€3000 ($1350-$4100); More than €3000 ($4100); I do not know.

- Q18: How was this publication fee covered? My research funding includes money for paying such fees; I used part of my research funding not specifically intended for paying such fees; My institution paid the fees; I paid the costs myself; Other (please specify).
- Q19: How easy is it to obtain funding if needed for Open Access publishing from your institution or the organisation mainly responsible for financing your research? Easy; Difficult; I have not used these sources.

In the re-analysis of the SOAP 2010 dataset to be carried out in this thesis we will mainly focus on the number of OA and non-OA published articles (Q12 and Q15), OA publication fees and how it was covered (Q17 and Q18) and more broadly on which factors are taken into consideration when deciding where to publish and who is involved in that decision (Q13 and Q14).

3.3.2 WoS 2016

3.3.2.1 WoS 2016 Questionnaire

The WoS 2016 questionnaire was based in the one used in the original SOAP 2010 study. In order to try to maximize the number of answers we removed some questions from the original questionnaire. We also removed some questions for which answers could be found by different means (e.g.: we extracted the respondent country and field of work from the original WoS sample). The questionnaire can be found in Annex II.

3.3.2.2 Demographics

3.3.2.2.1 Disciplines

Many of the original records in the WoS 2016 study included more than one discipline, having some of them up to 5 different disciplines. For practical purposes when analysing the WoS 2016 results we took into account only up to two different disciplines. However in the dataset distributed with the survey results we will include all disciplines assigned to researchers. Additionally we took the approach of double counting those answers with more than one discipline attached (The University of Reading & Statistical Services Centre, 2001).

Following we can see the disciplines distribution obtained in our sample (discipline correspondence between our survey and WoS disciplines can be found in annex I).

Table 3-7 Distribution of WoS 2016 answers by discipline

Discipline	Authors contacted	Number of answers	Response ratio
Agriculture and Related Sciences	2,898	657	22.7%
Architecture, Building and Planning	347	67	19.3%
Astronomy and Space Science	1,147	300	26.2%
Biological Sciences	7,304	1,346	18.4%
Business and Administration Studies	2,359	476	20.2%
Chemistry	6,069	901	14.8%
Communications, Information and Library Science	270	49	18.1%
Computer Science	7,976	1,294	16.2%
Creative Arts and Design	321	98	30.5%
Earth Sciences	5,040	1,114	22.1%
Education	738	198	26.8%
Engineering and Technology	17,125	3,195	18.7%
Historical Studies	413	138	33.4%
Language and Literature Studies	433	147	33.9%
Law	364	98	26.9%
Mathematics	3,132	757	24.2%
Medicine, Dentistry	18,588	2,977	16.0%
Philosophical Studies	84	26	31.0%
Physics and Related Sciences	3,530	634	18.0%
Psychology	1,268	320	25.2%
Social Sciences	1,563	443	28.3%
Total	**80,969**	**15,235**	**18.8%**

* Note: we are taking into account the first discipline only to calculate the response ratio even if for some authors more than one discipline was listed in their WoS record. When presenting the outcome of the survey we will double count answers where more than one discipline was used though.

3.3.2.2.2 Seniority

In the results chapter of this thesis we will present answers distributed by the seniority of the respondents. Unlike with the other two demographic variables taken into account we asked researchers directly how long they have been working on research.

Following we present the answers distribution depending on the respondents experience in research.

Table 3-8 Distribution of WoS 2016 answers by seniority

Years in research	Number of answers	Percentage of total
Fewer than 5 years	3,824	25.1%
5-14 years	6,433	42.2%
15-24 years	2,805	18.4%
25 years or longer	2,173	14.3%
Total	15,235	

3.3.2.2.3 Geographic distribution

In the results section of this thesis we will present some plots and tables including countries names for both SOAP 2010 and WoS 2016 studies. We computed answers from 150 different countries in our modified SOAP 2010 dataset and 144 in the WoS 2016 study. Including all of them in our results presentations would make them practically illegible. Because of this reason we grouped them in the following regions:

- Africa
- Asia
- Brazil
- China
- Europe
- India
- Middle East
- North America
- Oceania
- Russia
- South America

The list of countries included in each region can be found in annex II.

The distribution of answers in WoS 2016 by regions was as follows.

Table 3-9 Distribution of WoS 2016 answers by geographic regions

Region	Number of answers	Percentage of total
Africa	250	1.6%
Asia	1,167	7.7%
Brazil	702	4.6%
China	1,580	10.4%
Europe	5,523	36.3%
India	832	5.5%
Middle East	1,011	6.6%
North America	3,120	20.5%
Oceania	424	2.8%
Russia	180	1.2%
South America	446	2.9%
Total	**15,235**	

The WoS 2016 answers within European regions were distributed as follows.

Table 3-10 Distribution of WoS 2016 answers by European regions

European region	Number of answers	Percentage of total
Eastern Europe	594	10.8%
Northern Europe	555	10.0%
Southern Europe	1,760	31.9%
Western Europe	2,614	47.3%
Total	**5,523**	

3.3.2.3 Beliefs

In the WoS 2016 aspect of the study we wanted to try to understand how researchers' views and opinions on OA have evolved in the last few years.

In the survey we asked researchers two questions in this respect:

- Q2: Do any journals in your research field publish Open Access articles? Yes; No; I do not know.
- Q3: Do you think your research field benefits, or would benefit from journals that publish Open Access articles? Yes; No; I have no opinion; I do not care.

In this occasion we didn't asked respondents to provide an explanation to their answer. Given the limited amount of resources we couldn't have analysed them.

As in the SOAP 2010 we presented respondents with a series of statements around OA in order to analyse the evolution of perceptions in the last 6 years.

Positive aspects of OA

- Researchers should retain the rights to their published work and allow it to be used by others

- Publicly-funded research should be made available to be read and used without access barrier
- Open Access publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research
- Articles that are available by Open Access are likely to be read and cited more often than those not Open Access

Negative aspects of OA

- Open Access publishing undermines the system of peer review
- Open Access publishing leads to an increase in the publication of poor quality research
- If authors pay publication fees to make their articles Open Access, there will be less money available for research
- It is not beneficial for the general public to have access to published scientific and medical articles
- Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication

In the results section of this thesis we will focus mainly on respondents opinion about OA (Q9 Is OA beneficial?) and the myths.

3.3.2.4 Practice

In this study we also included a number of questions to find out what drives authors to submit their papers for publication to certain journals. These were:

- Q4: How many peer reviewed research articles (Open Access or not Open Access) have you published in the last five years? 0; 1-5; 6-10; 11-20; 21-50; More than 50.
- Q5: What factors are important to you when selecting a journal to publish in? Importance of the journal for academic promotion, tenure or assessment; Recommendation of the journal by my colleagues; Positive experience with publisher/editor(s) of the journal; The journal is an Open Access journal; Relevance of the journal for my community; The journal fits the policy of my organisation; Prestige/perceived quality of the journal; Likelihood of article acceptance in the journal; Absence of journal publication fees (e.g. submission charges, page charges, colour charges); Copyright policy of the journal; Journal Impact Factor; Speed of publication of the journal; Other (please specify).
- Q6: Who usually decides which journals your articles are submitted to? The decision is my own; A collective decision is made with my fellow authors; I am advised where to publish by a senior colleague; The organisation that finances my research advises me where to publish; Other (please specify).
- Q7: Approximately how many Open Access articles have you published in the last five years? 0; 1-5; 6-10; More than 10; I do not know.

- Q7B: Has there been a specific reason why you have not published an article by Open Access? If so, please give your reason(s) in the textbox provided. Yes; No; Reason(s) for not publishing by Open Access.
- Q8: What publication fee was charged for the last Open Access article you published? No charge; Up to €250 ($350); €251-€500 ($350-$700); €501-€1000 ($700-$1350); €1001-€3000 ($1350-$4100); More than €3000 ($4100); I do not know.
- Q9: How was this publication fee covered? My research funding includes money for paying such fees; I used part of my research funding not specifically intended for paying such fees; My institution paid the fees; I paid the costs myself; Other (please specify).
- Q10: How easy is it to obtain funding if needed for Open Access publishing from your institution or the organisation mainly responsible for financing your research? Easy; Difficult; I have not used these sources.

3.4 Data analysis

3.4.1 SOAP 2010

As discussed in 3.1.1 SOAP data sample (2010)) we removed a number of answers from some collectors in the original dataset. We also made some adjustments to certain variables (countries and disciplines). All this data treatment was carried out in Excel 2010.

Once final, the updated dataset with 26,540 responses was then uploaded to SPSS version 21.0.0. The main way to analyse the data was through frequencies and crosstabs descriptive analysis options. Tables with figures were then passed onto Excel 2010 were we calculated responses distribution and generated plots that can be found in the results section of this thesis.

3.4.2 WoS 2016

Once the questionnaires were closed the data was downloaded from SurveyMonkey in Microsoft Excel format (XLSX). Files were treated in Excel 2010 to remove extraneous information provided by the survey tool (such as collection date and different internal IDs). The datasets were then uploaded to SPSS version 21.0.0 where the different variables were combined to obtain cross-tabular tables. This output was then taken back to Excel 2010 in order to produce the plots that can be seen in this thesis.

To assess if the means between the two samples (SOAP 2010 and WoS 2016) were statistically different we applied the two-sample t-test. Many of the questions in our questionnaires follow the likert scale method. Although the distribution of our data is non-normal in almost all questions the t-test is known for its robustness to violations of normality with large data samples, which is the case in both of our distributions (Clason & Dormody, 1994; de Winter & Dodou, 2010).

3.4.3 Combined data analysis

We applied descriptive statistics using cross tabulations to measure the association between researcher's beliefs and practice and their discipline, seniority or geographical region. We also applied inferential statistics to test the significance level of these association using Chi square tests.

In the results chapter we analyse general results for each question. We then follow by an analysis by discipline, seniority, general geographic distribution and European regions distribution. Those results which didn't offer much interest, either statistically or in general, were moved to annexes.

4. Results

In the following sections we present the results of the re-analysis of the SOAP 2010 dataset (consisting of 26,540 responses in total) and we compare them with the results of the WoS 2016 study (consisting of 15,235 responses in total.

Given the fact that this is a longitudinal study is certain important to find out if there are differences between the samples obtained in the surveys carried out in 2010 and in 2016. There is a clear difference in size between both samples, independently from the differences in the way in which both surveys were distributed. We have already discussed this aspect in chapter 3 (Methodology). The sample size in SOAP 2010 is much larger than that of WoS 2016. While in WoS 2016 the response ratio was 18.82% in SOAP 2010 the response rate was just over 2.5% of the roughly 1,500,000 researcher/scholars who received the email.

4.1 Demographics

4.1.1 Disciplines

Each response was assigned to one or two disciplines in both studies. We can note that all disciplines are represented in both studies. In WoS 2016 we obtained opinions from researchers in the 252 thematic categories used in Web of Science to classify indexed journals.

The disciplines with higher number of responses in both surveys are those in the natural sciences. Those with the lowest response rate are from the arts and humanities. The three disciplines with the highest number of answer are practically the same for SOAP 2010 (Medicine, Biological Sciences and Social Sciences) and for WoS 2016 (Engineering and Technology, Medicine and Biological Sciences) although in different order.

If we compare the distribution of responses by discipline between the two surveys (SOAP 2010 and WoS 2016) we can observe that the sample sizes are similar in only 7 disciplines:

The sample size is larger in WoS 2016 in only four disciplines. In three of those (Earth Sciences, Engineering and Technology and Medicine) differences between the two samples are substantial.

The sample size obtained in WoS 2016 is smaller than that of SOAP 2010 in 10 disciplines, being the largest difference found in Social Sciences and Education.

Table 4-1 Distribution of responses by discipline (SOAP 2010 n= 35,189 - WoS 2016 n= 16,895)

Discipline	SOAP 2010		WoS 2016		Variation
	Responses	%	Responses	%	
Agriculture	4,274	12.1%	713	4.2%	+1.1%
Architecture	1,999	5.7%	68	0.4%	-0.5%
Astronomy	1,967	5.6%	300	1.8%	+0.3%
Biological Sciences	558	1.6%	1,651	9.8%	-2.4%
Business and Admin.	4,394	12.5%	487	2.9%	-1.1%
Chemistry	1,643	4.7%	997	5.9%	-0.2%
Comm., Inf. Library Sc.	278	0.8%	50	0.3%	-1.4%
Computer Science	823	2.3%	1,312	7.8%	+2.5%
Creative Arts and Design	618	1.8%	107	0.6%	+0.1%
Earth Sciences	3,173	9.0%	1,251	7.4%	+3.9%
Education	1,776	5.0%	198	1.2%	-3.9%
Engineering and Tec.	1,245	3.5%	3,557	21.1%	+12.0%
Historical Studies	205	0.6%	146	0.9%	-0.9%
Language and Literature	1,858	5.3%	155	0.9%	-1.4%
Law	587	1.7%	109	0.6%	-0.1%
Mathematics	2,163	6.1%	766	4.5%	-0.1%
Medicine, Dentistry	1,409	4.0%	3,261	19.3%	+6.8%
Philosophical Studies	4,280	12.2%	28	0.2%	-1.4%
Physics	525	1.5%	914	5.4%	-0.2%
Psychology	303	0.9%	341	2.0%	-3.7%
Social Sciences	1,111	3.2%	484	2.9%	-9.3%

* Some responses were assigned to more than one discipline, therefore N > total sample size

4.1.2 Seniority

One of the questions asked in both surveys was how many years respondents had been working in research. In the following table we present the distribution of answers for both samples.

The majority of respondents to both surveys have been working in research for 14 years or less (62% and 67% respectively). The highest rate of responses came from researchers with 5 to 14 years of experience. Young researchers were represented in excess of 20% in SOAP 2010 and 18% in WoS 2016. More than 30% of the respondents in both studies had 15 or more years of experience when the survey was distributed.

There are no significant differences in the responses distribution according to seniority between SOAP 2010 and WoS 2016. The only aspect we might mention is a slight increase in the number of researchers with 14 years or less of experience. At the same time there are more researchers with 14 years of experience or more. We can say that samples in both surveys are practically similar in this respect.

Table 4-2 Responses distribution by seniority (SOAP 2010 n=26,540 - WoS 2016 n=15,235)

Seniority	SOAP 2010		WoS 2016		Variation
	Responses	%	Responses	%	
Fewer than 5 years	5,534	20.9%	3,824	25.1%	+4.2%
5-14 years	10,846	40.9%	6,433	42.2%	+1.4%
15-24 years	4,799	20.2%	2,173	18.4%	-1.8%
25 years or longer	5,361	18.1%	2,805	14.3%	-3.8%

4.1.3 Geographical distribution

Each respondent was assigned to the country in which they work. In the case of SOAP 2010 researchers were asked directly. In the case of WoS 2016 countries were assigned from email or postal addresses in their WoS records. For the purpose of the data analysis countries were grouped into geographical regions. More details are provided in chapter 3 (Material and Methods).

Most respondents in both surveys are from the Western world. The remaining regions are also represented, although only representatives from Middle East countries reach more than 5% of the total in SOAP 2010.

In WoS 2016 more than half of the responses came from Europe and North America. China is represented with more than 10% of the total responses.

There are no major differences between SOAP 2010 and WoS 2016 regions distribution. We can highlight a lower response ratio in Europe (43.7% in SOAP 2010 vs 36.3% in WoS 2016). However, in the case of China the response rate is higher in WoS 2016 (10.4%) than in SOAP 2010 (3.9%).

Table 4-3 Responses distribution by geographical region (SOAP 2010 n=26,540 - WoS 2016 n=15,235)

Region	SOAP 2010		WoS 2016		Variation
	Responses	%	Responses	%	
Africa	551	2.1%	250	1.6%	-0.4%
Asia	1,208	4.6%	1,167	7.7%	3.1%
Brazil	788	3.0%	702	4.6%	1.6%
China	1,035	3.9%	1,580	10.4%	6.5%
Europe	11,598	43.7%	5,523	36.3%	-7.4%
India	1,030	3.9%	832	5.5%	1.6%
Middle East	1,862	7.0%	1,011	6.6%	-0.4%
North America	5,882	22.2%	3,120	20.5%	-1.7%
Oceania	959	3.6%	424	2.8%	-0.8%
Russia	420	1.6%	180	1.2%	-0.4%
South America	1,207	4.5%	446	2.9%	-1.6%

For the purpose of analysis we will also extract the distribution of responses by European regions. In the following table we present the distribution of responses by this criteria.

The region with highest representation in both studies is Western Europe with figures close to 50% of the total number of answers (51.1% in SOAP 2010 and 47.3% in WoS 2016). Southern Europe is the second largest option in both studies, with 27.1% in SOAP 2010 and 31.9% in WoS 2016. In the case of SOAP the third largest region is Eastern Europe with 12.2% and so is the case for WoS 2016, although with a slightly lower representation (10.8%). Northern Europe is the region with the lowest level of representation, 9.6% in SOAP 2010 and 10% in WoS 2016.

Table 4-4 Responses distribution by European region (SOAP 2010 n=11,598 - WoS 2016 n=5,523)

European region	SOAP 2010		WoS 2016		Variation
	Responses	%	Responses	%	
Eastern Europe	1,410	12.2%	2,614	10.8%	-1.4%
Northern Europe	1,109	9.6%	1,760	10.0%	+0.5%
Southern Europe	3,147	27.1%	555	31.9%	+4.7%
Western Europe	5,932	51.1%	594	47.3%	-3.8%

4.2 Beliefs

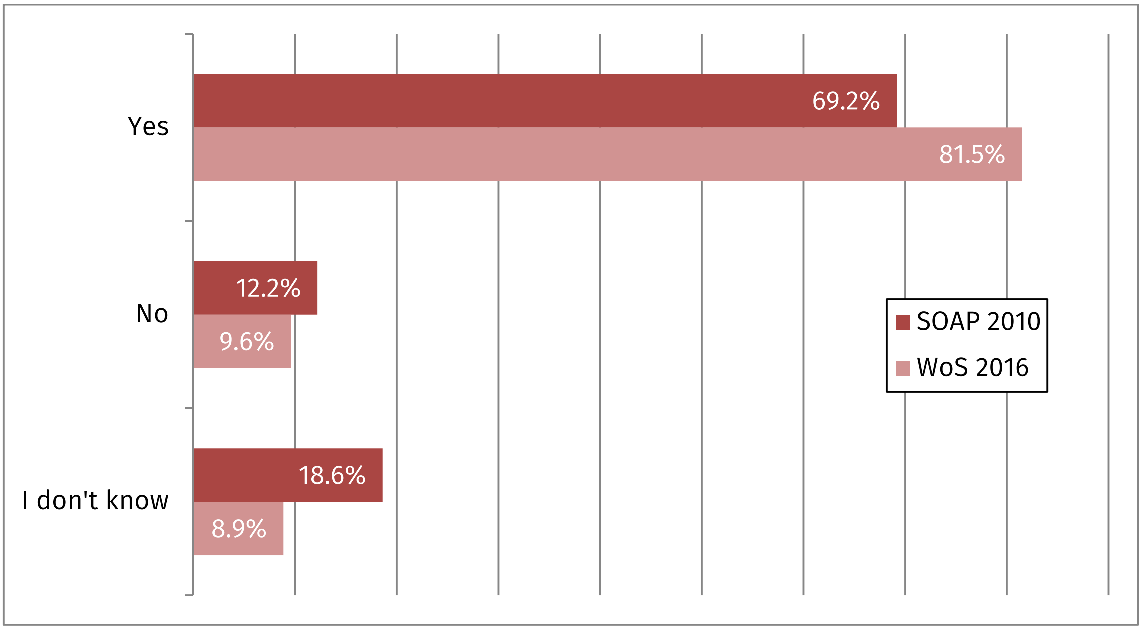
In this section we will focus on researcher's views or opinions on different aspects of OA publishing, that is what researchers *think*.

4.2.1 OA Awareness

The first question analysed is about awareness of OA journals: *Do any journals in your research field publish Open Access articles.*

The majority of respondents were aware of OA journals in their field. This figure has grown by more than 10% from 2010 (69.2%) to 2016 (81.5%). The number of respondents that were not aware of OA journals in their field has reduced though (12.2% in SOAP 2010 vs 9.6% in WoS 2016). Same situation with those that answered *I don't know* to this question, evolving from 18.6% in SOAP 2010 to 8.9% in WoS 2016.

Figure 4-1 Awareness of OA journals in field (SOAP 2010 n=26,540 - WoS 2016 n=15,235, $p < 0.001$)



4.2.1.1 OA awareness. Distribution by discipline

Most researchers were aware of OA journals in their fields, although there were significant differences between disciplines. There is an increase of awareness across all disciplines from the first survey to the second one.

Awareness of the existence of OA journals in the **SOAP 2010** survey varied between 79.5% in the case of Medicine and 86.1% in Biology to less than 60% of respondents being aware of this option in Business and Administration (53.2%), Astronomy (56%), Engineering (58.9%) and Creative Arts (59%). In most disciplines around 20% of respondents did not know whether OA journals were available or not.

In the **WoS 2016** study we can see respondents from four disciplines declared to be familiar with OA journals in their field in excess of 85% of the cases:

- Medicine (88.2%)
- Psychology (87.4%)
- Biological Sciences (87.0%)
- Language and Literature Studies (85.2%)

Chemistry was the only discipline in which more than 15% of the respondents said that there are no OA journals in their field (15.7%).

There is an increase of awareness of the existence of OA journals **between 2010 and 2016** in all disciplines. We can see three disciplines in which the increase of affirmative answers in WoS 2016 in respect to SOAP 2010 has been larger than 20%:

- Chemistry (+23.5%)
- Medicine (+20.9%)

- Earth Sciences (+20.0%)

In six disciplines this evolution has been of less than 10%:

- Architecture (+9.7%)
- Agriculture (+8.7%)
- Computer Science (+7.6%)
- Historical Studies (+5.8%)
- Mathematics (+4.2%)
- Biological Sciences (+0.9%)

The largest decrease of negative answers is found on:

- Medicine, Dentistry (-8.3%)
- Philosophical Studies (-9.1%)
- Creative Arts and Design (-9.4%)
- Social Sciences (-12.1%)

When looking at those respondents that answered “I don’t know” to this question we observe that in all disciplines but one (Social Sciences, +0.2%) this percentage is lower in WoS 2016. The biggest change is observed in:

- Chemistry (-17.1%)
- Psychology (-14.4%)
- Earth Sciences (-13.8%)
- Medicine (-12.6%)
- Language and Literature Studies (-12.0%)
- Architecture (-11.5%)

Table 4-5 Awareness of OA journals in field. Distribution by discipline (SOAP 2010 n=35,189 - WoS 2016 n=16,746, p < 0.001)

	SOAP 2010			WoS 2016		
	Yes	No	I don't know	Yes	No	I don't know
Agriculture and Related Sciences	74.8%	10.7%	14.5%	82.4%	11.1%	6.5%
Architecture, Building and Planning	60.4%	17.2%	22.4%	76.5%	10.3%	13.2%
Astronomy and Space Science	56.0%	20.2%	23.8%	68.7%	13.7%	17.7%
Biological Sciences	86.1%	6.6%	7.4%	87.0%	8.1%	4.9%
Business and Administration Studies	53.2%	18.7%	28.0%	73.3%	12.6%	14.2%
Chemistry	66.0%	13.9%	20.1%	75.7%	15.7%	8.6%
Communication, Information and Library Science	71.9%	11.1%	17.0%	84.0%	2.0%	14.0%
Computer Science	67.0%	11.8%	21.2%	77.7%	10.9%	11.4%
Creative Arts and Design	59.0%	16.1%	24.9%	70.5%	8.6%	21.0%
Earth Sciences	71.6%	14.0%	14.4%	84.3%	8.9%	6.7%
Education	66.6%	11.8%	21.7%	82.8%	5.1%	12.1%
Engineering and Technology	58.9%	17.2%	23.9%	78.6%	11.9%	9.5%
Historical Studies	62.1%	15.5%	22.3%	73.3%	6.2%	20.5%
Language and Literature Studies	64.3%	13.5%	22.2%	85.2%	5.2%	9.7%
Law	63.3%	17.6%	19.1%	75.2%	5.5%	19.3%
Mathematics	69.8%	11.9%	18.3%	75.7%	11.5%	12.8%
Medicine, Dentistry	79.5%	9.1%	11.4%	88.2%	6.0%	5.7%
Philosophical Studies	74.4%	7.7%	17.9%	78.6%	10.7%	10.7%
Physics and Related Sciences	67.0%	14.9%	18.0%	78.2%	11.6%	10.2%
Psychology	63.9%	12.3%	23.8%	87.4%	5.9%	6.7%
Social Sciences	64.0%	13.4%	22.6%	82.6%	6.8%	10.6%

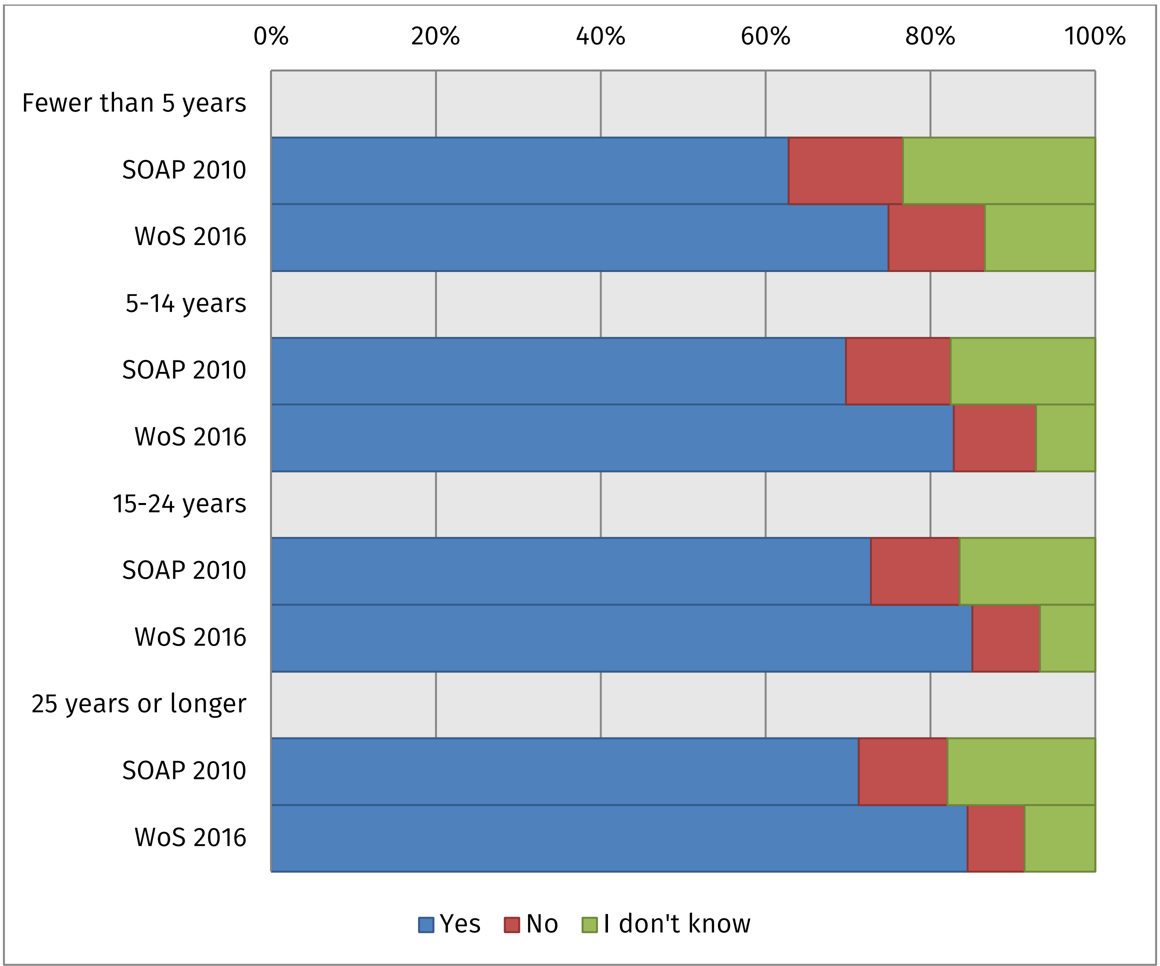
4.2.1.2 OA awareness. Distribution by seniority

We don't observe major differences between age groups in regards to awareness of existence of OA journals. The only aspect we can highlight is that the most senior group (25 years or longer) is more aware of OA journals than two of the less senior groups in both studies:

- 25 years or longer answered yes in 71.3% of the cases in SOAP 2010 and 84.5% did so in WoS 2016
- 5-14 years answered yes in 69.7% (-1.6%) of the cases in SOAP 2010 and 82.8% (-2.3%) in Wos 2016
- Fewer than 5 years answered yes in 62.8% (-8.5%) of the cases in SOAP 2010 and 74.9% (-10.4%) in WoS 2016

There is an increase of awareness in the last 6 years for all age groups.

Figure 4-2 Awareness of OA journals in field. Distribution by seniority (SOAP 2010 n=26,540 - WoS 2016 n=15,235, p < 0.001)



4.2.1.3 OA awareness. Distribution by geographic regions

We observe high levels of awareness of OA journals across all regions. There is also a general increase in those that answered yes as well as a decrease in those that answered no. In **SOAP 2010** all Western countries (including Brazil) were aware of the existence of OA journals, with a ratio of positive answers around 70%. More than 15% of the respondents from Africa, Asia and India responded that there were no OA journals in their field, reaching more than 20% in the case of China. Apart from Brazil and South America more than 15% of respondents did not know if there were OA journals in their fields. In the case of China, Middle East and North America this category exceeds 20%.

In **WoS 2016** there was a high level of awareness of OA journals across all regions in the world. In the case of China this was the case for 69.3% of the researchers, being the lowest rate. China was also the region with most “no” responses to this question (19.9%) while 10.8% said “I don’t know”. In North America there were 11% of the respondents declaring that they didn’t know if there are OA journals in their field and this percentage was 12.8 in the case of Russia.

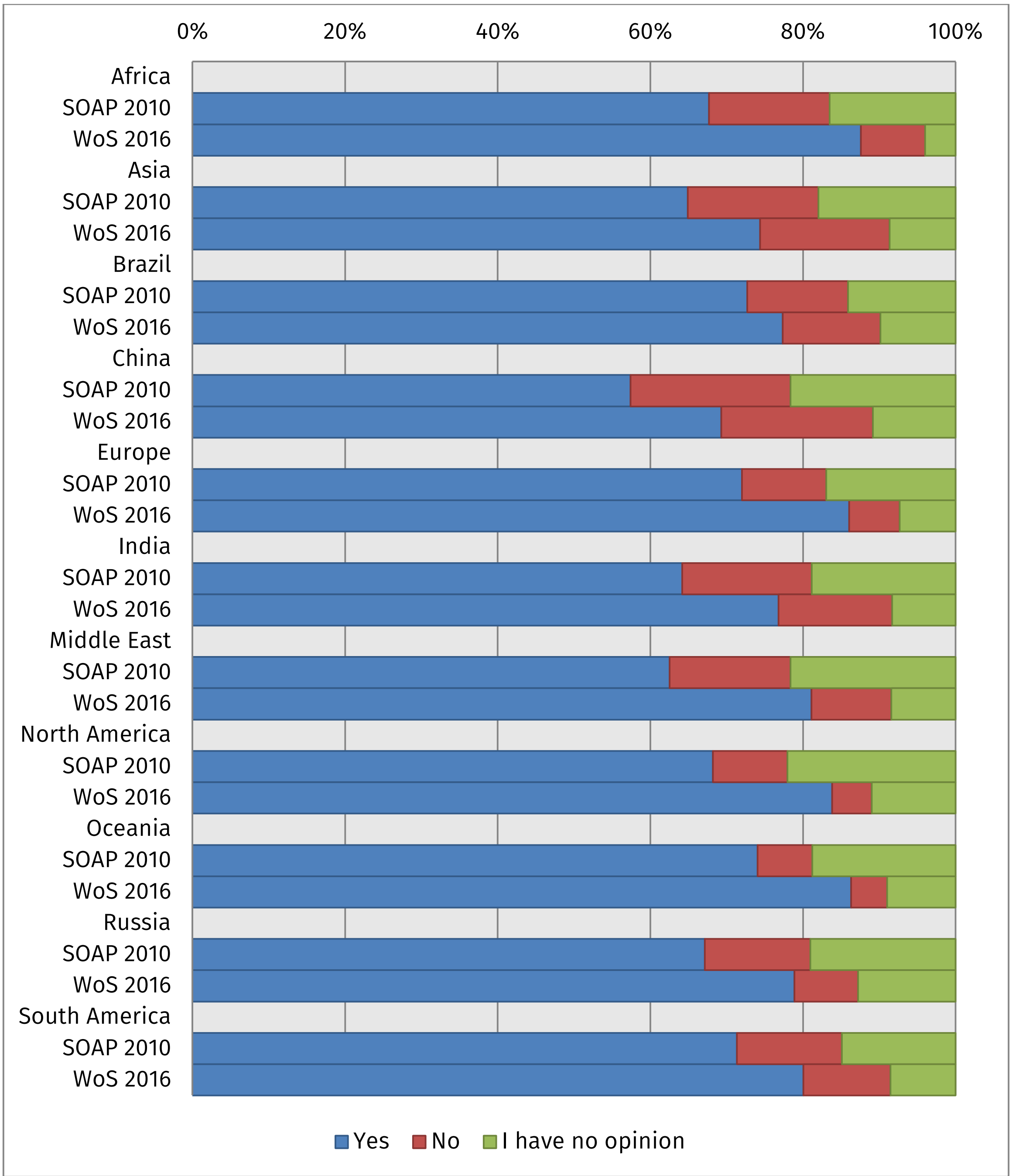
There is a clear evolution in the awareness of OA journals. The number of yeses has increased from 2010 to 2016 while both the noes and the “I don’t knows” decreased in all regions. The most acute evolutions are observed in…

- Those who responded yes in Africa (+19.9%), Middle East (+18.6%) and North America (+15.6%).
- Those who responded no in Africa (-7.4%), Russia (-5.5%) and the Middle East (-5.4%).
- The decrease in those who answered I don’t know to this question in Middle East (-13.2%), Africa (-12.5%) and North America (-11.0%).

On the other side of the spectrum we find…

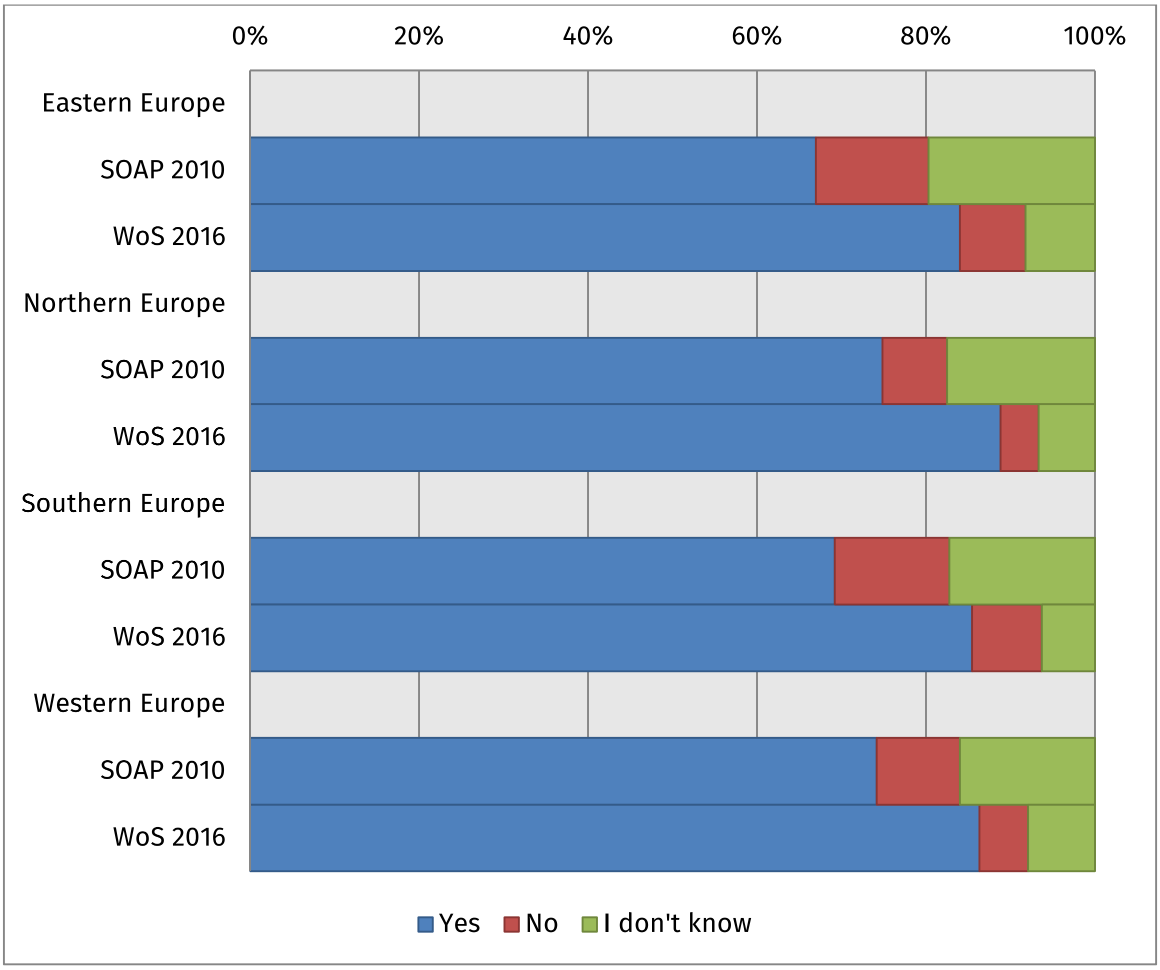
- Three regions in which the percentage of yes grew less than 10%: Brazil (+4.6%), South America (+8.7%) and Asia (+9.5%).
- Three regions with small decrease in the percentage of no answers: China (-1.1%), Brazil (-0.4%) and Asia (-0.2%).

Figure 4-3 Awareness of OA journals in field. Distribution by region (SOAP 2010 n=26,540 - WoS 2016 n=15,235, $p < 0.001$)



We also observe how there are high level of awareness of OA journals in all European regions. We can highlight that the lowest level of yes is in Eastern Europe (84% in WoS 2016 vs 67% in SOAP 2010), but it is also the region in which the strongest increase is observed +17.1%). Eastern Europe is also one of the regions with highest ratio of no answers (7.7%, 8.2% in Southern Europe) with an evolution of -5.6%. Finally it's also the region with a strongest reduction in I don't know answers, 11.5% less in 2016 in respect to 2010.

Figure 4-4 Awareness of OA journals in field. Distribution by European region (SOAP 2010 n=11,598 - WoS 2016 n=5,523, $p < 0.001$)

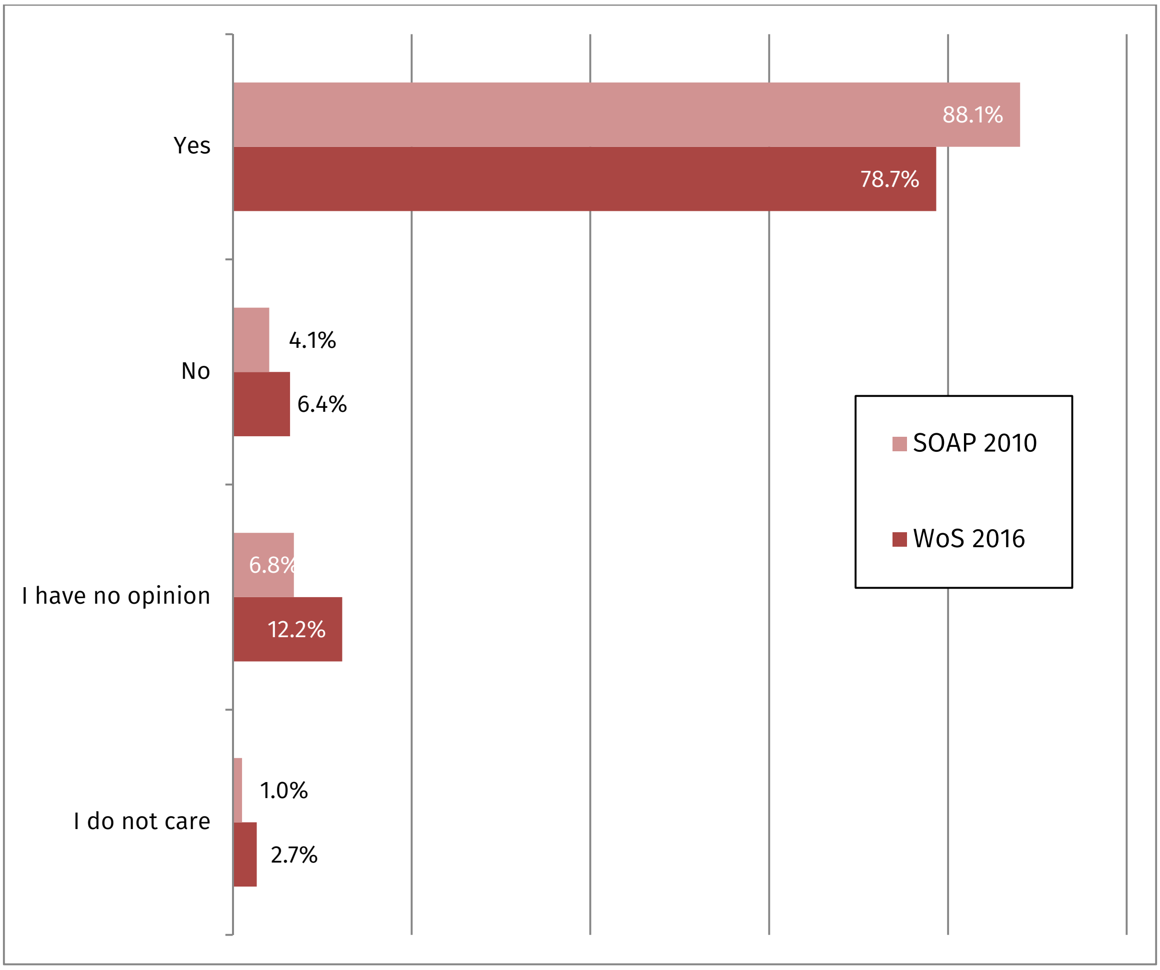


4.2.2 Is OA beneficial?

In both surveys researchers were asked about their opinion on OA publishing for their particular fields of knowledge. They were offered four possible options to answer the question *Do you think your research field benefits, or would benefit from journals that publish Open Access articles?* These were *yes, no, I have no opinion, I do not care.* We find that the group means for this question are significantly different from the statistical point of view in both samples. These results suggest that researcher's opinion on OA publishing has changed between both surveys.

Most respondents in both surveys were mostly supportive of OA (88.1% in SOAP 2010, 78.7% in WoS 2016). However we can see that this support is reduced by around 10% between the first and the second study. The number of noes is also higher in WoS 2016 (+2.3%) We can also see how there are more researchers that did not give an answer in any sense in the later survey (+5.4%). Same situation with those that declared not to care, with 1.7% increase in WoS 2016 in respect to SOAP 2010.

Figure 4-5 Is OA beneficial? (SOAP 2010 n=26,540 - WoS 2016 n=15,235, $p < 0.001$)



4.2.2.1 Is OA beneficial? Distribution by discipline

Looking at the distribution by disciplines we can see that the majority of researchers are supportive of OA across all disciplines. However there are significant differences between them. The lowest level of support is observed in Chemistry (76.7% of positive answers in SOAP 2010, dropping to 67.9% in WoS 2016). Many disciplines reached +90% percent of affirmative answers in the first survey, however none of them did in the second one. There are also many more disciplines which declared not to have an opinion in excess of 10% in 2016 .

In the **SOAP 2010** survey the most supportive disciplines are in the Social Sciences and Humanities fields, reaching all of them at least 90% of positive responses. Hard sciences are also supportive with figures in the 80% range. Engineers, mathematicians, physicists and astronomers responded afirmatively in less than 85% of the cases, while chemists were the only ones with less than 80% of yeses (76.7%). It was this same group that responded negatively to this question in figures of almost 5% (4.9% for engineering) or higher: physics (5.6%), mathematics (6.4%), astronomy (8.2%) and chemistry (8.6%). This same group also responded that they have no opinion or are not interested in more than 10% of the cases.

In WoS 2016 we can see that the majority of researchers from all disciplines also declared that OA is beneficial, although in all of them there is less support than in the previous survey. This opinion was lower than 70% in two disciplines: Mathematics (68.8%) and Chemistry (67.9%).

Among those declaring that OA is not beneficial we have 10.7% of astronomers and 11.5% of chemists. We see answers above the 20% mark for “I have no opinion” or “I do not care” answers in four disciplines:

- Chemistry (20.6%)
- Philosophy (21.4%)
- Mathematics (21.6%)
- Architecture, Building and Planning (25%)

As indicated by the student’s t-distribution differences between both studies are significant. There are fewer researchers that declared OA to be beneficial in WoS 2016 than in SOAP 2010. The largest variations were observed in:

- Computer Science (-11.2%)
- Architecture (-13.8%)
- Business and Administration (-18.7%)

In those that answered no to this question variations between disciplines are small. The only substantial one was observed in business and administration, with a +6.3% increase. In this same discipline there is an increase of +10.4% of researchers that declared not to have an opinion. In architecture this increase was of +11%.

Table 4-6 Opinion about OA. Distribution by discipline (SOAP 2010 n=26,540 - WoS 2016 n=15,235, $p < 0.001$)

	SOAP 2010				WoS 2016			
	Yes	No	I have no opinion	I do not care	Yes	No	I have no opinion	I do not care
Agriculture and Related Sciences	88.6%	2.1%	8.6%	0.8%	84.7%	4.3%	9.2%	1.8%
Architecture, Building and Planning	88.8%	1.3%	9.6%	0.3%	75.0%	0.0%	20.6%	4.4%
Astronomy and Space Science	81.7%	8.2%	8.0%	2.1%	73.3%	10.7%	13.0%	3.0%
Biological Sciences	89.0%	4.4%	5.6%	1.0%	83.6%	5.1%	8.8%	2.5%
Business and Administration Studies	89.9%	2.9%	6.7%	0.5%	71.2%	9.3%	17.1%	2.5%
Chemistry	76.7%	8.6%	12.4%	2.3%	67.9%	11.5%	16.2%	4.5%
Communication, Information and Library Science	94.4%	1.5%	3.1%	1.0%	86.0%	2.0%	10.0%	2.0%
Computer Science	90.0%	3.1%	6.0%	0.9%	78.8%	6.9%	11.7%	2.5%
Creative Arts and Design	95.1%	2.0%	2.9%	0.0%	89.5%	0.0%	9.5%	1.0%
Earth Sciences	88.2%	3.7%	6.8%	1.3%	83.9%	4.4%	9.1%	2.6%
Education	93.2%	1.7%	4.7%	0.3%	82.3%	3.5%	13.6%	0.5%
Engineering and Technology	84.7%	4.9%	8.7%	1.7%	75.6%	6.9%	14.3%	3.2%
Historical Studies	92.2%	2.6%	4.7%	0.5%	83.6%	4.1%	10.3%	2.1%
Language and Literature Studies	95.6%	1.1%	3.0%	0.2%	88.4%	4.5%	5.8%	1.3%
Law	90.6%	2.5%	6.5%	0.4%	84.4%	4.6%	10.1%	0.9%
Mathematics	83.4%	6.4%	8.6%	1.6%	68.8%	9.6%	17.7%	3.9%
Medicine, Dentistry	90.1%	3.7%	5.6%	0.6%	82.0%	5.4%	10.5%	2.1%
Philosophical Studies	91.8%	3.8%	3.9%	0.5%	75.0%	3.6%	14.3%	7.1%
Physics and Related Sciences	82.9%	5.6%	9.6%	1.9%	75.2%	8.8%	12.9%	3.1%
Psychology	90.0%	3.3%	5.9%	0.9%	79.8%	5.3%	14.1%	0.9%
Social Sciences	92.3%	2.1%	5.1%	0.6%	86.3%	4.1%	8.9%	0.6%

4.2.2.2 Is OA beneficial? Distribution by seniority

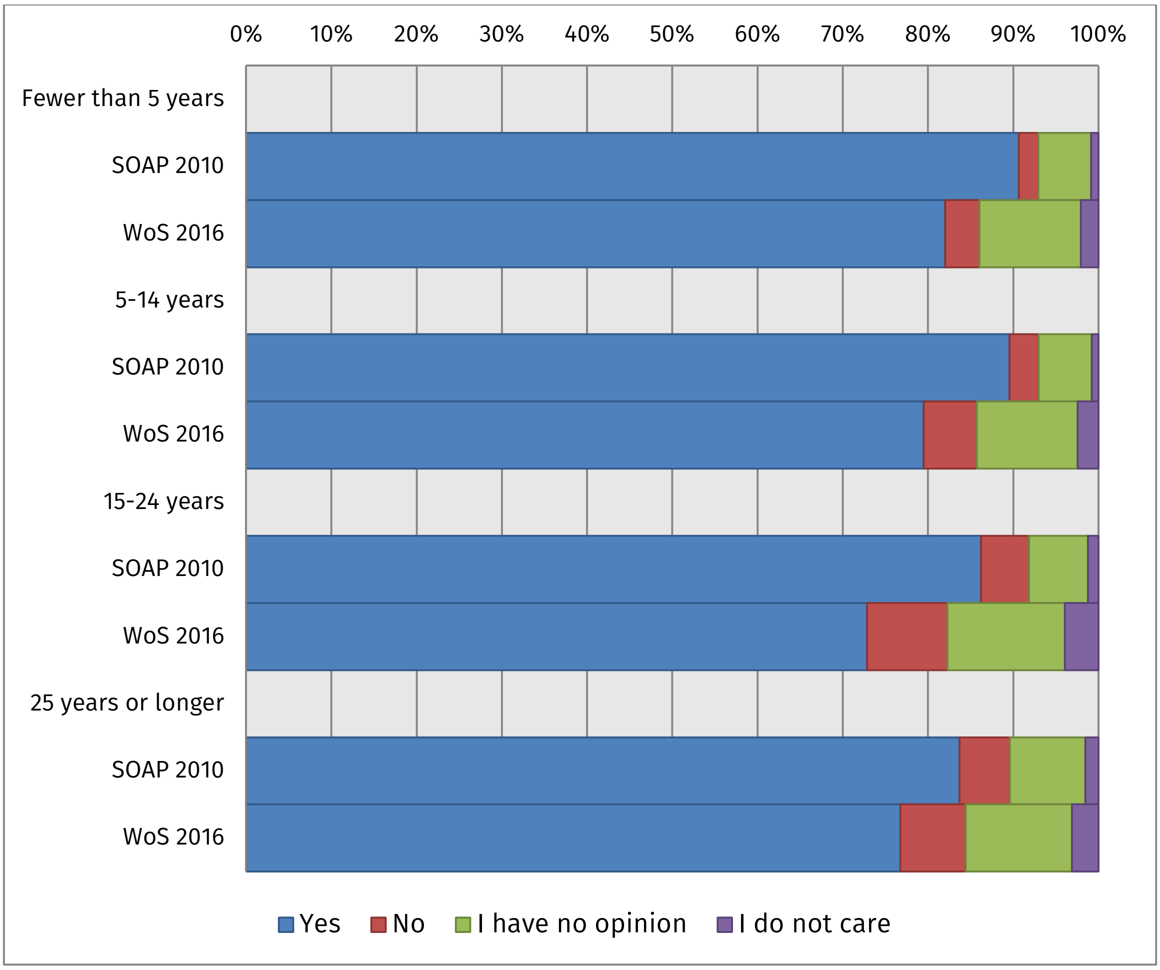
Researchers across all age groups answered yes to this question. However we can see how this support decreases in 2016 in respect to 2010. Younger researchers are the most supportive age group. The most senior researchers groups was the least supportive in 2010, however this is the case now for those with 15 to 24 years of experience.

In **SOAP 2010** we find that younger scientists responded affirmatively in more than 90% of the cases while those with longer careers (25 years of longer working in research) did believe so in 83.7% of the cases. This is also the pattern for those who responded no to this question, ranging from 2.3% of youngest researchers to almost 6% to those with longer careers. Those not interested or without an opinion ranged from 7% to 10.4%.

In the **WoS 2016** survey we can see that while 90.7% of researchers with less than 5 years of experience responded in this sense it was the case for only 83.7% of researchers with 25 or more years of experience.

If we compare **both samples** we also see the largest variation in the 15-24 years of experience group with -13.4%. This is also the group in which the largest difference in those who declared not to have an opinion is observed with +6.9%.

Figure 4-6 Opinion about OA. Distribution by seniority (SOAP 2010 n=26,540 - WoS 2016 n=15,235, p < 0.001)



4.2.2.3 Is OA beneficial? Distribution by geographic regions

In general terms we see high levels of support across all disciplines. The most supportive region in both surveys is Brazil (92.9% in SOAP 2010, 87.6% in WoS 2016), closely followed by Africa (92.0% and 86.0% respectively). On the other hand we see that China, Asia and Russia are the least supportive regions.

In SOAP 2010 South America, Brazil, Africa and India responded affirmatively to this question in exceed of 90% of the cases. It was the case for only 80% of the respondents from Russia. More than 10% of the respondents from Asia (10.3%), China (11.9%), Middle East (12.7%) and Russia (16.4%) did not have an opinion on this subject.

In the WoS 2016 study we can also see that the majority of respondents from all regions declared that OA is beneficial for their field, however levels of support are lower. There were three regions were this support was expressed by 75% of researchers or less:

- Asia (75.0%)
- Russia (73.3%)
- China (70.5%)

Researchers from many regions declared that they don't have an opinion or don't care in excess of 15% of the cases:

- North America (15.2%)
- Middle East (17.0%)
- Asia (19.6%)
- Russia (17.8%)
- China (22.6%)

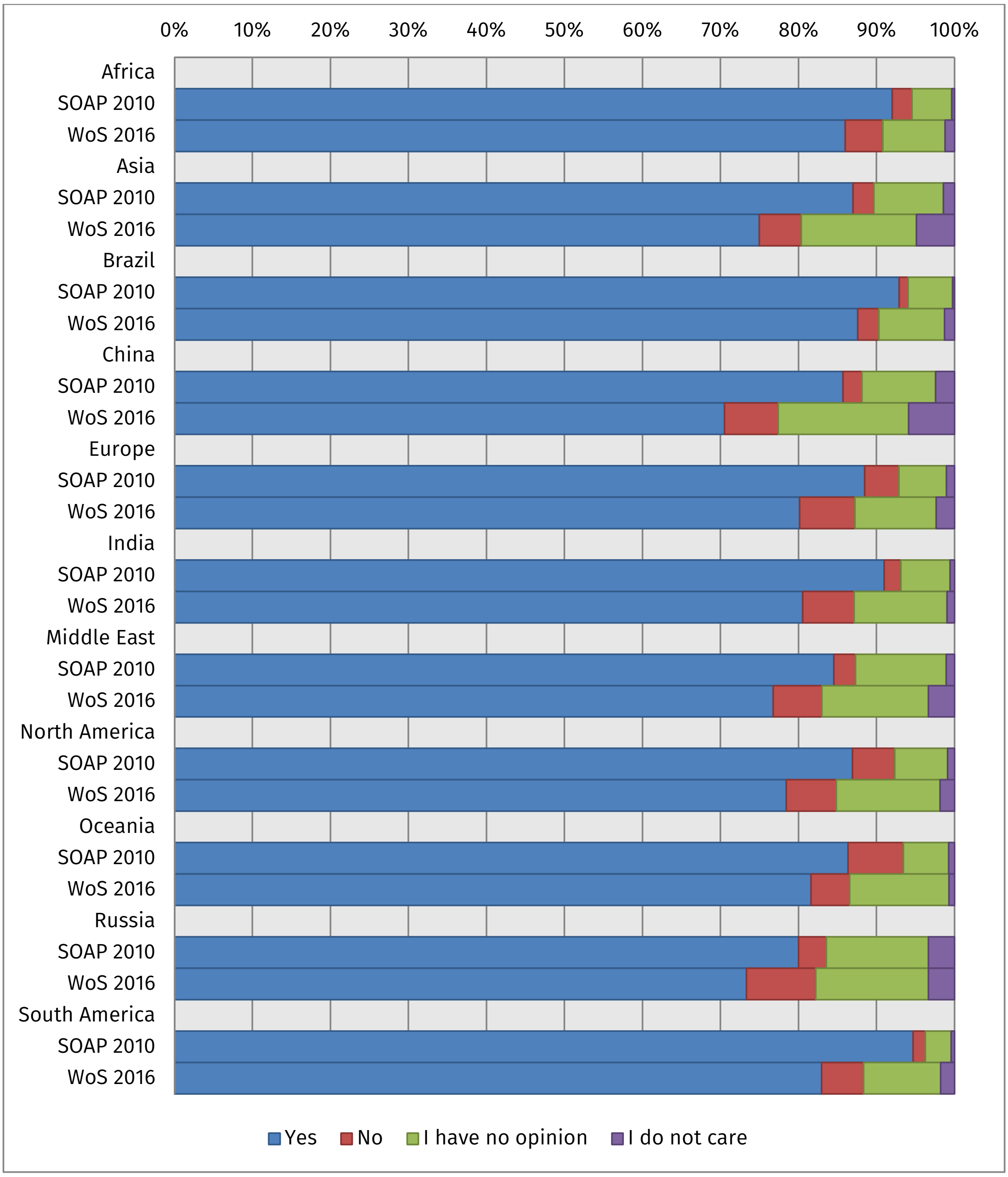
Looking at both samples we observe the same pattern of reduction in number of yeses in all regions. The largest decreases are observed in:

- India (-10.4%)
- South America (-11.7%)
- China (-15.2%)

There is also an increase in researchers that answered no to this question in all regions, with the exception of Oceania (-2.1%). The number of researchers that declared not to have an opinion has also increased in the last 6 years. The largest variation are observed in:

- North America (+6.5%)
- South America (+6.6%)
- Oceania (+6.9%)
- China (+7.2%)

Figure 4-7 Opinion about OA. Distribution by geographic region (SOAP 2010 n=26,540 - WoS 2016 n=15,235, $p < 0.001$)



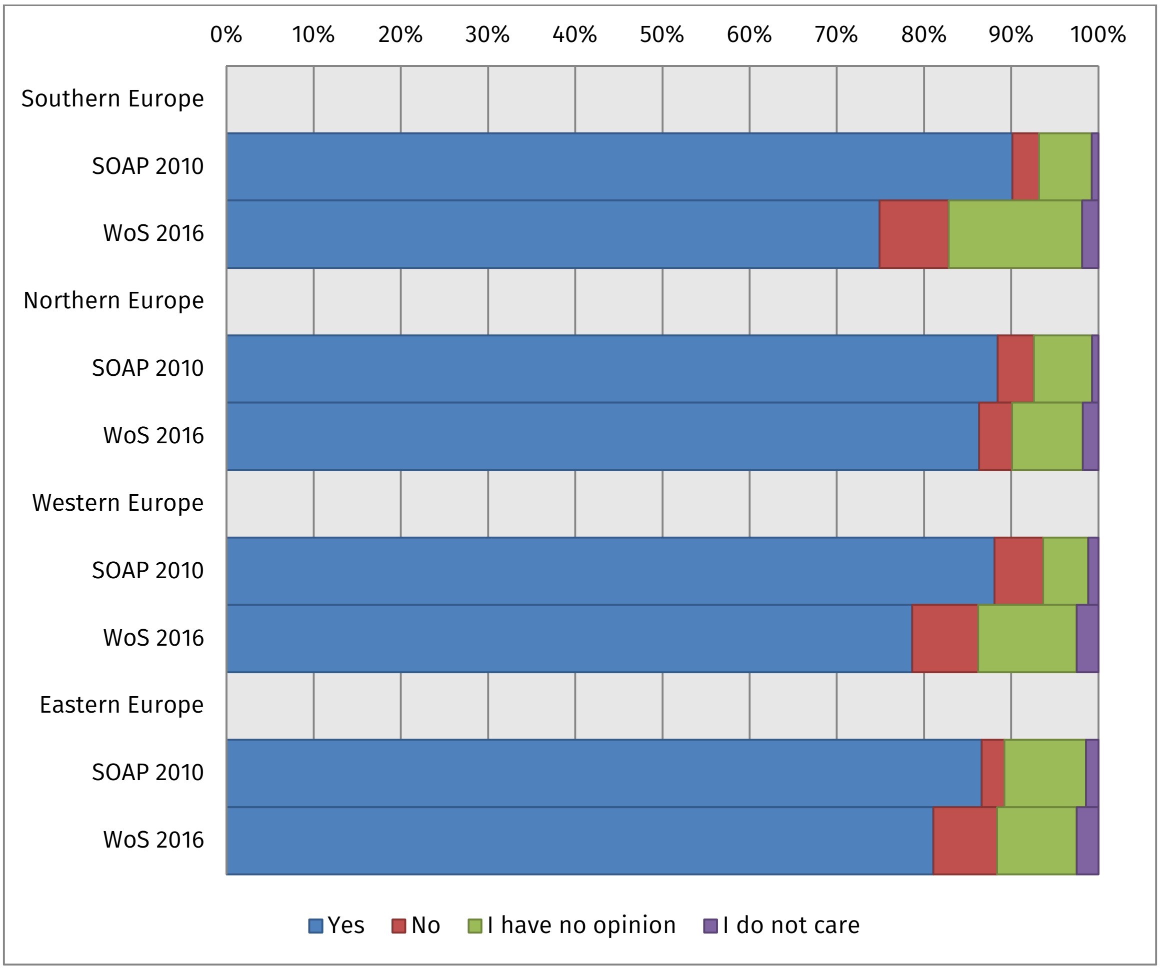
Looking at European regions we observe the same pattern. There is a majority of researchers that declared that OA is beneficial. However this support decreases from the first survey to the second one. This is specially the case for Southern Europe, the European region with the highest number of yes in SOAP 2010 (90.1%) and the lowest in WoS 2016 (74.9%). It is also the

In the SOAP 2010 survey Eastern Europe had the lowest percentage of positive responses with 86.6%. The highest rate of negative answers was from respondents from Western European countries, with 5.6%. Only Eastern Europeans exceeded 10% of don't know/don't care responses.

In the **WoS 2016** survey we observe a 86.3% of affirmative answers in Northern Europe, while 74.9% of Eastern Europeans responded in this sense. It is this last region were we observe the highest rate of "I have no opinion" or "I do not care" answers, with 17.2% of the respondents giving those answers.

The largest variations **between samples** are observed in Southern Europe. There is a decrease of -15.2% in the percentage of researchers that declared OA to be beneficial. In Western Europe this variation was of -9.4%. The no responses increased by +4.9% in Southern Europe and did so by +4.7% in Eastern Europe. There were +9.3% of researchers declaring not to have an opinion in Southern Europe in WoS 2016 than in SOAP 2010.

Figure 4-8 Opinion about OA. Distribution by European region (SOAP 2010 n=11,598 - WoS 2016 n=5,523, p < 0.001)



4.2.3 OA Myths

Both surveys included a question presenting a number of "myths" about OA publishing in random order. Respondents had to choose their level of agreement or disagreement with each of them (strongly agree, agree, neither agree nor disagree, disagree or strongly disagree). There were positive and negative myths about OA:

1. OA articles are likely to be read and cited more often than those not OA

2. **OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research**
3. **OA publishing leads to an increase in the publication of poor quality research**
4. **OA publishing undermines the system of peer review**
5. If authors pay publication fees to make their articles OA, there will be less money available for research
6. Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication
7. It is not beneficial for the general public to have access to published scientific and medical articles
8. Researchers should retain the rights to their published work and allow it to be used by others
9. Publicly-funded research should be made available to be read and used without access barriers

The T-Test indicated a significant difference between the two samples in all myths but one: If authors pay publication fees to make their articles OA, there will be less money available for research ($p=.477$). In the rest of myths we obtained $p < 0.001$. However, in order to make this chapter less content-heavy we will analyse in detail only four of these myths, those highlighted in bold in the previous paragraph. We believe these are the most interesting ones for the reader. Plots for the rest of myths can be found in Annex 1.

Looking at all the myths we can see that there two positive myths about OA with high levels of agreement (+70% in both surveys):

- Researchers should retain the rights to their published work and allow it to be used by others (75.9% agreement in SOAP 2010; 70.7% in WoS 2016)
- Publicly-funded research should be made available to be read and used without access barriers (87.9% agreement in SOAP 2010; 81.0% in WoS 2016)

Then we find a positive myths about OA to which the majority of respondents agreed, but with lower levels and a large percentage of neither agree nor disagree answers.

- OA articles are likely to be read and cited more often than those not OA (65.5% agreement, 23.1% neither agree nor disagree in SOAP 2010; 60.4%, 24.2% respectively in WoS 2016)

In the fourth positive myth about OA we can see that a scarce majority of respondents agreed in the first survey but in the second one opinions switch.

- OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research (in SOAP 2010, 50.2% agreement, 40.3% neither agree nor disagree, 9.5% disagreement; in WoS 2016 31.2%, 30.6%, 38.2% respectively)

On the negative myths about OA we see that most researchers disagreed with the statement that “OA publishing undermines the system of peer review” in both surveys (SOAP 2010, 57.7%; WoS 2016 46.6%) but with high levels of neither agree nor disagree (27.3% in SOAP 2010; 32.2% in WoS 2016).

There are high levels of neither agree nor disagree answers in the myth on linking OA to poor quality research (29.7% in SOAP 2010; 46.0% in WoS 2016) and on the negative impact of APCs for research-intensive institutions (45.9% in SOAP 2010; 42.7% in WoS 2016).

Looking at the surveys individually we see that respondents in the **SOAP 2010** study supported positive aspects of OA publication such as the fact that public-funded research should be made freely available (almost 88% agreed or strongly agreed to this statement) or the fact that researchers should keep control over their publications (supported or strongly supported by almost 76% of respondents).

In the case of **WoS 2016** we can group the OA myths in three categories. Those to which the majority of respondents fully agreed or agreed:

- It is not beneficial for the general public to have access to published scientific and medical articles (81.0%)
- OA publishing undermines the system of peer review (70.7%)
- OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research (60.4%)
- Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication (55.2%)

In the second category the majority of respondents neither agreed nor disagreed:

- OA publishing leads to an increase in the publication of poor quality research (46.0%)
- If authors pay publication fees to make their articles OA, there will be less money available for research (42.7%)

The third group is made by those myths which most respondents disagreed with:

- Publicly-funded research should be made available to be read and used without access barriers (67.3%)
- Researchers should retain the rights to their published work and allow it to be used by others (46.6%)
- OA articles are likely to be read and cited more often than those not OA (38.2%)

When we compare both surveys we observe the largest changes in WoS 2016 in respect to SOAP 2010 in two myths:

- OA publishing leads to an increase in the publication of poor quality research: +17.7% agreement, +16.3% neither agree nor disagree, -34.0% disagreement.

- OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research: -19.0% agreement, -9.8% neither agree nor disagree, +28.7% disagreement.

Figure 4-9 Level of agreement with positive and negative statements about OA – part 1 (SOAP 2010 n=24,957-25,264 - WoS 2016 n=14,136-14,192, p < 0.001)

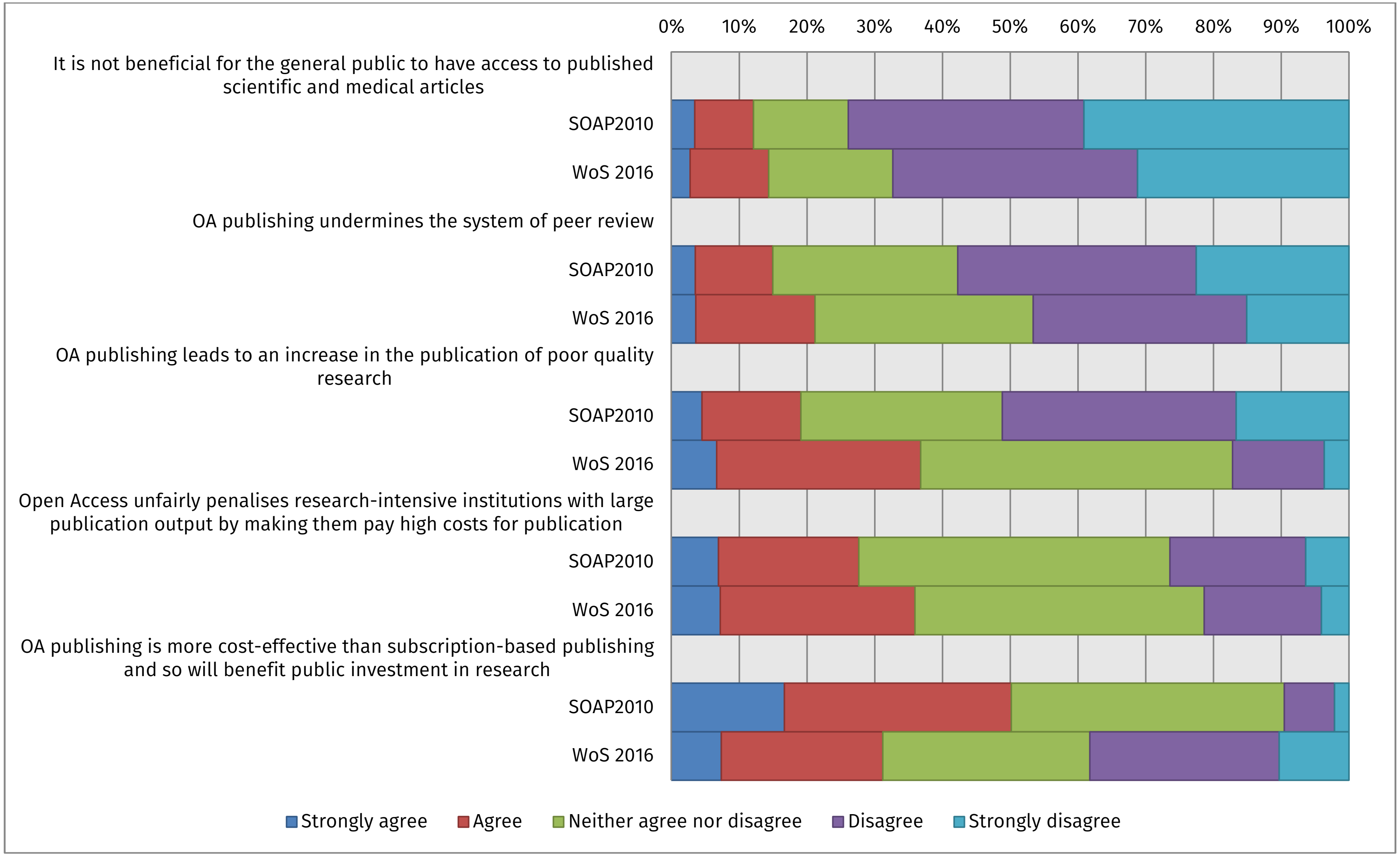
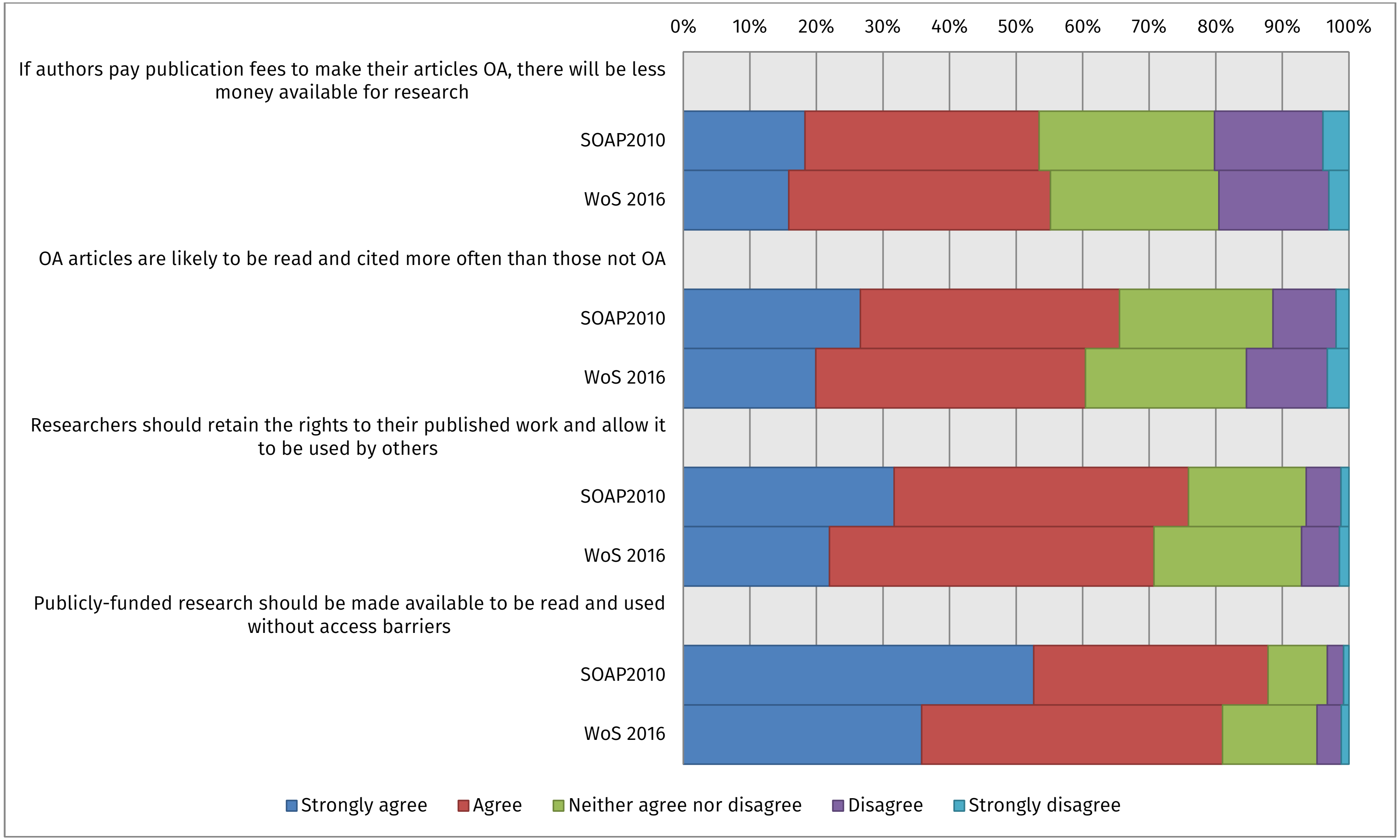


Figure 4-10 Level of agreement with positive and negative statements about OA – part 2 (SOAP 2010 n=24,957-25,264 - WoS 2016 n=14,136-14,192, p < 0.001 all but “If authors pay publication fees to make their articles OA, there will be less money available for research”, p=.477)



4.2.3.1 OA myths: OA articles are likely to be read and cited more often than those not OA

4.2.3.1.1 OA myths: OA articles are likely to be read and cited more often than those not OA. Distribution by discipline

In general there is agreement with this myth in all disciplines in figures around 60% of the respondents with the exception of Astronomy that actually drops from 55.3% in SOAP 2010 to 39.3% in WoS 2016. Mathematics is the other exception, dropping from 61.3% to 49.9%. The percentage of respondents that neither agree or disagree is around 20% in both studies.

In WoS 2016 there were four disciplines in which more than 20% of respondents disagreed or strongly disagreed with this statement:

- Business and Administration Studies (20.1%)
- Chemistry (20.4%)
- Mathematics (21.0%)
- Astronomy and Space Science (28.9%)

There were also four disciplines with rates higher than 30% of neither agree nor disagree responses:

- Astronomy and Space Science (31.9%)
- Historical Studies (32.3%)
- Law (33.0%)
- Philosophical Studies (33.3%)

When we compare both studies we see less researchers agreeing with this statement in WoS 2016 compare to SOAP 2010. The most significant drops are found in:

- Historical Studies (-13%)
- Biological Sciences (-14%)
- Physics and Related Sciences (-16%)

Table 4-7 OA articles are likely to be read and cited more often than those not OA. Distribution by discipline (SOAP 2010 n=33,493 - WoS 2016 n=15,591, p < 0.001)

	SOAP 2010					WoS 2016				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Agriculture	31.5%	42.0%	19.6%	5.6%	1.2%	25.7%	42.6%	20.1%	9.6%	2.1%
Architecture	30.0%	41.4%	20.0%	7.5%	1.1%	23.0%	42.6%	21.3%	11.5%	1.6%
Astronomy	16.0%	39.3%	25.7%	16.4%	2.6%	10.0%	29.3%	31.9%	25.2%	3.7%
Biological Sciences	26.8%	39.6%	22.6%	9.5%	1.5%	24.5%	41.3%	20.8%	9.9%	3.5%
Business and Administration	30.1%	36.0%	22.3%	9.4%	2.2%	17.4%	38.4%	24.1%	13.8%	6.3%
Chemistry	18.9%	37.6%	25.4%	14.1%	4.0%	15.2%	38.6%	25.8%	16.6%	3.9%
Com., Inf. Lib. Science	36.1%	37.2%	19.5%	5.7%	1.5%	28.3%	32.6%	26.1%	10.9%	2.2%
Computer Science	29.8%	43.0%	18.9%	6.6%	1.7%	19.7%	39.5%	25.8%	11.1%	4.0%
Creative Arts	29.9%	43.3%	19.6%	6.2%	1.0%	27.8%	35.1%	28.9%	6.2%	2.1%
Earth Sciences	23.5%	40.4%	25.0%	9.4%	1.8%	20.4%	45.1%	21.7%	11.2%	1.6%
Education	32.5%	37.0%	22.7%	7.2%	0.6%	21.2%	36.8%	28.0%	11.9%	2.1%
Engineering	24.4%	40.1%	22.0%	10.9%	2.7%	17.8%	41.3%	24.3%	13.3%	3.3%
Historical Studies	31.5%	40.5%	21.3%	6.1%	0.5%	21.1%	37.6%	32.3%	7.5%	1.5%
Language and Lit.	33.7%	39.0%	20.9%	5.9%	0.5%	31.2%	33.3%	23.4%	9.9%	2.1%
Law	33.8%	36.5%	23.2%	6.5%	0.0%	26.2%	33.0%	33.0%	6.8%	1.0%
Mathematics	21.6%	39.6%	25.3%	10.9%	2.6%	14.0%	35.9%	29.1%	16.1%	4.9%
Medicine, Dentistry	29.1%	39.0%	20.9%	9.5%	1.4%	20.5%	42.4%	22.7%	11.5%	2.9%
Philosophical Studies	24.4%	42.1%	25.3%	7.0%	1.1%	22.2%	37.0%	33.3%	7.4%	0.0%
Physics	19.6%	37.2%	27.5%	12.6%	3.0%	17.3%	39.4%	26.0%	14.1%	3.3%
Psychology	28.5%	37.5%	24.1%	8.1%	1.8%	22.5%	34.6%	28.7%	9.6%	4.6%
Social Sciences	30.6%	38.2%	22.1%	7.7%	1.4%	28.8%	39.9%	18.7%	8.3%	4.3%

4.2.3.1.2 OA myths: OA articles are likely to be read and cited more often than those not OA. Distribution by seniority

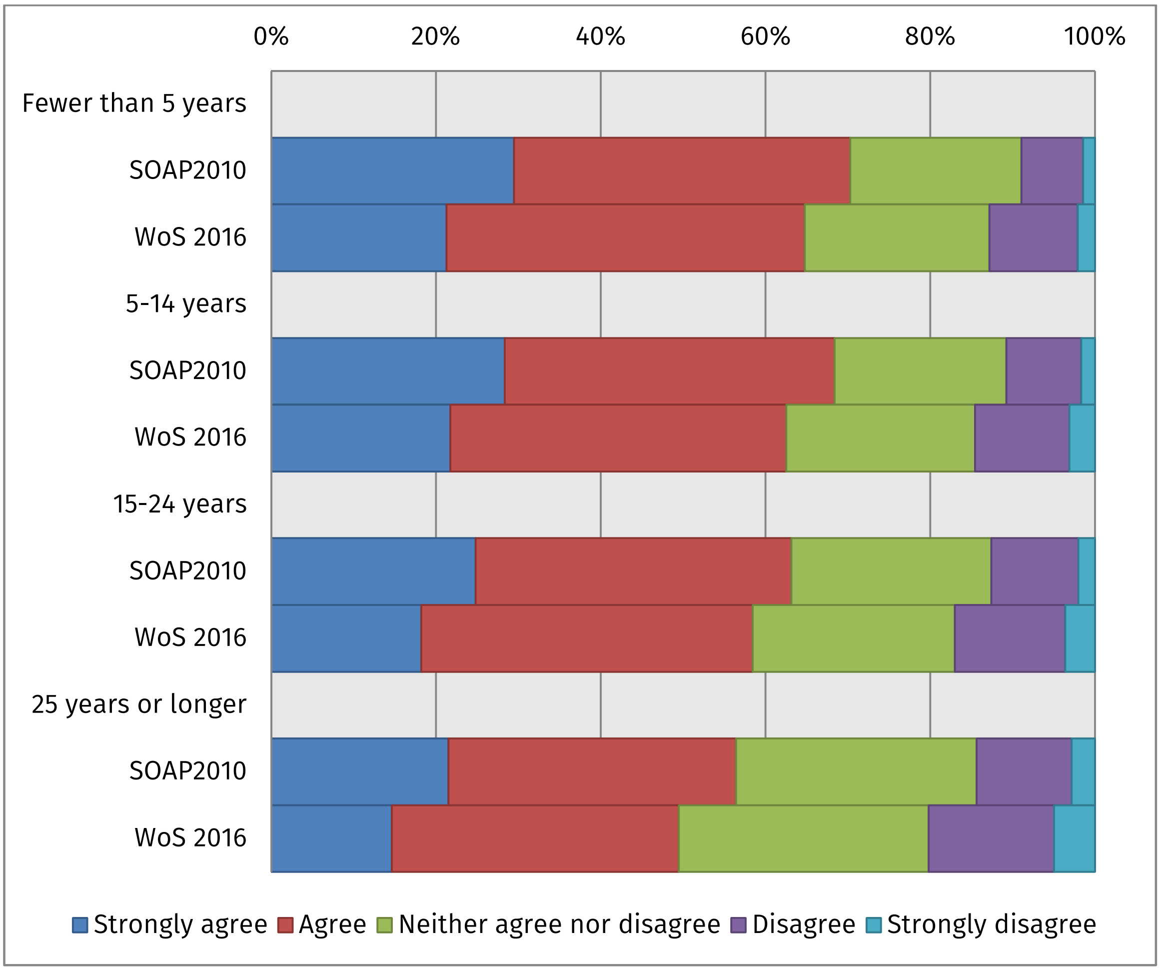
The majority of respondents agreed to this statement across all age groups. However this support decreases as researchers are more experienced, reaching only 49.5% of agreement among those with +25 years of experience in WoS 2016. Levels of neither agree or disagree are also around 20% in all age groups, with the exception of the most senior ones, in which is close to 30% in both surveys.

In **SOAP 2010** younger scientists were more supportive when agreeing or strongly agreeing (fewer than 5 years, 70.3%) than those more experienced (25 years or longer, 56.4%). There were not significant differences between those that disagreed or strongly disagreed. However 20.8% of the younger researchers did not offer an opinion in any sense vs 29.2% in the 25+ years group.

Youngest researchers in **WoS 2016** expressed agreement or strong agreement with this statement in 64.8% of the cases.

The largest difference between surveys is found in the most senior group of researchers (+25) in which there is a variation of -6.9% of researchers that agree or strongly agree. In the case of 5-14 years of experience this variation is -5.5%.

Figure 4-11 OA articles are likely to be read and cited more often than those not OA. Distribution by seniority (SOAP 2010 n=25,264 - WoS 2016 n=14,182, $p < 0.001$)



4.2.3.1.3 OA myths: OA articles are likely to be read and cited more often than those not OA. Distribution by geographic regions

The majority of respondents in all regions and in both surveys agreed with this statement. However we can differentiate between regions in which at least 70% of respondents answered that they agreed or strongly agreed in both surveys:

- Africa (83.0% in SOAP2010; 71.8% in WoS 2016)
- Brazil (71.2% in SOAP2010; 70.3% in WoS 2016)
- India (77.8% in SOAP2010; 70.3% in WoS 2016)

And regions in which the level of agreement with this myth is below the 60% mark:

- North America (57.4% in SOAP2010; 50.1% in WoS 2016)
- Oceania (58.3% in SOAP2010; 55.4% in WoS 2016)

In SOAP 2010 we can highlight North America, where 14.3% of the researchers disagreed or strongly disagreed with this statement. Five regions did not express an opinion (neither agree or disagree) in excess of 20% of the cases: Asia (20.2%), Russia (22.5%), Europe (23.8%), Oceania and North America (both with 28.3%).

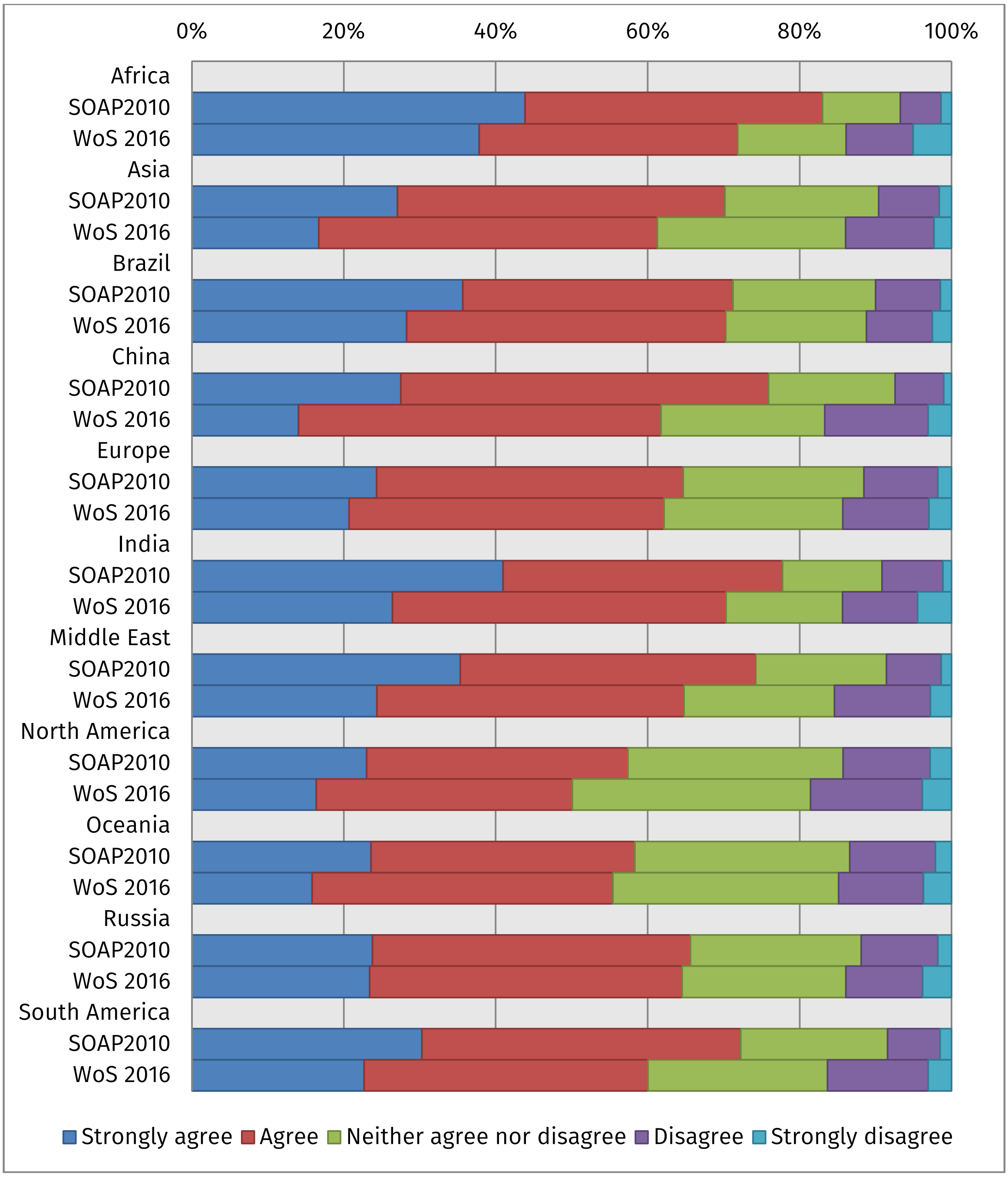
In WoS 2016 Oceania and North America are the regions where we find the highest rate of "neither agree nor disagree" answers: Oceania (29.7%) and North America (31.3%).

The largest reductions in the proportion of researchers that agreed with this statement between both surveys were found in:

- South America (-11.7%)
- Europe (-12.0%)
- India (-14.3%)
- Middle East (-15.3%)
- Asia (-17.9%)
- China (-18.1%)
- Oceania (-25.2%)
- North America (-27.1%)

We can also highlight that the proportion of researchers that did not agree neither disagree with this myth grew in many regions. This was particularly the case in North America (+13.3%) and Oceania (+14.1%).

Figure 4-12 OA articles are likely to be read and cited more often than those not OA. Distribution by geographical regions (SOAP 2010 n=25,264 - WoS 2016 n=14,182, p < 0.001)



The results for this myth by European regions are statistically significantly different as p < 0.001. However we don't find the differences particularly interesting. The corresponding plot can be found in Annex 1.

4.2.3.2 OA myths: OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research

4.2.3.2.1 OA myths: OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by discipline

Researchers' opinions for this myth are quite balanced between those that agreed (31.2), those that neither agreed nor disagreed (30.6%) and those that disagreed (38.2%). This way we can observe how the majority of respondents in SOAP 2010 agreed in all disciplines but one (Astronomy, 42.0%) while in WoS 2016 the highest percentage of answers is neither agree nor disagree for all disciplines but one (Language, 39.0%).

Most researchers in the SOAP 2010 study mainly agreed or strongly agreed with the statement that OA is more cost-effective and therefore more beneficial for research. The highest support was represented by Communication with 60.2%. Chemistry was the only discipline where the percentage of researchers disagreeing or strongly disagreeing was higher than 15% (15.3%).

In WoS 2016 there wasn't any discipline in which more than 50% of the respondents agreed or strongly agreed with this statement and only four supported the idea in excess of 40%:

- Computer Science (40.4%)
- Philosophical Studies (40.7%)
- Social Sciences (40.8%)
- Agriculture and Related Sciences (41.2%)
- Language and Literature Studies (45.4%)

In terms of disagreement only respondents from one discipline disagreed or strongly disagreed in excess of 20%: Chemistry (23.3%).

In a number of disciplines the "neither agree nor disagree" option was chosen by half or more than half of the respondents:

- History (54.8%)
- Architecture (54.1%)
- Astronomy (53.0%)
- Law (51.0%)
- Creative Arts and Design (50.0%)

When looking at both studies we find that there is an important reduction in the level of agreement with this myth in the 6 years between surveys. In most surveys the percentage of researchers agreeing or strongly agreeing felt by at least 10%. In the following disciplines even beyond 20%:

- Medicine, Dentistry (-21.1%)
- Philosophical Studies (-23.1%)
- Physics (-25.5%)
- Psychology (-25.8%)
- Social Sciences (-27.1%)

We can also highlight that in WoS 2016 there were more researchers not positioning themselves than in SOAP 2010. There were two disciplines in which the difference is higher than 15%: Architecture (+17.2%) and Law (+16.9%).

Figure 4-13 OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by discipline (SOAP 2010 n=n=33,226 - WoS 2016 n=15,569, $p < 0.001$)

	SOAP 2010					WoS 2016				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Agriculture	17.8%	38.8%	33.8%	7.8%	1.8%	8.2%	33.0%	41.3%	14.0%	3.5%
Architecture	16.8%	39.1%	36.9%	6.2%	1.1%	3.3%	29.5%	54.1%	11.5%	1.6%
Astronomy	13.7%	28.3%	49.0%	8.4%	0.6%	5.6%	28.9%	53.0%	8.9%	3.7%
Biological Sciences	15.1%	32.9%	41.3%	8.4%	2.4%	6.8%	30.6%	44.9%	13.6%	4.2%
Business and Admin.	22.4%	34.7%	34.9%	6.3%	1.7%	5.4%	25.9%	49.8%	14.2%	4.7%
Chemistry	11.3%	33.4%	40.0%	12.3%	3.0%	4.9%	29.1%	42.8%	18.1%	5.2%
Com., Inf. Lib. Science	27.8%	32.4%	31.7%	5.3%	2.8%	15.2%	23.9%	41.3%	10.9%	8.7%
Computer Science	19.6%	34.2%	38.7%	5.7%	1.9%	7.1%	33.3%	46.1%	10.5%	3.0%
Creative Arts	21.8%	29.0%	40.9%	7.3%	1.0%	12.2%	27.6%	50.0%	8.2%	2.0%
Earth Sciences	14.8%	34.3%	41.3%	7.6%	2.1%	5.8%	29.9%	49.1%	12.4%	2.8%
Education	22.4%	36.8%	34.3%	4.7%	1.9%	9.5%	22.6%	48.4%	14.2%	5.3%
Engineering	15.3%	36.3%	37.7%	8.3%	2.4%	6.6%	31.2%	44.4%	14.1%	3.7%
Historical Studies	20.7%	33.0%	40.8%	3.6%	1.9%	11.1%	25.2%	54.8%	5.9%	3.0%
Language and Lit.	24.8%	32.2%	38.4%	3.1%	1.4%	12.8%	32.6%	39.0%	12.1%	3.5%
Law	23.4%	34.5%	34.1%	5.0%	3.1%	6.9%	25.5%	51.0%	11.8%	4.9%
Mathematics	13.3%	32.0%	42.7%	8.7%	3.3%	7.1%	27.3%	46.0%	15.2%	4.5%
Medicine, Dentistry	14.2%	35.4%	40.0%	8.6%	1.9%	6.2%	29.2%	46.9%	14.5%	3.2%
Philosophical Studies	17.8%	32.9%	42.2%	5.8%	1.3%	3.7%	37.0%	44.4%	14.8%	0.0%
Physics	12.3%	34.5%	42.6%	8.6%	2.0%	5.4%	30.2%	48.0%	12.7%	3.8%
Psychology	17.0%	32.6%	42.7%	6.0%	1.7%	8.0%	24.5%	49.8%	13.9%	3.7%
Social Sciences	21.9%	33.4%	37.4%	5.4%	1.9%	11.2%	29.6%	47.0%	9.2%	3.0%

4.2.3.2.2 OA myths: OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by seniority

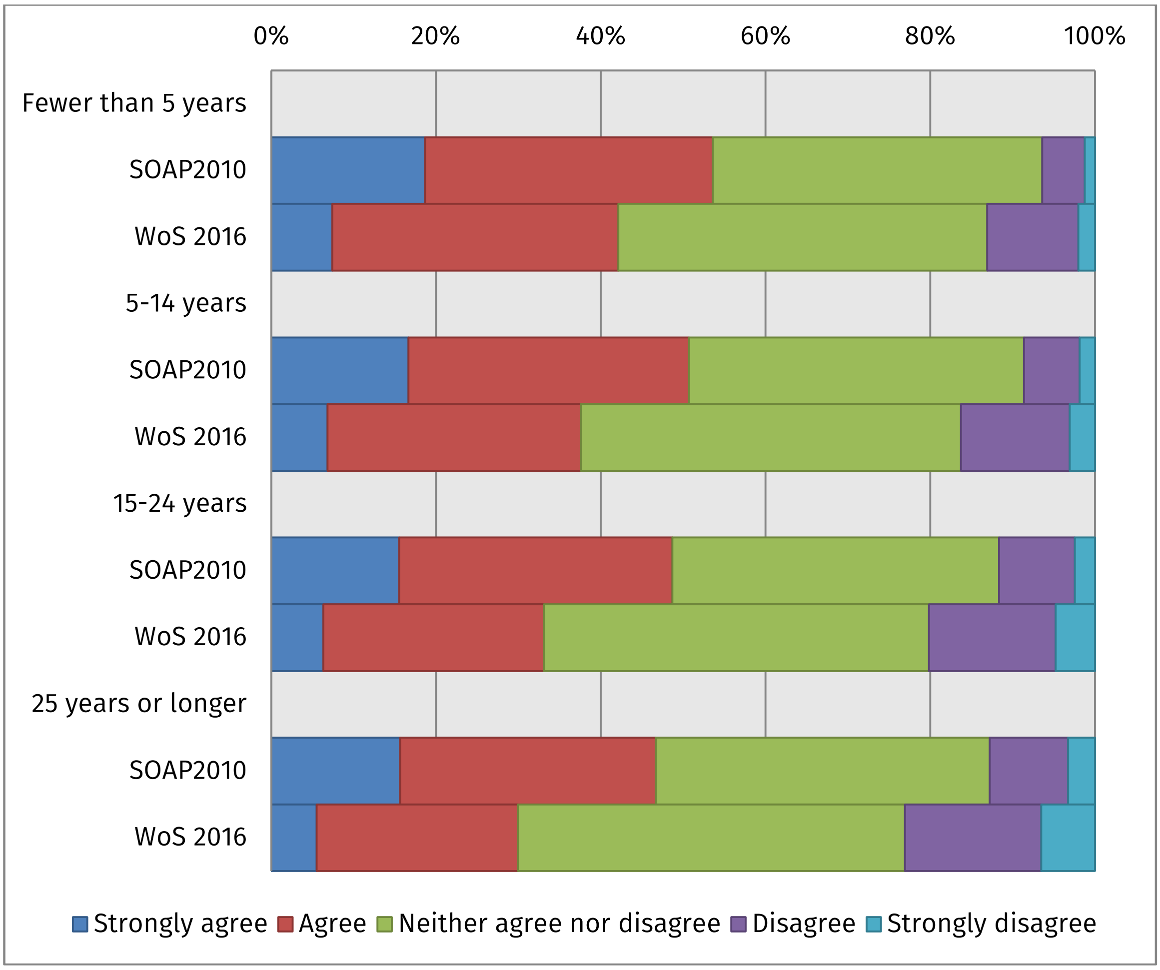
When looking at the distribution of answers by seniority we also observe that most researchers agreed with this statement in SOAP 2010, while in WoS 2016 neither agree nor disagree is the majority in all age groups.

In SOAP 2010 there were no major differences between age groups for this particular myth, with younger scientists in general more supportive towards OA than their more senior counterparts. In WoS 2016 we can see that in terms of age groups the main difference is the higher level of agreement and strongly agreement of researchers with less than 5 years of experience with this statement (42.1%) compared to those with 25 or more years of experience (29.9%).

The level of agreement or strong agreement with this statement is lower across all age groups in 2016 in excess of 10%:

- Fewer than 5 years (-11.5%)
- 5-14 years (-13.1%)
- 15-24 years (-15.6%)
- 25 years or longer (-16.7%)

Figure 4-14 OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by seniority (SOAP 2010 n=25,059 - WoS 2016 n=14,160, p < 0.001)



4.2.3.2.3 OA myths: OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by geographic regions

When looking at the distribution by geographic regions for this myth we can differentiate two groups. On one hand we find a number of regions in which the majority of researchers agreed with this statement in both surveys:

- Africa (63.5% in SOAP 2010; 44.1% in WoS 2016)
- Asia (59.3% in SOAP 2010; 44.5% in WoS 2016)
- Brazil (57.4% in SOAP 2010; 41.0% in WoS 2016)
- China (66.8% in SOAP2010; 50.4% in WoS 2016)
- India (68.7% in SOAP2010; 45.5% in WoS 2016)
- South America (60.9% in SOAP2010; 44.6% in WoS 2016)

The second group of regions by those regions in which the majority of respondents neither agreed nor disagreed with this statement in both surveys:

- North America (45.6% in SOAP2010; 52.1% in WoS 2016)
- Oceania (47.2% in SOAP2010; 56.0% in WoS 2016)
- Russia (47.5% in SOAP2010; 58.9% in WoS 2016)

In SOAP 2010 we find that within regions we could see five regions with more than 60% of their respondents agreeing or strongly agreeing to this statement: Middle East (60.7%), South America (60.9%), Africa (63.5%), China (66.8%) and India (68.7%). On the other extreme two regions went below the 45% mark, that's North America (44.3%) and Oceania (40.6%).

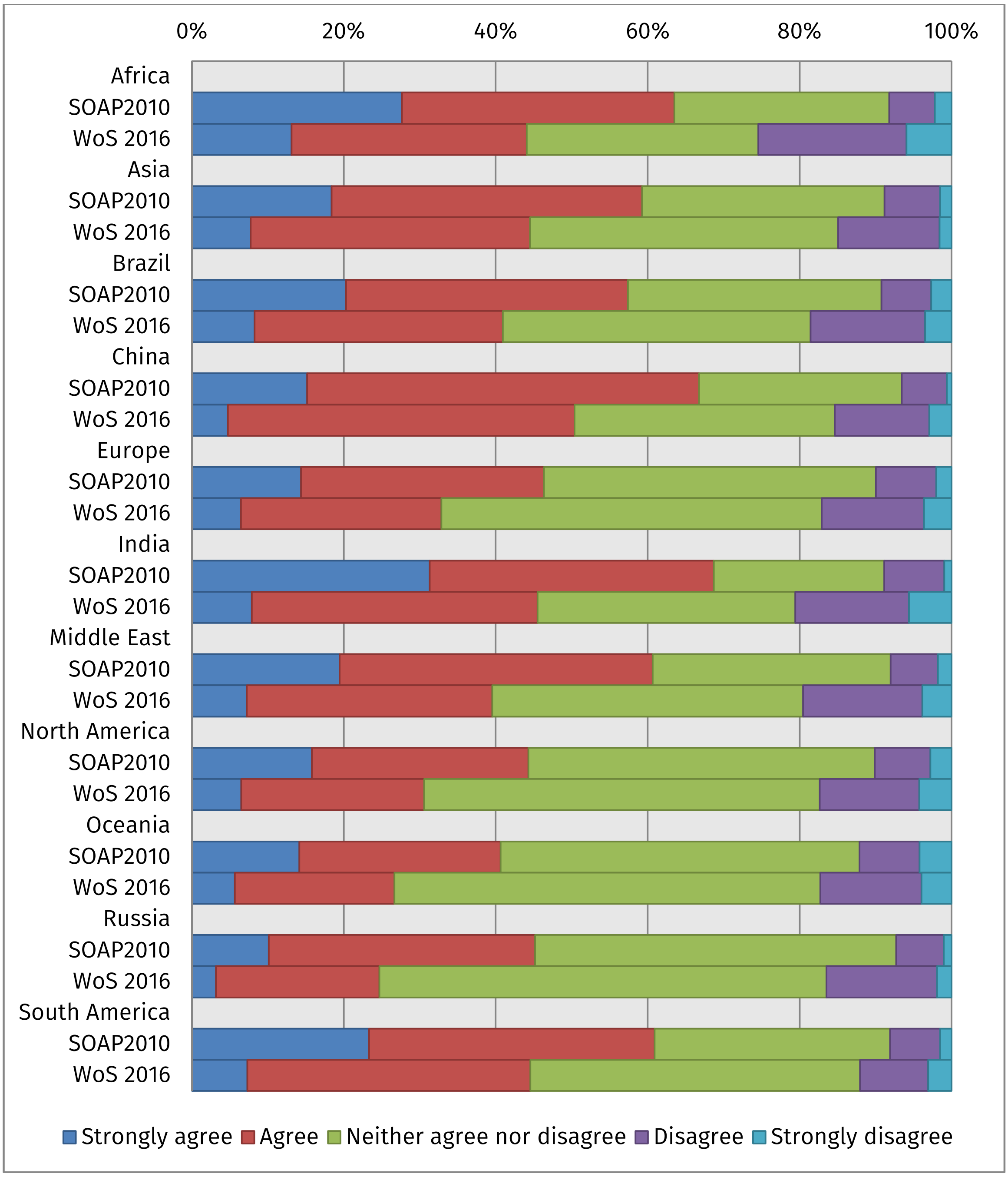
When looking at both surveys we can also see how the proportion of researchers agreeing with this statement drops between surveys. In a number of regions this decrease goes beyond the 20% mark:

- Russia (-20.5%)
- Middle East (-21.1%)
- India (-23.2%)

The proportion of scholars that did not provide an answer in any sense (neither agree nor disagree) increases in all regions. We can highlight three of them:

- Russia (+11.3%)
- India (+11.5%)
- South America (+12.4%)

Figure 4-15 OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by geographical region (n=25,059 - WoS 2016 n=14,160, $p < 0.001$)

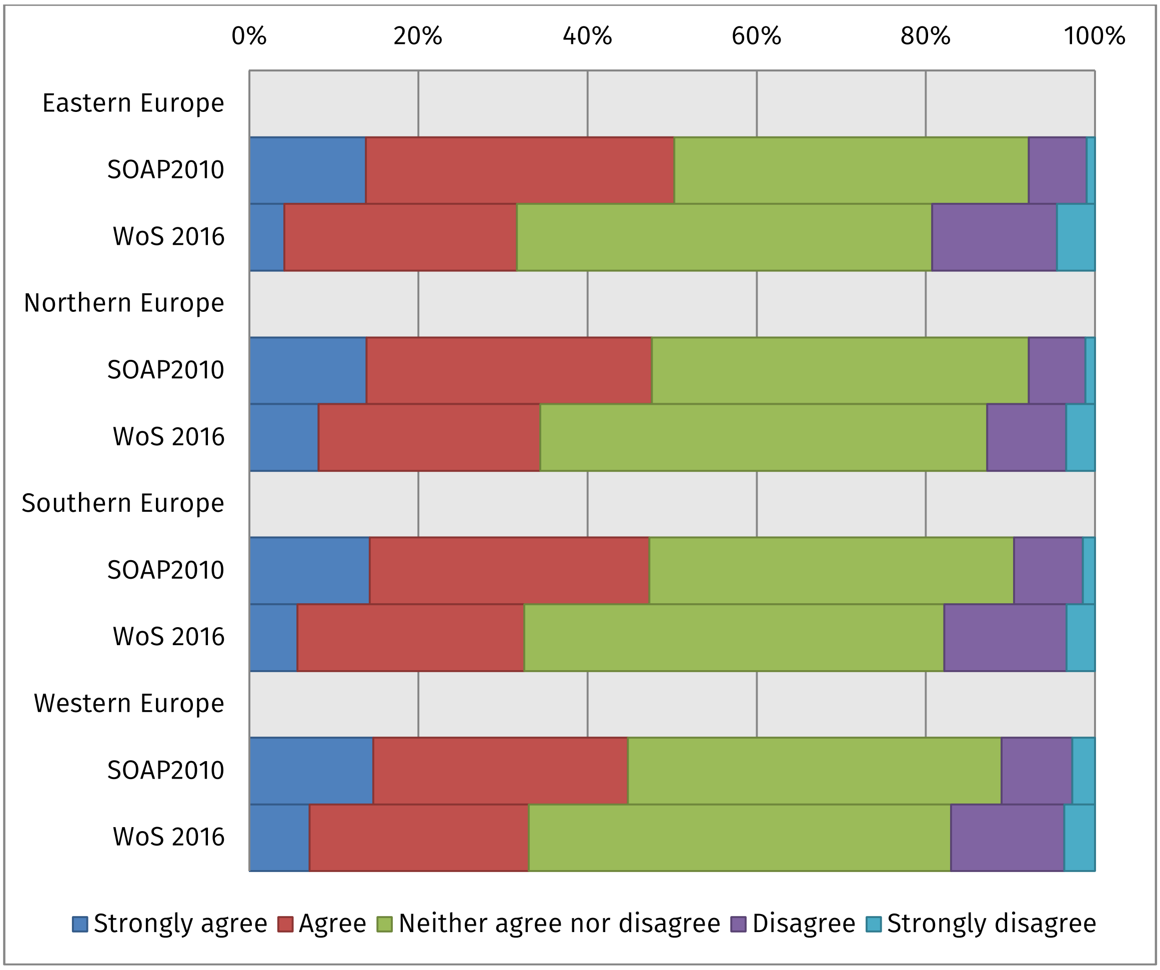


When looking at the distribution by European regions we observe the same pattern as in previous distributions. The majority of researchers agreed in SOAP 2010, while in WoS 2016 the majority of answers is neither agree or disagree. Differences between regions are not relevant though.

Agreement or strong agreement with this myth drops in all European regions beyond 10% if we compare the survey in 2016 to the one in 2010:

- Western Europe (-11.7%)
- Northern Europe (-13.2%)
- Southern Europe (-14.8%)
- Eastern Europe (-18.6%)

Figure 4-16 OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research. Distribution by European region (SOAP 2010 n=10,965 - WoS 2016 n=5,198, p < 0.001)



4.2.3.3 OA myths: OA publishing leads to an increase in the publication of poor quality research

4.2.3.3.1 OA myths: OA publishing leads to an increase in the publication of poor quality research. Distribution by discipline

The majority of researchers expressed disagreement with this statement, however in many cases with figures around 40% in both surveys. Neither agree nor disagree reached 30% in many disciplines.

In **SOAP 2010** most disciplines disagreed or strongly disagreed to this statement in excess of 45%. The only exceptions were Engineering (39.9%, 28.5% agreed or strongly agreed) and Chemistry (36.7%, 30.6% agreed or strongly agreed). Chemistry also showed the highest rate of “neither agree nor disagree” answers with 30.6% with Engineering reaching 28.5%.

Only two disciplines in **WoS 2016** agreed or strongly agreed with this statement in excess of 40%: Architecture (41%) and Chemistry (41.3%). Two disciplines disagreed or strongly disagreed in excess of 50%: Communication, Information and Library Science (51.1%) and Language (52.1%).

Neither agree nor disagree was the most chosen option in a number of disciplines:

- Mathematics (35.1%)
- Business and Administration Studies (36.1%)
- Historical Studies (37.3%)
- Law (41.2%)
- Creative Arts and Design (45.9%)

We observe that there are a higher proportion of researchers that agree with this statement in WoS 2016 than it was in SOAP 2010. There are a number of disciplines in which this increase is higher than 10%:

- Creative Arts and Design (+10.1%)
- Chemistry (+10.7%)
- Comm., Inf. and Library Science (+11.2%)
- Business and Admin. Studies (+11.6%)
- Medicine, Dentistry (+11.8%)
- Biological Sciences (+13.1%)
- Philosophical Studies (+13.2%)
- Mathematics (+13.5%)
- Computer Science (+15.3%)
- Arch., Building and Planning (+18.3%)
- Psychology (+22.6%)

The variation of researchers that neither agreed nor disagreed also varies between disciplines. It's worth highlighting Creative Arts and Design with +20.3%.

Table 4-8 OA publishing leads to an increase in the publication of poor quality research. Distribution by discipline (SOAP 2010 n=33,334 - WoS 2016 n=15,590, p < 0.001)

	SOAP 2010					WoS 2016				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Agriculture	5.0%	14.9%	28.6%	36.1%	15.4%	5.8%	22.9%	24.7%	33.7%	12.8%
Architecture	5.8%	16.9%	30.9%	31.7%	14.7%	9.8%	31.1%	26.2%	26.2%	6.6%
Astronomy	4.1%	17.5%	28.7%	34.6%	15.2%	4.4%	21.0%	29.2%	33.6%	11.8%
Biological Sciences	4.0%	11.4%	26.4%	37.8%	20.5%	6.5%	22.0%	28.3%	30.7%	12.5%
Business and Admin.	4.1%	17.3%	28.1%	35.3%	15.3%	8.5%	24.4%	36.1%	21.5%	9.4%
Chemistry	7.3%	23.3%	32.7%	29.1%	7.6%	11.6%	29.6%	27.2%	26.0%	5.5%
Com., Inf. Lib. Science	4.0%	13.6%	23.3%	33.6%	25.4%	4.4%	24.4%	20.0%	24.4%	26.7%
Computer Science	3.6%	9.8%	28.5%	33.1%	25.1%	7.5%	21.3%	32.8%	27.0%	11.5%
Creative Arts	3.1%	10.3%	25.6%	39.0%	22.1%	6.1%	17.3%	45.9%	14.3%	16.3%
Earth Sciences	4.1%	14.3%	28.2%	36.2%	17.2%	6.7%	21.1%	29.5%	30.8%	11.9%
Education	3.2%	13.2%	30.2%	34.7%	18.7%	5.7%	19.7%	30.1%	33.7%	10.9%
Engineering	7.8%	20.8%	31.6%	29.1%	10.8%	7.6%	26.4%	29.0%	28.0%	9.0%
Historical Studies	4.3%	11.7%	29.0%	34.8%	20.2%	6.0%	19.4%	37.3%	21.6%	15.7%
Language and Lit.	2.6%	11.1%	29.4%	36.5%	20.4%	4.3%	16.4%	27.1%	37.1%	15.0%
Law	5.0%	11.1%	37.4%	29.4%	17.2%	5.9%	15.7%	41.2%	23.5%	13.7%
Mathematics	6.0%	14.6%	29.6%	32.6%	17.2%	10.3%	23.8%	35.1%	19.9%	10.8%
Medicine, Dentistry	4.9%	15.4%	29.1%	36.7%	13.8%	7.7%	24.5%	31.4%	28.4%	8.1%
Philosophical Studies	2.6%	10.1%	29.2%	36.7%	21.3%	7.4%	18.5%	33.3%	22.2%	18.5%
Physics	5.1%	16.9%	32.0%	32.3%	13.7%	5.4%	23.1%	32.2%	26.9%	12.5%
Psychology	2.8%	13.7%	32.3%	34.2%	17.0%	6.8%	32.3%	30.5%	20.9%	9.5%
Social Sciences	3.3%	12.9%	29.3%	35.4%	19.0%	4.8%	17.4%	32.1%	30.1%	15.6%

4.2.3.3.2 OA myths: OA publishing leads to an increase in the publication of poor quality research. Distribution by seniority

The majority of researchers expressed disagreement with this statement in both surveys and across all age groups. The only exception is the most senior group, which in WoS 2016 expressed agreement in 37.1% of the cases. Levels of neither agree nor disagree answers are around 30% in all cases and agreement grows from 2010 to 2016 while disagreement decreases.

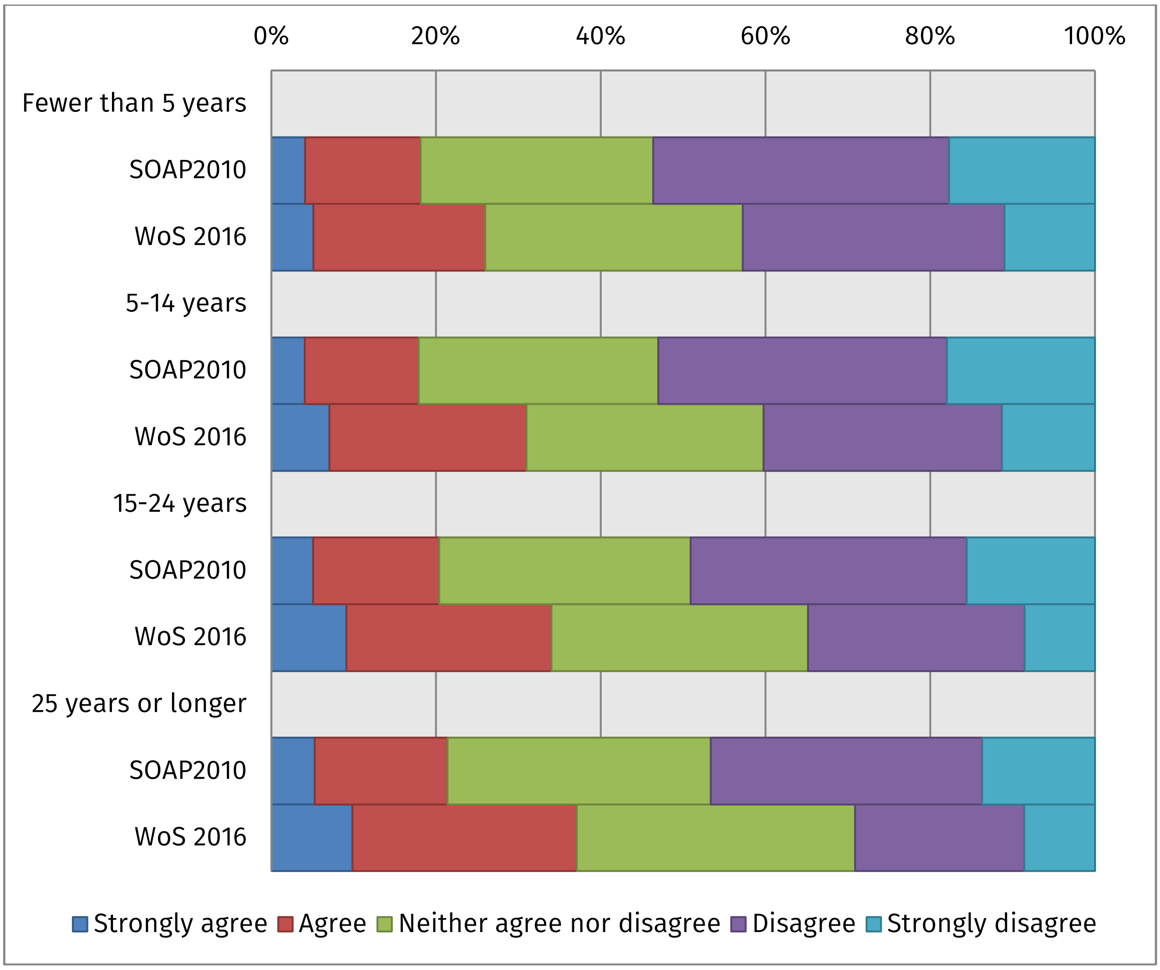
The only significant difference between age groups In **SOAP 2010** was observed in those disagreeing or strongly disagreeing to the fact that OA is linked to poor quality research. It was the case for 53.7% of the youngest scientists (18.1% agreed or strongly agreed) and 46.7% of the most experienced group (21.4% agreed or strongly agreed).

In **WoS 2016** the most chosen option for researchers with 25 or more years of experience was agreement or strong agreement with this statement (37.1%), while 33.8% neither agreed nor disagreed and 29.1% disagreed or strongly disagreed. In the case of researchers with 5 or fewer years of experience the most chose options were disagreement or strong disagreement (42.8%). Agreement or strong agreement was chosen by 26% of the researchers while 31.2% said they neither agree nor disagree.

All age groups in WoS 2016 tend to agree more with this statement than those in SOAP 2010. The largest variation is observed in the most experienced group and it decreases from there on:

- Fewer than 5 years (+7.9%)
- 5-14 years (+13.1%)
- 15-24 years (+13.6%)
- 25 years or longer (+15.7%)

Figure 4-17 OA publishing leads to an increase in the publication of poor quality research. Distribution by seniority (SOAP 2010 n=33,334 - WoS 2016 n=15,590, p < 0.001)



4.2.3.3.3 OA myths: OA publishing leads to an increase in the publication of poor quality research. Distribution by geographic regions

When looking at the distribution of this myth by regions we can differentiate two groups. The majority of respondents in all regions disagreed with this statement in 2010. Many regions followed this pattern, but a number of regions switched and actually the majority of researchers expressed agreement in 2016. These are:

- Asia (45.2% disagreed in SOAP 2010; 34.8% agreed in WoS 2016)
- China (34.2% disagreed in SOAP 2010; 37.9% agreed in WoS 2016)
- India (46.8% disagreed in SOAP 2010; 38.1% agreed in WoS 2016)
- Middle East (42.2% disagreed in SOAP 2010; 41.4% agreed in WoS 2016)
- Oceania (49.5% disagreed in SOAP 2010; 33.7% agreed in WoS 2016)
- Russia (41.6% disagreed in SOAP 2010; 42.4% agreed in WoS 2016)

There were three regions in **SOAP 2010** that disagreed or strongly disagreed with the fact that OA might be linked to poor quality research in excess of 40% of the cases. These were Africa (42.8%), South America (49.6%) and Brazil (51.1%). On the other extreme there are three other regions whose majority of respondents disagreed or strongly disagreed but with strong support for other options: Middle East (42.2%, 29.9% agreed or strongly agreed), Russia (41.6%, 24.4% strongly agreed or agreed) and China (34.2%, with 34% of the respondents agreeing or strongly agreeing with this statement).

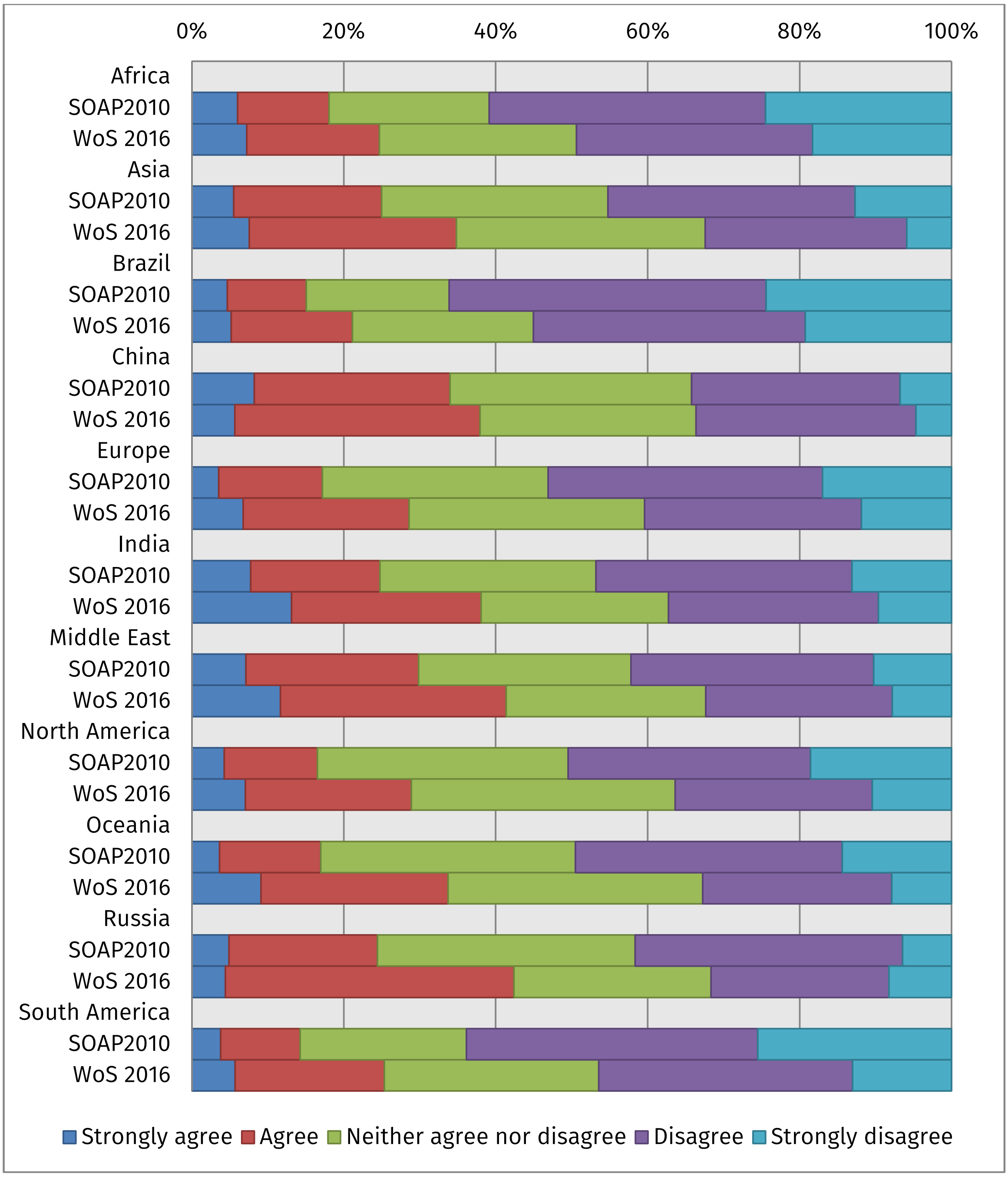
Two regions in **WoS 2016** expressed agreement or strong agreement with this statement in excess of 40%: Middle East (41.4%) and Russia (42.4%). The highest levels of disagreement or strong disagreement were in the following regions:

- Europe (40.4%)
- South America (46.4%)
- Africa (49.4%)
- Brazil (55.0%)

There were more researchers agreeing or strongly agreeing with this statement in WoS 2016 than in SOAP 2010. The largest increases are found in the following regions:

- South America (+11.1%)
- Europe (+11.4%)
- Middle East (+11.5%)
- North America (+12.4%)
- India (+13.3%)
- Oceania (+16.8%)
- Russia (+18.0%)

Figure 4-18 OA publishing leads to an increase in the publication of poor quality research. Distribution by seniority (SOAP 2010 n=25,144 - WoS 2016 n=14,179, $p < 0.001$)



The results for this myth by European regions are statistically significantly different as $p < 0.001$. However we don't find the differences particularly interesting. The corresponding plot can be found in Annex 1.

4.2.3.4 OA myths: OA publishing undermines the system of peer review

4.2.3.4.1 OA myths: OA publishing undermines the system of peer review. Distribution by discipline

The majority of respondents expressed disagreement with this myth in both surveys and in all disciplines. However there is a tendency to reduce the levels of disagreement in WoS 2016 in respect to SOAP 2010. The proportion of neither agree nor disagree answers is around 30% across all disciplines.

In SOAP 2010 70.6% of computer scientists and 69.7% of respondents from philosophy strongly disagreed or disagreed with this statement. Agriculture, Engineering and Chemistry also responded in this sense, but with responses agreeing or strongly agreeing in excess of 20%: Agriculture (48.2% disagreement, 22.9% agreement), Engineering (44.7% disagreement, 22.6% agreement), Chemistry (41.2 disagreement, 25.6% agreement).

In WoS 2016 only three disciplines expressed agreement or strong agreement with this statement above the 25% mark:

- Mathematics (26.1%)
- Chemistry (26.8%)
- Architecture (28.3%)

In many disciplines the majority of researchers disagreed or completely disagreed. The following disciplines did so in excess of 60%:

- Communication, Information and Library Science (60.9%)
- Philosophical Studies (63.0%)
- Language and Literature Studies (68.3%)

A larger proportion of researchers in WoS 2016 agreed that OA undermines the peer review system than in SOAP 2010. In a number of disciplines this increase in the level of agreement exceeds 15%:

- Comm., Inf. and Library Science (+15.5%)
- Chemistry (+15.7%)
- Medicine, Dentistry (+15.7%)
- Business and Admin. Studies (+17.3%)
- Philosophical Studies (+18.3%)
- Mathematics (+18.6%)
- Computer Science (+20.4%)
- Arch., Building and Planning (+25.0%)
- Psychology (+26.2%)

Table 4-9 OA publishing undermines the system of peer review. Distribution by discipline (SOAP 2010 n=33,158 - WoS 2016 n=15,559, p < 0.001)

	SOAP 2010					WoS 2016				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Agriculture	5.5%	17.4%	28.9%	33.6%	14.7%	5.8%	22.9%	24.7%	33.7%	12.8%
Architecture	3.5%	12.4%	31.6%	35.1%	17.4%	9.8%	31.1%	26.2%	26.2%	6.6%
Astronomy	2.9%	12.3%	26.1%	36.0%	22.6%	4.4%	21.0%	29.2%	33.6%	11.8%
Biological Sciences	3.4%	10.3%	23.5%	36.3%	26.4%	6.5%	22.0%	28.3%	30.7%	12.5%
Business and Administration	4.1%	11.5%	28.5%	35.8%	20.0%	8.5%	24.4%	36.1%	21.5%	9.4%
Chemistry	5.0%	20.5%	33.2%	30.8%	10.4%	11.6%	29.6%	27.2%	26.0%	5.5%
Com., Inf. Lib. Science	3.1%	10.2%	18.8%	34.0%	33.8%	4.4%	24.4%	20.0%	24.4%	26.7%
Computer Science	2.9%	5.5%	21.1%	33.9%	36.7%	7.5%	21.3%	32.8%	27.0%	11.5%
Creative Arts	2.6%	9.8%	27.3%	39.7%	20.6%	6.1%	17.3%	45.9%	14.3%	16.3%
Earth Sciences	3.6%	12.0%	25.8%	36.2%	22.3%	6.7%	21.1%	29.5%	30.8%	11.9%
Education	3.5%	11.5%	26.0%	35.7%	23.3%	5.7%	19.7%	30.1%	33.7%	10.9%
Engineering	5.2%	17.4%	32.7%	30.4%	14.3%	7.6%	26.4%	29.0%	28.0%	9.0%
Historical Studies	3.8%	10.0%	25.1%	35.5%	25.6%	6.0%	19.4%	37.3%	21.6%	15.7%
Language and Lit.	2.5%	7.4%	23.6%	37.8%	28.8%	4.3%	16.4%	27.1%	37.1%	15.0%
Law	4.2%	6.5%	27.4%	36.9%	25.1%	5.9%	15.7%	41.2%	23.5%	13.7%
Mathematics	4.3%	11.2%	26.8%	32.6%	25.1%	10.3%	23.8%	35.1%	19.9%	10.8%
Medicine, Dentistry	3.6%	12.9%	28.2%	36.7%	18.6%	7.7%	24.5%	31.4%	28.4%	8.1%
Philosophical Studies	1.5%	6.2%	22.6%	36.3%	33.5%	7.4%	18.5%	33.3%	22.2%	18.5%
Physics	3.6%	13.7%	30.5%	31.8%	20.5%	5.4%	23.1%	32.2%	26.9%	12.5%
Psychology	2.6%	10.3%	27.6%	35.8%	23.7%	6.8%	32.3%	30.5%	20.9%	9.5%
Social Sciences	3.2%	9.1%	26.4%	37.6%	23.7%	4.8%	17.4%	32.1%	30.1%	15.6%

4.2.3.4.2 OA myths: OA publishing undermines the system of peer review. Distribution by seniority

Although the relation between this variable and the respondents seniority is statistically significant in both studies ($p > 0.001$) the differences were not particularly interesting. Same happens when we compare both studies, therefore the corresponding plot can be found in Annex 1.

4.2.3.4.3 OA myths: OA publishing undermines the system of peer review. Distribution by geographic regions

The majority of researchers in many regions expressed disagreement with this statement in both surveys. However this was not the case for China with a quite even spread over the three options in both surveys (38.2% agreement in SOAP 2010, 36.5% neither agree not disagree in WoS 2016). We also see a switch in positions in Asia (41.6% disagreement in SOAP 2010, 38.5% neither agree nor disagree in WoS 2016) and Middle East (38.0% disagreement in SOAP 2010, 38.9% neither agree nor disagree in WoS 2016).

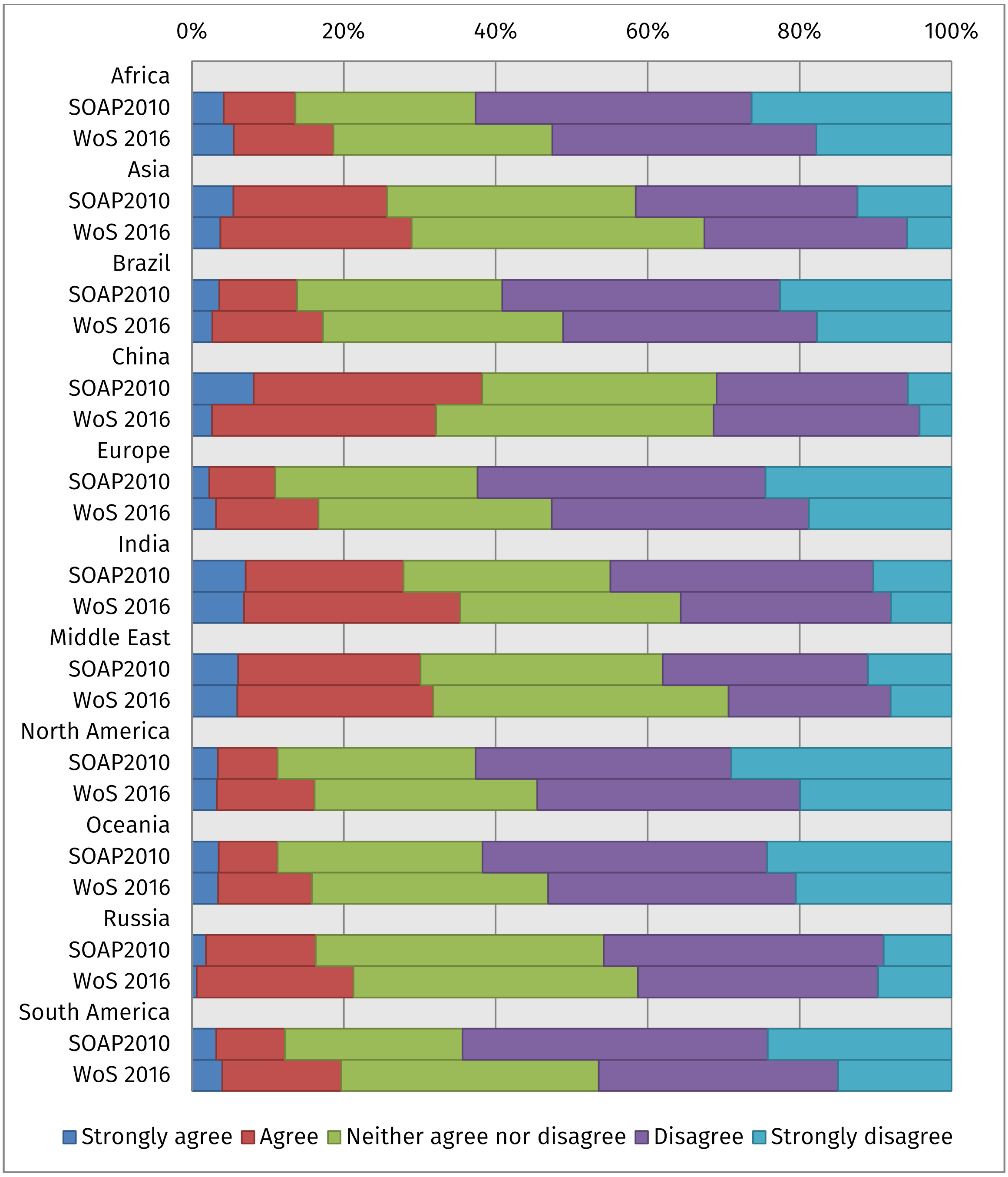
The strongest disagreement with this statement in **SOAP 2010** came from North America (62.6%), Africa (62.7%) and South America (64.4% disagreed or strongly disagreed). In the Middle East we can see 38% of the respondents disagreed or strongly disagreed with this myth while 30.1% of them actually agreed or strongly agreed. China was the only region with a different balance. The percentage of respondents that agreed is higher (38.2%) than those that disagreed (30.9%). In Russia most respondents disagreed (45.8%), but there were an important number of researchers that neither agreed nor disagreed (37.9%).

The majority of researchers in **WoS 2016** disagreed or strongly disagreed with this statement in a number of regions:

- Brazil (51.1%)
- Africa (52.5%)
- Europe (52.6%)
- Oceania (53.1%)
- North America (54.5%)

When looking at **both surveys** differences are significant from the statistical point of view ($p < 0.001$). In most regions agreement with this statement grows slightly, but never beyond the 10% mark. The only striking outcome in this sense is the decrease in the proportion of researchers that disagreed or strongly disagreed in South America (-17.9%).

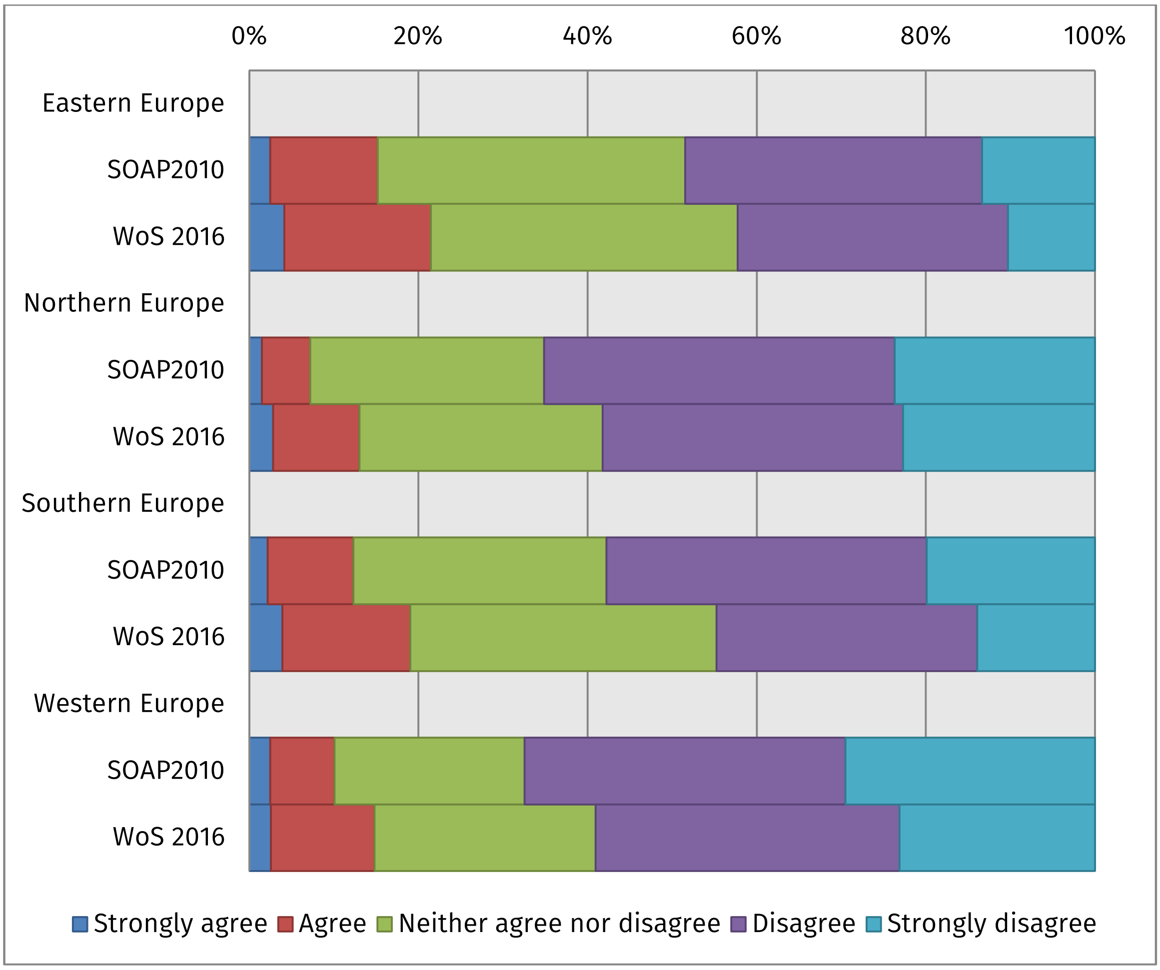
Figure 4-19 OA publishing undermines the system of peer review. Distribution by geographical regions (SOAP n=25,019 - WoS 2016 n=14,152, $p < 0.001$)



Looking at the distribution by European regions for this myth we can see that the majority of researchers in all sub-regions disagreed with this statement in both surveys. There is a tendency to reduce the disagreement and increase the agreement levels from SOAP 2010 to WoS 2016.

We didn't observe strong differences between European regions for this particular myth in **SOAP 2010**. However in **WoS 2016** we can see that the majority of researchers in Western Europe (59.1%) and Northern Europe (58.2%) disagreed or strongly disagreed with this statement.

Figure 4-20 OA publishing undermines the system of peer review. Distribution by European regions (SOAP 2010 n=10,973 - WoS 2016 n=5,202, p < 0.001)



4.3 Practice

In the following sections we will analyse on researcher's practices when publishing papers, including some directly related to OA publishing. That is what researchers *do*.

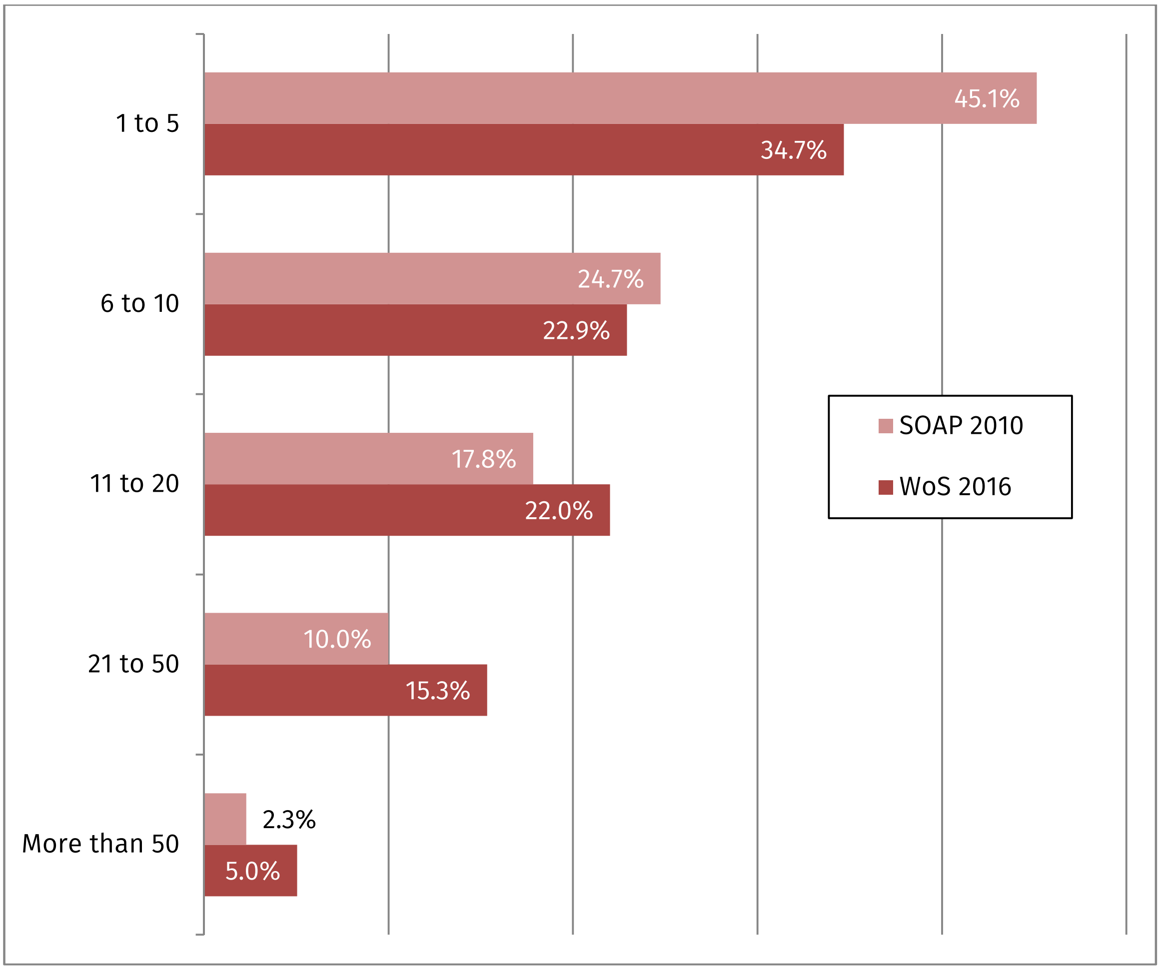
4.3.1 Number of articles

Respondents to the survey were asked how many research articles they had published in the last five years, including both Open Access and not Open Access. The group means for this question are statistically significantly different in both samples given that $p < 0.001$. These results suggest that there are significant differences in the number of articles published by researchers in each of the samples.

The distribution of the number of articles published in the last 5 years is pretty similar in both surveys. Almost half of the respondents in **SOAP 2010** have published 5 or less articles during the last five years. A quarter of the respondents had written between 6 to 10 articles in the last 5 years.

In **WoS 2016** almost half of the respondents to the survey had published between 6 and 20 articles in the last five years. The largest difference **between surveys** is found in the 1 to 5 articles group, which is larger in SOAP 2010 by 10.4%.

Figure 4-21 Number of articles published in the last five years (SOAP 2010 n=26,540 - WoS 2016 n=15,155, $p < 0.001$)



4.3.1.1 Number of articles. Distribution by discipline

The most popular category is 1 to 5 articles across almost all disciplines and in both surveys. In terms of productivity in the last 5 years we observe that the Social Sciences and Humanities (with the exception of Architecture) tend to have fewer publications than the hard sciences. The highest rate in the 1-5 articles category in SOAP 2010 was in History (66.5%). In all those disciplines where at least half the researchers have published 1 to 5 articles the second category (6-10) is much less populated, around 20%: History (66.5%-19.1%), Creative Arts (65.4%-21%), Education (64%-29.7%), Architecture (62.7%-20.8%), Language (62.5%-23.3%), Social Sciences (60.9%-24%).

In the other extreme we find several disciplines with a more even spread between the first three categories (1 to 5, 6 to 10, 11 to 20 articles in the last 5 years). That is a more balanced distribution between less productive and quite productive authors: Physics (27.9%-25.9%-27.1%), Astronomy (28.0%-25.7%-25.5%), Chemistry (28.2%-23.1%-24.5%), Computer Science (30.9%-25.2%-24.3%), Mathematics (32.4%-30.6%-24.7%).

When we look at **both surveys** we see the largest differences between disciplines in both studies in the 1 to 5 articles category in the last 5 years:

- Creative Arts and Design (-20.2%)

- Social Sciences (-23.0%)
- Historical Studies (-23.5%)
- Business and Administrative Studies (-23.6%)
- Psychology (-24.7%)
- Communication, Information and Library Science (-27.1%)
- Education (-29.1%)
- Architecture, Building and Planning (-30.4%)

In the 11 to 20 articles there is a large increase in two disciplines:

- Education (+16.8%)
- Communication, Information and Library Science (+27.1%)

Table 4-10 Number of articles published in the last five years (SOAP 2010 n=35,189 - WoS 2016 n=16,659, p < 0.001)

	SOAP 2010					WoS 2016				
	1 to 5	6 to 10	11 to 20	21 to 50	More than 50	1 to 5	6 to 10	11 to 20	21 to 50	More than 50
Agriculture	39.2%	28.2%	19.7%	11.2%	1.7%	36.8%	21.8%	20.5%	16.4%	4.4%
Architecture	62.7%	20.8%	11.6%	3.3%	1.7%	32.4%	27.9%	25.0%	13.2%	1.5%
Astronomy	28.0%	25.7%	25.5%	17.5%	3.2%	30.1%	19.7%	27.4%	16.4%	6.4%
Biological Sciences	39.6%	27.2%	19.1%	11.7%	2.4%	34.0%	23.1%	22.1%	16.1%	4.8%
Business and Administration	58.5%	23.1%	12.1%	4.6%	1.6%	34.9%	30.1%	22.4%	11.2%	1.5%
Chemistry	28.2%	23.1%	24.5%	18.7%	5.6%	32.0%	20.5%	21.7%	16.9%	8.8%
Com., Inf. Lib. Science	57.1%	27.8%	10.9%	3.4%	0.9%	30.0%	20.0%	38.0%	12.0%	0.0%
Computer Science	30.9%	25.2%	24.3%	16.6%	2.9%	33.8%	22.0%	22.9%	15.9%	5.4%
Creative Arts	65.4%	21.0%	5.9%	4.9%	2.9%	45.2%	25.0%	16.3%	10.6%	2.9%
Earth Sciences	42.3%	27.6%	18.8%	9.3%	2.0%	36.2%	23.2%	22.4%	14.4%	4.0%
Education	64.0%	20.7%	9.9%	4.1%	1.2%	34.9%	22.6%	26.7%	12.3%	3.6%
Engineering	39.6%	24.8%	20.2%	12.3%	3.2%	34.8%	22.1%	21.4%	16.3%	5.4%
Historical Studies	66.5%	19.1%	10.2%	2.9%	1.3%	43.0%	30.3%	16.9%	9.2%	0.7%
Language and Lit.	62.5%	23.3%	10.8%	2.9%	0.5%	42.6%	30.3%	18.7%	7.7%	0.6%
Law	50.7%	22.3%	19.8%	4.7%	2.5%	35.8%	22.0%	28.4%	12.8%	0.9%
Mathematics	32.4%	30.6%	24.7%	11.2%	1.2%	31.4%	25.9%	27.2%	12.5%	3.0%
Medicine, Dentistry	42.6%	23.1%	18.3%	12.4%	3.6%	34.7%	22.3%	20.8%	16.0%	6.1%
Philosophical Studies	51.3%	27.4%	14.7%	5.6%	1.1%	35.7%	28.6%	28.6%	7.1%	0.0%
Physics	27.9%	25.9%	27.1%	15.7%	3.4%	33.3%	24.8%	22.1%	14.7%	5.2%
Psychology	54.6%	21.9%	14.5%	7.1%	2.0%	29.9%	22.3%	25.2%	18.2%	4.4%
Social Sciences	60.9%	24.0%	10.8%	3.2%	1.1%	37.9%	26.5%	21.0%	11.0%	3.5%

4.3.1.2 Number of articles. Distribution by seniority

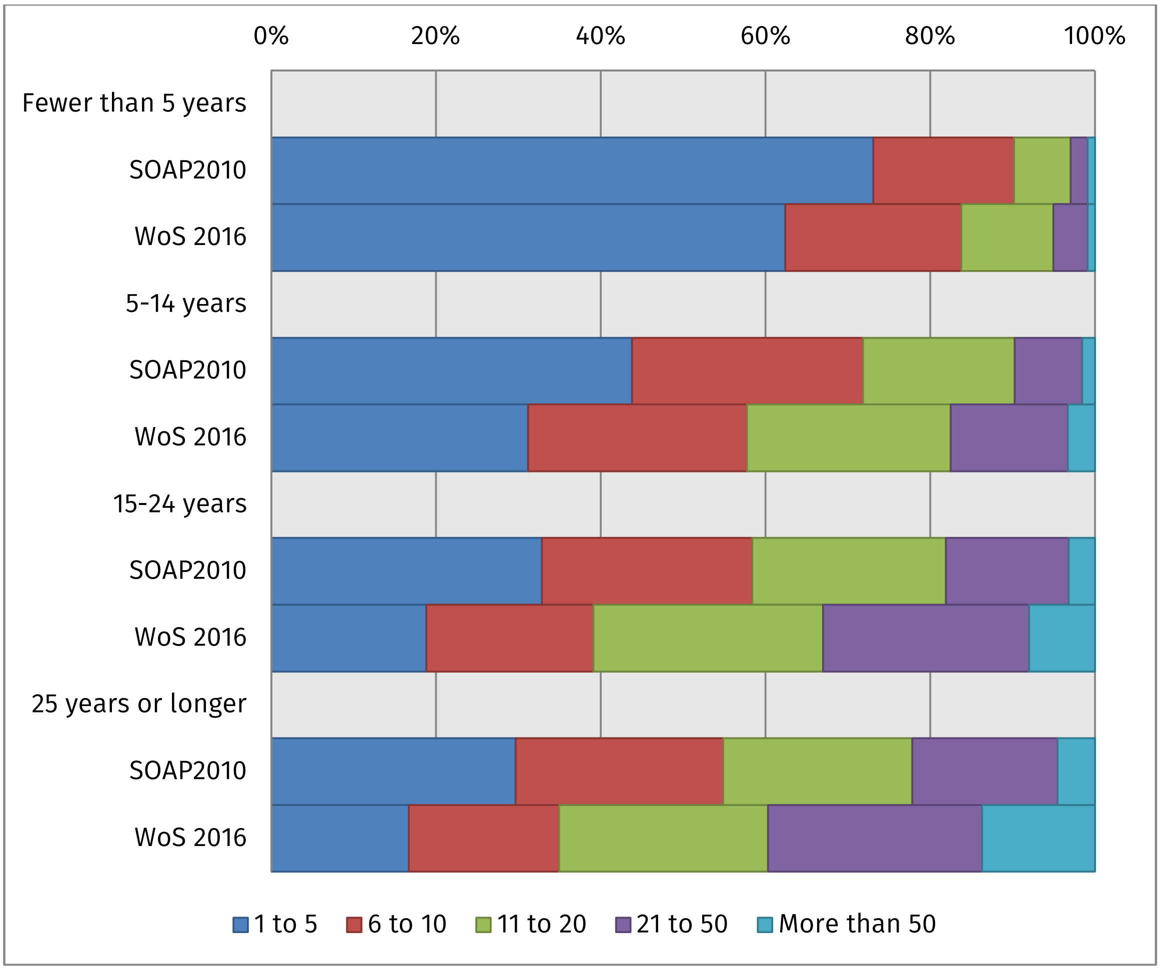
In terms of seniority we can see how the number of articles increases as researchers are more experienced. In WoS 2016 the most populated category in the 15 to 24 years of experience is 11 to 20 articles (27.9%). In the most senior category (+25 years of experience) the most popular category is 21 to 50 (26%)

In **SOAP 2010** the most common category is 1-5 in all age groups; however in those with 15 to 24 and 25 or more years of experience the spread is more even. In **WoS 2016** in terms of age groups we can see that younger scientists were less prolific than more experienced colleagues. Those with five or less years in research declared to have published between 1 and 5 articles in 62.4% of the cases. This figure drops to 31.2% for those with 5 to 14 years of experience.

The main difference between **both studies** is the higher productivity of researchers in the WoS 2016 sample. The main differences are found in the 1 to 5 category:

- Fewer than 5 years (-10.7%)
- 5-14 years (-12.6%)
- 15-24 years (-14.0%)
- 25 years or longer (-13.0%)

Figure 4-22 Number of articles published in the last five years. Distribution by seniority (SOAP 2010 n=26,540 - WoS 2016 n=15,155, p < 0.001)



4.3.1.3 Number of articles. Distribution by geographic regions

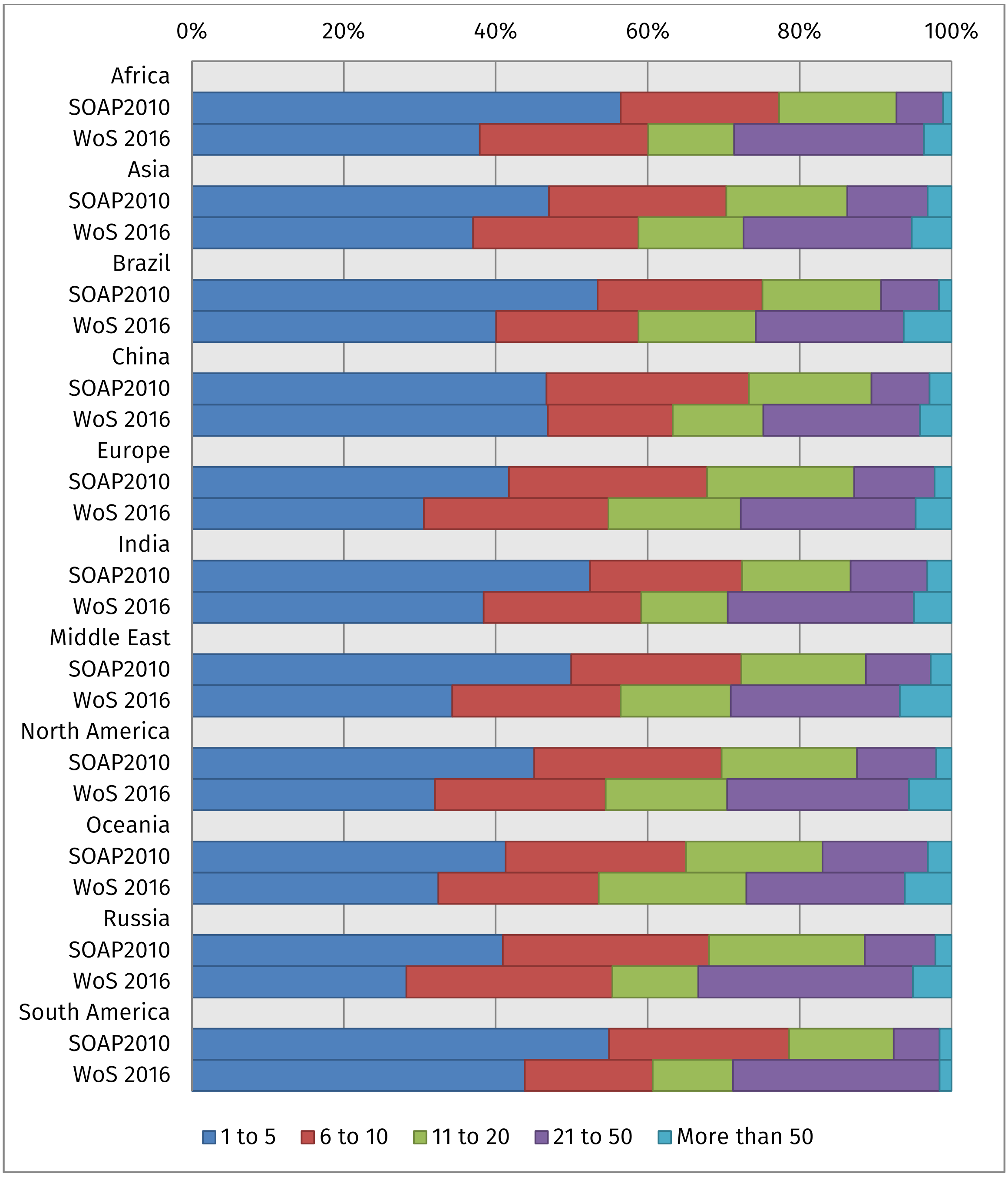
When looking at the regional spread of articles production in the last 5 years we can see that the 1 to 5 articles category is the most populated in all regions and all disciplines. The spread between regions follows a quite similar pattern.

The most even spread in SOAP 2010 is found in Russia with 41% of researchers declaring to have published 1 to 5 articles, 27.1% 1 to 5 and 20.5% 11 to 20. The highest rate of 1 to 5 articles in WoS 2016 was observed in China (46.9%) being Russia the lowest for this category with 28.9%.

The largest differences between regions in the 6 years between surveys are found in the 1 to 5 and the 21 to 50 articles categories. In 1-5 we see Middle East (-15.7%) and Africa (-18.5%). The largest increase in the 21 to 50 articles category are found in:

- India (+14.4%)
- Africa (+18.8%)
- Russia (+19.0%)
- South America (+21.1%)

Figure 4-23 Number of articles published in the last five years. Distribution by geographical region (SOAP 2010 n=26,540 - WoS 2016 n=15,155, $p < 0.001$)

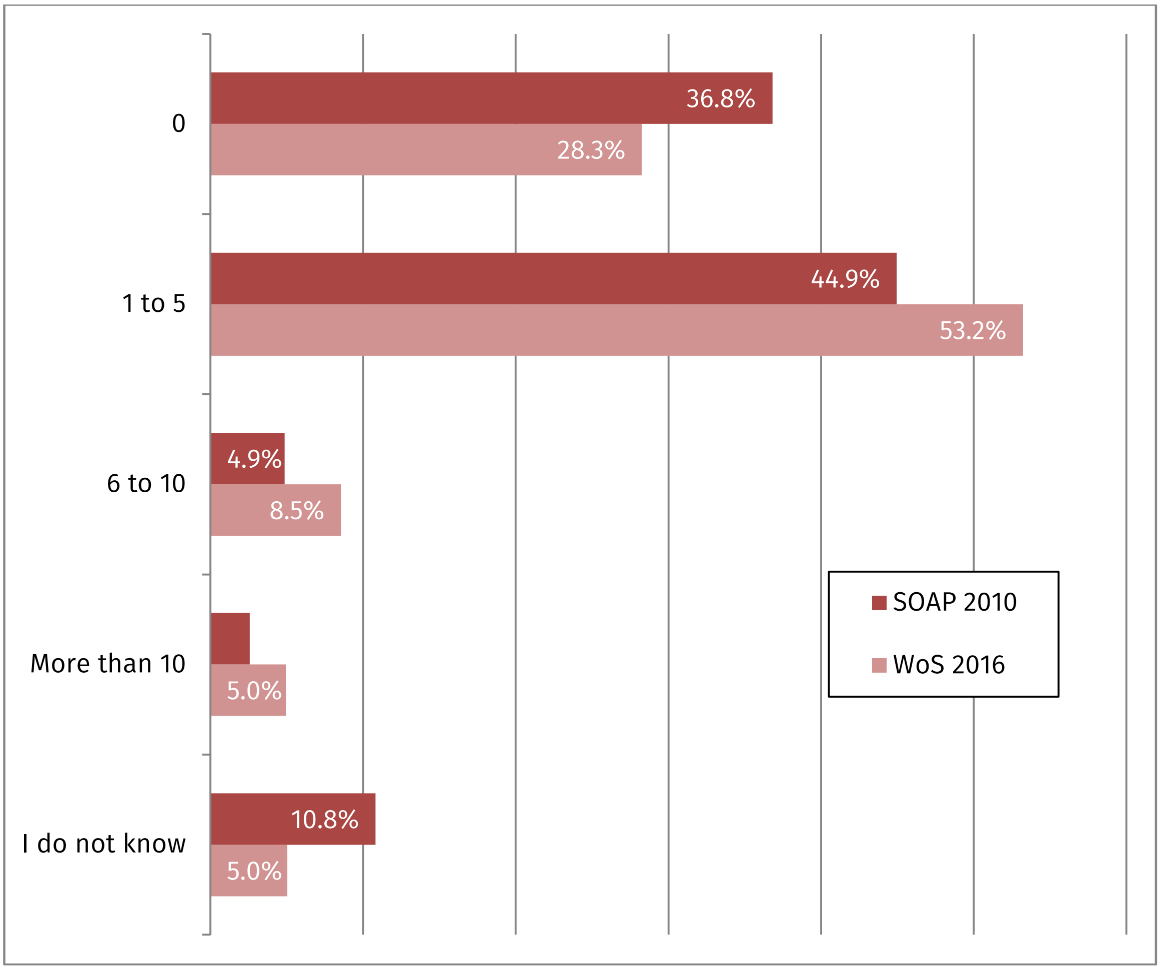


Although statistically significant since $p < 0.001$ differences between European regions were not particularly interesting and the corresponding plot can be found in Annex 1.

4.3.2 Number of Open Access articles

Respondents to the survey were asked how many Open Access research articles they had published in the last five years. More than half of the respondents in both studies had published at least one OA article in the last 5 years, but this figure is larger in WoS 2016 (66.7%) by +14.3% (52.4% in SOAP 2010).

Figure 4-24 Number of OA articles published in the last five years (SOAP 2010 n=25,984 - WoS 2016 n=15,187, p < 0.001)



4.3.2.1 Number of Open Access articles. Distribution by discipline

The majority of researchers had published at least one OA article in the last 5 years in all categories and in both surveys. There are only three exceptions in SOAP 2010 in which the most common option was 0 OA articles: Physics (41.6%), Psychology (43.3%) and Social Sciences (45.5%). We can also see that publishing OA is more common in 2016 than it was in 2010. The 0 OA articles category decreases in WoS 2016 in the majority of disciplines while the other categories increases, particularly 1 to 5 and 6 to 10.

In SOAP 2010 we find that In terms of disciplines at least half the respondents had published at least one OA articles in most cases. The exceptions were Chemistry (48.3% responded at least one OA article), Mathematics (48.3%), Business (48.1%), Psychology (47.2%), Engineering (46%) and Astronomy (38.1%).

In three disciplines respondents declared that had not published any OA articles in the last 5 years: Chemistry (41.6%), Engineering (43.3%) and Astronomy (45.5%).

In WoS 2016 the majority of researchers in all disciplines had published at least one OA article in the last 5 years. The highest rate of “0” responses are found in the following disciplines:

- Mathematics (35.0%)

- Astronomy and Space Science (35.6%)
- Business and Administration Studies (39.1%)
- Chemistry (39.9%)

The highest rates are found in the "1 to 5" category for all disciplines, being this figure higher than 60% in three disciplines:

- Architecture (61.2%)
- Language and Literature Studies (63.2%)
- Philosophical Studies (64.3%)

Comparing **both studies** we find that the percentage of researchers that did not publish any article in WoS 2016 in respect to SOAP 2010 is small in almost all disciplines. The largest differences are found in:

- Biological Sciences (-10.3%)
- Creative Arts and Design (-11.0%)
- Physics and Related Sciences (-11.7%)
- Law (-12.4%)
- Social Sciences (-18.2%)
- Medicine, Dentistry (-20.2%)
- Language and Literature Studies (-21.1%)

In the 1 to 5 OA articles category there are variances in increase/decrease in all disciplines. The largest changes are found in:

- Astronomy and Space Science (-11.4%)
- Medicine, Dentistry (+19.0%)
- Philosophical Studies (+20.6%)
- Social Sciences (+21.6%)
- Language and Literature Studies (+21.7%)

In the rest of categories differences between surveys are less relevant.

Table 4-11 Number of OA articles published in the last five years. Distribution by discipline (SOAP 2010 n=34,468 - WoS 2016 n=16,693, p < 0.001)

	SOAP 2010					WoS 2016				
	0	1 to 5	6 to 10	More than 10	I do not know	0	1 to 5	6 to 10	More than 10	I do not know
Agriculture	23.6%	57.6%	3.9%	3.9%	10.8%	25.9%	54.7%	9.8%	6.7%	3.0%
Architecture	26.4%	56.2%	6.1%	3.0%	8.3%	22.4%	61.2%	6.0%	6.0%	4.5%
Astronomy	30.2%	50.6%	4.1%	3.4%	11.7%	35.6%	39.3%	8.4%	7.4%	9.4%
Biological Sciences	30.2%	50.2%	5.7%	2.1%	11.8%	19.9%	57.5%	11.2%	7.9%	3.6%
Business and Administration	31.9%	48.5%	8.1%	4.0%	7.5%	39.1%	43.4%	4.7%	3.1%	9.7%
Chemistry	32.1%	49.8%	6.3%	2.8%	9.0%	39.9%	45.7%	6.6%	3.4%	4.5%
Com., Inf. Lib. Science	32.4%	49.5%	4.6%	1.8%	11.8%	28.0%	52.0%	10.0%	2.0%	8.0%
Computer Science	34.1%	48.5%	3.7%	3.7%	10.0%	34.6%	49.3%	6.0%	4.1%	6.0%
Creative Arts	34.1%	45.4%	4.3%	3.0%	13.2%	23.1%	56.7%	4.8%	2.9%	12.5%
Earth Sciences	35.4%	50.2%	5.4%	2.3%	6.7%	29.4%	55.9%	8.0%	3.5%	3.1%
Education	35.9%	46.8%	5.3%	2.5%	9.6%	29.6%	53.1%	6.6%	2.6%	8.2%
Engineering	36.5%	47.4%	3.4%	2.4%	10.3%	30.7%	53.0%	8.3%	3.9%	4.1%
Historical Studies	37.0%	42.3%	5.6%	4.3%	10.7%	34.2%	48.6%	6.8%	2.7%	7.5%
Language and Lit.	37.9%	41.5%	4.9%	1.9%	13.9%	16.8%	63.2%	8.4%	3.9%	7.7%
Law	38.1%	40.3%	3.7%	4.1%	13.8%	25.7%	51.4%	5.5%	3.7%	13.8%
Mathematics	38.3%	44.4%	4.7%	2.7%	9.8%	35.0%	45.1%	6.5%	4.0%	9.5%
Medicine, Dentistry	39.2%	40.7%	4.8%	1.7%	13.6%	19.0%	59.7%	10.2%	6.5%	4.6%
Philosophical Studies	39.7%	43.7%	5.1%	2.2%	9.3%	32.1%	64.3%	0.0%	0.0%	3.6%
Physics	41.6%	38.1%	5.2%	5.0%	10.1%	29.9%	51.8%	9.2%	4.5%	4.6%
Psychology	43.3%	38.6%	4.7%	2.7%	10.8%	33.7%	50.7%	8.2%	3.2%	4.1%
Social Sciences	45.5%	29.3%	6.1%	2.7%	16.4%	27.3%	50.9%	10.6%	5.0%	6.1%

4.3.2.2 Number of Open Access articles. Distribution by seniority

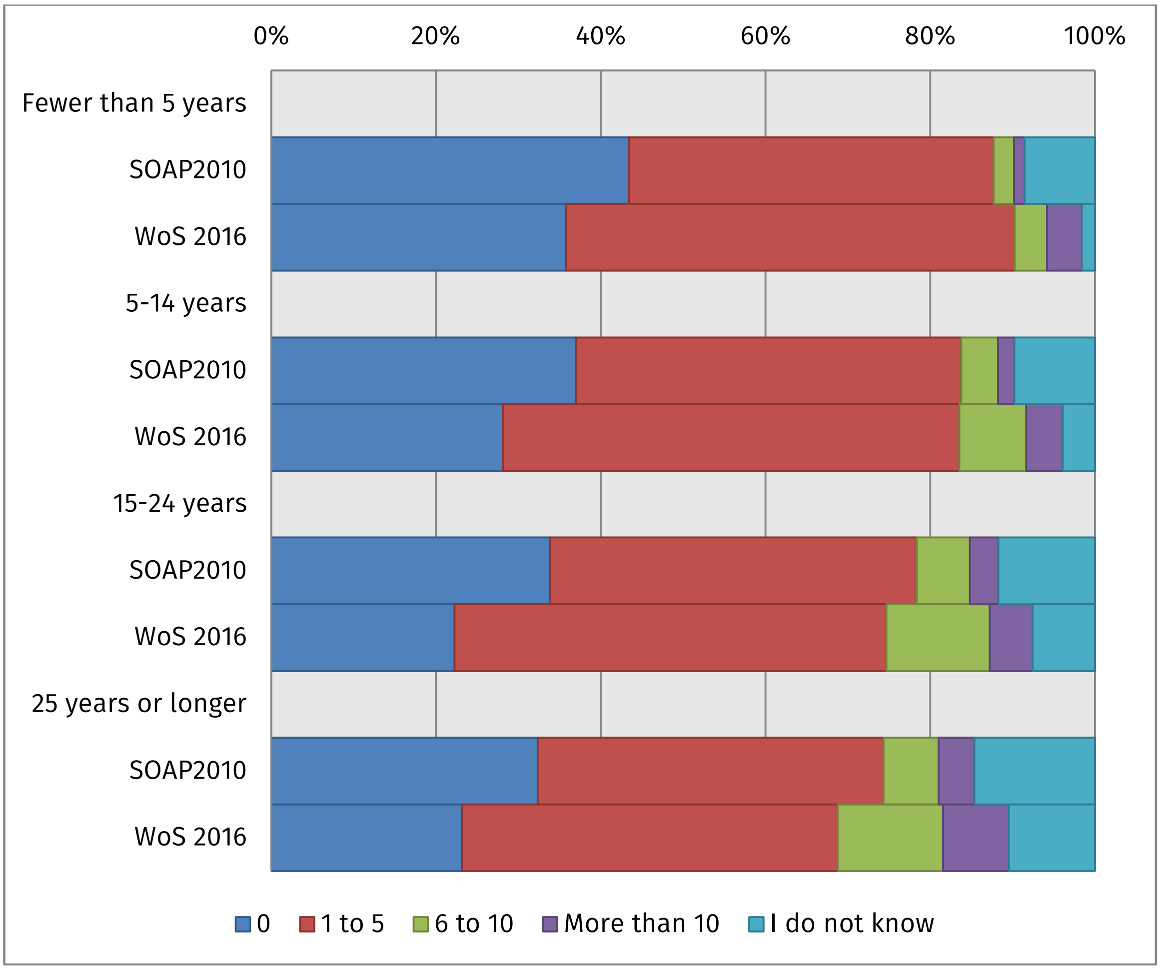
The most common category across all seniority groups and for both surveys is also 1 to 5. There is an increase in the number of OA articles as respondents are more senior.

In **WoS 2016** more than half of researchers in all age groups had published at least one OA article in the last 5 years. The largest proportion of researchers answering 0 is found in the youngest age group (35.8%). Between 50% and 60% of researchers in all age groups declared to have published between 1 and 5 OA articles with the exception of researchers with 25 of more years of experience, which did in 45.6% of the cases.

When we compare **both surveys** we can see that publishing OA articles is more common in all age groups in WoS 2016 than in SOAP 2010. There are -11.6% of researchers that declared not to have published any article in OA in the 15-25 years of experience group. In the youngest age group (1 -5) there are +10.2% in Wos 2016. Following we present the difference in those that published at least one OA article in the different age groups:

- Fewer than 5 years +14.6%
- 5-14 years +14.7%
- 15-24 years +15.7%
- 25 years or longer +13.4%

Figure 4-25 Number of OA articles published in the last five years. Distribution by seniority (SOAP n=25,984 - WoS 2016 n=15,187, p < 0.001)



4.3.2.3 Number of Open Access articles. Distribution by geographic regions

The 1 to 5 OA articles is also the most common category for all regions and for both disciplines. There are three regions in which at least 70% of respondents have published at least one OA article in the last five years: South America (71.1%), Africa (77.2%) and Brazil (76.5%).

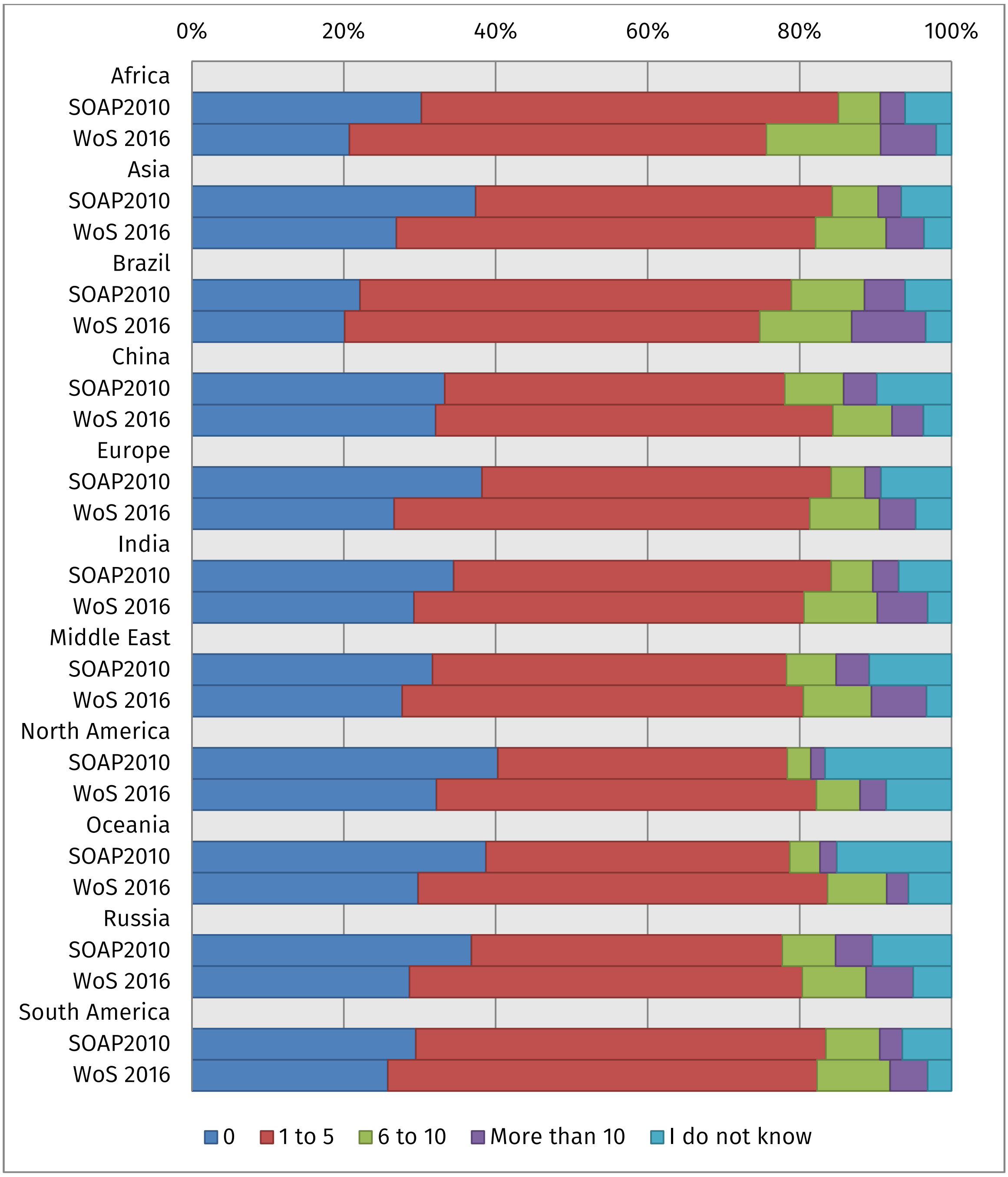
In **SOAP 2010** in terms of regions we observe that in Brazil 71.7% of the respondents had published at least one OA in the last 5 years. It was the case for 64.1% of the respondents from South America and 63.7% from Africa. In the other extreme we find two regions below 50%: Oceania (46.2%) and North America (43.1%).

In **WoS 2016** there were only two regions in which more than 30% of respondents declared to have not published any OA articles in the last five years. These are China (32.1%) and North America (32.3%).

If we compare **both surveys** we can see an increase in the proportion of researchers that published at least one OA article across all regions in 2016 in respect to 2010. The largest differences are found in:

- Europe (+16.1%)
- North America (+16.2%)
- Oceania (+18.4%)

Figure 4-26 Number of OA articles published in the last five years. Distribution by geographic region (n=25,871 - WoS 2016 n=15,187, p < 0.001)



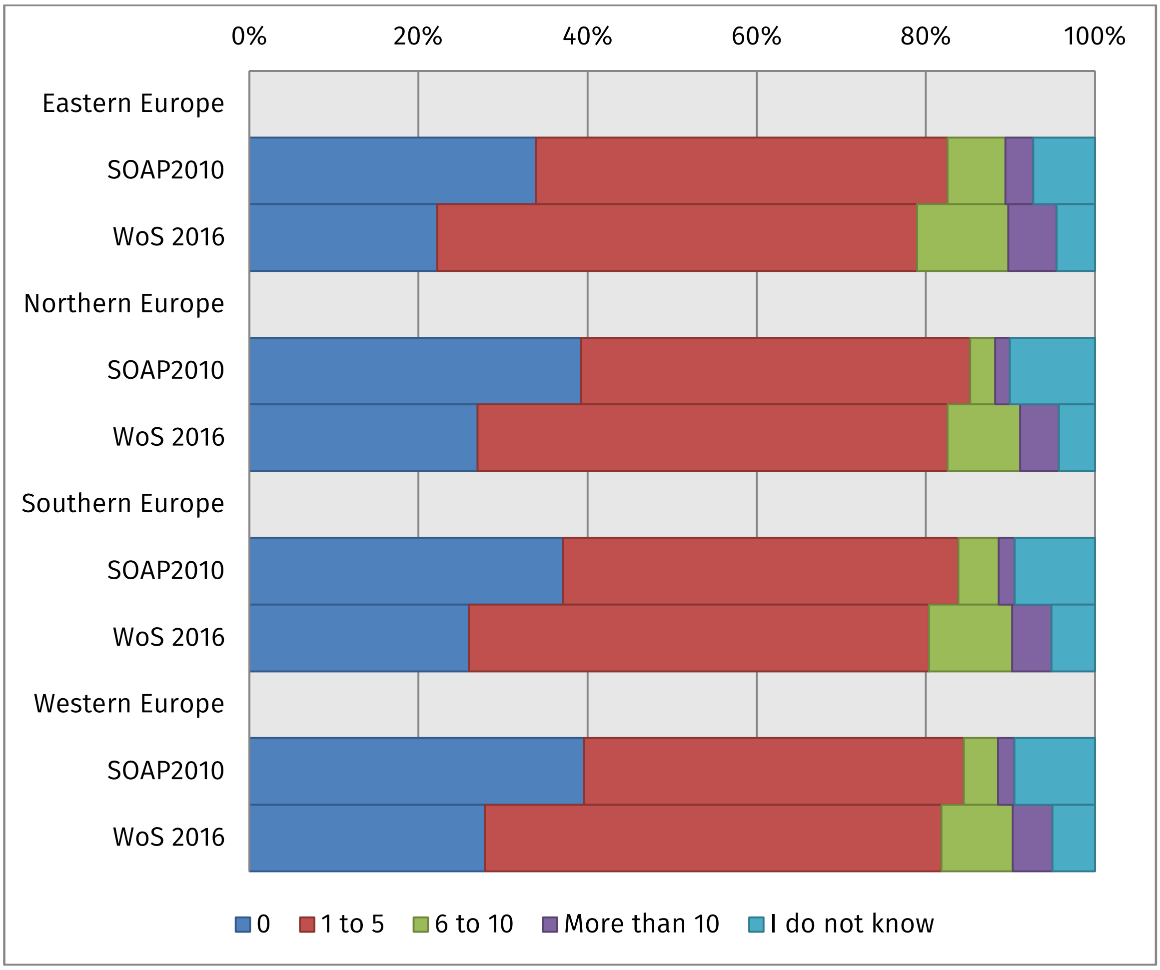
In terms of European regions the 1 to 5 OA articles is the most common category. The most prolific sub-region is Eastern Europe (73.2% published at least OA article in the last five years), although differences with other sub-regions are not particularly relevant.

In **SOAP 2010** there were slight differences between European regions. More than 50% of the researchers declared to have published at least 1 OA article in the four regions. In **WoS 2016** between 22% and 27% of researchers declared to have not published any OA articles in the last 5 years.

Looking at **both studies** we appreciate an evolution in the last 6 years. The percentage of researches that published at least one OA article in the last 5 years increases in all four European regions:

- Eastern Europe (+14.4%)
- Northern Europe (+17.3%)
- Southern Europe (+16.3%)
- Western Europe (+16.2%)

Figure 4-27 Number of OA articles published in the last five years. Distribution by European region (SOAP 2010 n=11,356 - WoS 2016 n=5,517, p < 0.001)



4.3.3 Publication fee OA articles

Both surveys included a question to those researchers that declared to have published at least one OA article in the last five years: What publication fee was charged for the last Open Access article you published? Respondents could choose one of the following options:

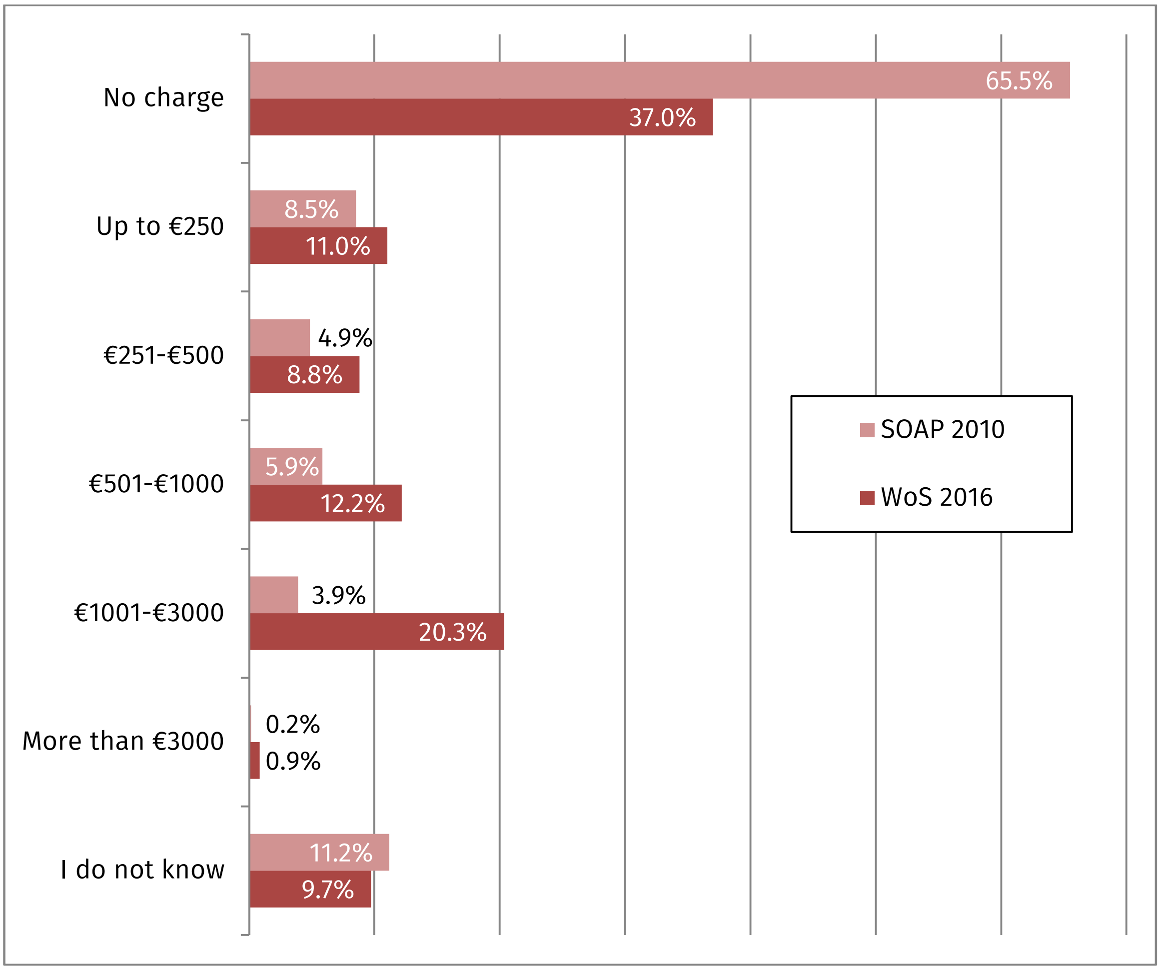
- No charge
- Up to €250 ($350)
- €251-€500 ($350-$700)
- €501-€1000 ($700-$1350)
- €1001-€3000 ($1350-$4100)
- More than €3000 ($4100)
- I do not know

The most common option in both studies was no charge. However we observe a strong decrease of this option in 2016 (65.5% in SOAP 2010, 37.0% in WoS 2016) while the €1001-€3000 category increases dramatically (3.9% in SOAP 2010, 20.3% in WoS 2016).

In **SOAP 2010** we can see a significant amount of researchers that responded "I do not know" to this question (11.2%). However in **WoS 2016** more than half of the respondents (53.2%) that declared to have published an OA article did pay for it (it was 23.4% in SOAP 2010).

If we compare **both surveys** the most important difference is found in those that did not pay to publish OA, which was -28.5% in WoS 2016. It's also important to note the difference in the €1001-€3000 category, +16.4% in WoS 2016. In total there were + 29.9% respondents that paid to publish OA in WoS 2016 in respect to SOAP 2010.

Figure 4-28 Fee paid to publish latest OA article (SOAP 2010 n=13,672 - WoS 2016 n=10,069, $p < 0.001$)



4.3.3.1 Publication fee OA articles. Distribution by discipline

The most common answer to this question across all disciplines and in both surveys is no charge. However there are to exceptions in WoS 2016: Biology (€1001-€3000, 27.4%) and Medicine (€1001-€3000, 27.2%). In general there is a decrease on the no charge option across all disciplines and its correspondent increase in other payment options, although these changes are uneven across the different disciplines.

The no charge option in SOAP 2010 was chosen by 80% or more of the cases in a number of disciplines: (Communication, 88.5%) , Philosophical Studies (87.8%), Creative Arts (87.3%), Language and Literature Studies (86.4%), Law (84.8%), Historical Studies (83.7%) and Social Sciences (81.1%). In the other extreme we see a number of disciplines where this option was chosen by less than 60% of the respondents: Earth Sciences (59.7%), Engineering and Technology (58.5%), Agriculture (56.9%), Physics (55.2%), Medicine (55.1%) and reaching even below that 50% in the case of Biology (43.1%).

In **WoS 2016** we can see some disciplines in which more than 70% of respondents did not pay, mainly from the soft sciences:

- Law (70.1%)
- Creative Arts and Design (73.1%)
- Historical Studies (75.3%)
- Communication, Information and Library Science (78.1%)
- Language and Literature Studies (82.1%)
- Philosophical Studies (83.3%)

In the €1001-€3000 category) we also find a prevalence of disciplines from the hard sciences. We can highlight:

- Engineering and Technology (21.3%)
- Earth Sciences (27.1%)
- Medicine (27.2%)
- Psychology (27.2%)
- Biological Sciences (27.4%)

Comparing **both studies** the main differences are found in two cost categories. There are fewer researchers that did not pay to publish OA in WoS 2016 than there were in SOAP 2010. This is particularly the case in:

- Medicine, Dentistry (-28.0%)
- Earth Sciences (-30.2%)
- Computer Science (-30.2%)
- Agriculture and Related Sciences (-31.2%)
- Psychology (-38.8%)
- Arch., Building and Planning (-39.7%)

The other major differences are found in the €1001-€3000 category, which grows in all disciplines but one. We can highlight:

- Physics and Related Sciences (+15.1%)
- Biological Sciences (+16.4%)
- Engineering and Technology (+18.7%)
- Medicine, Dentistry (+20.4%)
- Earth Sciences (+22.9%)
- Psychology (+24.1%)

Table 4-12 Fee paid to publish latest OA article. Distribution by discipline (SOAP 2010 n=18,554 - WoS 2016 n=11,087, p < 0.001)

	SOAP 2010							WoS 2016						
	No charge	Up to €250	€251-€500	€501-€1000	€1001-€3000	+ €3000	Don't know	No charge	Up to €250	€251-€500	€501-€1000	€1001-€3000	+ €3000	Don't know
Agriculture	56.9%	15.4%	10.0%	5.6%	2.9%	0.6%	8.7%	25.7%	20.1%	12.4%	14.7%	14.3%	0.4%	12.4%
Architecture	75.2%	11.1%	5.9%	0.7%	0.7%	0.0%	6.5%	35.4%	18.8%	14.6%	6.3%	12.5%	0.0%	12.5%
Astronomy	60.5%	11.3%	4.1%	5.6%	2.6%	0.0%	15.9%	54.0%	5.5%	6.1%	12.3%	8.6%	0.0%	13.5%
Biology	43.1%	9.4%	6.7%	12.9%	11.0%	0.2%	16.6%	26.1%	11.7%	11.0%	12.0%	27.4%	1.5%	10.3%
Business and Administration	76.5%	11.2%	3.2%	1.4%	0.6%	0.0%	7.2%	52.1%	17.4%	7.4%	5.8%	8.7%	0.0%	8.7%
Chemistry	64.9%	12.3%	5.7%	4.9%	2.5%	0.4%	9.3%	42.2%	8.7%	9.1%	11.5%	14.5%	1.1%	12.8%
Com., Inf. Lib. Sc.	88.5%	3.5%	0.3%	0.5%	0.8%	0.0%	6.4%	78.1%	9.4%	0.0%	0.0%	6.3%	0.0%	6.3%
Computer Sc.	73.0%	7.4%	6.4%	3.1%	2.0%	0.0%	8.1%	42.9%	15.0%	9.2%	12.3%	11.5%	0.3%	8.8%
Creative Arts	87.3%	1.5%	1.5%	0.7%	0.0%	0.0%	9.0%	73.1%	10.4%	6.0%	1.5%	4.5%	1.5%	3.0%
Earth Sciences	59.7%	12.5%	5.8%	6.7%	4.2%	0.3%	10.9%	29.6%	7.2%	9.8%	16.8%	27.1%	0.5%	9.1%
Education	78.7%	8.2%	2.4%	1.1%	0.3%	0.0%	9.3%	56.3%	12.7%	7.1%	4.8%	10.3%	0.0%	8.7%
Engineering	58.5%	13.1%	8.1%	6.0%	2.6%	0.1%	11.4%	35.3%	12.3%	8.2%	13.0%	21.3%	0.9%	9.0%
Historical Studies	83.7%	2.4%	2.1%	1.5%	0.3%	0.0%	10.0%	75.3%	8.2%	4.7%	0.0%	8.2%	0.0%	3.5%
Language and Lit.	86.4%	6.2%	0.8%	1.3%	0.4%	0.0%	4.9%	82.1%	1.7%	1.7%	3.4%	5.1%	0.0%	6.0%
Law	84.8%	6.6%	0.0%	0.0%	0.0%	0.0%	8.6%	70.1%	4.5%	1.5%	3.0%	7.5%	0.0%	13.4%
Mathematics	74.7%	7.2%	4.2%	2.8%	1.9%	0.0%	9.3%	67.7%	7.4%	4.5%	10.8%	3.6%	0.2%	5.7%
Medicine, Dent.	55.1%	9.7%	6.3%	9.3%	6.8%	0.2%	12.6%	27.1%	10.2%	10.1%	13.6%	27.2%	1.2%	10.6%
Philosophical St.	87.8%	1.0%	0.7%	0.3%	0.3%	0.0%	9.9%	83.3%	11.1%	5.6%	0.0%	0.0%	0.0%	0.0%
Physics	55.2%	9.3%	7.4%	11.9%	4.4%	0.1%	11.8%	39.7%	10.7%	7.6%	10.9%	19.5%	0.7%	11.0%
Psychology	70.8%	6.1%	1.7%	5.6%	3.1%	0.3%	12.4%	31.9%	7.0%	7.5%	14.1%	27.2%	0.9%	11.3%
Social Sciences	81.1%	5.2%	1.2%	1.5%	0.8%	0.1%	10.1%	66.0%	4.7%	6.2%	6.2%	6.2%	0.3%	10.3%

4.3.3.2 Publication fee OA articles. Distribution by seniority

The most common option in all seniority groups and for both studies was no charge. Differences between age groups are not particularly significant. However when we compare both surveys we observe a dramatic decrease in the no charge option and its consequent increase in the rest of payment categories.

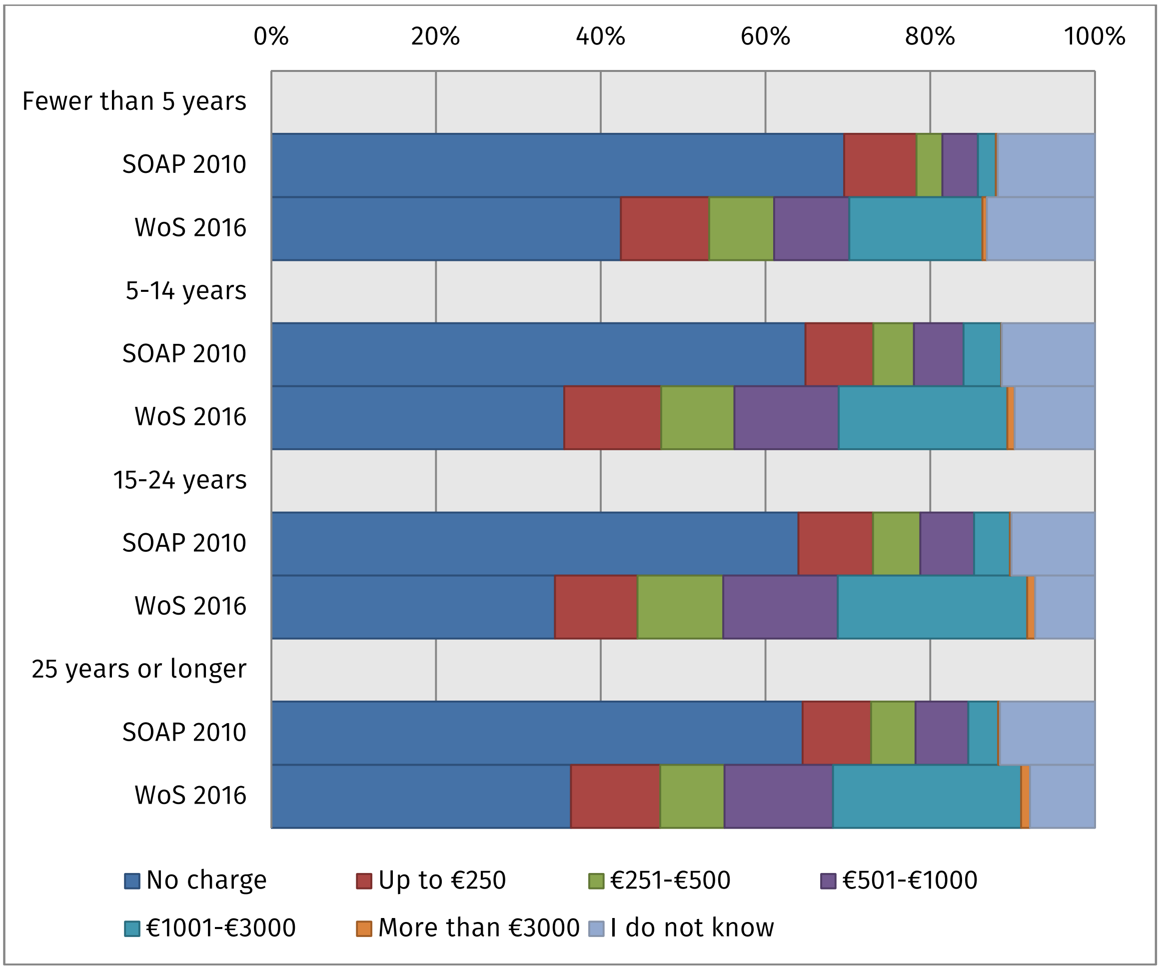
As in previous distributions the main differences are observed in those that did not pay to publish OA. There is reduction of percentage in excess of 25% across all age groups:

- Fewer than 5 years (-27.1%)
- 5-14 years (-29.3%)
- 15-24 years (-29.5%)
- 25 years or longer (-28.1%)

The other category in which a proportional increase between studies is observed is in those who paid between €1,001 and €3,000:

- Fewer than 5 years (+14.0%)
- 5-14 years (+15.9%)
- 15-24 years (+18.6%)
- 25 years or longer (+19.2%)

Figure 4-29 Fee paid to publish latest OA article. Distribution by seniority (SOAP 2010 n=13,672 - WoS 2016 n=10,069, p < 0.001)



4.3.3.3 Publication fee OA articles. Distribution by geographic regions

The most common option across all regions and in both surveys is once more no charge. However we can see a clear distinction between the wealthiest and the least wealthy regions. No charge was chosen in WoS 2016 by more than 40% of respondents in a number of regions:

- Africa (46.6%)
- Brazil (42.1%)
- India (56.0%)
- Middle East (49.3%)
- Russia (57.4%)
- South America (45.6%)

While in more developed regions it's always chosen by less than 40% of researchers:

- Asia (28.5%)
- China (28.7%)
- Europe (35.6%)
- North America (32.7%)
- Oceania (37.3%)

If we look at the €1001-€3000 category we can see how roles swap. This option was chosen by less than 15% of respondents in the regions from the first groups:

- Africa (11.6%)
- Brazil (7.8%)
- India (2.2%)
- Middle East (6.9%)
- Russia (12.2%)
- South America (11.9%)

While more than 15% from the second group did so:

- Asia (16.5%)
- China (18.3%)
- Europe (25.8%)
- North America (27.6%)
- Oceania (27.2%)

Looking at the world regions in SOAP 2010 we observe that the only region were respondents did declare they had not paid for the latest OA article they published below 60% was Asia (57.6%).

In WoS 2016 up to €250 was chosen by more than 20% of the respondents from two regions:

- Middle East (20.3%)
- India (26.9%)

In China 20.6% of respondents declared to have paid between €501 and €1,000. There were three regions in which more than 20% of respondents chose €1001-€3000:

- North America (27.6%)
- Europe (25.8%)
- Oceania (27.2%)

If we compare both surveys we find that the largest evolution is observed in the group of those who did not pay to publish OA. There are fewer researchers that did in 2016 so across all regions, and we can highlight:

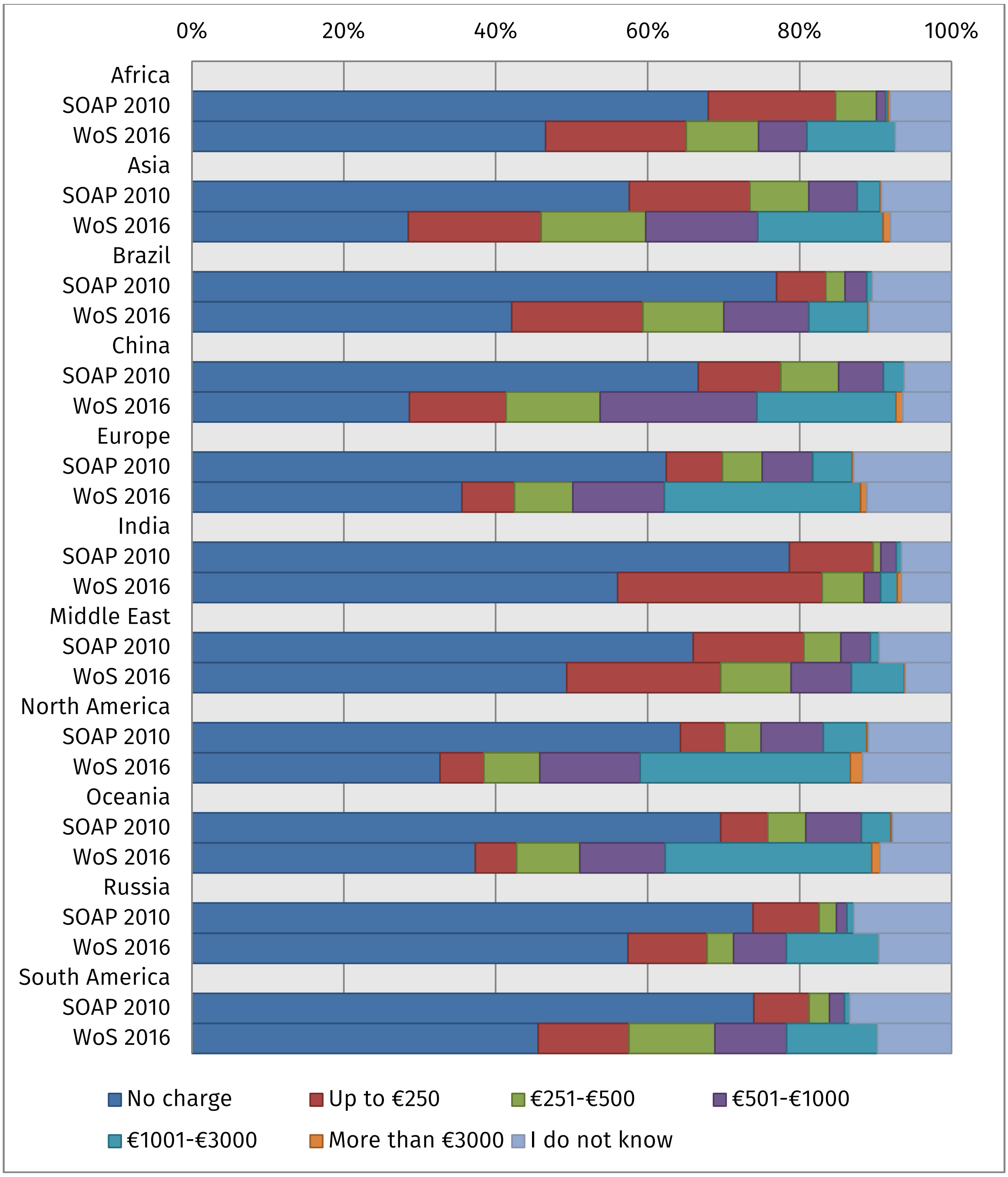
- Europe (-26.9%)
- Brazil (-29.1%)
- North America (-31.7%)
- Oceania (-32.3%)
- China (-38.0%)

The other group in which an evolution is observed in the last 6 years is in those that paid between €1001 and €3000 to publish their latest OA article:

- China (+15.5%)
- Europe (+20.7%)
- North America (+21.9%)

- Oceania (+23.3%)

Figure 4-30 Fee paid to publish latest OA article. Distribution by geographical (SOAP 2010 n=13,672 - WoS 2016 n=10,069, p < 0.001)

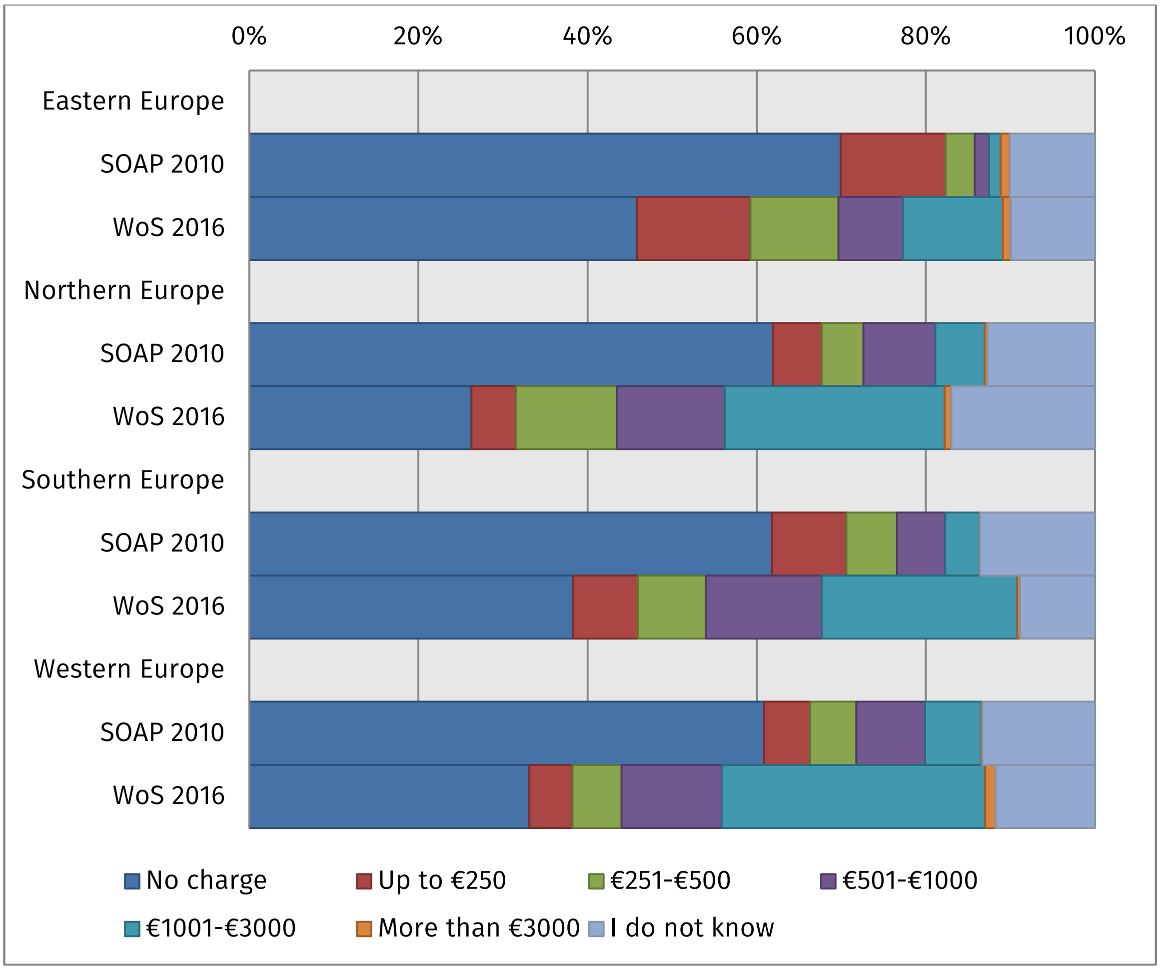


When looking at the distribution of the answers to this question by European regions we can also make a distinction between Eastern Europe and the rest. While in Eastern Europe 45.8% of researchers declared to not have paid to publish OA it is the case for less than 40% of researches in the other regions. In the case of the €1001-€3000 category we can see that 11.8% of Eastern Europe researchers chose this option while at least 23% did so in the other regions.

In European regions in **SOAP 2010** the main difference was found in Eastern Europe, where the highest percentage of the four regions in the up to €250 is found (12.4%) while is the lowest in all the other categories (3.4% in €251-€500, 1.7% in €501-€1,000, 1.3% in €1,001-€3,000). In Northern Europe 17% of researchers declared not to know the cost of their latest OA article, while it was the case for 10% in Eastern Europe.

When we compare both surveys we see there is a lower proportion of researchers that did not pay to publish OA across the four regions. The largest difference is found in Northern Europe (-35.6%). In this same region there were +20.2% of researchers that paid between €1001 and €3000 to publish OA. This difference is +24.5% in Western Europe.

Figure 4-31 Fee paid to publish latest OA article. Distribution by geographical (SOAP 2010 n=5,989- WoS 2016 n=3,771, $p < 0.001$)



4.3.4 Who covered OA fees?

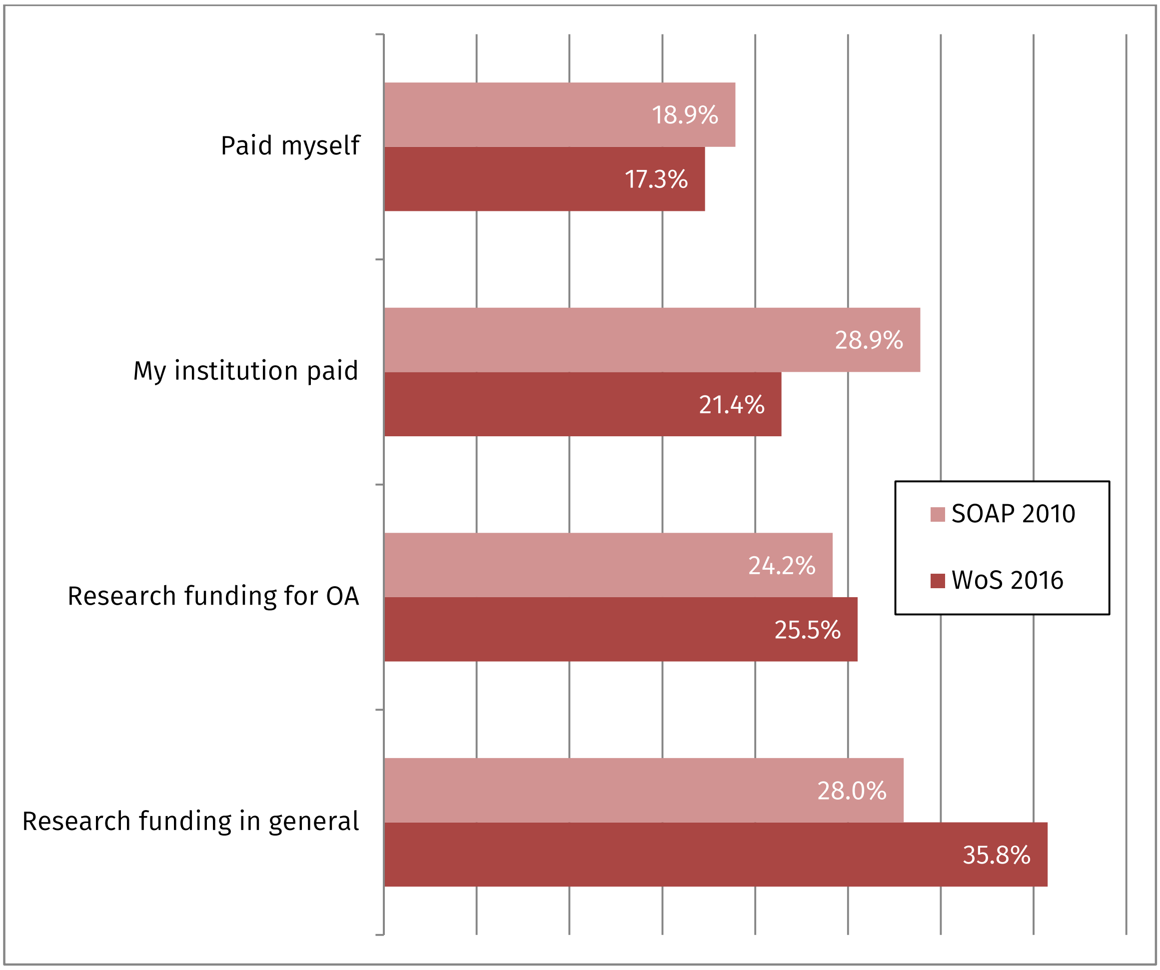
In both surveys researchers that had paid to publish their latest OA article were asked how such fee was covered. Respondents could choose between the following options: My research funding includes money for paying such fees; I used part of my research funding not specifically intended for paying such fees; My institution paid the fees; I paid the costs myself; Other (please specify).

There is a quite even spread between all options in both studies. Most researchers used general research funding to cover APCs in WoS 2016 while in SOAP 2010 the majority asked their institution to pay. Although these two options swapped positions between surveys, differences between were not excessive.

We could see that the spread between the different categories in **SOAP 2010** is quite even, not reaching the differences between categories the 10% mark. In **WoS 2016** the highest number of researchers used general research funding to pay for their OA article (35.8%) followed by 25.5% that used specific funds aimed at paying OA fees. In 21.4% of the cases it was the researcher's institution which paid and 17.3% of researchers had to pay themselves.

The main evolution in the last six years is observed in two variables. In WoS 2016 there were -7.5% which asked their institution to cover APCs. On the other hand there were +7.8% researchers that used research funds initially intended for other purposes.

Figure 4-32 How was OA publication fee covered (SOAP 2010 n=3,575 - WoS 2016 n=8,533, $p < 0.001$)



4.3.4.1 Who covered OA fees? Distribution by discipline

When looking at the spread by disciplines we observe that using funds specifically aimed at covering OA fees has become the most common option for most disciplines. In many disciplines, mainly from the hard sciences, this figure even exceeds the 40% mark in WoS 2016: Astronomy (40.5%), Chemistry (40.7%), Earth Sciences (41.6%), Mathematics (45.9%), Physics (41.5%). Self-funding is also relatively common in many disciplines. In many of them, mainly from the HSS, this option was chosen by more than one third of researchers in WoS 2016: Business and Administration (35.4%), Library Science (33.3%), Creative Arts (44.4%), Law (34.6%), Philosophy (33.3%).

A somehow similar pattern was already observed in SOAP 2010. Paying OA fees with research funds (either general or specifically aimed to pay for this concept) was the most common option in at least half of the cases for most hard science disciplines:

- Biological Sciences (69.3%)
- Earth Sciences (65.7%)
- Physics and Related Sciences (64.3%)
- Mathematics (61.7%)
- Chemistry (60.6%)

In Astronomy the most common option was “My institution paid” (39.6%). Self-funding was also quite high in two disciplines: Law (53.8%) and Language and Literature Studies (50.0%).

When we compare both surveys we observe a general decrease in using general research funds to pay OA fees. This is particularly the case in Mathematics (-15.2%) and Creative Arts (-35.2%). On the other hand we see that using specific funds to pay OA fees increases in almost all disciplines. We can highlight Mathematics (+19.6%) and Language (+20.2).

Authors covering for APCs from their own pockets increases and decreases in the different disciplines. We can highlight Creative Arts (+27.8%) as the disciplines with the largest growth. In the other extreme we find Law (-19.2%), Architecture (-21.1%), Creative Arts (-19.2%) and Language (-28.6%).

Table 4-13 How was OA publication fee covered. Distribution by discipline (SOAP 2010 n=4,864 - WoS 2016 n=17,938, p < 0.001)

	SOAP 2010				WoS 2016			
	Research funding in general	Research funding for OA	My institution paid	Paid myself	Research funding in general	Research funding for OA	My institution paid	Paid myself
Agriculture	27.3%	25.0%	22.7%	25.0%	21.2%	34.1%	21.8%	22.9%
Architecture	33.3%	20.0%	16.7%	30.0%	26.7%	35.6%	28.9%	8.9%
Astronomy	12.5%	29.2%	39.6%	18.8%	18.2%	40.5%	35.5%	5.8%
Biological Sciences	33.9%	35.3%	21.3%	9.4%	24.0%	37.0%	25.0%	14.0%
Business and Administration	15.5%	18.1%	19.0%	47.4%	12.0%	30.4%	22.2%	35.4%
Chemistry	33.8%	26.8%	19.5%	19.9%	23.6%	40.7%	24.2%	11.5%
Com., Inf. Lib. Science	25.0%	15.0%	20.0%	40.0%	22.2%	33.3%	11.1%	33.3%
Computer Science	32.4%	23.3%	29.2%	15.1%	20.1%	36.7%	24.2%	19.0%
Creative Arts	50.0%	0.0%	33.3%	16.7%	14.8%	18.5%	22.2%	44.4%
Earth Sciences	31.4%	34.3%	20.1%	14.2%	22.1%	41.6%	25.9%	10.4%
Education	11.3%	15.8%	28.6%	44.4%	22.5%	22.5%	25.4%	29.6%
Engineering	27.3%	30.9%	24.0%	17.8%	20.0%	38.9%	26.2%	14.9%
Historical Studies	13.6%	22.7%	31.8%	31.8%	13.2%	34.2%	21.1%	31.6%
Language and Literature	16.7%	11.9%	21.4%	50.0%	25.0%	32.1%	21.4%	21.4%
Law	0.0%	23.1%	23.1%	53.8%	11.5%	34.6%	19.2%	34.6%
Mathematics	35.3%	26.3%	20.3%	18.0%	20.2%	45.9%	13.3%	20.6%
Medicine, Dentistry	30.1%	21.3%	25.0%	23.6%	22.7%	28.2%	27.8%	21.3%
Philosophical Studies	12.5%	25.0%	37.5%	25.0%	22.2%	22.2%	22.2%	33.3%
Physics	29.4%	34.9%	25.8%	10.0%	20.9%	41.5%	24.7%	12.9%
Psychology	29.8%	25.1%	21.6%	23.4%	23.0%	32.1%	24.2%	20.6%
Social Sciences	19.1%	25.5%	25.5%	30.0%	12.4%	36.1%	27.2%	24.3%

4.3.4.2 Who covered OA fees? Distribution by seniority

When looking at the distribution by seniority we can see that the most common option across all groups is research funding specifically aimed at covering APCs. However differences with other options are quite minimal.

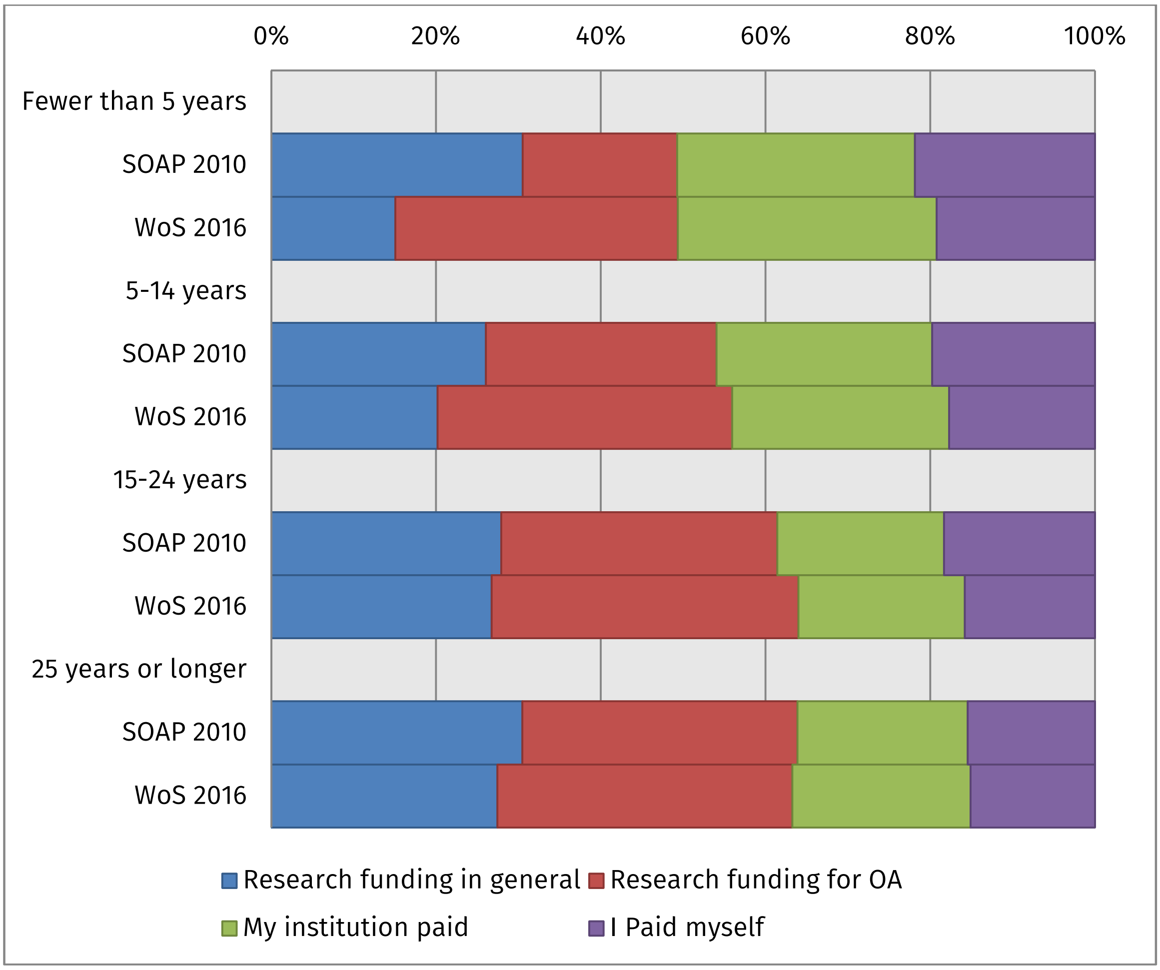
In terms of age groups in **SOAP 2010** the only significant difference was observed in the "fewer than 5 years" categories that had less access to research funding for OA (18.8%) than those with 15-24 years of experience (33.5%) or the most senior group (33.4%). In terms of self-funding the youngest group was also leading (21.9%).

Research funding for OA was the most chosen option in all cases in **WoS 2016**:

- Fewer than 5 years (34.3%)
- 5-14 years (35.8%)
- 15-24 years (37.2%)
- 25 years or longer (35.8%)

When comparing **both surveys** the most notable evolution we can observe is in the fewer than 5 years of experience group. In WoS 2016 we can see that OA fees were covered by research funding in general by -15.4% researchers than in SOAP 2010. However there is an increase of +15.5% in the usage of research funds aimed specifically at covering APCs.

Figure 4-33 How was OA publication fee covered. Distribution by seniority (SOAP 2010 n=3,575 - WoS 2016 n=8,533, $p < 0.001$)



4.3.4.3 Who covered OA fees? Distribution by geographic regions

The distribution by regions shows a clear difference between two groups. On one had those areas in which using funds aimed at covering OA fees was the most common option in both studies:

- Asia (33.2% in SOAP 2010; 48.0% in WoS 2016)
- China (51.9% in SOAP 2010; 64.9% in WoS 2016)
- North America (33.2% in SOAP 2010; 38.0% in WoS 2016)

On the other hand there are regions in which self-funding was the most chose option in both studies:

- Brazil (38.7% in SOAP 2010; 46.0% in WoS 2016)
- India (52.9% in SOAP 2010; 51.7% in WoS 2016)
- Middle East (47.9% in SOAP 2010; 54.3% in WoS 2016)

When looking at regions in **SOAP 2010** we observe that research funding in general was the most common option for some regions:

- Oceania (44.5%)
- Europe (32.6%)

In **WoS 2016** research funding in general was the most chosen option by researchers in Oceania (36.7%). Specific funding for OA publishing was the least chosen option by African researchers (17.8%).

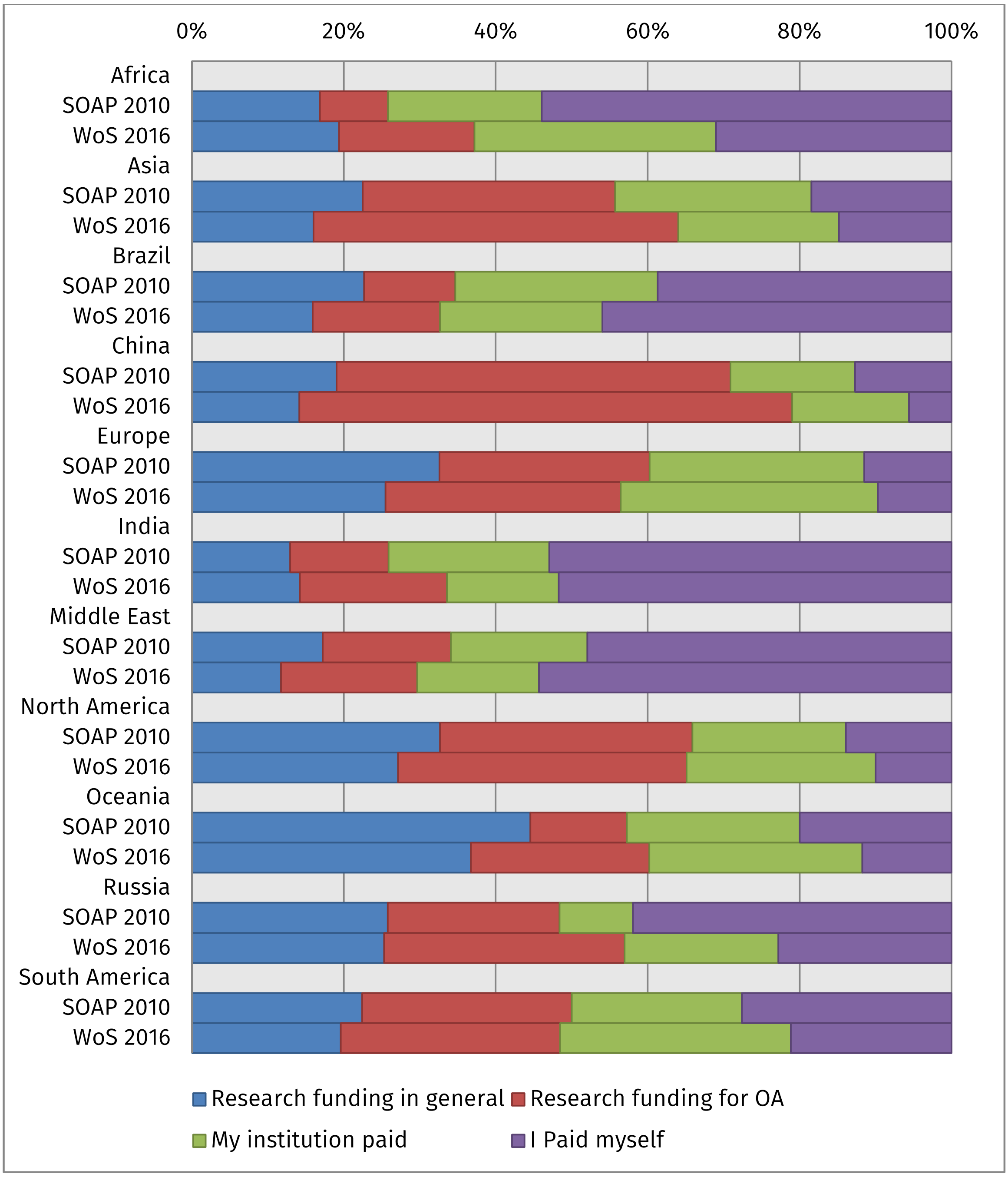
When we compare both surveys we see that the usage of specific funds to pay for OA fees grows in all regions in WoS 2016 in relation to SOAP 2010. We can highlight:

- Oceania (+10.7%)
- China (+13.0%)
- Asia (+14.8%)

The usage of self-funding on the contrary drops in most regions and more sharply in:

- Russia (-19.2%)
- Africa (-22.9%)

Figure 4-34 How was OA publication fee covered. Distribution by geographic regions (SOAP 2010 n=3,575 - WoS 2016 n=8,533, p < 0.001)



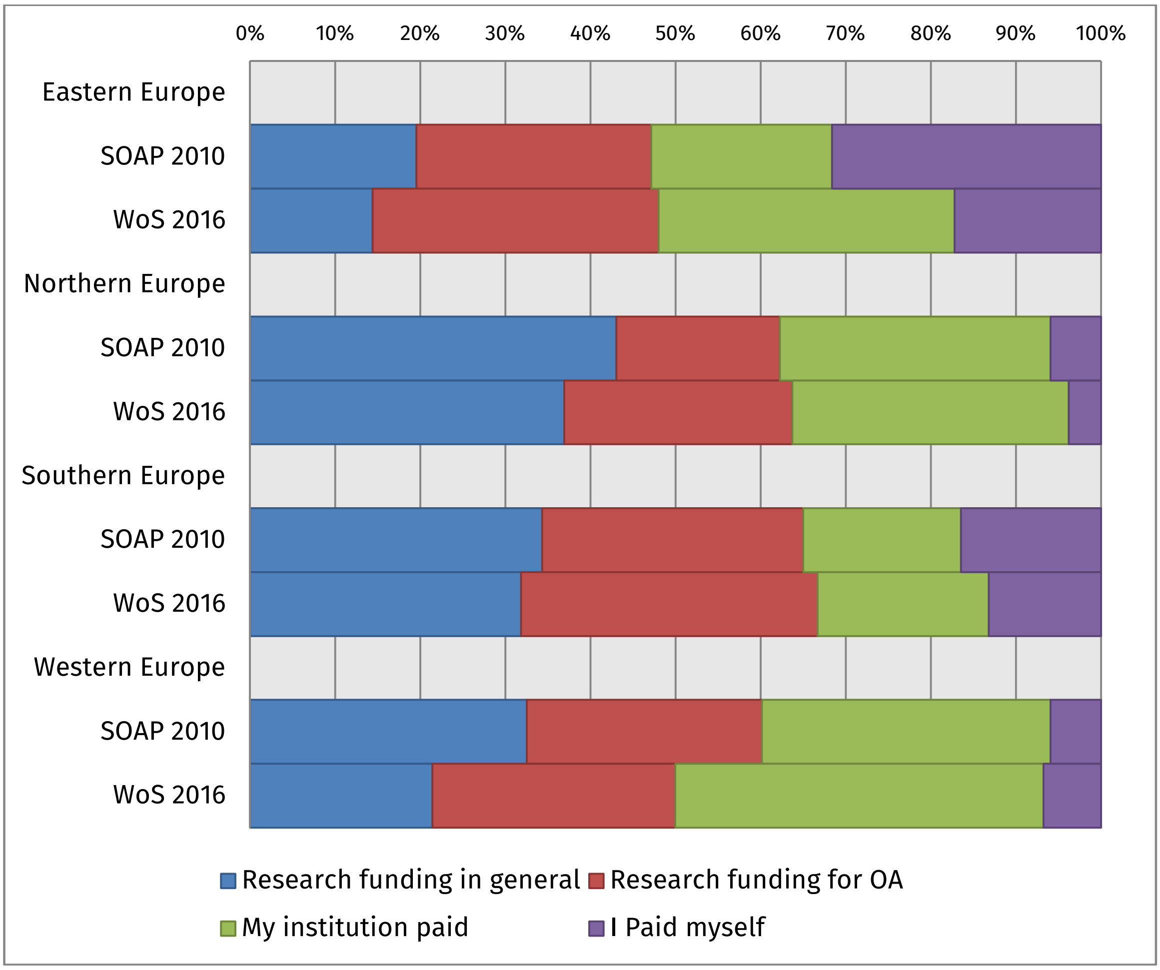
At European regions level differences between options are small, but we can observe a varied casuistry in the most popular options in each region as well as certain levels of variance between studies.

In European regions in **SOAP 2010** we could see that covering OA fees with research funding in general was the most common option in Northern Europe (43%) and Southern Europe (34.3%). In Western Europe most researchers declared that their institution paid (33.9%), closely followed by research funding in general (32.5%). In Eastern Europe, however, the most chosen option was “I paid myself” (31.6%).

In **WoS 2016** also observed differences within European regions. While in Eastern Europe the least common option was to cover OA publishing costs with research funding in general (14.4%) this was the most common option in Northern Europe (36.9%).

When comparing both studies the most striking difference is observed in Eastern Europe, where "my institution paid" grows + 13.5% while "I paid myself" decreases by -14.4%.

Figure 4-35 How was OA publication fee covered. Distribution by European regions (SOAP 2010 n=1,638 - WoS 2016 n=3,047, $p < 0.001$)



4.3.5 Importance of factors when selecting a journal to publish

Both surveys included a question asking researchers about the importance of factors when selecting a journal to publish in. Factors were presented in random order and respondents were asked to qualify them as "Extremely important", "Important", "Less important" or "Irrelevant".

1. Journal Impact Factor
2. Absence of journal publication fees (e.g. submission charges, page charges, colour charges)
3. Speed of publication of the journal
4. The journal is an Open Access journal
5. Relevance of the journal for my community
6. Prestige/perceived quality of the journal
7. Importance of the journal for academic promotion, tenure or assessment
8. Positive experience with publisher/editor(s) of the journal

9. Likelihood of article acceptance in the journal
10. Recommendation of the journal by my colleagues
11. The journal fits the policy of my organisation
12. Copyright policy of the journal

Student's t-test indicates a significant difference between the two samples in all factors but two: prestige/perceived quality of the journal ($p = 0.081$) and importance of the journal for academic promotion, tenure or assessment ($p = 0.0641$). In the rest of factors we obtain $p < 0.001$, therefore there is a significant difference from the statistics point of view between SOAP 2010 and WoS 2016. However, in order to make this chapter less content-heavy we will analyse in detail only four of these factors, those highlighted in bold. Plots for the rest of factors can be found in Annex 1.

The most important factors for researchers when choosing a journal to publish in, in both studies, were:

- Prestige/perceived quality of the journal (93.8% in SOAP 2010; 94.1% in WoS 2016)
- Relevance of the journal for my community (90.4% in SOAP 2010; 89.1% in WoS 2016)
- Journal Impact Factor (82.7% in SOAP 2010; 87.9% in WoS 2016)

While the three least important factors for researchers in both studies were:

- The journal fits the policy of my organisation (36.6% in SOAP 2010; 45.6% in WoS 2016)
- Copyright policy of the journal (37.0% in SOAP 2010; 34.7% in WoS 2016)
- The journal is an Open Access journal (41.6% in SOAP 2010; 30.8% in WoS 2016)

Most researchers in SOAP 2010 mentioned that 7 out of the 12 factors presented were extremely important or important in at least 70% of the cases or more:

- Importance for career (76.5%)
- Speed of publication (76.9%)
- Positive experience (78.0%)
- Likelihood of acceptance (78.5%)
- Impact Factor (82.7%)
- Relevance for community (90.4%)
- Prestige (93.8%)

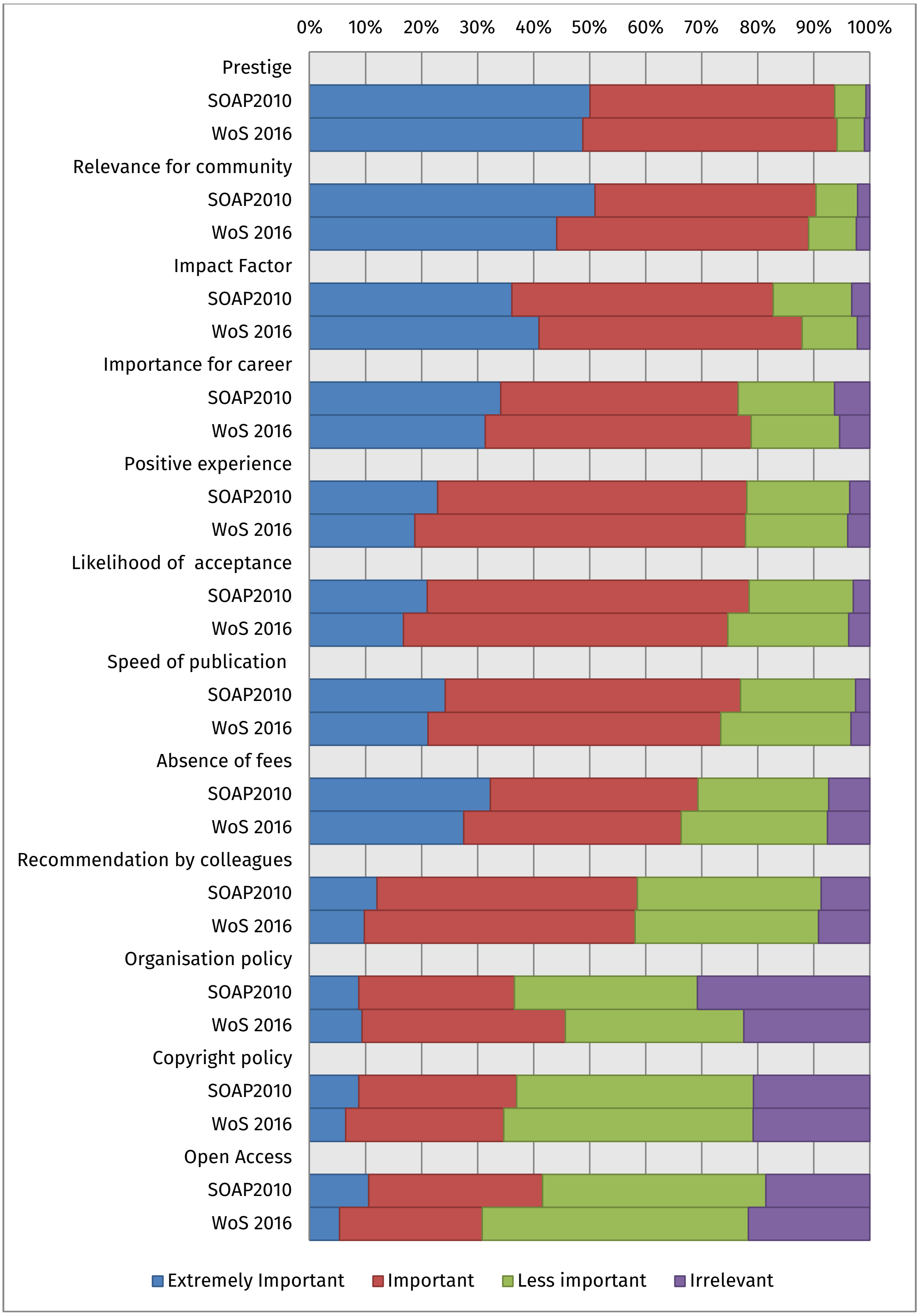
In WoS 2016 we can highlight factors that for the majority of respondents are either extremely important or important:

- Prestige (94.1%)
- Relevance for community (89.1%)
- Impact Factor (87.9%)
- Importance for career (78.8%)
- Positive experience (77.8%)
- Likelihood of acceptance (74.6%)
- Speed of publication (73.4%)

When we compare **both studies** we can highlight two factors in which importance has evolved considerably:

- The journal fits the policy of my organisation (+9.1%)
- The journal is an Open Access journal (-10.7%)

Figure 4-36 Importance of factors when selecting a journal to publish in (SOAP 2010 n=25,209-25,608 - WoS 2016 n=14,974-15,091, p < 0.001)



4.3.5.1 *Importance of factors when selecting a journal to publish in: Journal Impact Factor*

4.3.5.1.1 *Importance of factors when selecting a journal to publish in: Journal Impact Factor. Distribution by discipline*

This factor is important or extremely important by at least 65% of researchers in almost all disciplines and in both studies. However many cases in which this important exceeds the 87% mark, mostly in the hard sciences. In WoS 2016:

- Agriculture and Related Sciences (92.3%)
- Chemistry (91.9%)
- Medicine, Dentistry (91.6%)
- Psychology (91.4%)
- Arch., Building and Planning (91.0%)
- Engineering and Technology (89.8%)
- Biological Sciences (89.1%)
- Earth Sciences (88.2%)
- Physics and Related Sciences (87.5%)
- Computer Science (87.2%)
- Business and Admin. Studies (87.1%)

However mathematics is not included in this group as 67.4% of researchers said it was important or extremely important in SOAP 2010 and 70.2% did so in WoS 2016.

The journal impact factor in **SOAP 2010** was an important or extremely important factor when selecting a journal for all disciplines. In the case of Chemistry this option reached 90.9%. Importance to this factor was also given by other disciplines in the hard sciences:

- Medicine, Dentistry (87.4%)
- Biological Sciences (88.4%)
- Engineering and Technology (88.7%)
- Agriculture and Related Sciences (89.6%)

The largest increases in the importance given to this factor in WoS 2016 in respect to SOAP 2010 are observed in:

- Computer Science (+9.1%)
- Social Sciences (+9.7%)
- Law (+10.3%)
- Arch., Building and Planning (+12.4%)

Table 4-14 Importance of factors when selecting a journal to publish in. Journal Impact Factor. Distribution by discipline (SOAP 2010 n=33,854 - WoS 2016 n=16,559, p < 0.001)

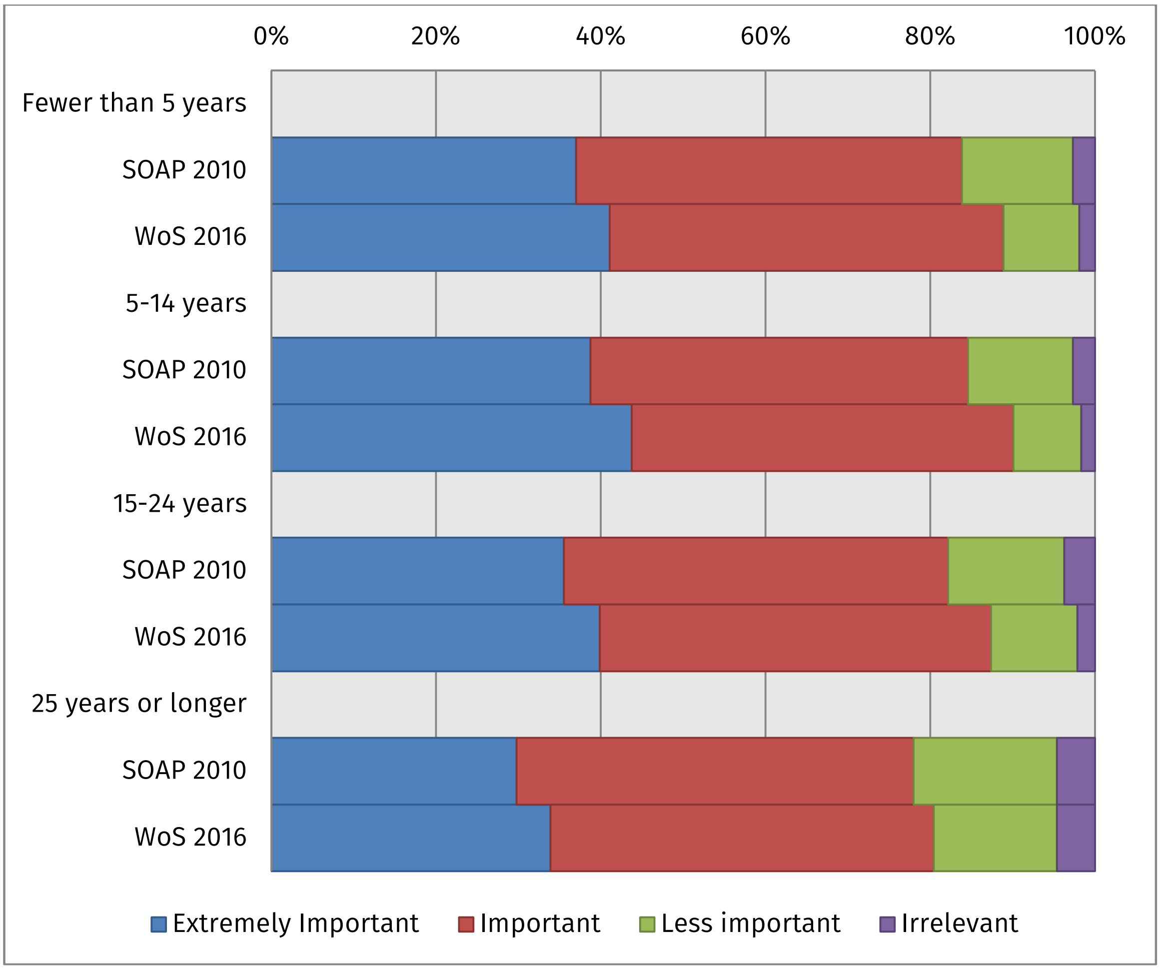
	SOAP 2010				WoS 2016			
	Extremely Important	Important	Less important	Irrelevant	Extremely Important	Important	Less important	Irrelevant
Agriculture	43.8%	45.7%	0.9%	9.5%	44.1%	48.1%	0.9%	6.9%
Architecture	35.4%	43.2%	3.2%	18.2%	38.8%	52.2%	4.5%	4.5%
Astronomy	34.3%	49.9%	2.8%	13.0%	30.8%	49.2%	5.1%	14.9%
Biological Sciences	41.2%	47.2%	1.5%	10.1%	42.0%	47.1%	2.0%	8.9%
Business and Administration	40.4%	44.5%	2.7%	12.5%	40.9%	46.1%	2.7%	10.2%
Chemistry	43.8%	47.1%	1.2%	7.9%	44.6%	47.2%	1.1%	7.0%
Com., Inf. Lib. Science	29.5%	46.0%	4.5%	20.0%	32.0%	44.0%	2.0%	22.0%
Computer Science	31.6%	46.5%	5.0%	16.9%	42.8%	44.4%	1.5%	11.3%
Creative Arts	33.9%	43.2%	4.2%	18.8%	28.2%	42.7%	7.8%	21.4%
Earth Sciences	34.6%	49.3%	2.1%	14.0%	38.2%	50.0%	1.5%	10.3%
Education	35.0%	46.5%	3.3%	15.2%	40.8%	44.4%	4.1%	10.7%
Engineering	43.4%	45.3%	1.4%	9.9%	42.4%	47.4%	2.0%	8.2%
Historical Studies	26.7%	44.1%	6.8%	22.3%	30.3%	36.6%	14.8%	18.3%
Language and Literature	32.2%	42.8%	6.2%	18.7%	31.0%	37.4%	7.1%	24.5%
Law	27.6%	41.8%	7.3%	23.4%	30.6%	49.1%	6.5%	13.9%
Mathematics	23.2%	44.2%	9.0%	23.6%	22.6%	47.7%	7.3%	22.4%
Medicine, Dentistry	41.4%	46.0%	1.7%	10.9%	45.2%	46.3%	1.0%	7.4%
Philosophical Studies	23.6%	46.2%	8.6%	21.6%	21.4%	42.9%	14.3%	21.4%
Physics	35.9%	48.6%	3.3%	12.1%	37.3%	50.2%	2.5%	10.0%
Psychology	36.1%	48.4%	2.3%	13.1%	43.7%	47.8%	1.2%	7.4%
Social Sciences	28.6%	47.1%	5.2%	19.0%	43.2%	42.3%	2.5%	12.0%

4.3.5.1.2 Importance of factors when selecting a journal to publish in: Journal Impact Factor. Distribution by seniority

Researchers across all age groups gave high levels of importance to this factor. In **SOAP 2010** the highest rate was found in those with 5 to 14 years of experience (84.6%) while 78% of the respondents in the most senior group chose one of those two options. In **WoS 2016** differences between age groups were not particularly significant, with at least 80% support across all of them.

The main difference between surveys is the augmentation of the importance of this factor in at least +5% across all age groups in WoS 2016, with the exception of the most senior ones.

Figure 4-37 Importance of factors when selecting a journal to publish in. Journal Impact Factor. Distribution by seniority (SOAP 2010 n=25,545 - WoS 2016 n=15,073, p < 0.001)



4.3.5.1.3 Importance of factors when selecting a journal to publish in: Journal Impact Factor. Distribution by geographic regions

Journal Impact Factor is an important or extremely important factor for the large majority of respondents in all regions and in both surveys. In **SOAP 2010** North America and Russia are the only two regions where less than 80% of researchers chose “extremely important” or “important” for this factor with 77.8% and 76.6% respectively.

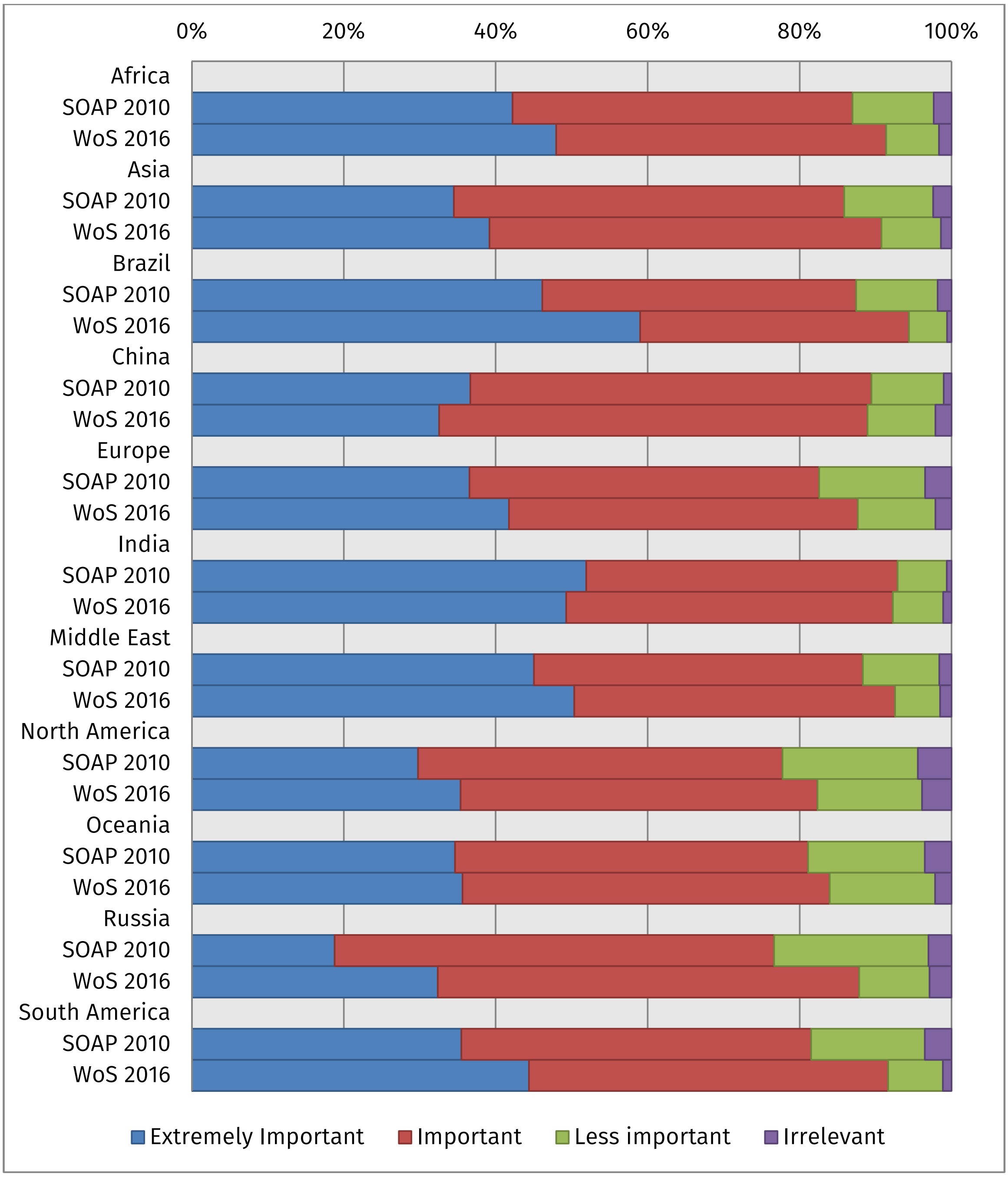
In **WoS 2016** the journal impact factor is an extremely important or important factor for the majority of researchers in all regions, reaching more than 80% in all cases.

There are two regions in which more than 50% of researchers believe it's an extremely important reason when selecting a journal to publish a paper in:

- Middle East (50.4%)
- Brazil (59%)

The largest increases in importance in WoS 2016 are observed in South America (+10.2%) and Russia (+11.2%).

Figure 4-38 Importance of factors when selecting a journal to publish in. Journal Impact Factor. Distribution by geographical regions (SOAP 2010 n=25,545 - WoS 2016 n=15,073, p < 0.001)



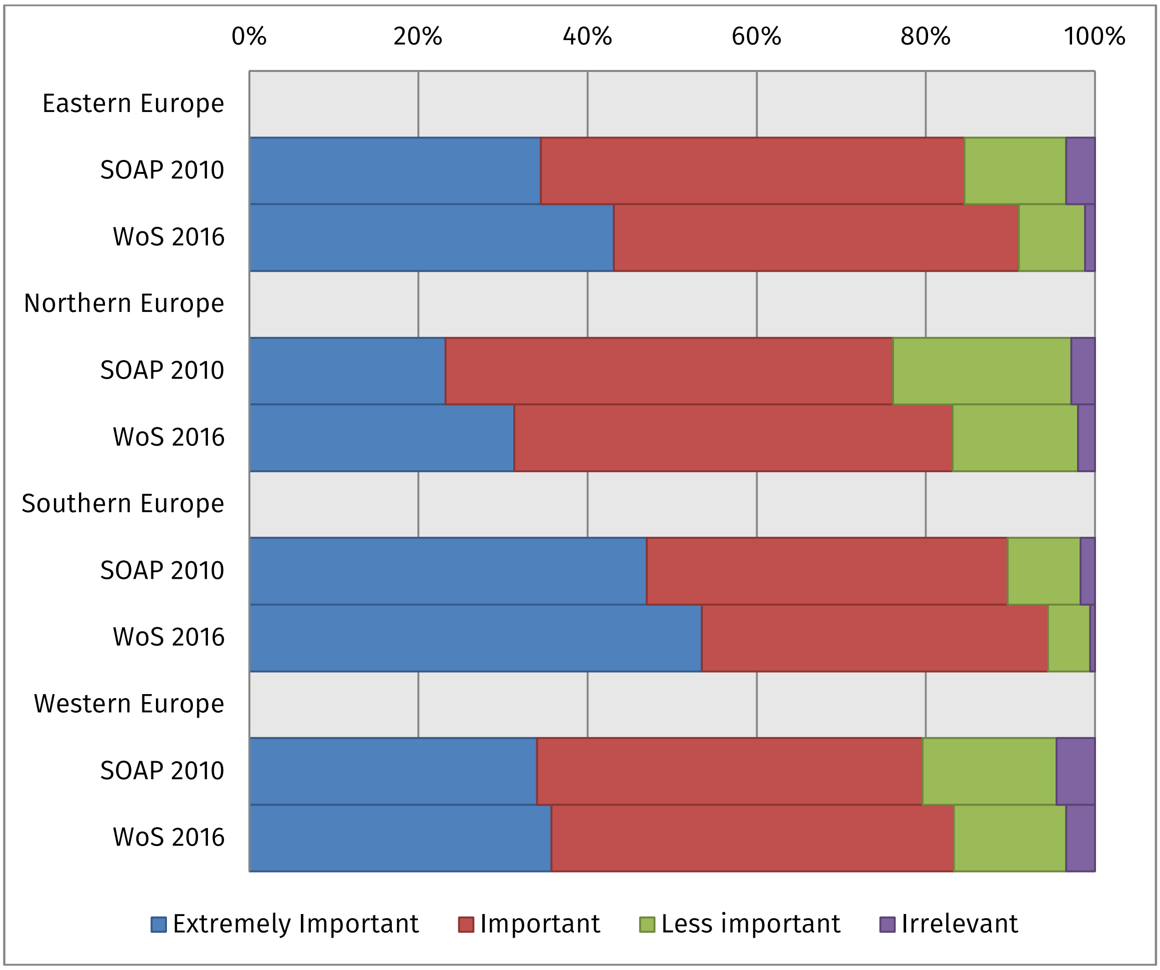
This factor is also important or extremely important for a large majority of researchers in all European regions and for both surveys. In **SOAP 2010** Southern

European researchers gave most importance to impact factor (89.7%) while Western Europeans did so in 79.6% of the cases.

More than 80% of researchers from all disciplines in **WoS 2016** and in the four European regions believed this factor is important or extremely important. In Southern Europe 53.5% of researchers said it is an extremely important factor when selecting a journal to publish in.

When comparing the evolution in 6 years we don't find particularly relevant differences.

Figure 4-39 Importance of factors when selecting a journal to publish in. Journal Impact Factor. Distribution by European regions (SOAP 2010 n=11,205 - WoS 2016 n=5,489, $p < 0.001$)



4.3.5.2 Importance of factors when selecting a journal to publish in: absence of journal publication fees

4.3.5.2.1 Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by discipline

Absence of APCs is an important factor for the majority of researchers across all disciplines and in both studies. We find that this importance exceeds the 70% mark in both studies for a number of disciplines:

- Chemistry (76.9% in SOAP 2010; 71.3% in WoS 2016)
- Comm., Inf. and Library Science (71.4% in SOAP 2010; 78.0% in WoS 2016)

- Creative Arts and Design (75.8% in SOAP 2010; 73.5% in WoS 2016)
- Education (72.6% in SOAP 2010; 79.2% in WoS 2016)
- Law (71.4% in SOAP 2010; 74.3% in WoS 2016)
- Mathematics (76.6% in SOAP 2010; 77.4% in WoS 2016)

All disciplines in SOAP 2010 thought absence of fees were important or extremely important in excess of 60%. Computer science was the only discipline below the 65% threshold with 64.8% of researchers declaring it's an important or extremely important factor.

More than half of researchers in all disciplines in WoS 2016 considered this factor as important or extremely important when choosing a journal to publish in. The lowest rate of support is found in Computer Science (59.6%) and Business Studies (53.2%). In two cases researchers responded that this factor is irrelevant in more than 30% of the cases: Earth Sciences (30.3%) and Computer Science (31.2%). The most relevant difference between surveys is found in Business and Administration (-13%).

Table 4-15 Importance of factors when selecting a journal to publish in. Absence of journal publication fees. Distribution by discipline (SOAP 2010 n=33,813 - WoS 2016 n=16,585, p < 0.001)

	SOAP 2010				WoS 2016			
	Extremely Important	Important	Less important	Irrelevant	Extremely Important	Important	Less important	Irrelevant
Agriculture	36.2%	39.9%	20.8%	3.1%	24.5%	44.3%	24.2%	7.0%
Architecture	34.5%	38.9%	19.8%	6.8%	30.3%	36.4%	27.3%	6.1%
Astronomy	27.3%	39.2%	26.1%	7.3%	24.9%	37.7%	29.6%	7.7%
Biological Sciences	26.4%	38.8%	28.5%	6.3%	27.4%	37.6%	28.5%	6.5%
Business and Administration	32.9%	33.3%	22.6%	11.2%	22.3%	30.9%	27.6%	19.2%
Chemistry	38.6%	38.3%	19.0%	4.1%	31.1%	40.2%	23.3%	5.3%
Com., Inf. Lib. Science	39.5%	31.9%	19.9%	8.7%	44.0%	34.0%	20.0%	2.0%
Computer Science	28.7%	36.1%	26.6%	8.6%	23.4%	36.2%	31.2%	9.2%
Creative Arts	34.8%	40.9%	19.2%	5.1%	42.2%	31.4%	15.7%	10.8%
Earth Sciences	29.6%	41.0%	25.9%	3.5%	23.0%	39.8%	30.3%	7.0%
Education	38.0%	34.6%	19.2%	8.2%	43.1%	36.0%	15.7%	5.1%
Engineering	28.5%	40.0%	25.1%	6.5%	25.3%	40.2%	26.4%	8.2%
Historical Studies	38.4%	31.4%	20.7%	9.5%	32.6%	39.6%	14.6%	13.2%
Language and Literature	36.6%	32.3%	19.2%	12.0%	38.3%	29.9%	22.1%	9.7%
Law	39.7%	31.7%	17.9%	10.7%	41.3%	33.0%	16.5%	9.2%
Mathematics	40.8%	35.8%	17.0%	6.4%	42.3%	35.0%	14.5%	8.1%
Medicine, Dentistry	34.2%	38.2%	22.3%	5.4%	26.9%	39.9%	27.3%	5.9%
Philosophical Studies	36.7%	32.6%	20.0%	10.7%	25.9%	40.7%	18.5%	14.8%
Physics	30.3%	38.4%	25.1%	6.2%	27.8%	39.2%	27.1%	5.9%
Psychology	33.3%	35.6%	22.6%	8.5%	32.0%	43.9%	19.6%	4.5%
Social Sciences	32.2%	35.0%	23.5%	9.3%	33.3%	34.8%	22.6%	9.2%

4.3.5.2.2 *Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by seniority*

All age groups gave an importance of 60-70% to this factor in both surveys. Differences between age groups and/or surveys them were not particularly significant. The corresponding plot can be found in Annex 1.

4.3.5.2.3 *Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by geographic regions*

Most researchers in both surveys and across all regions declared this factor to be extremely important or important when choosing a journal to publish in. However we can identify three outstanding groups. On one hand we have regions in which this factor is given importance by at least 80% of respondents:

- Africa (81.5% in SOAP 2010; 80.7% in WoS 2016)
- India (85.3% in SOAP 2010; 80.5% in WoS 2016)

Other two regions did so in less than 70% of the cases:

- Asia (69.5% in SOAP 2010; 61.0% in WoS 2016)
- Europe (65.4% in SOAP 2010; 66.2% in WoS 2016)

We can also highlihgt the case of China (73.4% in SOAP 2010; 57.0% in WoS 2016).

In WoS 2016 the absence of publication fees is considered extremely important in more than 40% of the cases:

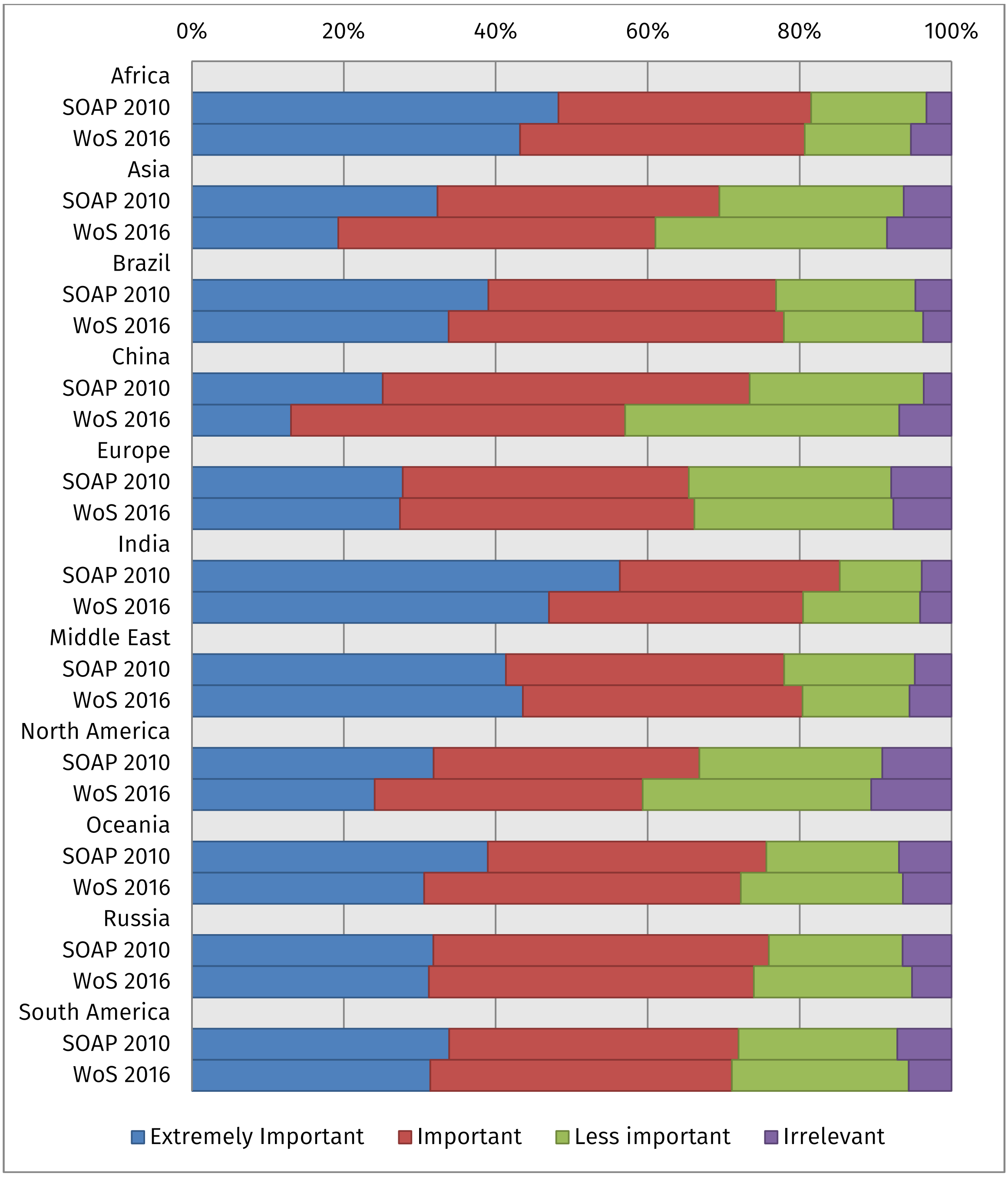
- Africa (43.2%)
- Middle East (43.6%)
- India (47.0%)

This factor was considered irrelevant by more than 10% of the respondents only in one region: North America (10.6%).

We can highlight three regions in which this factor is less important for researchers in WoS 2016 than it was in SOAP 2010:

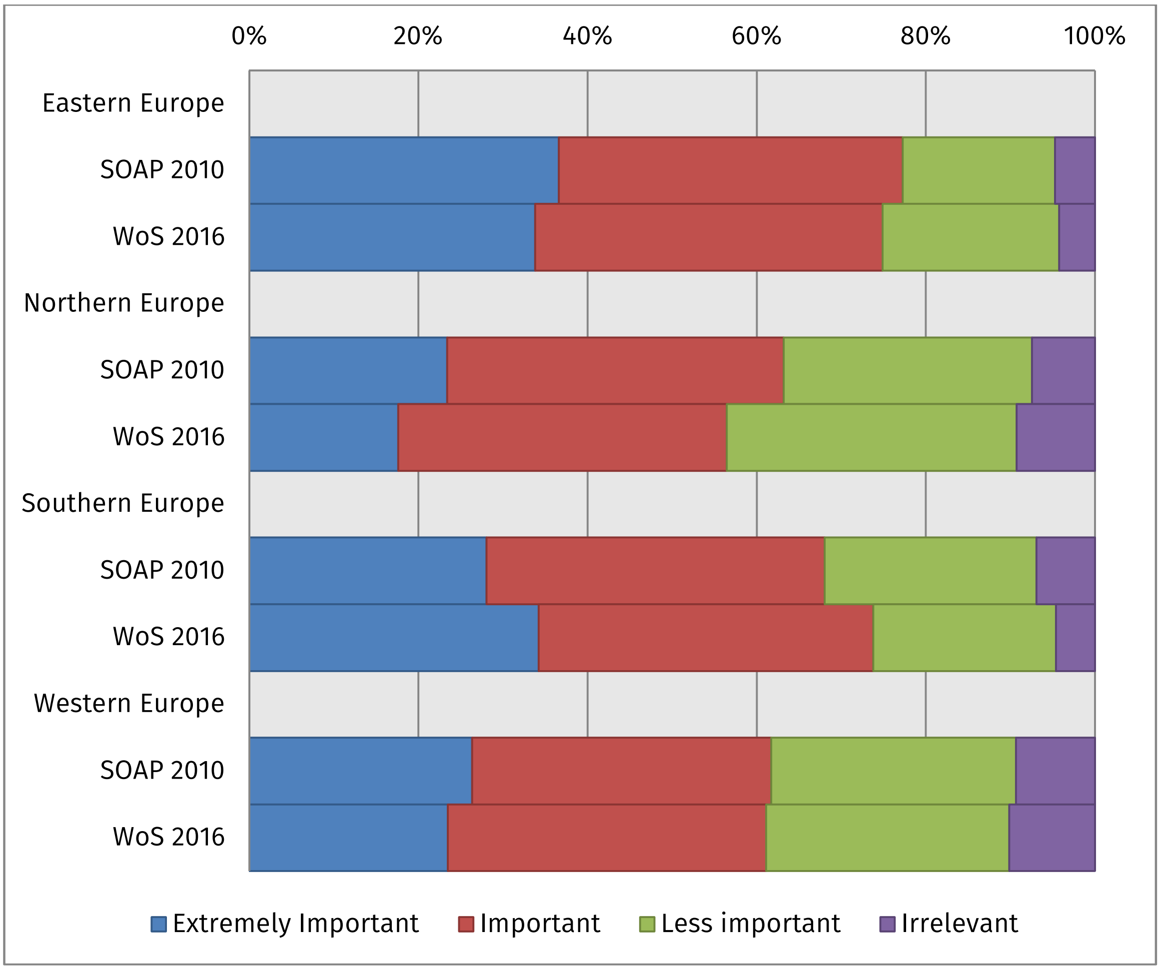
- North America (-7.4%)
- Asia (-8.4%)
- China (-16.4%)

Figure 4-40 Importance of factors when selecting a journal to publish in. Absence of journal publication fees. Distribution by geographical regions (SOAP 2010 n=25,528 - WoS 2016 n=15,091, p < 0.001)



This factor was important for the majority of researches across all European regions and in both surveys. However we can notice differences between Northern Europe (63.2% gave importance in SOAP 2010 and 56.4% did so in WoS 2016) and Eastern Europe (77.3% and 74.9% respectively).

Figure 4-41 Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by European regions (SOAP 2010 n=11,182 - WoS 2016 n=5,492, p < 0.001)



4.3.5.3 Importance of factors when selecting a journal to publish in: speed of publication of the journal

4.3.5.3.1 Importance of factors when selecting a journal to publish in: speed of publication of the journal. Distribution by discipline

This factor was important or extremely important for the majority of researchers across all disciplines and for both studies. However the level of importance given in WoS 2016 is higher for some disciplines:

- Agriculture (80.5%)
- Chemistry (80.8%)
- Agriculture (80.5%)

Than for others:

- Law (61.1%)
- Mathematics (60.5%)
- Comm., Inf. and Library Science (60.0%)
- Language and Literature Studies (58.8%)
- Business and Admin. Studies (58.8%)
- Philosophical Studies (53.6%)

In SOAP 2010 we see that in the hard sciences this factor was important or extremely important in many disciplines in excess of 80% of the researchers:

- Agriculture (89.7%)
- Earth Sciences (86.3%)
- Chemistry (84.9%)
- Biological Sciences (83.1%)
- Engineering (82.3%)
- Physics (80.3%)

In the soft sciences we could see that being also quite important for the majority of researchers these numbers drop below 70% in many cases:

- Social Sciences (70.7%)
- Philosophical Studies (68.4%)
- Creative Arts and Design (67.5%)
- Historical Studies (65.3%)

In this group we also find mathematicians, which chose these options in 70.9% of the cases.

When comparing both surveys we find that for a number of disciplines this factor was more important in 2010 than it was in 2016:

- Agriculture and Related Sciences (-9.1%)
- Earth Sciences (-9.4%)
- Mathematics (-10.5%)
- Comm., Inf. and Library Science (-11.0%)
- Language and Literature Studies (-12.5%)
- Law (-13.3%)
- Business and Admin. Studies (-14.5%)
- Philosophical Studies (-14.8%)

Table 4-16 Importance of factors when selecting a journal to publish in. Absence of journal publication fees. Distribution by discipline (SOAP 2010 n=33,857 - WoS 2016 n=16,568, p < 0.001)

	SOAP 2010				WoS 2016			
	Extremely Important	Important	Less important	Irrelevant	Extremely Important	Important	Less important	Irrelevant
Agriculture	37.6%	52.0%	9.0%	1.3%	30.5%	50.1%	17.6%	1.9%
Architecture	26.9%	45.5%	25.5%	2.1%	26.9%	53.7%	16.4%	3.0%
Astronomy	18.0%	54.7%	23.6%	3.8%	14.5%	50.7%	30.4%	4.4%
Biological Sciences	27.3%	55.8%	15.6%	1.3%	23.3%	54.6%	20.4%	1.7%
Business and Administration	27.2%	46.1%	22.9%	3.8%	10.6%	48.1%	33.5%	7.7%
Chemistry	32.5%	52.5%	13.7%	1.3%	25.2%	55.6%	16.4%	2.8%
Com., Inf. Lib. Science	21.4%	49.6%	24.6%	4.4%	10.0%	50.0%	40.0%	0.0%
Computer Science	21.9%	52.8%	21.8%	3.5%	19.2%	52.8%	23.5%	4.5%
Creative Arts	21.8%	45.7%	24.9%	7.6%	9.8%	52.9%	33.3%	3.9%
Earth Sciences	30.2%	56.1%	12.4%	1.2%	23.7%	53.2%	20.4%	2.7%
Education	25.9%	48.4%	23.1%	2.5%	14.7%	53.3%	27.9%	4.1%
Engineering	29.7%	52.6%	15.8%	1.9%	24.4%	53.8%	19.2%	2.6%
Historical Studies	18.8%	46.4%	30.2%	4.6%	13.2%	51.4%	29.9%	5.6%
Language and Literature	21.2%	50.1%	23.5%	5.2%	10.5%	48.4%	35.3%	5.9%
Law	19.8%	54.6%	21.8%	3.8%	10.2%	50.9%	31.5%	7.4%
Mathematics	16.4%	54.5%	26.1%	2.9%	14.5%	45.9%	34.0%	5.6%
Medicine, Dentistry	25.4%	53.8%	18.8%	2.0%	18.5%	54.1%	24.3%	3.1%
Philosophical Studies	15.5%	52.9%	27.7%	3.9%	10.7%	42.9%	39.3%	7.1%
Physics	24.7%	55.6%	17.4%	2.3%	24.3%	47.7%	24.0%	4.0%
Psychology	21.0%	52.6%	23.2%	3.3%	14.8%	49.3%	31.8%	4.2%
Social Sciences	21.1%	49.6%	25.9%	3.4%	19.6%	48.2%	28.6%	3.6%

4.3.5.3.2 *Importance of factors when selecting a journal to publish in: speed of publication of the journal. Distribution by seniority*

Although both the chi-square test and the t-test indicate that the results of this factor by seniority are statistically significant we didn't find them of special interest. The corresponding plot can be found in Annex 1.

4.3.5.3.3 *Importance of factors when selecting a journal to publish in: speed of publication of the journal. Distribution by geographic regions*

This factor is extremely important or important for the majority of researchers across all regions and for both surveys. However we can highlight two regions where this factor seems to particularly relevant:

- India (90.0% in SOAP 2010; 87.4% in WoS 2016)
- Middle East (85.7% in SOAP 2010; 85.2% in WoS 2016)

This factor in **WoS 2016** seems to be more important in less rich regions, with some of them with more than 80% of researchers tagging it as important or extremely important:

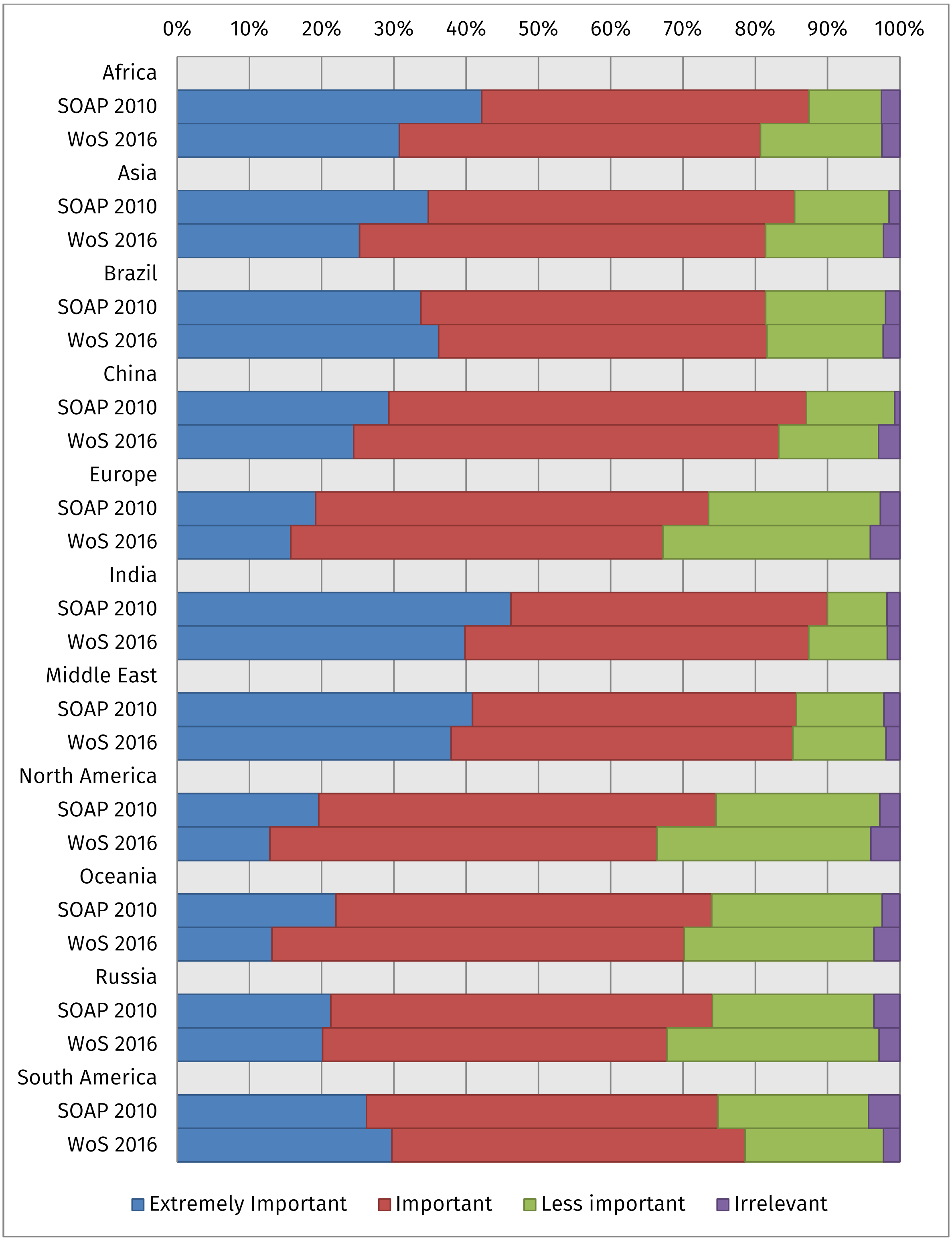
- Africa (80.7%)
- Asia (81.4%)
- Brazil (81.6%)
- China (83.3%)
- Middle East (85.2%)
- India (87.4%)

In some of these regions we even find more than 30% of respondents saying that this is an extremely important factor:

- Africa (30.7%)
- Brazil (36.2%)
- Middle East (37.9%)
- India (39.9%)

When comparing **both surveys** the largest variation is observed in North America where -8.2% found this factor as important or extremely important when comparing WoS 2016 to SOAP 2010.

Figure 4-42 Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by geographical regions (SOAP 2010 n=25,534 - WoS 2016 n=15,076, $p < 0.001$)



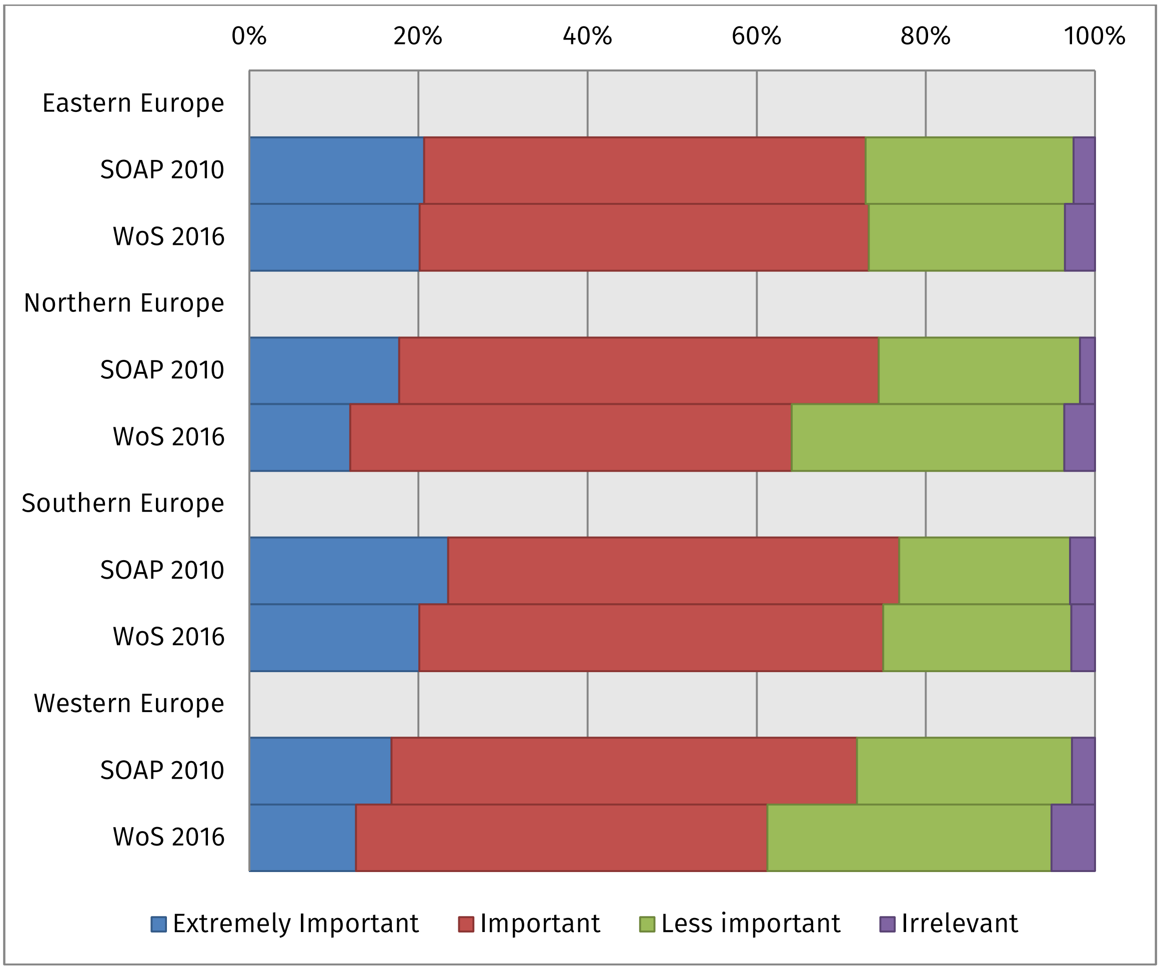
This factor was also important for the majority of researchers in the four European regions. The main aspect we can highlight is that levels of importance drop to less than 65% in Northern and Western Europe in 2016. In Eastern and Southern Europe it maintains levels +70% in both surveys.

In WoS 2016 the highest level of support for this factor is found in Eastern Europe (74.9%) while on the other extreme we find 56.4% of researchers in Northern Europe considering this factor as important or extremely important.

The most significant differences when comparing both surveys are found in:

- Northern Europe (-10.3%)
- Western Europe (-10.6%)

Figure 4-43 Importance of factors when selecting a journal to publish in: absence of journal publication fees. Distribution by European regions (SOAP 2010 n=11,173 - WoS 2016 n=5,484, $p < 0.001$)



4.3.5.4 Importance of factors when selecting a journal to publish in: the journal is Open Access

4.3.5.4.1 Importance of factors when selecting a journal to publish in: the journal is Open Access. Distribution by discipline

When looking at the distribution by disciplines for this factor we find that is not important or extremely important for any discipline in either survey. The main aspect we can highlight is that while more than 40% of researchers declared it as an important or extremely important factor in many disciplines in SOAP 2010 it's only the case for Language and Literature Studies in WoS 2016 (42.9%).

Whether a journal is OA or not is important or extremely important for more than half of the researchers in a few disciplines in the SOAP 2010 study:

- Law (50.0%)
- Education (51.2%)
- Communication, information and library science (55.3%)
- Creative Arts and Design (59.1%)

We also find a number of disciplines in which more than 20% of the researchers thought that this factor was irrelevant:

- Engineering and Technology (20.8%)
- Psychology (20.8%)
- Physics and Related Sciences (21.0%)
- Mathematics (22.0%)
- Chemistry (22.3%)
- Business and Admin. Studies (24.0%)
- Astronomy and Space Science (27.3%)

In WoS 2016 the fact that a journal is Open Access is an irrelevant or less important factor for the majority of respondents across all disciplines. It is in Business and Administration Studies where we find the highest rate of "irrelevant" answers with 40.9%. In a number of other disciplines this percentage goes beyond the 25% mark:

- Astronomy and Space Science (25.9%)
- Historical Studies (26.4%)
- Education (26.7%)
- Chemistry (26.7%)
- Psychology (28.1%)
- Philosophical Studies (29.6%)
- Mathematics (30.1%)

When we compare both surveys we observe the larges drops in the importance given to this factor in:

- Arch., Building and Planning (-17.7%)
- Historical Studies (-17.9%)
- Education (-20.9%)
- Law (-21.3%)
- Philosophical Studies (-21.9%)
- Business and Admin. Studies (-23.4%)
- Creative Arts and Design (-27.1%)
- Comm., Inf. and Library Science (-27.3%)

Table 4-17 Importance of factors when selecting a journal to publish in: the journal is Open Access. Distribution by disciplines (SOAP 2010 n=33,594 - WoS 2016 n=16,517, $p < 0.001$)

	SOAP 2010				WoS 2016			
	Extremely Important	Important	Less important	Irrelevant	Extremely Important	Important	Less important	Irrelevant
Agriculture	15.1%	34.2%	37.9%	12.8%	9.1%	30.5%	44.1%	16.3%
Architecture	14.6%	33.0%	36.1%	16.3%	6.0%	23.9%	55.2%	14.9%
Astronomy	8.2%	21.0%	43.5%	27.3%	4.1%	18.0%	52.0%	25.9%
Biological Sciences	10.2%	35.2%	41.4%	13.3%	7.6%	30.2%	47.3%	15.0%
Business and Administration	14.2%	25.1%	36.6%	24.0%	3.5%	12.4%	43.2%	40.9%
Chemistry	8.6%	27.7%	41.4%	22.3%	3.4%	21.1%	48.7%	26.7%
Com., Inf. Lib. Science	17.6%	37.8%	33.5%	11.2%	2.0%	26.0%	56.0%	16.0%
Computer Science	9.5%	35.9%	37.6%	17.0%	4.5%	22.6%	49.4%	23.5%
Creative Arts	16.2%	42.9%	27.3%	13.6%	4.9%	27.2%	47.6%	20.4%
Earth Sciences	9.9%	33.4%	40.2%	16.6%	5.3%	26.9%	49.4%	18.3%
Education	16.2%	34.9%	34.7%	14.2%	4.1%	26.2%	43.1%	26.7%
Engineering	9.2%	28.2%	41.8%	20.8%	4.8%	24.9%	47.6%	22.7%
Historical Studies	14.5%	32.6%	34.3%	18.6%	4.9%	24.3%	44.4%	26.4%
Language and Literature	14.8%	32.9%	36.9%	15.4%	9.1%	33.8%	40.3%	16.9%
Law	14.1%	35.9%	31.7%	18.3%	1.9%	26.9%	48.1%	23.1%
Mathematics	7.8%	30.8%	39.5%	22.0%	4.2%	23.3%	42.5%	30.1%
Medicine, Dentistry	11.6%	33.8%	39.3%	15.2%	6.0%	27.8%	48.2%	18.0%
Philosophical Studies	11.3%	32.8%	38.0%	17.8%	7.4%	14.8%	48.1%	29.6%
Physics	7.5%	29.7%	41.8%	21.0%	4.9%	23.0%	50.6%	21.5%
Psychology	10.0%	29.3%	39.8%	20.8%	3.3%	21.9%	46.7%	28.1%
Social Sciences	13.9%	32.3%	35.7%	18.1%	8.9%	28.2%	42.7%	20.2%

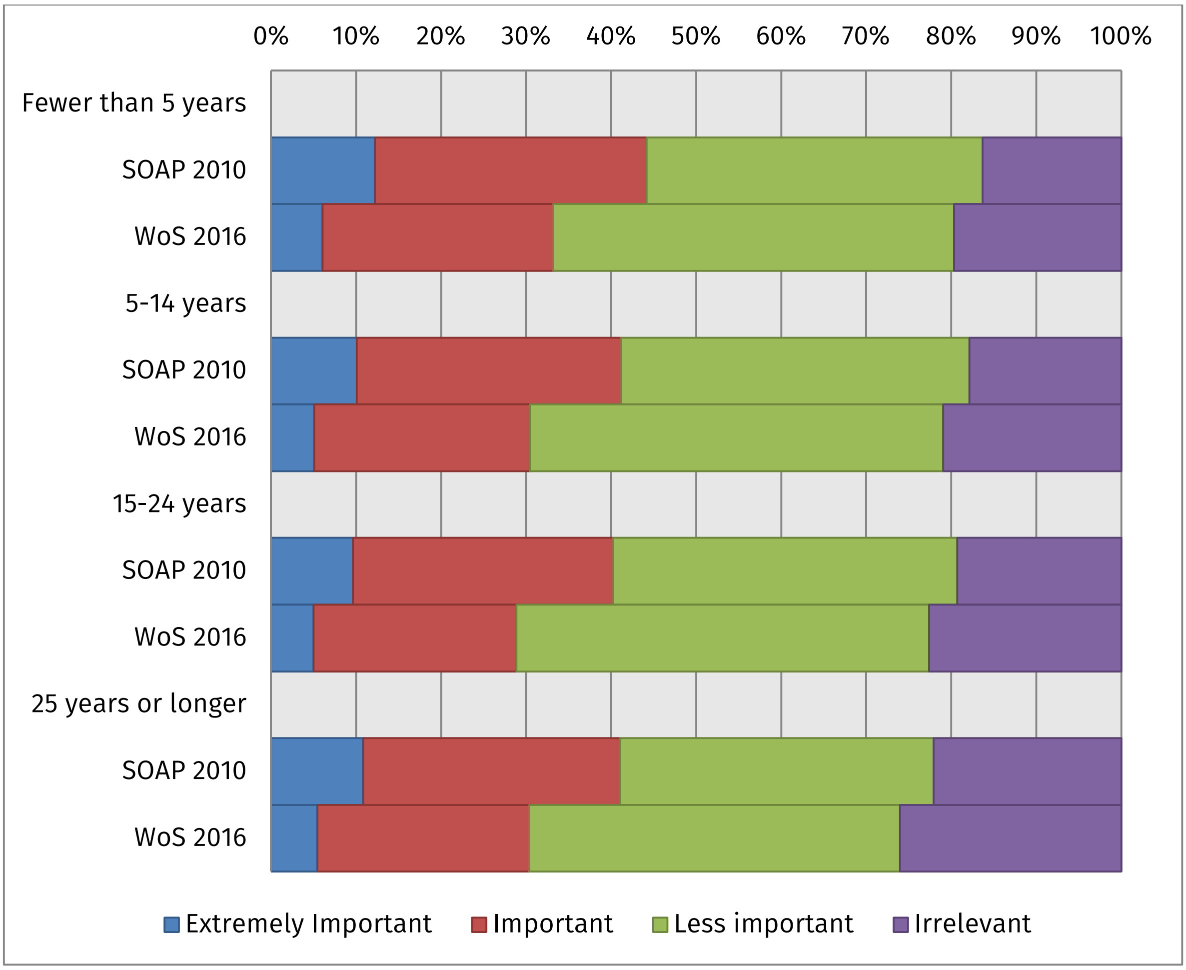
4.3.5.4.2 Importance of factors when selecting a journal to publish in: the journal is Open Access. Distribution by seniority

Looking at seniority distribution for this factor we can see that while it was important for around 40% of researchers in all age groups in SOAP 2010 it drops to figures around 30% in WoS 2016.

In **SOAP 2010** all age groups considered this factor as less important or irrelevant in excess of 50% of the cases, with slight differences between them. When we compare both surveys we can see that this factor is less important for all age groups in excess of 10%.

- Fewer than 5 years (-11.0%)
- 5-14 years (-10.7%)
- 15-24 years (-11.4%)
- 25 years or longer (-10.7%)

Figure 4-44 Importance of factors when selecting a journal to publish in. The journal is Open Access. Distribution by seniority (SOAP 2010 n=25,343 - WoS 2016 n=15,028, $p < 0.001$)



4.3.5.4.3 Importance of factors when selecting a journal to publish in: the journal is Open Access. Distribution by geographic regions

Brazil is the only region in which the majority of respondents declared that this aspect is important or extremely important in both surveys (61.5% in SOAP 2010, 51.1% in WoS 2016). We also find three regions in which the majority of respondents gave importance to this factor in SOAP 2010 and while this support drops in 2016 it doesn't dramatically:

- Africa (51.4% in SOAP 2010; 44.3% in WoS 2016)
- India (60.8% in SOAP 2010; 45.0% in WoS 2016)
- South America (56.6% in SOAP 2010; 46.3% in WoS 2016)

The third group of regions we can highlight includes those regions in which support to this factor dropped considerably:

- India (60.8% in SOAP 2010; 45.0% in WoS 2016)
- Middle East (47.5% in SOAP 2010; 31.5% in WoS 2016)
- China (43.9% in SOAP 2010; 27.2% in WoS 2016)
- Asia (50.3% in SOAP 2010; 31.9% in WoS 2016)

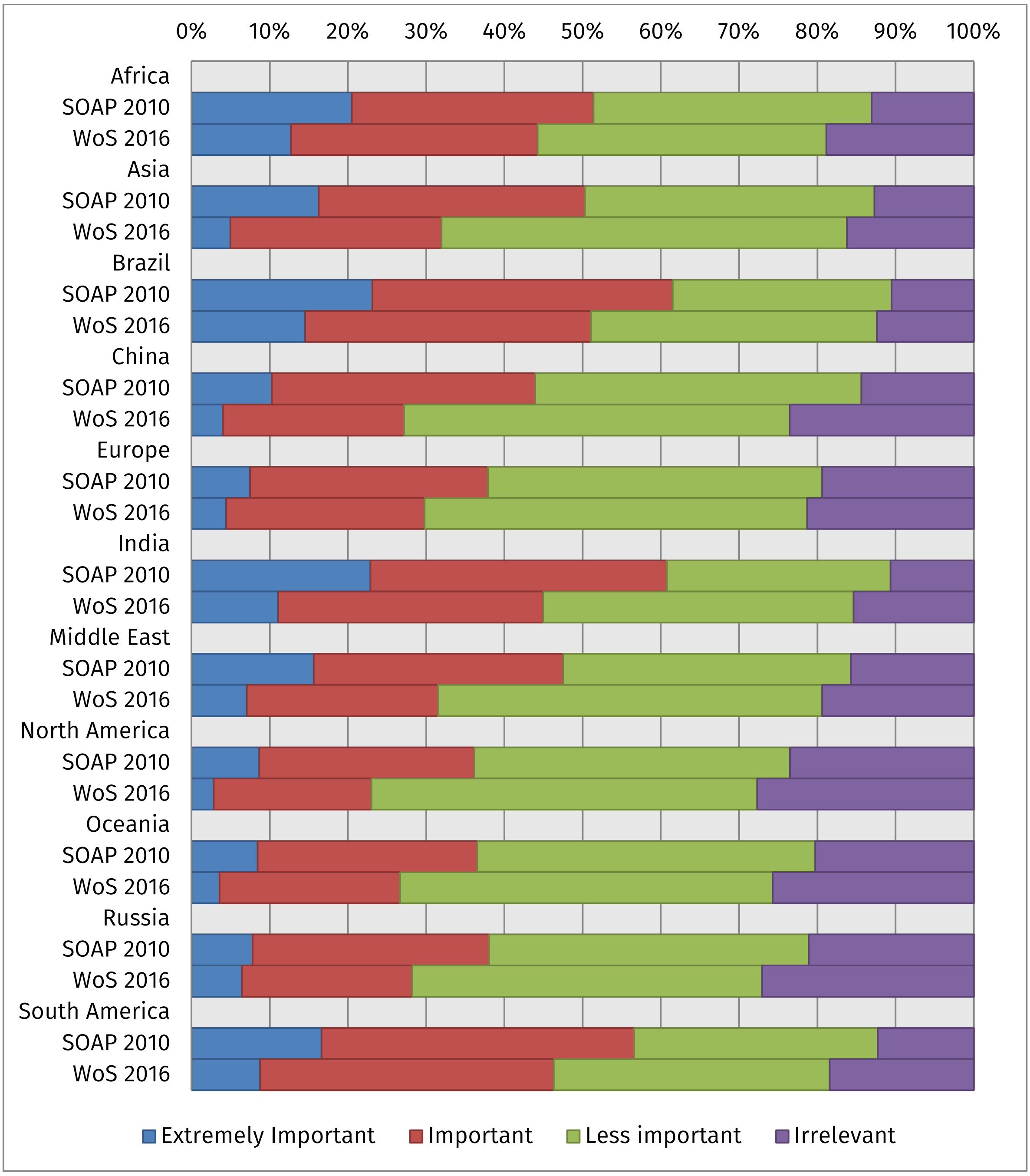
In SOAP 2010 we find three regions where more than 20% of the researchers thought that this is an irrelevant factor:

- Oceania (20.3%)
- Russia (21.1%)
- North America (23.5%)

In WoS 2016 respondents declared that this factor is less important or irrelevant in excess of 70% of the cases in a number of regions:

- Europe (70.2%)
- Russia (71.8%)
- China (72.8%)
- Oceania (73.3%)
- North America (77.0%)

Figure 4-45 Importance of factors when selecting a journal to publish in. The journal is Open Access. Distribution by geographic regions (SOAP 2010 n=25,343 - WoS 2016 n=15,028, p < 0.001)



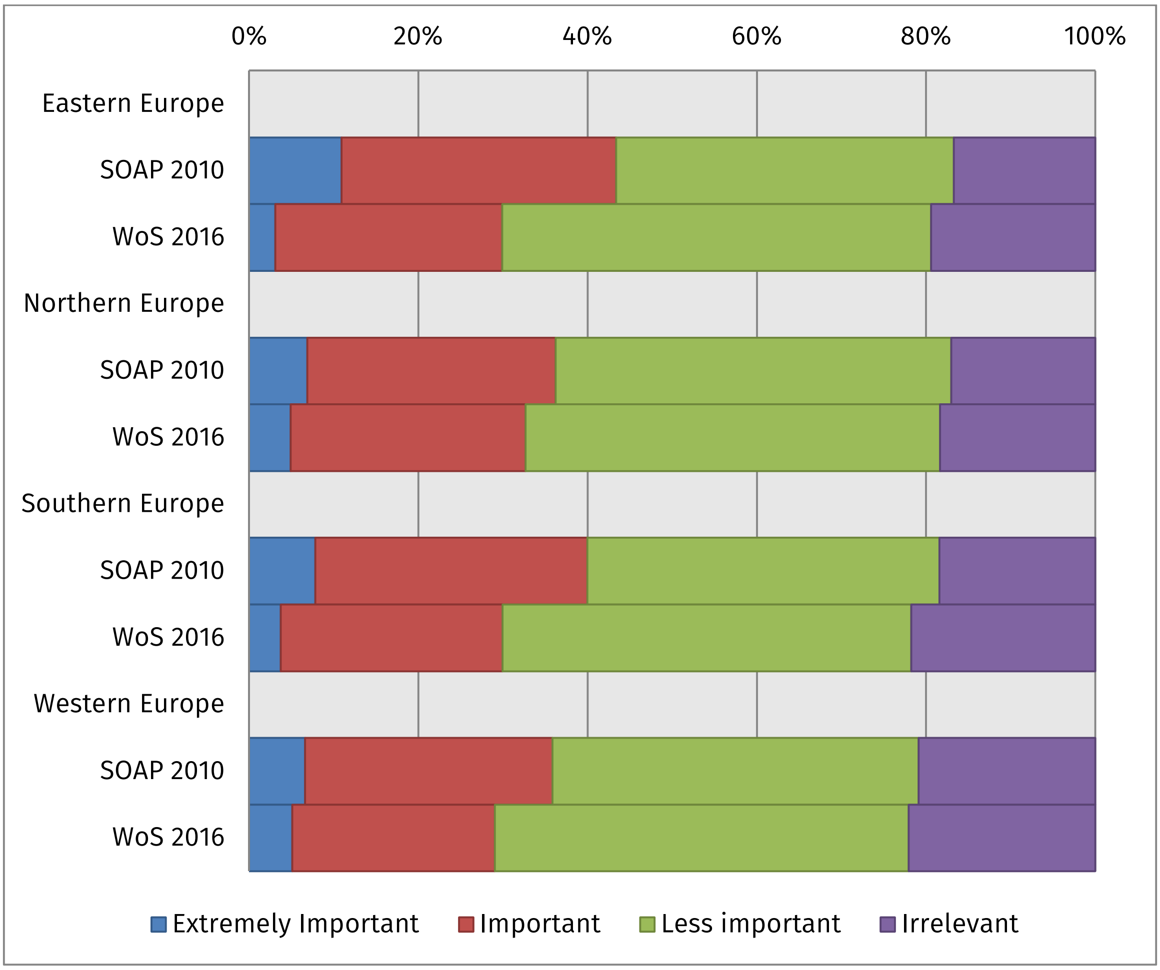
Looking at European regions we don't see a majority of researchers supporting this factor in either survey. Levels of support drop between surveys.

In **SOAP 2010** in terms of European regions the highest rate of extremely important and important is found in Eastern Europe (43.4%) while the lowest was Western Europe (35.8%).

In WoS 2016 differences between European regions were not particularly significant, with around 70% of researchers responding that this factor is irrelevant or less important across all four sub-regions.

When looking at both studies the main difference is observed in Eastern Europe, where -13.5% of researchers declared this factor to be important or extremely important.

Figure 4-46 Importance of factors when selecting a journal to publish in. The journal is Open Access. Distribution by European regions (SOAP 2010 n=11,115 - WoS 2016 n=5,468, p < 0.001)



5. Discussion

Open Access showed up in the late 80s as an alternative to traditional dissemination channels in the scholarly communication system. Since then there has been many attempts to understand the views and needs of stakeholders in relation to OA publishing: librarians, policy makers, publishers... and obviously researchers.

Our research follows up on the largest survey carried out to date, the SOAP Survey (Dallmeier-Tiessen, et al., 2011). However, it also tries to build on top of many other surveys carried out in since the early 2000s. Along this chapter we'll discuss our findings, comparing them to previous surveys. We will try to focus on the evolution (or the absent of changes) on the opinion and practices of researchers in the last 16 years. We will try to identify general trends and patterns, but also paying attention to different approaches depending on researcher's disciplines, seniority and regions in the world in which they develop their activities.

5.1 Limitations

Before proceeding with discussing in detail the results obtained in this study we need to mention a number of potential limitations in our analysis. Acknowledging them will help the reader to interpret the results in a more appropriate way. Hopefully it will also help potential follow up studies to draw a more accurate picture of the situation at the time and most importantly, on the evolution.

5.1.1 SOAP 2010 dataset sampling

A rather important aspect in this PhD thesis is the comparison with the SOAP study carried out in 2010. The main criticisms made to the published results of the project at the time were that as the survey was based on a convenience sample it suffered of sampling and non-response biases. It was also pointed out that in the way the survey was carried out it might have invoked acquiescence and social desirability biases (Davis, 2011).

In order to try to remove, or at least to diminish the biases pointed out we used a reduced dataset when producing our results for SOAP 2010:

- Collectors removal. In our working sample we kept only the answers received from invitations generated from the European Commission, Springer, SAGE and Thomson Reuters mailing lists. This way we removed all people that did not receive a direct invitation (i.e., those who found the link in a blog and decided to complete the survey), as well as those who came from the BioMed Central mailing list, who were not necessarily OA authors, but also people with a general interested in OA. In the SOAP 2010 dataset we only kept authors that had published scientific articles, but not necessarily only in OA journals, as we can see in chapter 4 (Results).

- Taxonomies categories in SOAP 2010. We split the original category "Mathematical and Computer Sciences" into "Mathematical Sciences" and "Computer Sciences" and the category "Historical and Philosophical Studies" into "Historical Studies" and "Philosophical Studies". To do so we looked into the "Secondary Research field" variables. We eliminated those answers where the main research field could not be matched.

After removing the data collectors abovementioned and doing the adjustments in the taxonomy categories, we ended up with a final dataset of **26,540** responses for the SOAP 2010. However, we need to acknowledge that given the way in which invitations to the survey were distributed the bieases mentioned might be still present in the SOAP 2010 dataset. Equally there is a risk that some answers were assigned to the wrong disciplines.

Another possible bias we identified in the original SOAP 2010 study was undercoverage, as the scientific population could be represented inadequately in our data. Certain countries and/or knowledge areas could not have enough representation. In order to normalize the results obtained we considered applying a post-stratification weight to our dataset, a technique widely used in survey methodology (Crockett & Higgins, 2011).

We found out what was the scientific production distribution among disciplines and countries was in the SCImago Journal & Country Rank (SJR)[18] and compared it with our sample. SJR can represent the worldwide scientific production in a fair way, as already discussed by other authors (Delgado-López-Cózar & Repiso-Caballero, 2013; Harzing & Alakangas, 2016).

Attending to the countries distribution, we observed certain differences between the SJR data and our own dataset for some cases (i.e. China was under-represented in our SOAP 2010 dataset by -10.3%). In the case of disciplines we also observed some under-representation in some disciplines (Medicine -16.4% or Chemistry -5.5%) as well as over-representation of some areas (i.e. Social Sciences +9%).

We considered weighting our data to reduce this bias. The outcome was the difference between weighting and not weighting was not significant enough and decided not to pursue this avenue. More details can be found in Annex 2.

5.1.2 WoS 2016 dataset sampling

Obtaining a good response ratio in this type of studies is frequently one of the toughest challenges for researchers. In similar surveys issued in 2015 the ratios obtained were 9% (Rowley et al., 2017), 4% (Nature Publishing Group, 2015b) and 16% (White & Remy, 2016). Although we reached a 18.82% response ratio in our WoS 2016 study we are conscious of the difficulty to obtain representative samples in all fields of knowledge. In this particular case we believe that our results are quite representative of the current situation both in experimental sciences and in the humanities and the social sciences. The only exception is probably medicine, which might be underrepresented in our WoS 2016 sample.

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[18] http://www.scimagojr.com/

If we compare the distribution of disciplines in our sample to that of the 90,580,627 records available in WoS (as of September 2016) there are slight deviations in our sample, close to 5% in almost all cases. The only exception is Medicine, underrepresented in our study by -10.9%.

Table 5-1 Distribution of WoS 2016 sample compared to total number of records in WoS (as of September 2016) (total WoS n=90,580,627 – WoS 2016 n=16,895)

Discipline	Total WoS	WoS 2016 sample	Deviation
Agriculture and Related Sciences	2.3%	4.2%	+1.9%
Arch., Building and Planning	0.4%	0.4%	0.0%
Astronomy and Space Science	0.8%	1.8%	+1.0%
Biological Sciences	10.3%	9.8%	-0.5%
Business and Admin. Studies	2.0%	2.9%	+0.9%
Chemistry	7.3%	5.9%	-1.4%
Comm., Inf. and Library Science	0.8%	0.3%	-0.5%
Computer Science	2.7%	7.8%	+5.1%
Creative Arts and Design	1.5%	0.6%	-0.9%
Earth Sciences	4.2%	7.4%	+3.2%
Education	0.9%	1.2%	+0.3%
Engineering and Technology	17.7%	21.1%	+3.4%
Historical Studies	1.8%	0.9%	-0.9%
Language and Literature Studies	2.0%	0.9%	-1.1%
Law	1.2%	0.6%	-0.6%
Mathematics	1.8%	4.5%	+2.8%
Medicine, Dentistry	30.2%	19.3%	-10.9%
Philosophical Studies	0.4%	0.2%	-0.2%
Physics and Related Sciences	6.6%	5.4%	-1.2%
Psychology	2.0%	2.0%	0.0%
Social Sciences	3.2%	2.9%	-0.4%

We can also mention as a limitation of our WoS 2016 sample the objective population itself. Although the WoS is internationally recognized as one of the most important bibliographic databases we cannot ignore that our analysis is focused only on researchers that have published in journals indexed by the WoS.

5.1.3 Data analysis

This study has a longitudinal aspiration. Our approach has been to use the SOAP 2010 questionnaire as a base for the WoS 2016 one, but also to compare the findings in both surveys. As already pointed by Xia in his longitudinal study (J. Xia, 2010) the majority of reports on OA have been carried out individually. Different scopes, populations and sample sizes have been used in previous surveys. It is therefore necessary to point this out when we compare our findings to those of previous surveys. For some of them will be difficult to identify comparable aspects, but we will also point out basic differences in their populations object of analysis.

5.2 Beliefs

5.2.1 OA Awareness

The vast majority of researchers in 2016 were aware of options to publish in OA in their fields (81.5%). We observe an evolution in respect to SOAP 2010 of more than +10%, combined with a reduction in the number of researchers that declared not to be aware of these options as well as a reduction in those that did not know. In the last few years we have seen many institutions launching OA-related initiatives (e.g.: SCOAP[3], OpenAire, the Finch Report, OA policy by research funders and governments, etc.). At the same time new OA publishers have been created and traditional publishers have embraced OA, either through the creation of OA journals or implementing hybrid options in existing ones.

In a survey carried out in 2004 62% of respondents were already aware of the existence of OA journals in their fields (Swan & Brown, 2004a). In a different survey also in 2004 Rowlands et al. reported that around 66% of researchers had some knowledge of OA publishing (Rowlands et al., 2004). In a follow-up survey in 2005 these same authors reported that 81% of researchers were aware of OA options (Rowlands & Nicholas, 2005). A survey in 2006 found that at least 62% of researchers from different disciplines and countries were familiar with OA literature (Hess et al., 2007). In 2008 Coonin et al. reported 88.8% of the 918 respondents to a survey to be familiar with OA publishing venues. In the 2015 Nature survey between 5-10% mentioned not being aware of journals that offered this option as a reason not to publish OA (Nature Publishing Group, 2015b). In the longitudinal study carried out by Xia is confirmed how the unawareness of OA journals has been decreasing from around 50% in the mid-1990s (J. Xia, 2010). By 2007 it had dropped and around 85% of researchers were aware of OA options in their field, which is compatible with our findings.

When we look at the awareness of OA journals by disciplines we can observe high levels of agreement in disciplines such as Medicine (88.2%), Psychology (87.4%) or Biology (87.0%). We can also highlight important increases in awareness in respect to 2010 in disciplines like Chemistry (+23.5%) or Earth Sciences (+20.0%). In a survey carried out in 2004 amongst Medicine researchers levels of 84% of awareness were already reported (Schroter et al., 2005). Another survey among Canadian bio scientists in 2006 reported levels of awareness of 81% (Morrison et al., 2006). Another survey aimed at Medicine researchers in Cuba in 2007 reported familiarity with OA initiatives by 80%. However, these same respondents declared to be aware of OA journals in only 44.8% of the cases (Sánchez Tarragó & Fernández Molina, 2008). Also in 2007 Brown & Swan reported findings of low levels of awareness among researchers in the arts and humanities (44.1%) and social sciences (44.6%) while for physical sciences (54.5%) and life sciences (71.4%) the proportions were greater (Sheridan Brown & Swan, 2007). In 2007 a survey aimed at Library and Information Science researchers found an overwhelming awareness of open access journals with 95.7% of positive responses. On the other extreme we find a survey answered by Psychology experts in 2008 in which only 58% of respondents declared to be aware of OA journals in their field (Uhl, 2009).

In general terms awareness of OA publishing venues have grown in the last few years and most researchers don't have problems to find OA options to submit their papers to. When looking at the respondents seniority we also observe equal levels of awareness among all age groups. There are event slightly higher levels of awareness among more senior researchers. Other authors have also reported levels of awareness of 85-90% across different age groups (Coonin & Younce, 2009).

If we focus on the awareness by geographical regions we can also observe high levels of knowledge across all regions. Great levels of improvement in respect to 2010 were observed in regions like Africa (+19.9%), Middle East (+18.6%) and North America (+15.6%). Quite significant is the case of China, where 69.3% of respondents are aware of OA journals in their field, but 19.9% answered that they didn't know any OA journals in their field and 10.8% claimed not to know. This is compatible with the findings of a Nature survey in 2014 in which 18% or Chinese researchers declared not to be aware of OA journals in their field (Nature Publishing Group, 2015a). In this same survey in 2015 this figure reached 12% (Nature Publishing Group, 2015b).

Other authors have found high level of awareness in different countries or regions. In 2004 Beer reported levels of 91% of awareness of OA journals among South African researchers (Beer, 2005). In a survey in 2006 around 66% of respondents in the US declared to be aware of OA journals in their fields (University of California, 2007). Another study based on the SOAP Project data found that 73% of Argentinian researchers were aware of the existence of OA journals (Bongiovani et al., 2012). Singson et al. reported 98% of respondents stating awareness of OA journals in a survey carried out in 2011 in India (Singson et al., 2015). In another survey in 2012 authors found high level of awareness among German researchers, with the caveats of significant differences within disciplines (Eger et al., 2013a). The latest survey reporting on OA awareness is one carried out in 2015 among researchers in New Zealand and found positive responses in 77% of the cases (White & Remy, 2016).

There is consensus among experts that as of today one can probably find OA journals in basically any field of knowledge (Suber, 2012b)[19]. Some authors claim that sometimes it's unclear whether journals offer OA options or not and that might explain why even higher levels of awareness are not reached in surveys (Coonin & Younce, 2009; Kennan, 2007; D. Nicholas et al., 2005; Thorn et al., 2009).

5.2.2 Is OA beneficial?

Both in WoS 2016 and SOAP 2010 a vast majority of researchers declared that OA is beneficial for their fields. It is quite noticeable how this support has involved from one survey to the other. We need to point out that is not only a difference of almost -10% of researchers that answered yes to this question(88.1% in SOAP 2010, 78.7% in WoS 2016), it's also +2.3% noes, +5.4% I don't knows as well as +1.7% I don't cares. For some reason there are more options to publish OA together with an increase in the awareness. However, researchers in 2016 see less advantages in OA publishing than they did in 2010.

[19] Directory of Open Access Journals (DOAJ): https://doaj.org/subjects

The first international and multidisciplinary survey in which researchers were asked their general opinion about OA did not include this question in exactly the same way. However, 71% of respondents declared that the main reason to publish in OA was "the principle of free access for all readers" (Swan & Brown, 2004a). Another survey in 2004 reported that the prime reason for publishing in an OA journal was free access to information(Rowlands et al., 2004). In a survey launched in 2006 with 688 respondents more than 90% respondents stated a positive or very positive attitude towards OA (Hess et al., 2007). More than 70% of researches in a large survey with almost 15K respondents declared in 2014 that OA is beneficial. Actually this result sees an increase of 10% in respect to the same survey in 2013 (Frass et al., 2014). Nature Publishing Group surveys reported that the most common reason to publish OA was "that research should be OA, so freely available immediately to all" by 45% of researchers in 2014 (Nature Publishing Group, 2015a).

Although at disciplines level we also see a majority of researchers expressing that OA is beneficial for their fields there are some disciplines in which this is not the case so much. Chemistry is probably one of the most outstanding disciplines with only 67.9% of researchers declaring that is beneficial, but also large levels of no opinion (16.2%) or I don't care answers (4.5%). In this groups of dubious researchers we can include mathematicians (68.8% answered yes), astronomers (10.7% said OA is not beneficial) or architects (support dropped by-13.8% between surveys). If we compare these outputs with those in SOAP 2010 we can see large drops in agreement in History (-13%), Biology (-14%) or Physics (-16%).

In a survey aimed at bioscientists in South Africa in 2006 researchers expressed levels of up to 91% of support in some beneficial aspects of OA (Fullard, 2007). Another survey with bioscientists, this time in the US, revealed that many scientists see the possibility of providing free access to literature as one of the most interesting aspects of OA publishing (Warlick & Vaughan, 2007). And yet another survey among bioscientists in 2008, focused on the UK this time, also threw 74% of respondents saying that OA journals were a good idea (Thorn et al., 2009). In a survey run in 2010 among Business and Administration researchers in the US it was reported 72.8% of support to the idea that OA means free access for all readers (Coonin, 2011). In the 2013 study on Nursing professionals based on SOAP data 92% of agreement with this statement was found (Muñoz-García, 2013).

In terms of age groups we also find a majority of supporters of OA in all age groups. However, this support declines in the 2016 survey. The most experience researchers are less supportive (83.7% of +25 years of experience answered yes) while younger researchers positioned themselves in 90.7% of OA being beneficial. We can also highlight a drop of the 15-24 years of experience group with -13.4% positive answers in WoS 2016, together with a 6.9% increase in those that declared not to know.

We also find high levels of support across all regions in the world in WoS 2016. Brazil (87.6% yes), Africa (86.0%) and South America (83%) maintain high levels of support. However, we have seen large drops in region like Asia (75.0%, 14.7% no opinion), Russia (73.3%, 14.4% respectively) and China (70.5%, 16.7% respectively). While India (-10.4%) and South America (-11.7%) saw an important change of position in respect to SOAP 2010, it is in China where we observe the largest drop (-15.2%).

When looking at surveys carried in specific areas of the world we find that in a survey in 2006 70% of respondents in India agreed with the idea that OA is beneficial (Deoghuria & Roy, 2007). Another survey focused on UK researches reported 88% of support towards OA principles in 2010 (Stone, 2010) while a similar one in 2011 83% support was reported (Budden, 2011). A survey among researchers in New Zealand carried out in 2015 also found an overwhelming of 86% of responses stating that OA is beneficial (White & Remy, 2016).

There is strong support to the concept of OA across all disciplines and regions in the world. Differences are observed in certain regions with patterns probably linked to their gross domestic product (GDP) levels. At the same time levels of support are different across disciplines, with those in HSS more supportive than the hard sciences in general terms.

5.2.3 OA Myths

When presented with the so-called OA myths we found two of them in which nothing but strong levels of agreement were expressed: Researchers should retain the rights to their published work and allow it to be used by others (70.7% in WoS 2016), Publicly-funded research should be made available to be read and used without access barriers (81.0%). On the citation advantage of OA articles However, we observed a slight tendency to agreement (65.5%), but also high levels of neither agree nor disagree answers (23.1%). It is also interesting to see that on the supposedly financial advantages of OA there is an almost equal distribution between agreement (31.2%), disagreement (30.6%) and neither of them (38.2%). Researchers did not believe that OA is necessarily negative for the peer-review system (46.6% disagreed), although many of them were doubtful (32.2%). Finally researchers in our sample were quite doubtful on the fact that APCs might impact research-intensive institutions (42.7% neither agreed nor disagreed).

In the following sections we will analyse some of these facts in detail and in the context of previous surveys.

5.2.3.1 OA myths: OA articles are likely to be read and cited more often than those not OA

In general terms the majority of researchers in our survey believed that OA articles have a citation advantage towards those non-OA. However, this tendency has reduced between surveys and in WoS 2016 we found that while 60.4% of researchers agreed, 24.2% neither agreed nor disagreed with this statement. This is a reduction in around 5% in respect to SOAP 2010.

When we look at previous surveys we can see how in 2004 22% of respondents declared to believe that their articles would be more cited in OA journals (Swan & Brown, 2004a). In the follow up to this survey, this time mainly focused on green OA, it was also mentioned citation as a primary motivation for self-archiving (Swan & Brown, 2005). A survey in 2006 mentioned some 44% of researchers declaring that publishing OA would bring additional citation advantages. In another survey in 2008 it was reported that while 20.60% believed that publishing in OA journals would bring more citations, 38.80% didn't have an opinion. In 2012 a survey with 14,769 respondents found that 25% believed OA journals to be cited more heavily than subscription journals. The proportion of researchers that neither agreed nor disagreed was 37% (Frass et al., 2013). In the 2014 Nature survey with 30,466 respondents around 20% mentioned higher citations in OA journals as one of the reasons to choose them. An analysis of a survey carried out in 2014 found that respondents were ambivalent regarding whether articles in OA were cited more heavily, with HSS respondents showing slightly less agreement with this than STM respondents (Rowley et al., 2017).

At disciplines level we find agreement with this statement in around 60% of the cases with around 20% of neither agree nor disagree answers. The less supportive disciplines were Business and Administration (20.1% disagreement), Chemistry (20.4%), Mathematics (21.0%) and Astronomy (28.9% disagreement and 31.9% neither agree nor disagree). The largest drops in support in respect to SOAP 2010 were observed in History (-13%), Biology (-14%) and Physics (-16%).

Looking at other authors outputs, we find a survey in 2006 aimed at bioscientists in South Africa in which 79.4% agreed with this statement, with 22.8% not having a clear opinion (Fullard, 2007). Another survey in 2008 among bioscientists in the UK mention higher level of citations as an important incentive to publish OA (Thorn et al., 2009). Another survey this time aimed at researchers in Education carried out in 2009 reported 33.1% of researchers believing that OA articles are more cited, while 33.4% did not provide an answer in any sense (Coonin & Younce, 2010a). We also find a survey issued in 2010 responded by 627 mathematicians in which only 8% higher citation rates of OA journals as an important factor (Fowler, 2011). A research asking 1,293 researchers in Business and Administration studies in 2010 reported 11.5% of researchers agreeing that OA articles bring more citation, while 20% had no opinion (Coonin, 2011). In the reanalysis of the SOAP data for nursing professionals it was reported that 60% of researchers agreed to the fact that OA articles are more cited, while 26% did not provide an opinion (Muñoz-García, 2013).

The only outstanding age group in WoS 2016 was the youngest researchers which expressed agreement or strong agreement with this statement in 64.8% of the cases. Other age groups were more conservative though.

In WoS 2016 we found the majority of respondents in all regions agreeing with this myth. The strongest support was observed in Africa (71.8%), Brazil (70.3%) and India (70.3%). On the other side of the spectrum were North America (50.1%) and Oceania (55.4%). Agreement with this myth fell particularly in regions like Asia (-17.9%), China (-18.1%), Oceania (-25.2%) and North America (-27.1%).

At country level in other studies we find a survey in 2004 in Germany that reported 73.1% of researchers declaring that OA articles actually have less citations than non-OA ones (Over et al., 2005). Another survey in 2006, this time aimed at researchers in India reported that 64% believed that that OA outlets might increase citations of their papers (Deoghuria & Roy, 2007). Another survey in 2006 among Australian researchers only reported 6% of researchers mentioning higher citations as a reason to publish OA (Kennan, 2007). However, we find another survey in 2007 also among Australian researchers that reported 70% agreement with the statement that OA increases research citation levels (Austin et al., 2008). In the JISC/OSI survey focused on researchers in the UK and with 2,250 respondents in 2007 64% of respondents declared to believe that their articles would be more frequently cited if published as OA (Sheridan Brown & Swan, 2007). Another survey in 2008 and also with a +2K research sample from the UK reported 58% of researches stating that OA articles would increase their citation rates (Creaser, 2010). Another survey in 2013 aimed at US researchers reported that 67% of researchers agreed that OA would increase citations to their works, while 19% answered that they didn't know if it would be the case (Odell et al., 2014). We can also mention that in the specific report on China from the Nature survey in 2014 32% of Chinese authors mentioned that OA publications generate more citations than non-OA venues (Nature Publishing Group, 2015a).

There has been an open debate on the potential citation advantages of OA publications for quite some time (Antelman, 2004; Eysenbach, 2006; Stevan Harnad et al., 2004; Lawrence, 2001; Sotudeh et al., 2015; Sotudeh & Horri, 2007). Most recent research suggest that this is not necessarily the case (Bo-Christer Björk, 2017b; Mueller-Langer & Watt, 2014). However, this is a much wider deliberation that goes beyond the objectives of this thesis. Our findings suggest that researchers are aware of this possibility at different levels and with variations within disciplines and countries. We haven't found a clear pattern on the evolution of researcher's views and uncertainty in their responses is quite high in many cases.

5.2.3.2 OA myths: OA publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research

In this myth we found some sort of balance between the tree possible positions which researchers could adopt, with an inclination to disagree. In WoS 2016 31.2% of researchers agreed, while 30.6% did not position themselves and 38.2% disagreed. In the SOAP survey in 2010 most researchers actually agreed with this statement (50.2% agreement, 40.3% neither agree nor disagree, 9.5% disagreement). This is an important drop of around -20% in agreement together with a notable increase of +30% in disagreement.

Looking at the findings of other authors we can mention a survey in 2004 in which Swan & Brown already asked 311 researchers about these aspects and 20% declared to be concerned about the cost to their institution of non-OA journals (Swan & Brown, 2004a). In another survey in 2004 with 3,787 respondents it was reported that authors seem to hold strongly to the view that a move to open access systems would have more money to spend(Rowlands et al., 2004). Rowlands & Nicholas following a survey in 2005 reported that “researchers acknowledge that high prices are a barrier to accessing the literature: but their behaviour as authors shows little sensitivity to this aspect, and they select publishing outlets for other reasons” (David Nicholas et al., 2005). Another survey in 2008 reported 73.5% of researchers believed that OA publishing would help to reduce the cost of publication subscriptions (Coonin & Younce, 2009).

In the WoS 2016 survey we also find a balance between the three options in almost all disciplines. However, the majority of respondents in all of them declined to either agree or disagree with this statement. An slightly higher level of agreement was found in disciplines such as Agriculture (41.2%) or Language and Literature (45.4%). On the other hand the only disciplines which expressed certain levels of disagreement was Chemistry (23.3%). Large drops in agreement with this statement were found in disciplines like Medicine (-21.1%), Philosophy (-23.1%), Physics (-25.5%), Psychology (-25.8%) and Social Sciences (-27.1%).

Looking at other surveys we find one aimed at South African bioscientists in 2006 reported 65.4% of researchers agreeing with the statement that OA would help to break the serials crisis facing libraries, while 30.2% were unsure (Fullard, 2007). Another survey, this one aimed at researchers in education, found that 79.2% believed that OA publishing would help to reduce the cost of publication subscriptions (Coonin & Younce, 2010a). In a survey aimed at mathematicians in 2010 70% of the respondents declared that one of the reasons when choosing a journal to submit an article to was low subscription costs to libraries while 33% of them mentioned the absence of costs to libraries as a factor to choose to publish OA (Fowler, 2011). In 2010 another survey aimed at Business and Administration researchers reported 62.6% of researchers that believed that OA publishing would help reduce cost of publication subscriptions (Coonin, 2011). In the survey based on SOAP data on nursing professionals it was found that 50% of respondents found OA more cost-effective than traditional publishing models (Muñoz-García, 2013).

In terms of seniority in WoS 2016 the only outstanding aspect was the higher level of agreement of those with less than 5 years of experience with this statement (42.1%) compared to those with 25 or more years of experience (29.9%). It is in the 15-24 years (-15.6%) and the 25 years or longer (-16.7%) groups where support to this myth falls more.

At regions levels we found fairly high levels of support with this statement in regions like Africa (44.1%), Asia (44.5), India (45.5%) or China (50.4%). In contrast there were regions in which the majority of researchers neither agreed nor disagreed, like North America (52.1%), Oceania (56%) or Russia (58.9%). We also find changes of -20% in some regions for this myth: Russia (-20.5%), Middle East (-21.1%) and India (-23.2%) being the outstanding ones.

Other authors have issued surveys aimed at researchers in certain regions. We can mention a survey in 2005 aimed at scholars from the University of California, Berkeley faculty. King et al. found that given the high prestige of this university researchers were not actually concerned about aspects such as the serials crisis faced by libraries (King et al., 2006). In another survey among Australian researchers 59% mentioned reduced subscription fees as one of the benefits derived from OA publishing (Austin et al., 2008).

5.2.3.3 OA myths: OA publishing leads to an increase in the publication of poor quality research

This myth saw high proportions of researchers that did not position themselves, 46% in WoS 2016, with 36.8% agreeing and 17.2% disagreeing. There is a clear evolution in respect to the survey in 2010 in which the majority of respondents disagreed (51.2%). It seems like the sample in 2016 is less pro-OA and have more doubts on this particular aspect.

When we look at other authors that have queried researchers about this we find that already in 2004 Swan & Brown mention the perception of quality of OA journals in their interviews with authors for the JISC/OSI survey. Their conclusion basically was that OA-published authors perceived OA journals to have high levels of quality some authors refused to publish in these journals due to their concerns about their quality (Swan & Brown, 2004a). Also in 2004 another survey with 3,787 respondents reported around 55% of researchers associating OA with high quality and a very large majority declared to believe that OA publications would improve with time (Rowlands et al., 2004). In a follow up survey with 5,513 respondents in 2005 the same authors reported a bit more than half of respondents agreeing that OA would improve in the future (Rowlands & Nicholas, 2005). In a survey carried out in 2008 Coonin found that 46.5% would agree with the statement that OA journals are less prestigious than subscription based journals, while 22.9% of researchers did not have an opinion (Coonin & Younce, 2009). In 2012 a survey with 14,769 respondents reported 34% of researchers not positioning themselves in one sense or the other on an statement declaring that "OAP journals are lower quality than subscription journals", while 35% agreed and 32% disagreed (Frass et al., 2013). In the 2014 Nature survey with more than 30,466 respondents we find that 40% of researchers from the hard sciences had not published in OA journals because of concerns about their quality. This figure rises to 54% in the HSS (Nature Publishing Group, 2015a). In the follow-up survey in 2015 we find that this figure reaches 31% and it's the main reason because 7,955 did not publish in OA (Nature Publishing Group, 2015b).

In the longitudinal study from 2010 by Xia those that decided not to publish OA and gave "low prestige/impact factor" as a reason were analysed. The conclusion is that opinions have fluctuated over the years, but the general pattern is a mild concern about these aspects (J. Xia, 2010).

In our own analysis of this factor by disciplines we find in WoS 2016 only two disciplines from the hard sciences in which the majority of researchers agreed that OA means low quality: Architecture (41%) and Chemistry (41.3%). On the other side there were only two disciplines from HSS in which the majority disagreed: Library Science (51.1%) and Language (52.1%). In the rest of disciplines the majority of researchers neither agreed nor disagreed. This means an evolution in respect to SOAP 2010, survey in which there was a tendency to disagree with this statement.

If we look at other surveys we find that already in 2004 in a series of interviews to researchers in Medicine many mentioned their concerns about quality aspects of OA publishing (Schroter et al., 2005). In a survey in 2006 aimed at bioscientists in South Africa several questions around the quality of OA journals were asked. We find that a very large proportion (63.9%) neither agreed nor disagreed with a statement saying that OA journals were not recognized by review committees. We also see that while 39% of researchers declared that OA journals were on a par with traditional ones, 25% didn't agree and 25.8% did not provide an answer (Fullard, 2007). In another survey with 14 bioscientists, this time in the US, one of them mentioned high quality as an incentive to publish in OA venues while 4 of them expressed their concerned about the perceived quality of this type of scholarly communication (Warlick & Vaughan, 2007). In a survey issued in 2007 among medical researchers in Cuba only 0.7% expressed concerns about the quality of OA journals (Sánchez Tarragó & Fernández Molina, 2008). Another survey in 2007 in which information scientists took part saw how a high proportion of them associated OA to high quality (Johnson & Roderer, 2008a). In another survey in 2009 researchers in Education disagreed with the statement that "OA journals are less prestigious than subscription based journals" in 49% of the cases, while 31.8% of them agreed (Coonin & Younce, 2010a). The same author issued a survey aimed at Business and Administration researchers and reported 55.1% of agreement with the statement already mentioned, while 6.1% thought it was false (Coonin, 2011). Another survey in 2010 aimed at mathematicians found that the most important factor that took 76% of the respondents to publish OA was actually "the OA journal's quality and reputation" (Fowler, 2011). Muñoz-García in her analysis of nursing professionals in the SOAP survey reported high levels of concerns about the quality of OA journals (Muñoz-García, 2013). Another survey in 2014 with respondents from Physical Sciences, Engineering and Mathematics reported an average of 47.5% of researchers expressing concerns about publishing in OA journals due to concerns about quality aspects.

When we look at the distribution of responses by regions in WoS 2016 we can see that Middle East (41.4%) and Russia (42.4%) mostly agreed with this statement. On the other hand South America (46.4%), Africa (49.4%) or Brazil (55.0%) expressed high level of disagreement with the fact that the quality of OA journals is lower than that of traditional ones. There is a switch in respect to these opinions in respect to SOAP 2010 in regions in which the increase of agreement was in the order of +12.4% in North America, +13.3% in India, +16.8% in Oceania or +18.0% in Russia.

Other authors like Over et al. reported in a survey issued in 2004 40% of agreement by German researchers with the following statement about OA journals: "Quality assurance is just as guaranteed as with conventional publications" (Over et al., 2005). Another author issued a survey in 2006 aimed at Australian researchers and found that journal prestige 37.5% of those having published in OA journals mentioned quality as a deciding factor to do so. On the other hand 31.8% of authors that did not publish OA argued quality concerns (Kennan, 2007). Another survey in 2007 with Australian researchers found 76% of respondents mentioning "improved research outcomes or impact" as one of the advantages of OA (Austin et al., 2008). In 2008 Creaser asked UK researchers about their position about the following statement: "OA outputs are likely to be of lower quality than non-OA outputs", 38% of them agreed, while 36% didn't have an opinion and 26% disagreed (Creaser, 2010). A survey aimed at Spanish researchers in 2010 reported around 16% of authors that had published in OA journals mentioning quality as one of the aspects to do so (Bernal, 2010a). Also in 2010 another study based on the SOAP survey results on Argentinian researchers reported 8% of researchers not publishing in OA due to concerns about the quality of the journals (Bongiovani et al., 2012). In the 2014 survey issued by Nature 37% of Chinese researchers expressed concerns about quality as one of the reasons for not publishing OA (Nature Publishing Group, 2015a). In the 2015 version this was also the most cited reason for not publishing OA by around 28% of researchers (Nature Publishing Group, 2015b).

In general terms we see that quality of OA publications has been a one of the main sources of concern for researchers since the first surveys were issued. It is more acute in those regions or disciplines that are not so keen on OA. We have also seen that different surveys have approached this issue in different ways. While those authors with a more pro-OA attitude would ask the question in a positive way (e.g.: OA journals are associated with high quality) others would express it in a negative form (e.g.: OA journals have lower quality than subscription journals). We have also seen that in some surveys researchers were asked about quality aspects only if they had published OA or exactly the other way round, only those not having had published in OA were asked if one of the reasons was because of the perceived quality. All these aspects would probably deserved a deeper analysis to find out the real impact it has in researchers' responses.

To this we might add a point already made by Swan and Brown in 2004: " New open access journals, such as those from the BioMed Central stable and from PLoS, inevitably have no impact factor assigned to them by ISI. They simply have not been in existence long enough" (Swan & Brown, 2004b). Since them obviously things have greatly evolved but that perception has kept somehow stuck in some part of research's collective memory.

5.2.3.4 OA myths: OA publishing undermines the system of peer review

This aspect is tightly linked to the previous myth. However, the majority of researches disagreed in WoS 2016 (46.6%), although we also find high levels of neither agree nor disagree answers (32.2%). In this sense we also observe a less positive evolution in respect to SOAP 2010, in which more researchers disagreed (57.7%;) and there was also less slightly less researchers that did not position themselves (27.3%).

Other authors have found that peer review is a critical aspect for researchers. In the case of a survey in 2001 is mentioned as an important aspect by 94% of researchers, although not in the context of OA (Swan & Brown, 2003). In a follow up survey by the same authors in 2004 it was actually asked as one of the potential reasons for not publishing in OA: "I perceive the OA journals in my field to have poor peer review procedures in place". Around 49% of authors declared it as an important factor, while the 51% remaining said it wasn't. On the other hands OA published authors were asked to compare the standards of peer review in the Open Access journals in which they had published with those of traditional subscription-based journals. The great majority (76%) said they were about the same as a traditional subscription-based journal of similar quality. 13% said they were better than a traditional subscription based journal of similar quality and 6% said they were worse. Four percent of respondents answered don't know (Swan & Brown, 2004b). In a follow up survey with a much larger sample size (1,296 respondents) the authors asked authors that hadn't published in OA journals if poor peer-review had played a role in their decision and 6% said so (Swan & Brown, 2005). The next survey we find that asked about peer-review aspects was in 2008. Coonin & Younce asked researchers if they believed that "OA journals are usually not peer reviewed", 76.9% said it was false while 19.8% did not state any opinion (Coonin & Younce, 2009).

Looking at the disciplines distribution for this myth in our survey we could see that most authors disagree that peer-review in OA journals is worse than in subscription-based journals in most cases. There are lowel levels of disagreement in some hard sciences disciplines: Mathematics (26.1%), Chemistry (26.8%) and   Architecture (28.3%), while those with a stronger position against this statement are in the HSS: Library Science (60.9%), Philosophy (63.0%) and Language (68.3%). In SOAP 2010 some disciplines took a much stronger position disagreeing with this statement, like 70.6% of computer scientists and 69.7% of respondents from philosophy. In many disciplines more than half of the researchers expressed disagreement while those not positioning themselves where in 20-30% range.

Other authors like Fullard reported high levels of uncertainty by bioscientists in South Africa during the early days of OA. In a survey issued in 2007 that 48.8% of respondents disagreed with the statement "OA journals do not offer proper peer review", while 40.6% did not have an opinion (Fullard, 2007). In 2009 Coonin reported 86.3% researchers in Education saying it was false that OA journals are not peer-reviewed, while 10.8% did not provide an opinion (Coonin & Younce, 2010a). Coonin also issued a survey in 2010 aimed at researchers in Business and Administration and reported 29.8% of respondents that did not believe that articles in OA journals were not peer-reviewed, with 20% not responding in any sense. However, the caveat in this occasion is that 37.3% choose an option not present in the previous survey: depends on the journal (Coonin, 2011). In 2010 a survey aimed at mathematicians reported that 16% of researchers that had not published in OA argued "inadequate peer review procedures" as a reason for not doing so (Fowler, 2011). In the subset on nursing professionals from the SOAP survey it was reported only around 8% of researchers agreeing with this myth, with around 24% of them neither agreeing nor disagreeing.

While the majority of researchers across all disciplines expressed disagreement with this myth it is outstanding the position of Chinese researchers. Opinions were quite spread across all the possible options, being the most chosen one neither agree nor disagree with 36% of responses. There was strong disagreement in both surveys in regions like Brazil (51.1% in WoS 2016), Africa (52.5%), Europe (52.6%), Oceania (53.1%) and North America (54.5%).

When we look at the findings of other authors we can mention a survey in 2006 among Australian researchers in which "some of them" mentioned concerns about the lack of peer-review processes in OA journals (Kennan, 2007). In another survey among researchers in New Zealand in 2015 there are also some researchers expressing concerns on peer-review aspects of OA journals, but it doesn't seem to be a major issue (White & Remy, 2016).

In general terms researchers seem to tend to believe that peer-review processes in OA journals are similar to those in subscription-based journals. In the early days of OA there seemed to be more doubts although a certain evolution is observed. There is still some reticence in some disciplines and countries though. What is clear is that peer-review is one of the most important aspects for researchers to be present in any scientific journal, OA or not.

5.3 Practice

5.3.1 Number of OA articles

Already in SOAP 2010 we found that publishing OA articles was becoming more and more common in scholarly communication (52.4% had published at least OA articles in the previous five years). In our survey in 2016 this tendency was confirmed as 66.7% of the respondents had done so (14.3% increase).

In 2004 we find the first survey in which authors were asked if they had published in OA. In a 311 sample size 50% of researchers contacted declared to have published at least one article in OA (Swan & Brown, 2004b). In a follow-up survey, this time with a larger sample (1,296 respondents) the same authors reported 24% they had published in OA and 9% don't know (Swan & Brown, 2005). In 2005 a large survey with 5,513 respondents reported that a very small proportion (11%) had published in OA. We need to mention that only those respondents that declared to be familiar with OA (66%) were actually asked this question. Many authors issuing surveys around this time mention confusion around what could be considered OA and what not (D. Nicholas et al., 2005). Another international and multidisciplinary survey in 2006 reported 33% of researchers with experience publishing OA (Hess et al., 2007). A large survey issued by Taylor & Francis in 2012 with 14,769 respondents found that 21% had published in OA venues (Frass et al., 2013). On the other hand the Nature Publishing group 2014 survey reported that 62% of Science authors had published OA in the previous 3 years while 38% of the HSS had done so (Nature Publishing Group, 2015a). In the 2015 edition of this survey 60% declared to have done so (Nature Publishing Group, 2015b).

The longitudinal study from Xia compiled data up to 2008 and already reported a raising trend in OA publication with certain level of hesitance: "although the rate started very low in the mid-1990s, it still did not reach a high level by the end of the sequence of observations, even with a detectable, continual rise. This may indicate a relative hesitation among scholars for making contributions to OA journal publishing" (J. Xia, 2010).

When looking at the distribution of responses by disciplines in our findings we can see that in 2016 the majority of researchers across all disciplines had published at least one OA articles in the last five years. The most OA-sceptic disciplines were Mathematics (35.0% of respondents had not published any OA articles), Astronomy (35.6%), Business and Administration Studies (39.1%) and Chemistry (39.9%). On the other hand the most OA-prolific disciplines were Biology (76.5% of respondents had published at least one OA article), Medicine (76.4%) and Language and Literature Studies (75.5%). When we compare these data with SOAP we can see strong variations in Social Sciences (-18.2% with 0 OA articles), Medicine (-20.2%), Physics (+17.2% had published at least one OA article).

Other authors have looked at specific disciplines in their surveys. In 2006 a survey aimed at Canadian bioscientists reported 27% of them having published in OA (Morrison et al., 2006). In 2007 a survey among Medicine researchers in Cuba reported 28% of researchers having published OA (Sánchez Tarragó & Fernández Molina, 2008). In 2007 a survey aimed at Information Scientists reported 35.3% OA publication ratio (Johnson & Roderer, 2008b).

In 2008 Uhl reported 41% of researchers in Psychology declaring to have published at least one OA article (Uhl, 2009). Also in 2008 and in the context of a survey among 1,368 bioscientists in the UK we find another reference to certain level of confusion these years around OA publications. The authors not just asked respondents if they had published in OA but they also did check those journals and this is what they found: "just 25% said that they published in OA journals (again, 34% of titles were not OA journals, which reduced the real figure to around 17%)" (Thorn et al., 2009). In 2010 a survey among mathematicians reported 33% of respondents claiming to have published in OA while 19% declared not to be sure (Fowler, 2011). Also in 2010 a survey among researchers in Byzantine studies reported 28.7% of respondents having published OA (Tsoukala & Sachini, 2011). In the reanalysis of the SOAP data focusing on nursing researchers in 2010 the author reported 51% of researchers having published OA, with 13% declaring not to know (Muñoz-García, 2013).

In terms of seniority we found in both surveys that while more senior researchers are more productive both in terms of non-OA and OA articles, differences were not particularly significant. The most senior group is slightly behind, but the evolution since the survey in 2010 is equally significative.

When we look at the country distribution of OA publication we do see some striking differences. There are high levels of OA productivity in less rich regions: South America (71.1% published at least one OA article), Africa (77.2%) and Brazil (76.5%). On the other side we observe regions with high percentages of authors in WoS 2016 that had not published any OA article in the last 5 years, like North America (32.2%) or China (32.1%). In any case and in respect to SOAP 2010 there is strong evolution in many regions in which researchers declared to have published at least one OA article, like Europe (+16.1%), North America (+16.2%) or Oceania (+18.4%).

A survey in 2004 focused on German researchers reported 11.9% of OA published authors (Over et al., 2005). Another survey in 2006 aimed at Indian researchers reported 0% of researchers having published in OA journals (Deoghuria & Roy, 2007), and another survey in 2006 with 1,118 researchers from the USA reported 21% of faculty having published in OA journals (University of California, 2007). We also find a survey in 2006, this one among Australian researchers, in which 11.9% of researchers indicated to have experience publishing in OA outlets (Kennan, 2007) while another survey one year later found 41% of Australian researchers such experience (Austin et al., 2008). A survey aimed at Spanish researchers in 2010 reported 7% o researchers publishing in OA journals (Bernal, 2010a). A study of Argentinian researchers based on the SOAP 2010 dataset reported levels of OA publishing of 85% (Bongiovani et al., 2012). Ina survey in 2012 with German researchers it was reported 48% of researchers having published OA (Eger et al., 2013b). Another survey in 2015 with researchers from New Zealand reported 49% of researchers having published OA (White & Remy, 2016). In the 2014 Nature OA survey 63% of Chinese authors declared to have published at least OA article in the previous 3 years (Nature Publishing Group, 2015a) while this same figure reaches 70% one year later (Nature Publishing Group, 2015b).

We have observed a clear evolution in the number of researchers with experience publishing in OA journals. As we will see later quality of the journal is one of the most important aspects when researchers choose where to submit their articles. In the early days of OA most OA journals were new and traditional ones did not offer OA options. Today researchers have more and better options and this is reflected in their experience publishing in OA venues.

5.3.2 Publication fee OA articles and who covered it

In our 2016 survey we found that more than half of respondents declared to have paid to publish in OA (53.2%). This is already a quite substantial difference with SOAP 2010, in which 23.4% responded in this sense. We also found that the highest proportion of researchers that declared to have paid was in the €1,001-€3,000 category (20.3%). Not having to pay was still fairly common though (37% declared so in WoS 2016).

When looking at how such fee was covered we found that researchers usually take the money from research grants. It looks like funds specifically designated to cover OA fees are more and more common (25.5% in WoS 2016), although the majority used general research funds (35.8%). Asking institutions to pay those fees is still fairly common, with +20% doing so in both surveys. In any case we still see a fair amount of researchers that had to pay for OA fees out of their pockets (17.3% in 2016, 18.9% six years before).

In the JISC/OSI survey in 2004 with 311 respondents around 45% of respondents declared to have paid OA fees. Authors reported that 25% of the respondents paid the fee from their research grant, in 17% of the cases it was their institution who paid and 4% paid the fee themselves. Researchers in this survey were not asked how much they actually paid, However, they were asked how much they would be willing to pay. While 15% of OA authors said nothing, 26% of those that had not published in OA responded in this sense. In total 70% of OA authors declared to be willing to pay between $500 and $1,500. Non-OA authors provided this opinion in 51% of the cases (Swan & Brown, 2004b). Another survey in 2004 with 3,787 respondents reported that only 38% of authors surveyed had had any prior experience of paying OA fees. When asked how much they would be willing to pay 48% responded nothing. Authors of the survey made an estimation of $400 as a global amount researchers would be willing to pay (Rowlands et al., 2004). Another survey in 2008 reported 26.9% of respondents that said they had published in journals that had author fees, although it didn't indicate how much they had paid (Coonin & Younce, 2009). In a survey in 2011 Solomon & Björk asked authors published in OA journals with APCs about their experience. The authors calculated that researchers would be willing to pay an average amount of $649 and a standard deviation of $749 (Solomon & Björk, 2012b). In the Taylor & Francis survey in 2012 with 14,769 respondents 8% declared to have paid APCs (either directly or through their institution) (Frass et al., 2013). The next international and multidisciplinary survey in which we find details about APCs is the Nature survey in 2014 with 30,466 respondents. In this survey we find that 74% of science authors and 71% of HSS authors who published OA in the past 3 years did pay an APC fee they paid for their most recent OA publication. The most frequent response from HSS authors was "less than $800" (37%), whereas for science authors the most frequent response was "between $800 and $1,600" (45%). However, we need to point out that the base for these responses was formed by 6,394 science researchers and 1,667 HSS. From these, 63% of science authors had funding available for publication costs, being "as part of an existing grant" the most common source of such funding. In the case of HSS 53% of authors asked their institution to pay (Nature Publishing Group, 2015a). I the 2015 version of this survey it was reported that 68% of researchers had access to cover publication costs for OA articles. From those 21% declared to have more than $1,000 available, while 32% responded that “reasonable costs could be covered” although did not indicate any specific amount (Nature Publishing Group, 2015b).

Although is not a survey aimed at researchers at this point it would be interesting to mention a survey in 2014 aimed at 26% of journals listed in DOAJ that do have APCs (2,567 in total). This study found that journals charge on average (mean) $1,221 to publish an article, with a standard deviation $795. The authors of the paper concluded at the time that “open access article processing fee approach is a model in an early and still highly volatile phase” (Morrison et al., 2015).

Coming back to our researchers’ survey, when we look at the distribution by disciplines we find that the majority of researchers did not have to pay to publish OA in any survey. However, there is an evolution and there were more researchers that had to pay in the last 6 years. Particularly interesting is the case of Biology (€1001-€3000, 27.4%) and Medicine (€1001-€3000, 27.2%) in WoS 2016. But there are also some disciplines in which paying these same amounts is also fairly common: Engineering and Technology (21.3%) Earth Sciences (27.1%) or Psychology (27.2%). In terms of how fees are covered we also see many cases in which grants include specific budget lines to cover these costs: Astronomy (40.5%), Chemistry (40.7%), Earth Sciences (41.6%), Mathematics (45.9%), Physics (41.5%). In many disciplines in the HSS However, there are many cases in which researchers need to pay these costs out of their own pockets: Business and Administration (35.4%), Library Science (33.3%), Creative Arts (44.4%), Law (34.6%), Philosophy (33.3%).

In the re-analysis of the SOAP survey data from 2010 focused on nursing researchers it was found that most of half of the researchers (53%) did not pay at all. The rest of 146 researchers that did pay were spread in different cost categories ranging from €250 to €3,000+. Around half of the respondents used research grants funds to cover them and some 14% had to pay themselves (Muñoz-García, 2013). In a study mainly focused on APC in 2011 with 429 respondents the authors reported that the majority of researchers in Agriculture (71%) and Business (71%) declared to have paid $500 or less. 90% of researchers in Chemistry, Earth Sciences, Physics and Astronomy and 87% in Education, Social Sciences, Law and Political Science declared to have paid between $501 and $2,000. In the Health Sciences, Biology and Life Sciences 79% of researchers responded to have paid between $1,001 and $3,000 (Solomon & Björk, 2012b).

In terms of seniority our findings only suggest a strong decrease in the number of researchers that didn’t have to pay to publish OA across all age groups. Differences in terms of amounts paid and sources of funding were not particularly interesting.

In terms of geographic regions we actually did find interesting differences. The most striking one is the gap between less wealthy regions in which the majority of respondents in 2016 opted mainly for OA publications at no cost: Brazil (42.1%), South America (45.6%), Africa (46.6%), Middle East (49.3%), India (56.0%), Russia (57.4%) . On the other hand we had regions with large proportions of researchers that paid between €1,001 and €3,000 to publish their latest OA article: China (18.3%), Europe (25.8%), North America (27.6%), Oceania (27.2%). In this last group we can see that many authors used funds aimed at paying OA fees to cover these costs: China (64.9%), North America (38.0%). In the first group, however, we saw many regions in which researchers had to cove these costs from their own personal funds: Brazil (46.0%), India (51.7%). Although the general tendency is for authors to pay to publish OA and to dedicate particular budget lines for this purpose, this transition is slower in some countries than in others though.

A survey in 2004 aimed at German researchers with more than 1,000 respondents reported that 42.7% of them had paid to publish OA. However, strong differences between disciplines were found in that study. While only 8.8% of researchers in HSS paid, the percentages were much higher in the other disciplines, with 24.7% in Engineering, 50.3% in the Natural sciences and 79.7% in the Life sciences paid (Over et al., 2005). In another survey in 2006 aimed at bioscientists in the US all respondents that paid to publish OA declared that they covered the fee with funds from research grants (Warlick & Vaughan, 2007). In 2014 a survey aimed at French researchers found that only 30% of respondents had paid APCs up to that moment. Those in Physics and Biology were more inclined to pay OA in the future while mathematicians and those in the HSS were less. Unfortunately the questionnaire didn't include questions about amounts paid (Schöpfel et al., 2016). Another survey among researchers in New Zealand asked the 75% of researchers that had paid to publish OA to indicate the TOTAL expenditure on this concept for the preceding 2-year period. Around 47% of respondents indicated that they had spent between €1-2,500 (White & Remy, 2016). The 2014 survey issued by Nature reported that 52% of researchers that had published in OA did pay APCs. It also found that while 10% did not have any specific budget to cover OA costs, 25% had between $1,000-$4,999 in total and 6% had $5,000 or more (Nature Publishing Group, 2015a).

While in the early days most researchers wouldn't have to pay any costs to publish in OA this has become more and more common. However, we can observer how the fact that a cost is covered and the amount to pay when is the case vary between regions and disciplines.

5.3.3 Importance of factors when selecting a journal to publish

The last analysis of our surveys was focused on the factors that influence researchers to select a journals to publish in. Our results suggested that the factors researchers gave more importance to were prestige or perceived quality of the journal (94.1% in WoS 2016), the relevance of the journal for their community (89.1%) and the journal Impact Factor (87.9%). The three factors to which researchers gave least importance were the fitting of the journal in their organisation policy (45.6% in WoS 2016), copyright policy of the journal (34.7%) and the fact that the journal is an Open Access journal (30.8%). Other factors relatively important for researchers in our samples were importance for their career (78.8%), positive previous experience with the journal (77.8%), likelihood of acceptance (74.6%), speed of publication (73.4%), absence of publication fees (66.3%) or recommendation by colleagues (58.1%). Differences between surveys were not particularly striking, which somehow hints that these factors have not actually evolved much in the last six years.

Other surveys have treated these aspects extensively in the past. The JISC/OSI report in 2002 reported that the most important factor for researchers when looking at OA journals was the fact that they were peer reviewed (Swan & Brown, 2004b). Rowlands & Nicholas in 2004 reported that the most highly rated factor determining journal choice was the fact that a particular title was perceived to offer the author access to a highly targeted readership. This was followed by a cluster of factors relating the quality of the journal (impact factor, editorial board) (Rowlands et al., 2004). A large survey in 2005 with 5,513 respondents also reported reputation of the journal, readership and impact factor as the most important aspects when choosing a journals to publish in. Speed of publication was also rather important while copyright aspects were not high in the priorities (D. Nicholas et al., 2005). In the 2014 and 2015 Nature surveys we also found that the most important factors for authors were relevance of the journal (around 97% in both surveys), Journal's reputation (around 97%), Quality of peer review (92.5% for Science, 88.5% for HSS) and Impact Factor (specially for Science, 90%). On the other side of the spectrum these surveys found that among the least important factors was the immediacy of OA, 36% in Science and 24.5% in HSS (Nature Publishing Group, 2015a, 2015b).

Looking at the disciplines distribution of the factors we analysed in detail we found that Impact Factor is rather important for all disciplines. There were slight differences between the hard sciences (e.g. Medicine 91.6% in WoS 2016, Architecture 91%, Chemistry 91.9%) and the HSS (e.g.: Library Science 76%, Creative Arts 70.9%, History 66.9%). Certain evolution between studies was observed, being Computer Science (+9.1%) and Social Sciences (+9.7%) the most interesting ones. The absence of publication fees was important for around 70% across all disciplines. In disciplines like Mathematics these figures reached 77.4% in WoS 2016 while we observed high levels of "it's irrelevant" answers in disciplines like Earth Sciences (30.3%) and Computer Science (31.2%). This factor was also quite steady between surveys and opinions didn't evolve dramatically.

Speed of publication was the third factor analysed in detail. In this case differences between disciplines are more substantial. On one hand there were some in which a strong majority of researchers gave quite some importance to this factor, the likes of Agriculture (89.7%) , Earth Sciences (86.3%) or Chemistry (84.9%). However, in the HSS this seems to be less critical, for example in Social Sciences (70.7%) or History (65.3%). Despite most researchers across all disciplines said that OA is beneficial for their disciplines in a previous question, it doesn't seem to be that important when choosing a journal to submit an article to. This way we observed high levels of researchers for which is an irrelevant factor, e.g. in WoS 2016 Astronomy (25.9%), Chemistry (26.7%) or Mathematics (30.1%). But most importantly the importance of this factor actually dropped considerably in respect to SOAP 2010 across all disciplines.

In other discipline-focused surveys other authors also looked into the importance of these factors. This way we find that Medicine researchers mentioned aspects such as impact factor, reputation, readership, speed of publication, and the quality of peer review systems when choosing where to submit (Schroter et al., 2005). Researchers interviewed by Warlick & Vaughan mentioned aspects such as Impact Factor, target audiences or quality, while OA status or speed of publication were less important (Warlick & Vaughan, 2007). Coonin & Younce also looked at the important factors for researchers in Education and their findings were similar. The most important factor is the quality of peer review followed by prestige-related aspects. Citation impact was less important and respondents did not have copyright policies high in their priorities (Coonin & Younce, 2010b). Another survey aimed at mathematicians reported that for 99% of the respondents the journal's quality and reputation was important, followed by speed of publication (93%). The absence of publication charges was also highly rated (87%) while the fact that the journal was OA was mentioned by 74% (Fowler, 2011). Another survey focusing on Business and Administration researchers in the US reported that peer review was the most important factor, followed by the reputation of the journal. While speed of publication was high in the priorities, the author reported that impact factor was actually not as important (Coonin, 2011). In the nursing researchers analysis based on the SOAP data it was reported that relevance for the community and prestige were the most important factors. Absence of fees was important for almost 80% of researchers while the fact that the journals was OA was for almost 60% of them (Muñoz-García, 2013).

Although in terms of seniority differences were not particularly striking it was not the case when looking at the regions in which researchers carry on their activities. For instance impact factor seems to be an extremely important factor in regions like Middle East (50.4%) and Brazil (59%). We also saw that the absence of journal publication fees is rather important in regions like Africa (80.7% in Wos 2016) or India (80.5%) while is not so much in Asia (61%), Europe (66.2%) or China (57.0%), where it actually dropped by -16.4% in respect to SOAP 2010.

The speed of publication of journals was a particular factor for regions like India (87.4% in WoS 2016) or Middle East (85.2%) as well as other less wealthy regions: Africa (80.7%), Asia (81.4%), Brazil (81.6%). In China 83.3% of researchers said so. Brazil was the only region in which most researchers declared that the fact that a journal is OA was an important factor (51.1% in WoS 2016). While important in the previous survey this factor dropped considerably in WoS 2016 in some regions: India (45.0%), Middle East (31.5%), China (27.2%) and Asia (31.9%).

In a survey in 2004 aimed at German researchers Over also reported that the most important factor the relevance of the journal (92.6%) and the journals reputation (90.7%). On average Impact Factor was important for 61.7% of researchers, although we need to point out that it was the case for 42.7% of HSS researchers and 83.3% of researchers in the life sciences. Speed of publication was important for only 59.5% while the absence of fees was for 23.2% (Over et al., 2005). In a survey in 2006 focused on Indian researchers it was reported that speed of publication was important for 42% of them, 45% mentioned impact factor and 78% the prestige of the journal (Deoghuria & Roy, 2007). Another survey this time among Australian researchers also mention reputation of the journal (74%) and quality of peer review (63%) high in their reasons to choose a journal. The fact that there is no fee to publish was important for 35% while speed of publication was for 49%. The fact that the journals was OA was important for 14% of respondents (Austin et al., 2008).

Factors like journal prestige, quality of peer-review or impact factor are always among the most important for researchers to decide where to publish. We have observed this since the earliest surveys were issued. It is the case also in different disciplines and countries. Other aspects such as the fact that journals are OA are less important, but again, there is a consistency across regions and disciplines. The less homogenous factor of those studied in detail was the absence of OA fees. While for some disciplines or regions is more important, in others it was not a deciding factor.

6. Conclusions

We can probably say that two factors have triggered the biggest change in the scholarly communication system in the last 20 years. Actually some even call it a “revolution” (K. Peach, 2005). On one hand, the creation of the WWW by Tim Berners-Lee with the subsequent creation and popularisation of the so-called “electronic journals”. On the other hand a long serials crisis that has even put at stake the pure existence of many libraries around the world. The OA movement appeared as an utopic alternative. It was the solution to the many limitations that researchers from around the world had to face in their daily work: the research outputs they wanted to read, they needed to read, were behind pay walls. The kick-start were the BBB declarations (BOAI, Bethesda, Berlin). Since then much has been written, positions have been taken and initiatives have been launched. All stakeholders involved have had their say: librarians, policy makers, publishers, funders… and obviously one of the most important ones, probably THE most important one: researchers.

One of the main tools to collect not only researchers’ views but also their hopes, their worries, their expectations have been surveys. Along this PhD thesis we have studied many types of surveys: international or focused on specific countries (or regions, or universities, or research institutions), multidisciplinary (or focused on specific disciplines, or areas of knowledge, or communities). But we have also seen pro-OA surveys as well as surveys launched by commercial publishers when they had zero interest in promoting OA.

This researcher had the immense honour of taking direct and active part in a project known for issuing the largest OA survey to date. However, there is an important factor that is not usually mentioned when we talk about SOAP. This project, funded by the European Commission, brought together a consortium integrated by, among others, libraries and publishers (both traditional and OA publishers). As someone said during the project kick-off, SOAP was a project to study OA, not to promote OA. We truly believe that in the SOAP questionnaire we managed to extract researcher’s views on OA publishing in a balanced way. Much has happened since 2010 and during this study we have updated that snapshot. We have learnt that many things have changed, some others… not much.

6.1 OA Awareness

In our research we have offered a picture of attitudes and practices of researchers from around the world towards gold Open Access publishing. We did not find significant differences between disciplines or age groups either in the early days of OA or currently. In 2010 there were fewer options available and quite often researchers expressed confusion about what was OA and what wasn’t. As OA became more common, researchers’ awareness started to increase progressively and we have also observed that evolution in respect to 2010. Nowadays most surveys (including ours) find a small proportion of researchers declaring not to be aware of OA options in their field. This is probably due to the combination of a lack of interest and/or a general negative attitude towards OA. There are options to publish in OA in all fields of knowledge and most researchers are aware of them.

6.2 Is OA beneficial?

When we ask researchers a question like "Is OA beneficial?" one can only expect an overwhelming positive response. We can probably conclude that many of those researchers are answering this question with their readers hats on. It was anyhow interesting to see how there was a residual number of researchers whose answer was "no" (6.4% in the case of WoS 2016). These are probably those taking an active position against the OA movement. But we cannot ignore the fact that almost 15% of our respondents in 2016 were actually not interested in OA.

Equally interesting was to see how the responses to this questions evolved from SOAP 2010 to WoS 2016. Our reading of this outcome is twofold. Although we tried to diminish known biases in the SOAP survey sampling methods, we need to acknowledge that any person receiving the link to the survey had the possibility to pass it on. Having so many OA advocates among researchers we can easily picture an active dissemination of the survey link to promote OA. The other reason we can think of is that six years ago OA was seen by many as a solution to a number of problems. In 2016, however, many researchers might have faced the not-so-good aspects of OA: they might have been asked to pay to publish OA, for example... or they might even have had to pay from their own pockets! Obviously publishers have also done their job. There is much at stake, the academic publishing market has an annual revenue of $25.2 billion (Ware & Mabe, 2015). We can only recognize that some large companies certainly put their marketing muscle to the task of justifying the virtues of the traditional publication system against the OA alternative.

When looking at how researchers from different disciplines answered this question in OA surveys we usually find three of them outstanding: Chemistry, Physics and Mathematics. These disciplines are often identified in surveys as having a less positive approach to OA. Reasons for this to happen differ though. In Chemistry the American Chemical Society (ACS) took a quite belligerent approach towards OA in the mid-2000s. This society relied quite heavily on it subscriptions to its journals as a source of income and saw in OA a menace to its viability (Giles, 2007). Despite the fact that (as many commercial publishers) nowadays the ACS has actively embraced OA[20] many researchers still perceive more risks than advantages. Physicists, astronomers, mathematicians adopted OA at the very beginning, albeit a different type of the OA object of this thesis: green OA (Bo-Christer Björk, 2017a). When invited to fill both our OA surveys quite often researchers would reply back declining with a common argument: we don't need gold OA, we have arXiv.

When looking at the regions of the world we have also seen regions with higher levels of support. Regions like Brazil, Africa or South America are "net-reader" areas where researchers consume more than produce. This factor probably linked to the more than probable modest library budgets contribute to a much more positive attitude towards OA.

[20] http://acsopenaccess.org/

The other regions that stood out, in this case, as less supportive than others were China and Asia. Other surveys have actually confirmed this tendency and it would be interesting to find the reasons.

6.3 OA Myths

It seems clear that from the very beginning of the OA movement many researchers directly assumed that articles available for anyone to read without paywalls would be more widely read. And therefore they would receive more citations. There has been many studies confirming that this is the case (Eysenbach, 2006). Also many others confirming that this is not actually the case and the most rigorous recent studies are pointing in this direction: OA articles do not necessarily receive more citations (Dorta-González et al., 2017).

Other studies, especially those in the early days of the movement, pointed in this direction. We have seen an evolution which was actually confirmed by our longitudinal study. There are less researchers today believing that OA has a citation advantage. Nevertheless, there is still a majority of researchers believing that this is the case (60.4%). Significant and growing levels of uncertainty lead us to believe that this perception is tending to soften, slowly though. We also found that agreement with this statement is higher in those regions with a more pro-access researchers population, which actually is just expected.

Much has been said and written about the financial advantages of the OA model. And so has happened about the traditional model. This strong lobbying in one sense and the other is reflected in a quite balanced perception from researchers. There are approximately as many researchers that agree as there are that disagree. Actually, there is also a third of researchers that just haven't positioned themselves in one position or the other. When looking at a more granular level is not surprising to find that those disciplines more pro-OA also tend to agree more with this statement. Ditto with regional distributions. After all, positions tend to be more moderate than when responding about the general benefits of OA.

Less quality and a less strict peer-review have also been linked to OA since the first journals started to be published. Most researchers in both surveys tended to disagree with these sort of statements in spite of high levels of absence of opinion. This perception has been confirmed by many other surveys carried out some years ago. It is anyway shrinking and our instinct says that this tendency will continue. A plausible explanation is that the first OA journals didn't have any publication history behind. This obviously meant at the same time that they wouldn't have any Impact Factor, even in very prestigious journals nowadays such as PLoS or BioMed Central publications. Therefore these publications would rarely count for tenure or promotion, or even for grants. This perception is still somehow embedded in researchers' collective memory. We are conscious that this point of view is albeit in contradiction with our findings, that show more opposition to these negative statements about OA in SOAP 2010 than in WoS 2016. Our explanation is twofold. We have already mentioned the likely pro-OA biases in the SOAP survey. But in this time another collateral damage of the rapid expansion of OA has been the appearance of predatory journals (Shen & Björk, 2015).

6.4 OA articles publication

Along the two surveys analysed in detail and together with many others we can see how the publication of articles in OA is becoming a common place for many researchers. This tendency has been identified in past few years and has probably reached its tipping point. There are still disciplines with large bastions of researchers resisting to change. These are those already mentioned (Chemistry, but also Mathematics and Astronomy) and exactly for the same reasons already mentioned: lack of trust or better alternatives (namely green OA). At the same time we observe large figures also in those disciplines more traditionally pro-OA, many from the HSS. The most eye-catching cases are Biology and Medicine, pioneer disciplines in which today the norm is to publish in OA. We need to retain a figure, less than 20% of researchers in these disciplines have NOT published in OA in the last 5 years.

At regional level was not surprising to find that those more supportive are actually practicing what they preach. More than 70% of researchers in Africa, South America and Brazil have experience publishing in OA venues. China is a quite peculiar region in this respect. We have seen a small difference in respect to 2010 and there are levels of +30% of authors without any experience publishing in OA. If we compare these results with those in the Nature surveys we can only speculate that maybe less individuals publish in OA, but in total they publish more articles. To this we can add a slower-pace OA adoption. It will certainly be interesting to learn how things evolve in the Asian giant. Also interesting is to observe how publication rates have evolved in wealthier parts of the world as Europe and Oceania. We need to include North America here, despite once more it would be interesting to learn the reasons behind +30% of researchers without direct OA publication experience in the last five years in this region.

It is remarkable that levels of negative opinions about OA have maintained the same levels. In a number of cases have even increased. Despite this fact, adoption of OA has increased. This shows us that OA has evolved from being a matter of principle, almost a philosophical and ethical precept, to something much more practical. I don't believe it's beneficial, I have doubts about its quality, but I still publish in OA. We can probably say that OA is now accepted, and it's here to stay.

6.5 Publication fee OA articles and who covered it

APCs to publish OA is one of those topics often inducing to very heated debates. In our study we found a change of paradigm. While six years ago the norm was not to pay to publish OA, in 2016 is exactly the contrary. The majority of researchers that published in OA paid to do so. Being said this, we need to remark that differences with those that did not pay are small. Many other recent surveys have found quite similar results, it seems clear that the status quo is the balance.

We face a rather similar situation when looking at how were those costs met. There seems to be 15-20% of researchers that need to cover these costs from their own pockets. Using research grants to pay APCs seems to be the new norm. This is telling us that funders are recognizing and accepting APCs just as another cost involved in the research process. Some of them are even adding specific budget items to cover these costs. Funders are not only mandating to publish OA, they are also allowing researchers to use their grants for this purpose and event encouraging them to do so. At least in general terms.

When we went one level down we found that actually there were two big categories when looking at APCs by disciplines. In many of them paying is not common and the majority of researchers do not have to cover any cost to publish OA. This is specially the case for HSS, with two exceptions: Astronomy and Mathematics. In line with our previous comments, this seems to be a preference for green OA kicking in again.

In HSS we have also seen many cases in which more than 30% of researchers needed to cover those costs from their own pockets. These results are telling us that OA paying models are not quite common in HSS. And when there are, researchers do not have enough mechanisms to cover those costs from research grants.

In STM publishing in OA means paying fees quite often. In most cases those fees are covered with research grants. Either with either items specifically aimed at this or as direct costs. However, once more with find Biology and Medicine where costs are often high (€1001-€3000) and there are mechanisms to cover them. So we find two disciplines in which researchers are not more convinced about the benefits of OA than others. They have the same doubts about quality aspects or economic efficiencies. Despite all this, they publish more quantity at a higher cost. Mechanisms for all this to happen seem to be in place.

When we put the focus on the geographical distribution we also observe a similar pattern. Less wealthy regions have embraced OA. They see it's beneficial and they practice it. However, they can't afford it and when they need to pay researchers need to cover these costs themselves. In those regions funders seem to be behind in terms of covering APCs for OA publishing. We also need to mention that many OA publishers have mechanisms in place to waive OA fees for researchers in developing countries, which probably paid a role in the outcomes of the surveys.

The other big group includes countries with larger GDPs. Interesting once more is to see how China and Asia are part of this groups of regions. The negative evolution in the number of researchers that did not pay a few years ago and pay today is notable, particularly in the €1001-€3000 category. Actually many researchers in those regions had specific funds to cover OA costs in their grants. The combination of these factors indicate that OA adoption has taken longer to arrive to these countries than to other regions. But now funders are showing a firm commitment to it.

6.6 Factors to decide where to publish

The irruption of OA in the scholarly communication system has brought passion as well as enormous economic and financial consequences. Nevertheless, we have learnt through this research that there is an aspect that has kept immutable all this time. Researchers want to publish in those journals read by their peers. They need to disseminate their research in good quality journals in order to make an impact in their fields. At the end of the day this is the way in which we make science progress. Quality and Impact Factor are the most critical aspects for most researchers in all disciplines and all around the world.

As can only be expected, having to pay fees to publish or not is more or less important for researchers depending on where they live or how they can cover them. Ditto for the speed of publication... important for all, more for some and less for some others. And when it comes to the fact that journals are OA we come back to the beginning of this chapter. We can't help to conclude that yes, we all like OA but when it comes to choose, there are many more important things to think about.

At this point we can't help paraphrasing James Carville: it's the quality, stupid!

6.7 Final remarks

We won't say anything new if we say that OA is inevitable (Lewis, 2012). Information wants to be free and those producing also it want it to be free. The current system needs to be regenerated. The serials crisis needs to come to an end so librarians can develop their work without having a sword of Damocles hanging over their heads each time budgets are negotiated.

Policy makers and funders have understood that the research they fund needs to be made available openly. This is the way to make science progress. And they are starting to understand that there is a cost involved. Therefore researchers need mechanisms to cover those costs.

Publishers add value to the scholarly communication system, we can't deny that. Electronic journals have improved in the last few years enormously. Organizing papers peer-review, improving and maintaining website articles, preparing the layout, etc. It is only fair to recognize that there are costs involved in the publication chain. Costs that need to be met. However, we cannot just ignore that the most important part of this effort is carried out by the researchers themselves. It's them who generate the content. It's them who improve and validate such content working as peer-reviewers for free. And no matter how much these private companies invest in innovation, their revenues are unjustifiable in many cases. Private companies need to make a profit, but not an unfair profit. We are suffering an oligopoly of publishers (Larivière et al., 2015) that keeps the keeps the whole system hostage.

Publishers have already embraced the OA system and that's an important step in the right direction. But we need to move forward. It doesn't make sense to generate new knowledge paid with tax-payers money. And then ask those same tax-payers to pay again to get access to that knowledge. But it's even more absurd to put the burden in those who generated that knowledge. Mechanisms are being put in place, but more needs to be done.

Green OA is an alternative. And it works in some disciplines. But once again we cannot ignore what's important for researchers to make science. We cannot ignore the fact that as of today peer-review is critical and despite laudable initiatives like open peer-review we are not ready yet. We just cannot do it for them, but without them.

This PhD candidate humbly believes that projects like Scoap^3 and the OA2020 Initiative are the way forward. We all need to work together, understand what's involved and get all to row in the same direction. It won't be easy, but we'll make it happen.

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Annex I - Subject correspondence in WoS 2016

Web of Science - Research Areas	WoS 2016 Study - Subject
ACOUSTICS	Physics and Related Sciences
AGRICULTURE	Agriculture and Related Sciences
ALLERGY	Medicine, Dentistry
ANATOMY MORPHOLOGY	Medicine, Dentistry
ANESTHESIOLOGY	Medicine, Dentistry
ANTHROPOLOGY	Social Sciences
ARCHAEOLOGY	Historical Studies
ARCHITECTURE	Architecture, Building and Planning
AREA STUDIES	Social Sciences
ART	Creative Arts and Design
ARTS HUMANITIES OTHER TOPICS	Creative Arts and Design
ASIAN STUDIES	Social Sciences
ASTRONOMY ASTROPHYSICS	Astronomy and Space Science
AUDIOLOGY SPEECH LANGUAGE PATHOLOGY	Medicine, Dentistry
AUTOMATION CONTROL SYSTEMS	Engineering and Technology
BEHAVIORAL SCIENCES	Psychology
BIOCHEMISTRY MOLECULAR BIOLOGY	Biological Sciences
BIODIVERSITY CONSERVATION	Biological Sciences
BIOMEDICAL SOCIAL SCIENCES	Medicine, Dentistry
BIOPHYSICS	Biological Sciences
BIOTECHNOLOGY APPLIED MICROBIOLOGY	Biological Sciences
BUSINESS ECONOMICS	Business and Admin. Studies
CARDIOVASCULAR SYSTEM CARDIOLOGY	Medicine, Dentistry
CELL BIOLOGY	Biological Sciences
CHEMISTRY	Chemistry
CLASSICS	Language and Literature Studies
COMMUNICATION	Communications, Information and Library Science
COMPUTER SCIENCE	Computer Science
CONSTRUCTION BUILDING TECHNOLOGY	Architecture, Building and Planning

CRIMINOLOGY PENOLOGY	Law
CRYSTALLOGRAPHY	Chemistry
CULTURAL STUDIES	Creative Arts and Design
DEMOGRAPHY	Social Sciences
DENTISTRY ORAL SURGERY MEDICINE	Medicine, Dentistry
DERMATOLOGY	Medicine, Dentistry
DEVELOPMENTAL BIOLOGY	Biological Sciences
EDUCATION EDUCATIONAL RESEARCH	Education
ELECTROCHEMISTRY	Chemistry
EMERGENCY MEDICINE	Medicine, Dentistry
ENDOCRINOLOGY METABOLISM	Medicine, Dentistry
ENERGY FUELS	Engineering and Technology
ENGINEERING	Engineering and Technology
ENTOMOLOGY	Biological Sciences
ENVIRONMENTAL SCIENCES ECOLOGY	Earth Sciences
ETHNIC STUDIES	Social Sciences
EVOLUTIONARY BIOLOGY	Biological Sciences
FAMILY STUDIES	Social Sciences
FILM RADIO TELEVISION	Communications, Information and Library Science
FISHERIES	Agriculture and Related Sciences
FOOD SCIENCE TECHNOLOGY	Agriculture and Related Sciences
FORESTRY	Agriculture and Related Sciences
GASTROENTEROLOGY HEPATOLOGY	Medicine, Dentistry
GENERAL INTERNAL MEDICINE	Medicine, Dentistry
GENETICS HEREDITY	Biological Sciences
GEOCHEMISTRY GEOPHYSICS	Earth Sciences
GEOGRAPHY	Earth Sciences
GEOLOGY	Earth Sciences
GERIATRICS GERONTOLOGY	Medicine, Dentistry
GOVERNMENT LAW	Law
HEALTH CARE SCIENCES SERVICES	Medicine, Dentistry
HEMATOLOGY	Medicine, Dentistry
HISTORY	Historical Studies
HISTORY PHILOSOPHY OF SCIENCE	Historical Studies
IMAGING SCIENCE PHOTOGRAPHIC TECHNOLOGY	Engineering and Technology
IMMUNOLOGY	Medicine, Dentistry
INFECTIOUS DISEASES	Medicine, Dentistry
INFORMATION SCIENCE LIBRARY SCIENCE	Communications, Information and Library Science
INSTRUMENTS INSTRUMENTATION	Engineering and Technology
INTEGRATIVE COMPLEMENTARY MEDICINE	Medicine, Dentistry

INTERNATIONAL RELATIONS	Social Sciences
LEGAL MEDICINE	Medicine, Dentistry
LIFE SCIENCES BIOMEDICINE OTHER TOPICS	Medicine, Dentistry
LINGUISTICS	Language and Literature Studies
LITERATURE	Language and Literature Studies
MARINE FRESHWATER BIOLOGY	Biological Sciences
MATERIALS SCIENCE	Engineering and Technology
MATHEMATICAL COMPUTATIONAL BIOLOGY	Biological Sciences
MATHEMATICAL METHODS IN SOCIAL SCIENCES	Social Sciences
MATHEMATICS	Mathematics
MECHANICS	Engineering and Technology
MEDICAL ETHICS	Medicine, Dentistry
MEDICAL INFORMATICS	Computer Science
MEDICAL LABORATORY TECHNOLOGY	Medicine, Dentistry
METALLURGY METALLURGICAL ENGINEERING	Engineering and Technology
METEOROLOGY ATMOSPHERIC SCIENCES	Earth Sciences
MICROBIOLOGY	Biological Sciences
MICROSCOPY	Engineering and Technology
MINERALOGY	Earth Sciences
MUSIC	Creative Arts and Design
MYCOLOGY	Biological Sciences
NEUROSCIENCES NEUROLOGY	Medicine, Dentistry
NUCLEAR SCIENCE TECHNOLOGY	Engineering and Technology
NURSING	Medicine, Dentistry
NUTRITION DIETETICS	Medicine, Dentistry
OBSTETRICS GYNECOLOGY	Medicine, Dentistry
OCEANOGRAPHY	Earth Sciences
ONCOLOGY	Medicine, Dentistry
OPERATIONS RESEARCH MANAGEMENT SCIENCE	Business and Admin. Studies
OPHTHALMOLOGY	Medicine, Dentistry
OPTICS	Physics and Related Sciences
ORTHOPEDICS	Medicine, Dentistry
OTORHINOLARYNGOLOGY	Medicine, Dentistry
PALEONTOLOGY	Earth Sciences
PARASITOLOGY	Medicine, Dentistry
PATHOLOGY	Medicine, Dentistry
PEDIATRICS	Medicine, Dentistry
PHARMACOLOGY PHARMACY	Medicine, Dentistry
PHILOSOPHY	Historical Studies
PHYSICAL GEOGRAPHY	Earth Sciences
PHYSICS	Physics and Related Sciences
PHYSIOLOGY	Medicine, Dentistry

PLANT SCIENCES	Biological Sciences
POLYMER SCIENCE	Chemistry
PSYCHIATRY	Medicine, Dentistry
PSYCHOLOGY	Psychology
PUBLIC ADMINISTRATION	Social Sciences
PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH	Medicine, Dentistry
RADIOLOGY NUCLEAR MEDICINE MEDICAL IMAGING	Medicine, Dentistry
REHABILITATION	Medicine, Dentistry
RELIGION	Philosophical Studies
REMOTE SENSING	Engineering and Technology
REPRODUCTIVE BIOLOGY	Biological Sciences
RESEARCH EXPERIMENTAL MEDICINE	Medicine, Dentistry
RESPIRATORY SYSTEM	Medicine, Dentistry
RHEUMATOLOGY	Medicine, Dentistry
ROBOTICS	Engineering and Technology
SCIENCE TECHNOLOGY OTHER TOPICS	Engineering and Technology
SOCIAL ISSUES	Social Sciences
SOCIAL SCIENCES OTHER TOPICS	Social Sciences
SOCIAL WORK	Social Sciences
SOCIOLOGY	Social Sciences
SPECTROSCOPY	Engineering and Technology
SPORT SCIENCES	Medicine, Dentistry
SUBSTANCE ABUSE	Medicine, Dentistry
SURGERY	Medicine, Dentistry
TELECOMMUNICATIONS	Engineering and Technology
THERMODYNAMICS	Engineering and Technology
TOXICOLOGY	Medicine, Dentistry
TRANSPORTATION	Social Sciences
TROPICAL MEDICINE	Medicine, Dentistry
URBAN STUDIES	Social Sciences
UROLOGY NEPHROLOGY	Medicine, Dentistry
VETERINARY SCIENCES	Medicine, Dentistry
VIROLOGY	Medicine, Dentistry
WATER RESOURCES	Earth Sciences
WOMEN S STUDIES	Social Sciences
ZOOLOGY	Biological Sciences

Annex II - Country correspondence

Annex II. 1 Countries and email addresses domain extension in WoS 2016

Domain in email address	Country
.ac	Ascension Island
.ad	Andorra
.ae	United Arab Emirates
.af	Afghanistan
.ag	Antigua and Barbuda
.ai	Anguilla
.al	Albania
.am	Armenia
.an	Netherlands Antilles
.ao	Angola
.aq	Antarctica
.ar	Argentina
.as	American Samoa
.at	Austria
.au	Australia
.aw	Aruba
.ax	Åland
.az	Azerbaijan
.ba	Bosnia and Herzegovina
.bb	Barbados
.bd	Bangladesh
.be	Belgium
.bf	Burkina Faso
.bg	Bulgaria
.bh	Bahrain
.bi	Burundi
.bj	Benin
.bm	Bermuda
.bn	Brunei
.bo	Bolivia
.bq	Bonaire
.br	Brazil
.bs	Bahamas

.bt	Bhutan
.bv	Bouvet Island
.bw	Botswana
.by	Belarus
.bz	Belize
.ca	Canada
.cc	Cocos (Keeling) Islands
.cd	Democratic Republic of the Congo
.cf	Central African Republic
.cg	Republic of the Congo
.ch	Switzerland
.ci	Côte d'Ivoire
.ck	Cook Islands
.cl	Chile
.cm	Cameroon
.cn	Peoples R China
.co	Colombia
.cr	Costa Rica
.cu	Cuba
.cv	Cape Verde
.cw	Curaçao
.cx	Christmas Island
.cy	Cyprus
.cz	Czech Republic
.de	Germany
.dj	Djibouti
.dk	Denmark
.dm	Dominica
.do	Dominican Republic
.dz	Algeria
.ec	Ecuador
.edu	USA
.ee	Estonia
.eg	Egypt
.eh	Western Sahara
.er	Eritrea
.es	Spain
.et	Ethiopia
.eu	European Union
.fi	Finland
.fj	Fiji
.fk	Falkland Islands
.fm	Federated States of Micronesia

.fo	Faroe Islands
.fr	France
.ga	Gabon
.gb	United Kingdom
.gd	Grenada
.ge	Georgia
.gf	French Guiana
.gg	Guernsey
.gh	Ghana
.gi	Gibraltar
.gl	Greenland
.gm	The Gambia
.gn	Guinea
.gov	USA
.gp	Guadeloupe
.gq	Equatorial Guinea
.gr	Greece
.gs	South Georgia and the South Sandwich Islands
.gt	Guatemala
.gu	Guam
.gw	Guinea-Bissau
.gy	Guyana
.hk	Hong Kong
.hm	Heard Island and McDonald Islands
.hn	Honduras
.hr	Croatia
.ht	Haiti
.hu	Hungary
.id	Indonesia
.ie	Ireland
.il	Israel
.im	Isle of Man
.in	India
.io	British Indian Ocean Territory
.iq	Iraq
.ir	Iran
.is	Iceland
.it	Italy
.je	Jersey
.jm	Jamaica
.jo	Jordan
.jp	Japan
.ke	Kenya

.kg	Kyrgyzstan
.kh	Cambodia
.ki	Kiribati
.km	Comoros
.kn	Saint Kitts and Nevis
.kp	Democratic People's Republic of Korea
.kr	Republic of Korea
.kw	Kuwait
.ky	Cayman Islands
.kz	Kazakhstan
.la	Laos
.lb	Lebanon
.lc	Saint Lucia
.li	Liechtenstein
.lk	Sri Lanka
.lr	Liberia
.ls	Lesotho
.lt	Lithuania
.lu	Luxembourg
.lv	Latvia
.ly	Libya
.ma	Morocco
.mc	Monaco
.md	Moldova
.me	Montenegro
.mg	Madagascar
.mh	Marshall Islands
.mil	USA
.mk	Macedonia
.ml	Mali
.mm	Myanmar
.mn	Mongolia
.mo	Macau
.mp	Northern Mariana Islands
.mq	Martinique
.mr	Mauritania
.ms	Montserrat
.mt	Malta
.mu	Mauritius
.mv	Maldives
.mw	Malawi
.mx	Mexico
.my	Malaysia

.mz	Mozambique
.na	Namibia
.nc	New Caledonia
.ne	Niger
.nf	Norfolk Island
.ng	Nigeria
.ni	Nicaragua
.nl	Netherlands
.no	Norway
.np	epal
.nr	Nauru
.nu	Niue
.nz	New Zealand
.om	Oman
.pa	Panama
.pe	Peru
.pf	French Polynesia
.pg	Papua New Guinea
.ph	Philippines
.pk	Pakistan
.pl	Poland
.pm	Saint-Pierre and Miquelon
.pn	Pitcairn Islands
.pr	Puerto Rico
.ps	Palestine[27]
.pt	Portugal
.pw	Palau
.py	Paraguay
.qa	Qatar
.re	Réunion
.ro	Romania
.rs	Serbia
.ru	Russia
.rw	Rwanda
.sa	Saudi Arabia
.sb	Solomon Islands
.sc	Seychelles
.sd	Sudan
.se	Sweden
.sg	Singapore
.sh	Saint Helena
.si	Slovenia
.sj	Svalbardand Jan Mayen Islands

.sk	Slovakia
.sl	Sierra Leone
.sm	San Marino
.sn	Senegal
.so	Somalia
.sr	Suriname
.ss	South Sudan
.st	São Tomé and Príncipe
.su	Soviet Union
.sv	El Salvador
.sx	Sint Maarten
.sy	Syria
.sz	Swaziland
.tc	Turks and Caicos Islands
.td	Chad
.tf	French Southern and Antarctic Lands
.tg	Togo
.th	Thailand
.tj	Tajikistan
.tk	Tokelau
.tl	East Timor
.tm	Turkmenistan
.tn	Tunisia
.to	Tonga
.tp	East Timor
.tr	Turkey
.tt	Trinidad and Tobago
.tv	Tuvalu
.tw	Taiwan
.tz	Tanzania
.ua	Ukraine
.ug	Uganda
.uk	United Kingdom
.us	USA
.uy	Uruguay
.uz	Uzbekistan
.va	Vatican City
.vc	Saint Vincent and the Grenadines
.ve	Venezuela
.vg	British Virgin Islands
.vi	United States Virgin Islands
.vn	Vietnam
.vu	Vanuatu

.wf	Wallis and Futuna
.ws	Samoa
.ye	Yemen
.yt	Mayotte
.za	South Africa
.zm	Zambia
.zw	Zimbabwe

Annex II.2 Country and region correspondence in both studies

Country in SOAP 2010 study	Region
Algeria	Africa
Angola	Africa
Benin	Africa
Botswana	Africa
Burkina Faso	Africa
Burundi	Africa
Cameroon	Africa
Cape Verde	Africa
Chad	Africa
Cote d'Ivoire	Africa
Equatorial Guinea	Africa
Eritrea	Africa
Ethiopia	Africa
Ghana	Africa
Kenya	Africa
Lesotho	Africa
Libya	Africa
Malawi	Africa
Mauritius	Africa
Morocco	Africa
Mozambique	Africa
Nigeria	Africa
Rwanda	Africa
Senegal	Africa
Seychelles	Africa
Somalia	Africa
South Africa	Africa
Sudan	Africa
Swaziland	Africa
Tanzania	Africa
Uganda	Africa
Zambia	Africa

Zimbabwe	Africa
Bangladesh	Asia
Bhutan	Asia
Cambodia	Asia
East Timor	Asia
Indonesia	Asia
Japan	Asia
Kazakhstan	Asia
Korea, South	Asia
Kyrgyzstan	Asia
Malaysia	Asia
Mongolia	Asia
Myanmar (Burma)	Asia
Nepal	Asia
Philippines	Asia
Singapore	Asia
Sri Lanka	Asia
Taiwan	Asia
Tajikistan	Asia
Thailand	Asia
Uzbekistan	Asia
Vietnam	Asia
Brazil	Brazil
China	China
Belarus	Eastern Europe
Bulgaria	Eastern Europe
Czech Republic	Eastern Europe
Hungary	Eastern Europe
Moldova	Eastern Europe
Poland	Eastern Europe
Romania	Eastern Europe
Slovakia	Eastern Europe
Ukraine	Eastern Europe
Armenia	Eastern Europe
Georgia	Eastern Europe
India	India
Afghanistan	Middle East
Azerbaijan	Middle East
Bahrain	Middle East
Brunei	Middle East
Egypt	Middle East
Iran	Middle East
Iraq	Middle East

Israel	Middle East
Jordan	Middle East
Kuwait	Middle East
Lebanon	Middle East
Oman	Middle East
Pakistan	Middle East
Qatar	Middle East
Saudi Arabia	Middle East
Syria	Middle East
Tunisia	Middle East
Turkey	Middle East
United Arab Emirates	Middle East
Yemen	Middle East
Canada	North America
United States of America	North America
Iceland	Northern Europe
Denmark	Northern Europe
Estonia	Northern Europe
Finland	Northern Europe
Latvia	Northern Europe
Lithuania	Northern Europe
Norway	Northern Europe
Sweden	Northern Europe
Australia	Oceania
New Zealand	Oceania
Papua New Guinea	Oceania
Russia	Russia
Antigua and Barbuda	South America
Argentina	South America
Barbados	South America
Belize	South America
Bolivia	South America
Chile	South America
Colombia	South America
Costa Rica	South America
Cuba	South America
Dominica	South America
Dominican Republic	South America
Ecuador	South America
El Salvador	South America
Guatemala	South America
Haiti	South America
Honduras	South America

Jamaica	South America
Mexico	South America
Panama	South America
Paraguay	South America
Peru	South America
Suriname	South America
The Bahamas	South America
Trinidad and Tobago	South America
Uruguay	South America
Venezuela	South America
Cyprus	Southern Europe
Albania	Southern Europe
Andorra	Southern Europe
Bosnia and Herzegovina	Southern Europe
Croatia	Southern Europe
Greece	Southern Europe
Italy	Southern Europe
Macedonia	Southern Europe
Malta	Southern Europe
Montenegro	Southern Europe
Portugal	Southern Europe
Serbia	Southern Europe
Slovenia	Southern Europe
Spain	Southern Europe
Austria	Western Europe
Belgium	Western Europe
France	Western Europe
Germany	Western Europe
Ireland	Western Europe
Luxembourg	Western Europe
Netherlands	Western Europe
Switzerland	Western Europe
United Kingdom	Western Europe

Annex III - Surveys invitations

Annex III.1 SOAP 2010 survey invitation email

Subject line: Your views on open access publishing are needed!

Email body: A debate is under way concerning open access publishing, peer review and publication fees and your views matter.

The SOAP Project(*) is asking your help in filling an online survey to assess researchers' opinions on these important issues.

If you would like to contribute to shaping the public discourse on open access, please visit http://www.surveymonkey.com/s/soap_survey_k.

It should take 10-15 minutes to complete. We would appreciate if you would share this message widely among your work colleagues, research collaborators and project partners so that the views of your community are properly represented.

The survey outcome will be made public and the resulting insights as well as recommendations will be openly shared with the European Commission and other research funding agencies, publishers, and libraries.

(*) Note: The SOAP project is co-funded by the European Commission under the FP7 Grant Agreement Nr. 230220 (Science in Society Programme). This survey is anonymous. All responses will be confidential and submitted anonymously. Each reply will be assigned a random processing number. No technical identification data is being collected. The data controller certifies that the above information is correct and guarantees that the results will be used in an aggregated from that will not allow the identification of individuals within a response category. This data processing operation has not been notified to the Data Protection Officer in accordance with recital No 8 of Regulation (EC) No 45/2001. The survey reflects only the author's views and that the European Union is not liable for any use that may be made of the information contained therein.

Annex III.2 WoS 2016 survey invitation email

Subject line: Your [Article/Conference Proceeding] in [Journal or Conference Name]

Email body:

Dear Dr [LastName]

I'm contacting you as author in an article published in [NameJournal] in 2016.

I'm conducting a survey as part of a PhD thesis on Drivers and Barriers for Open Access publishing and your input would be really appreciated. Click the link below to start the survey, it shouldn't take you more than 8-10 minutes to complete.

[SurveyLink]

You can unsubscribe from this list on the following link.

[OptOutLink]

If you would like to be informed of the outcome of the study please drop me a line to sergioruiz@correo.ugr.es.

Thank you once more and best regards,

Sergio Ruiz - PhD Student at the University of Granada (Spain)

Annex III.3 WoS 2016 survey reminder email

Subject line: Your [Article/Conference Proceeding] in [Journal or Conference Name]

Email body:

Dear Dr [LastName]

We recently contacted you about a survey, but haven't received your responses. We'd really appreciate your participation. Please note that in any case I won't send you any further reminders.

I'm contacting you as author in an article published in [NameJournal] in 2016.

I'm conducting a survey as part of a PhD thesis on Drivers and Barriers for Open Access publishing and your input would be really appreciated. Click the link below to start the survey, it shouldn't take you more than 8-10 minutes to complete.

[SurveyLink]

You can unsubscribe from this list on the following link.

[OptOutLink]

If you would like to be informed of the outcome of the study please drop me a line to sergioruiz@correo.ugr.es.

Thank you once more and best regards,

Sergio Ruiz - PhD Student at the University of Granada (Spain)

Annex IV - Surveys questionnaires

Annex IV.1 SOAP 2010 survey questionnaire

SOAP 2010

Introduction

Welcome to the survey.

This survey is being conducted by the SOAP (Study of Open Access Publishing) project, financed by the European Commission. The study is investigating publishing practices and attitudes towards Open Access publishing. More information about the SOAP project can be found on the project's public website.

This survey is primarily aimed at active researchers in public and private organisations, from all fields of the research in the sciences and humanities. It focuses on publication of research articles in peer-reviewed journals. All responses will be confidential and submitted anonymously. It should take about 10-15 minutes to complete. Results will be made publicly available in the second half of 2010.

Note that, depending on your responses, this survey may skip certain questions that are not relevant to you. Please avoid using your 'back' and 'forward' browser buttons while completing the survey. If you wish to move around use the navigation buttons at the bottom of the survey page.

*1. Are you involved in research?

- I am an active researcher
- I am in the publishing industry
- I am a librarian
- I work in another field and am interested in Open Access

[If the answer is anything other than "I am an active researcher", the survey jumps to Q5.]

*2. Please select your main research field from the drop-down list.

[Extensive two-level drop-down list of research fields follows]

Respondents were allowed to select a secondary field of research.

* 3. Which of the following best describes your institution?

- University or college
- Hospital or medical school
- Research institute
- Government
- Industrial/commercial
- Other

* 4. How many years have you been employed in research?

- Fewer than 5 years
- 5-14 years
- 15-24 years
- 25 years or longer

* 5. In which country do you work?

[Drop-down list of countries of the world follows]

6. Please indicate your gender (this question is optional)

- Male
- Female

* 7. How easily can you gain online access to peer-reviewed journal articles of interest for your research?

- Very easily
- Quite easily
- With some difficulties
- I can rarely access the articles I need
- I do not know

* 8. Do any journals in your research field publish Open Access articles?

- Yes
- No
- I do not know

*** 9. Do you think your research field benefits, or would benefit from journals that publish Open Access articles?**

- Yes
- No
- I have no opinion
- I do not care
- Can you briefly explain your opinion? [Text box follows]

*** 10. When you are reading a journal article, are you generally aware whether it is Open Access or not?**

- Yes
- No

[If the answer is 'No', the survey jumps to Q12.]

*** 11. How do you know whether the article is Open Access? (Choose more than one answer if applicable)**

- I had prior knowledge that the article or journal was Open Access
- It is clearly indicated on the Web page linking to the article
- It is clearly indicated in the article itself
- Other (please specify) [Text box follows]

*** 12. How many peer reviewed research articles (Open Access or not Open Access) have you published in the last five years?**

- 0
- 1-5
- 6-10
- 11-20
- 21-50
- More than 50

[If the answer is "0", the survey jumps to Q20.]

*** 13. What factors are important to you when selecting a journal to publish in?**

[Each factor may be rated “Extremely important”, “Important”, “Less important” or “Irrelevant”. The factors are presented in random order.]

- Importance of the journal for academic promotion, tenure or assessment
- Recommendation of the journal by my colleagues
- Positive experience with publisher/editor(s) of the journal
- The journal is an Open Access journal
- Relevance of the journal for my community
- The journal fits the policy of my organisation
- Prestige/perceived quality of the journal
- Likelihood of article acceptance in the journal
- Absence of journal publication fees (e.g. submission charges, page charges, colour charges)
- Copyright policy of the journal
- Journal Impact Factor
- Speed of publication of the journal
- Other (please specify) [Text box follows]

*** 14. Who usually decides which journals your articles are submitted to? (Choose more than one answer if applicable)**

- The decision is my own
- A collective decision is made with my fellow authors
- I am advised where to publish by a senior colleague
- The organisation that finances my research advises me where to publish
- Other (please specify) [Text box follows]

*** 15. Approximately how many Open Access articles have you published in the last five years?**

- 0
- 1-5
- 6-10
- More than 10
- I do not know

[If the answer is “0”, Q16 is asked then the survey jumps to Q20. If the answer is “I do not know”, the survey jumps to Q20. Otherwise the survey jumps to Q17.]

*** 16. Has there been a specific reason why you have not published an article by Open Access? If so, please give your reason(s) in the textbox provided.**

- Yes
- No
- Reason(s) for not publishing by Open Access [Text box follows]

*** 17. What publication fee was charged for the last Open Access article you published?**

- No charge
- Up to €250 ($350)
- €251-€500 ($350-$700)
- €501-€1000 ($700-$1350)
- €1001-€3000 ($1350-$4100)
- More than €3000 ($4100)
- I do not know

[I the answer is "No charge or I don't know" the survey jumps to Q20.

18. How was this publication fee covered? (Choose more than one answer if applicable)

- My research funding includes money for paying such fees
- I used part of my research funding not specifically intended for paying such fees
- My institution paid the fees
- I paid the costs myself
- Other (please specify) [Text box follows]

*** 19. How easy is it to obtain funding if needed for Open Access publishing from your institution or the organisation mainly responsible for financing your research?**

- Easy
- Difficult
- I have not used these sources

20. Are you on the editorial board of one or more journals?

- Yes
- No

[If the answer is "No", the survey jumps to Q22.]

21. Are you on the editorial board of any fully Open Access journals?

- Yes
- No

22. Do you provide peer review services for one or more journals?

- Yes
- No

* 23. Listed below are a series of statements, both positive and negative, concerning Open Access publishing. Please indicate how strongly you agree/disagree with each statement.

[Each statement may be rated "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree" or "Strongly disagree". The statements are presented in random order.]

- Researchers should retain the rights to their published work and allow it to be used by others
- Open Access publishing undermines the system of peer review
- Open Access publishing leads to an increase in the publication of poor quality research
- If authors pay publication fees to make their articles Open Access, there will be less money available for research
- It is not beneficial for the general public to have access to published scientific and medical articles
- Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication
- Publicly-funded research should be made available to be read and used without access barrier
- Open Access publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research
- Articles that are available by Open Access are likely to be read and cited more often than those not Open Access

* Would you like to contribute further to the SOAP project? We are looking for volunteers to help the SOAP team explore Open Access attitudes and publishing practices within different research communities. If you choose to volunteer, you will be automatically entered into our prize draw to win an Apple iPad. You may then be contacted by a member of the SOAP team to follow up your responses to the survey in more depth.

- Yes, I want to volunteer
- No, I don't want to volunteer

[if the answer is "No, I don't want to volunteer" the survey jumps to the final page.]

Thank you for choosing to help the project further.

To participate in the follow-up study, please enter your email address below. By doing so, you are granting permission for a member of the SOAP team to contact you. Not everyone who volunteers will be contacted.

Your email address will not be stored with the information you have already given when the survey responses are analysed by the project team. The address will not be used for any purpose other than contacting you within the context of the SOAP project, will not be made available to anyone outside the SOAP project, and will be deleted at the end of the project.

*** Enter your email address here:** [Text box follows]

Annex IV.2 WoS 2016 survey questionnaire

WoS 2016

Introduction

This survey is being conducted as part of a PhD thesis on Drivers and Barriers for Open Access publishing based on the results of the SOAP project, although completely independent.

The survey is primarily aimed at active researchers in public and private organisations, from all fields of research in the sciences and humanities. It focuses on publication of research articles in peer-reviewed journals. All responses will be confidential. It should take about 8-10 minutes to complete. Results will be made publicly available in an aggregated form. If you would like to be kept up to date please drop a line to sergioruiz@correo.ugr.es.

Thanks in advance for your help!

*** 1. How many years have you been employed in research?**

- Fewer than 5 years
- 5-14 years
- 15-24 years
- 25 years or longer

Many of the questions that follow concern Open Access publishing. For the purposes of this survey, an article is Open Access if its final, peer-reviewed, version is published online by a journal and is free of charge to all users without restrictions on access or use.

* 2. Do any journals in your research field publish Open Access articles?

- Yes
- No
- I do not know

* 3. Do you think your research field benefits, or would benefit from journals that publish Open Access articles?

- Yes
- No
- I have no opinion
- I do not care

* 4. How many peer reviewed research articles (Open Access or not Open Access) have you published in the last five years?

- 1-5
- 6-10
- 11-20
- 21-50
- More than 50

* 5. What factors are important to you when selecting a journal to publish in?

[Each factor may be rated “Extremely important”, “Important”, “Less important” or “Irrelevant”. The factors are presented in random order.]

- Importance of the journal for academic promotion, tenure or assessment
- Recommendation of the journal by my colleagues
- Positive experience with publisher/editor(s) of the journal
- The journal is an Open Access journal
- Relevance of the journal for my community
- The journal fits the policy of my organisation
- Prestige/perceived quality of the journal
- Likelihood of article acceptance in the journal
- Absence of journal publication fees (e.g. submission charges, page charges, colour charges)
- Copyright policy of the journal
- Journal Impact Factor
- Speed of publication of the journal

6. Who usually decides which journals your articles are submitted to? (Choose more than one answer if applicable)

- The decision is my own
- A collective decision is made with my fellow authors
- I am advised where to publish by a senior colleague
- The organisation that finances my research advises me where to publish
- Other (please specify) [Text box follows]

7. Approximately how many Open Access articles have you published in the last five years?

- 0
- 1-5
- 6-10
- More than 10
- I do not know

[If the answer is “0”, the survey jumps to Q10.]

*** 8. What publication fee was charged for the last Open Access article you published?**

- No charge
- Up to €250 ($275)
- €251-€500 ($275-$550)
- €501-€1000 ($551-$1100)
- €1001-€3000 ($1101-$3300)
- More than €3000 ($3300)
- I do not know

[If the answer is “No charge or I don’t know” the survey jumps to Q20.]

*** 9. How was this publication fee covered? (Choose more than one answer if applicable)**

- My research funding includes money for paying such fees
- I used part of my research funding not specifically intended for paying such fees
- My institution paid the fees
- I paid the costs myself
- Other (please specify) [Text box follows]

*** 10. How easy is it to obtain funding if needed for Open Access publishing from your institution or the organisation mainly responsible for financing your research?**

- Easy
- Difficult
- I have not used these sources

*** 11. Listed below are a series of statements, both positive and negative, concerning Open Access publishing. Please indicate how strongly you agree/disagree with each statement.**

[Each statement may be rated “Strongly agree”, “Agree”, “Neither agree nor disagree”, “Disagree” or “Strongly disagree”. The statements are presented in random order.]

- Researchers should retain the rights to their published work and allow it to be used by others
- Open Access publishing undermines the system of peer review
- Open Access publishing leads to an increase in the publication of poor quality research
- If authors pay publication fees to make their articles Open Access, there will be less money available for research
- It is not beneficial for the general public to have access to published scientific and medical articles
- Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication
- Publicly-funded research should be made available to be read and used without access barrier
- Open Access publishing is more cost-effective than subscription-based publishing and so will benefit public investment in research
- Articles that are available by Open Access are likely to be read and cited more often than those not Open Access

Thank you for participating in the survey. If you would like to be notified once the results of the survey are published please send an email to sergioruiz@correo.ugr.es.

Annex V - Additional results

Annex V.1 Opinion

Figure 47 Articles that are available by Open Access are likely to be read and cited more often than those not Open Access. By European region (SOAP 2010 n=11,066 - WoS 2016 n=5,220, p < 0.001)

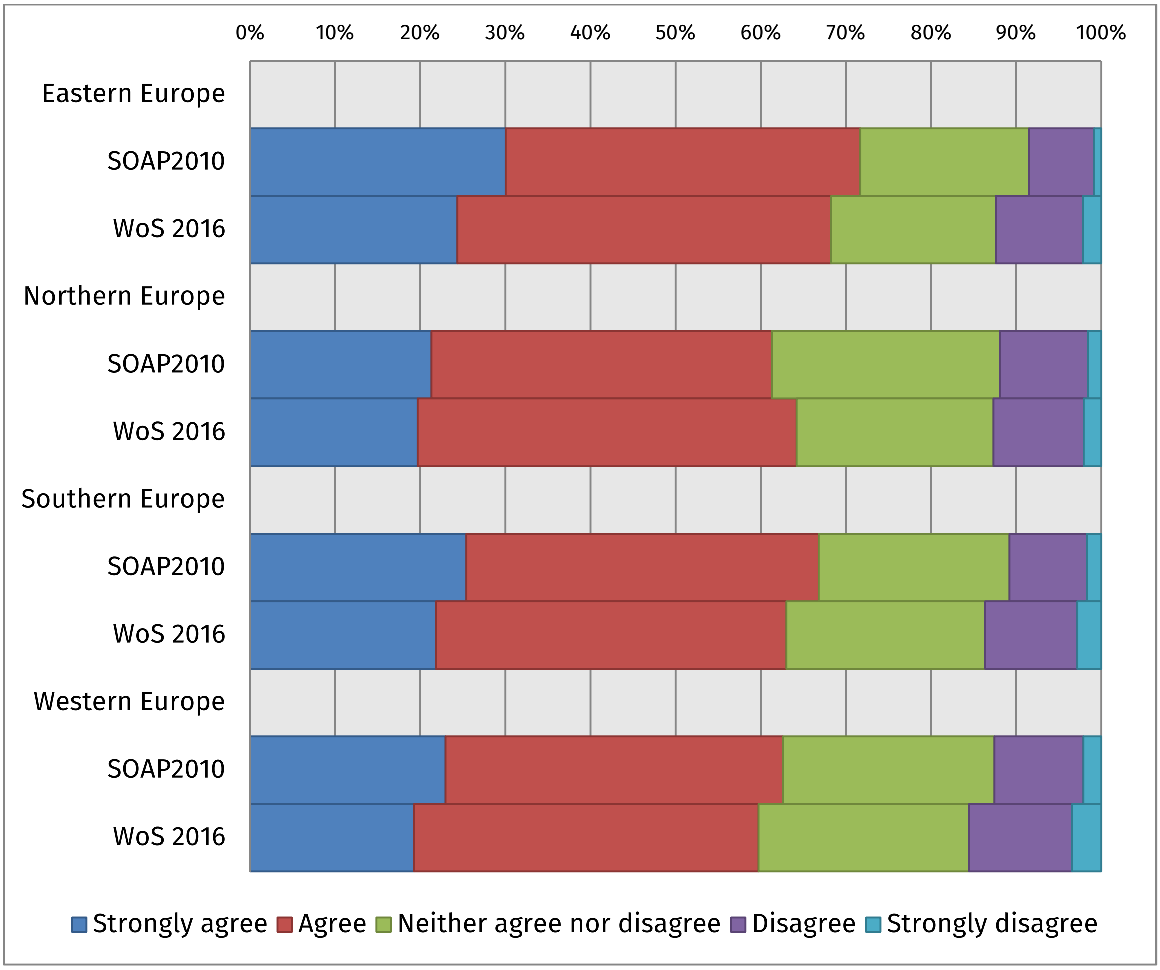


Figure 48 OA publishing leads to an increase in the publication of poor quality research. By European region (SOAP 2010 n=11,013 - WoS 2016 n=5,125, p < 0.001)

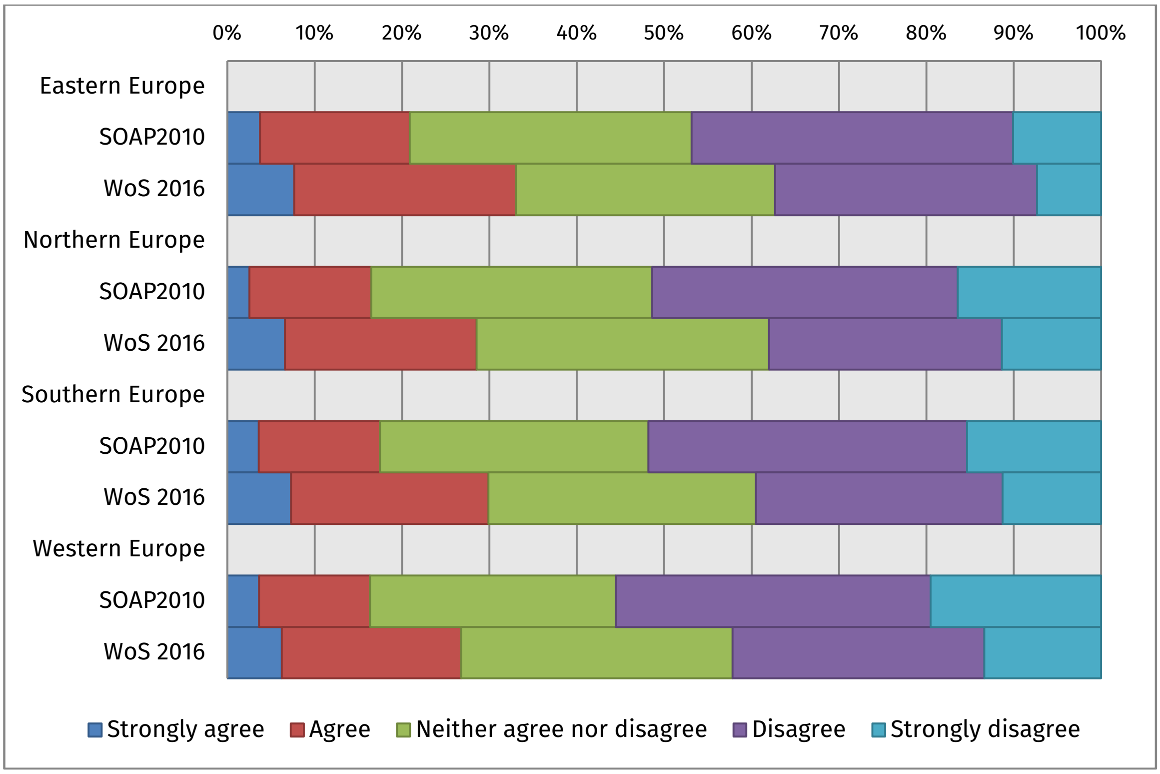


Figure 49 OA publishing undermines the system of peer review. By seniority (SOAP 2010 n=25,019 - WoS 2016 n=14,152, p < 0.001)

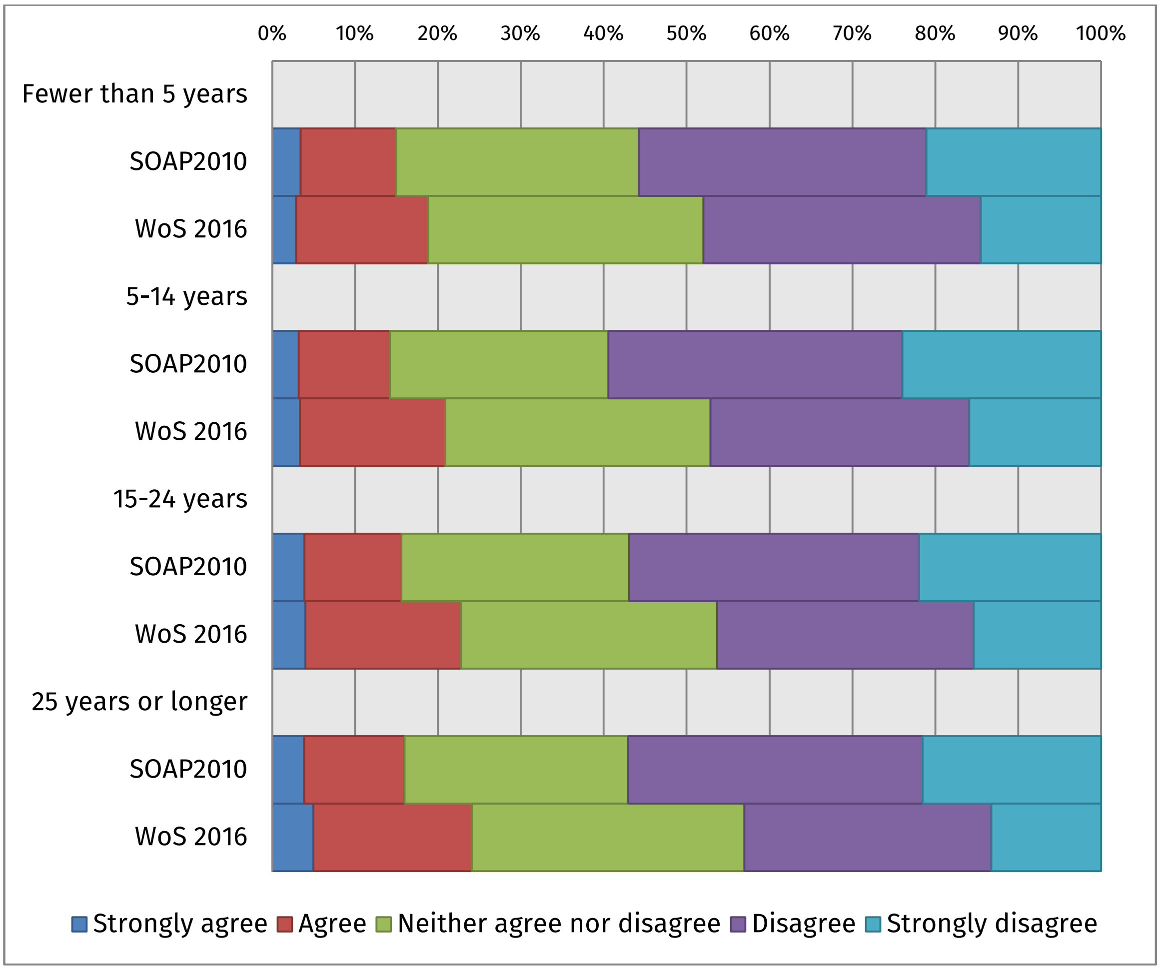
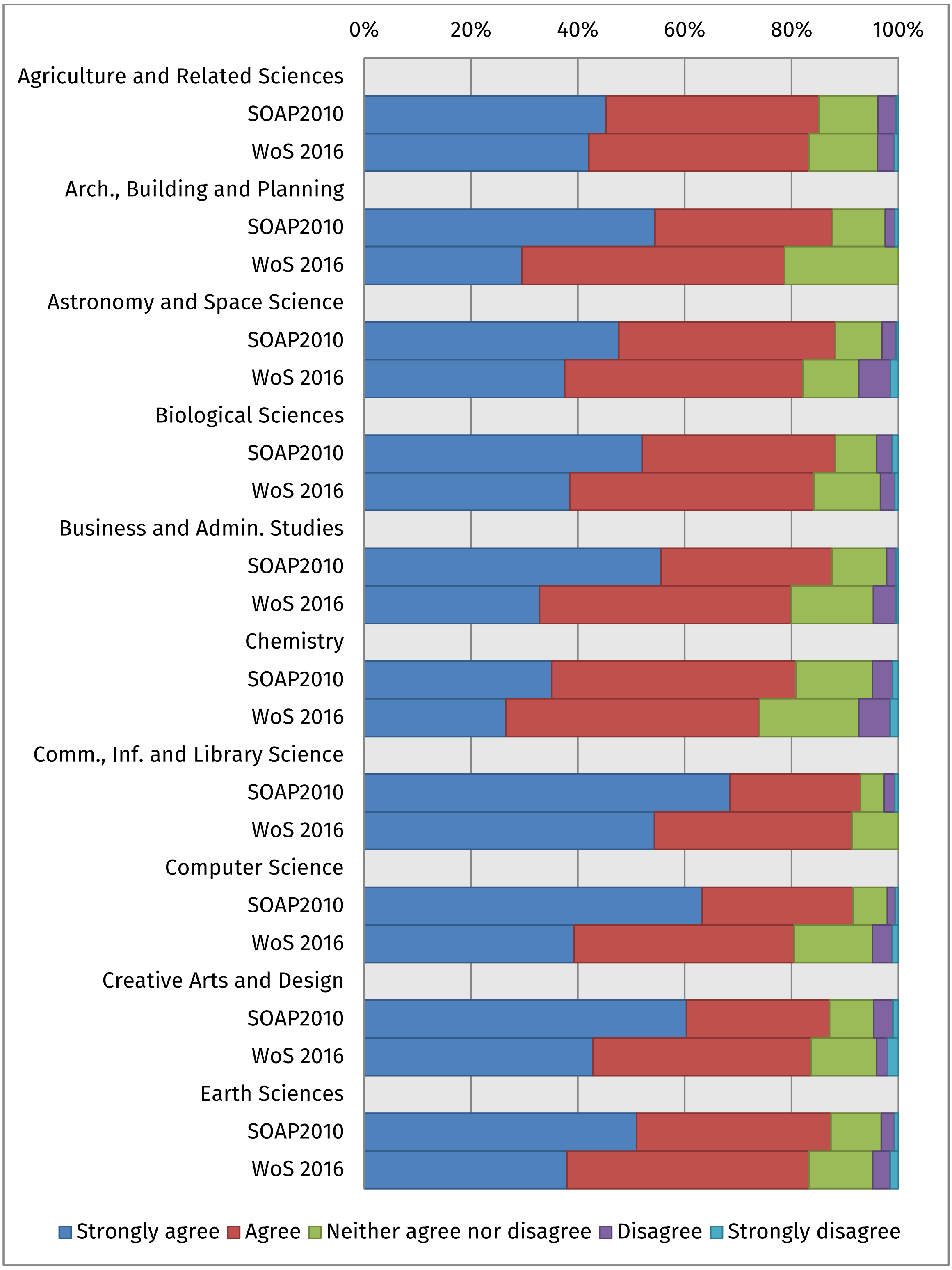


Figure 50 Publicly-funded research should be made available to be read and used without access barriers. By discipline (SOAP 2010 n=33,389 - WoS 2016 n=15,587, $p < 0.001$)



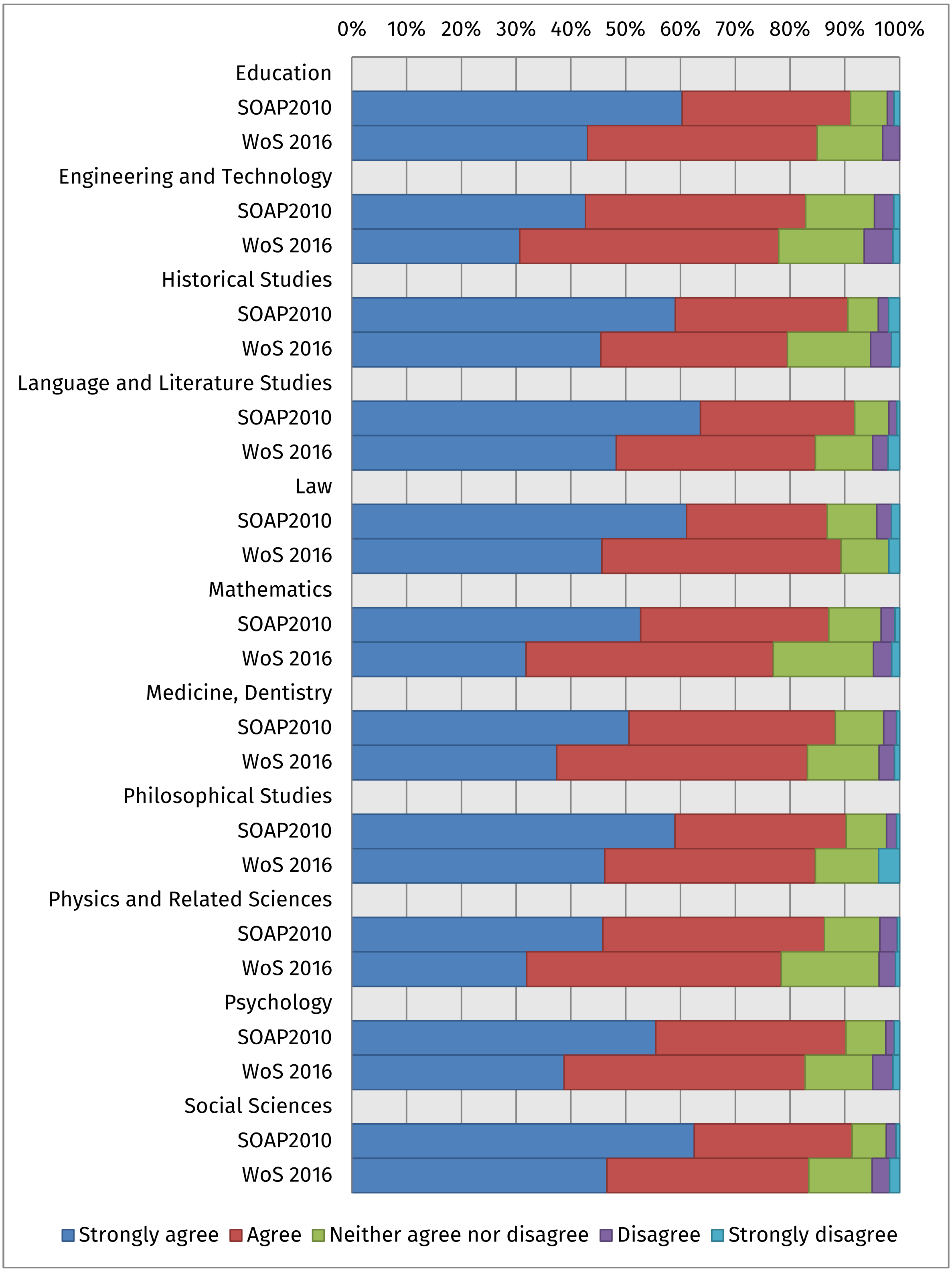

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Education
SOAP2010
WoS 2016
Engineering and Technology
SOAP2010
WoS 2016
Historical Studies
SOAP2010
WoS 2016
Language and Literature Studies
SOAP2010
WoS 2016
Law
SOAP2010
WoS 2016
Mathematics
SOAP2010
WoS 2016
Medicine, Dentistry
SOAP2010
WoS 2016
Philosophical Studies
SOAP2010
WoS 2016
Physics and Related Sciences
SOAP2010
WoS 2016
Psychology
SOAP2010
WoS 2016
Social Sciences
SOAP2010
WoS 2016
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 51 Publicly-funded research should be made available to be read and used without access barriers. By seniority (SOAP 2010 n=25,191 - WoS 2016 n=14,177, p < 0.001)

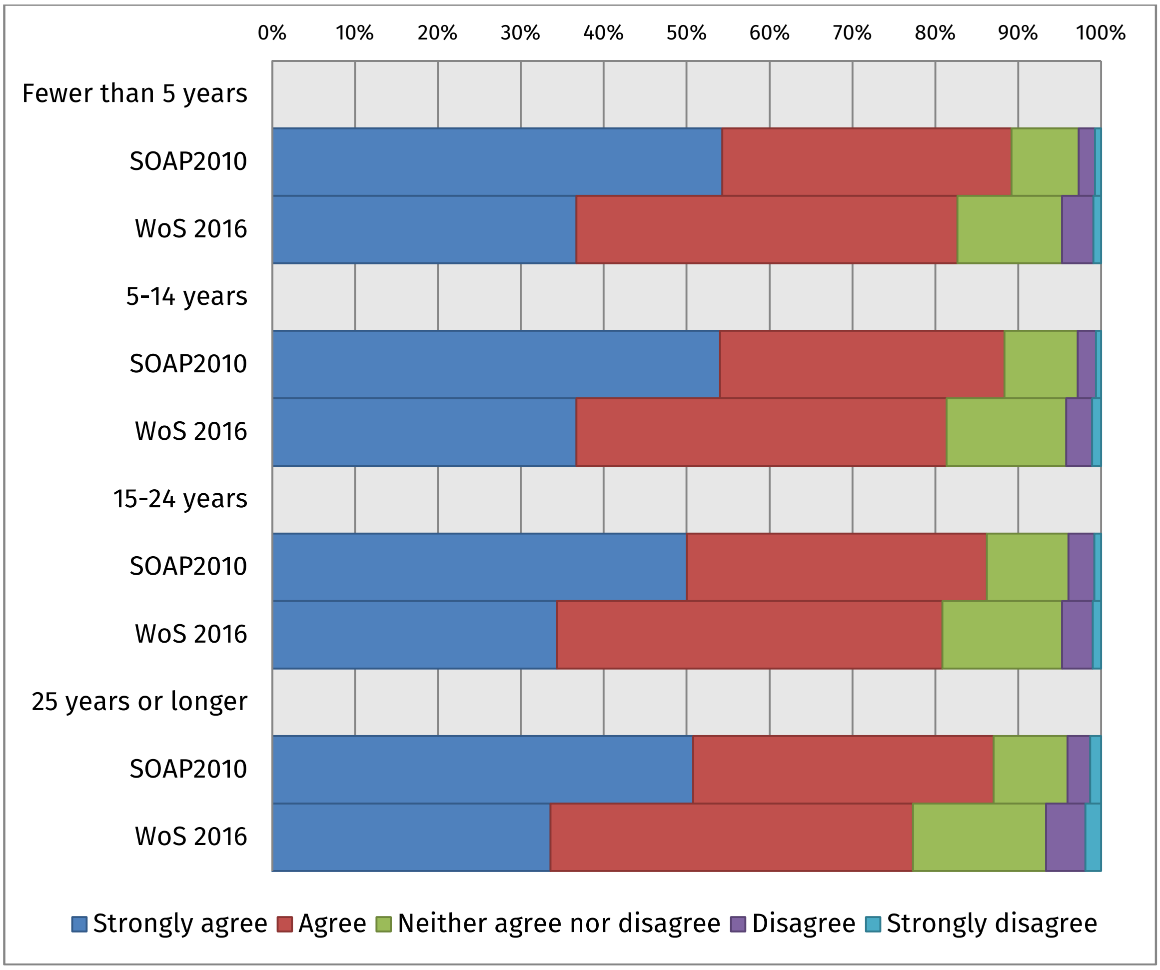


Figure 52 Publicly-funded research should be made available to be read and used without access barriers. By geographic regions (SOAP 2010 n=25,191 - WoS 2016 n=14,177, $p < 0.001$)

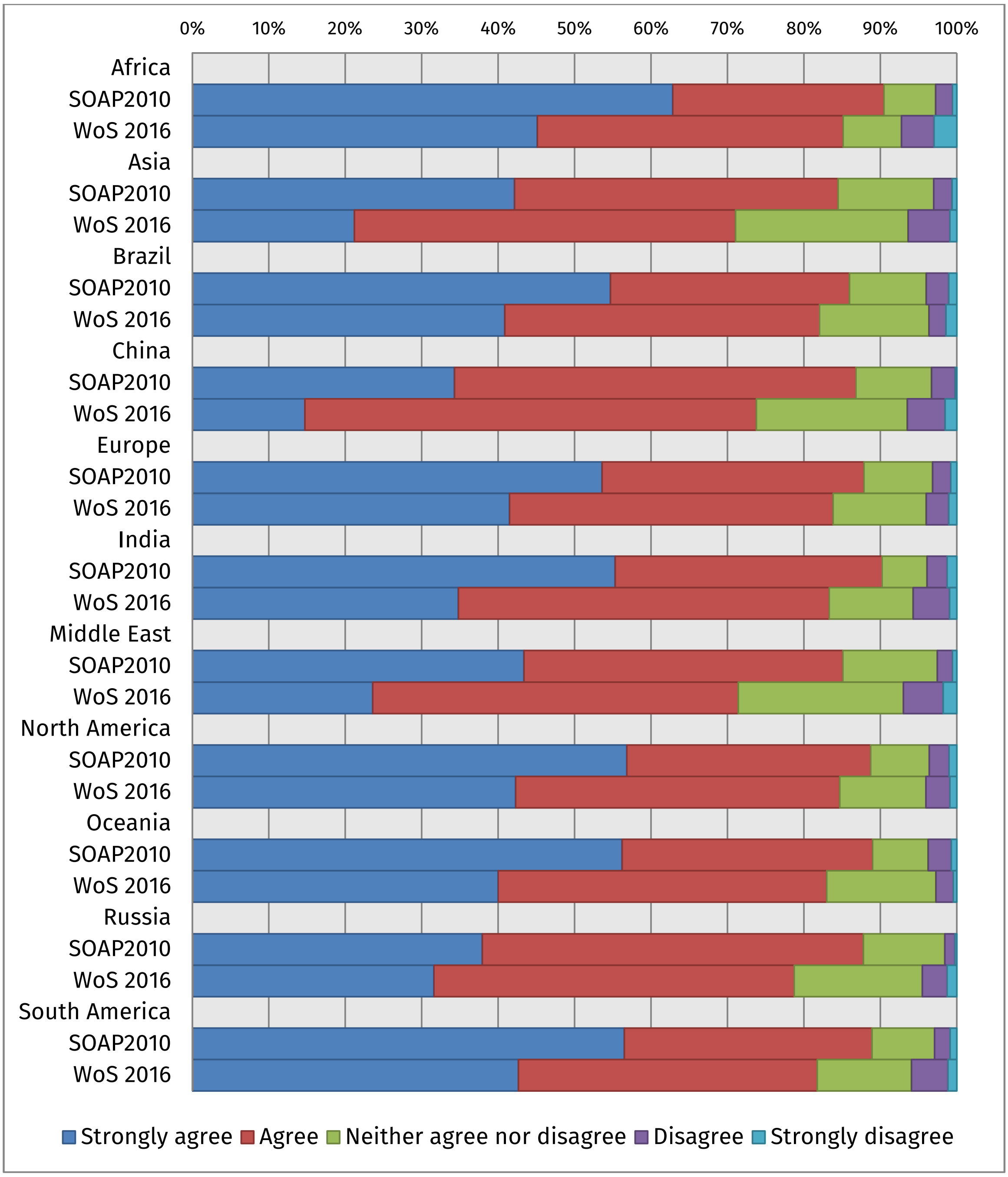


Figure 53 Publicly-funded research should be made available to be read and used without access barriers. By European region (SOAP 2010 n=11,002 - WoS 2016 n=5,206, p < 0.001)

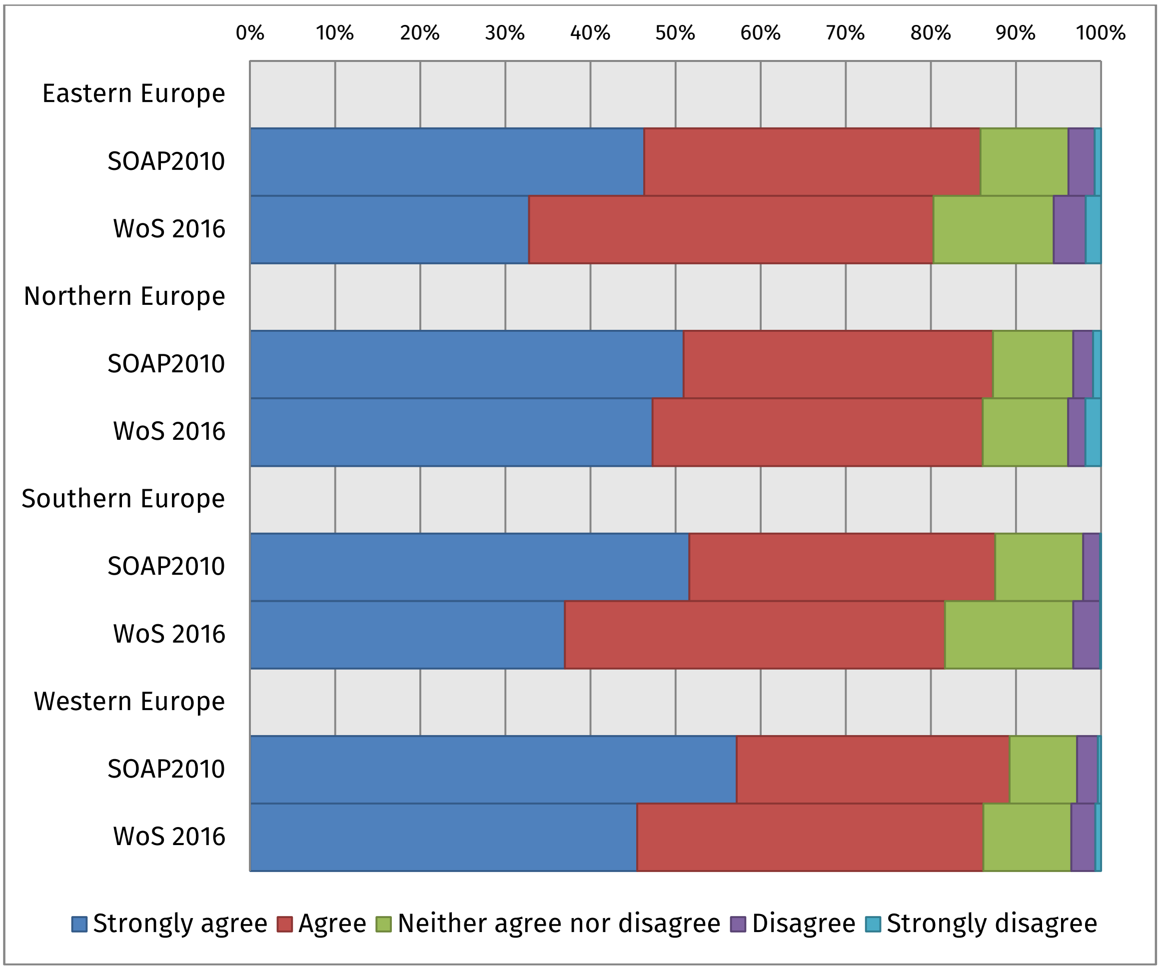
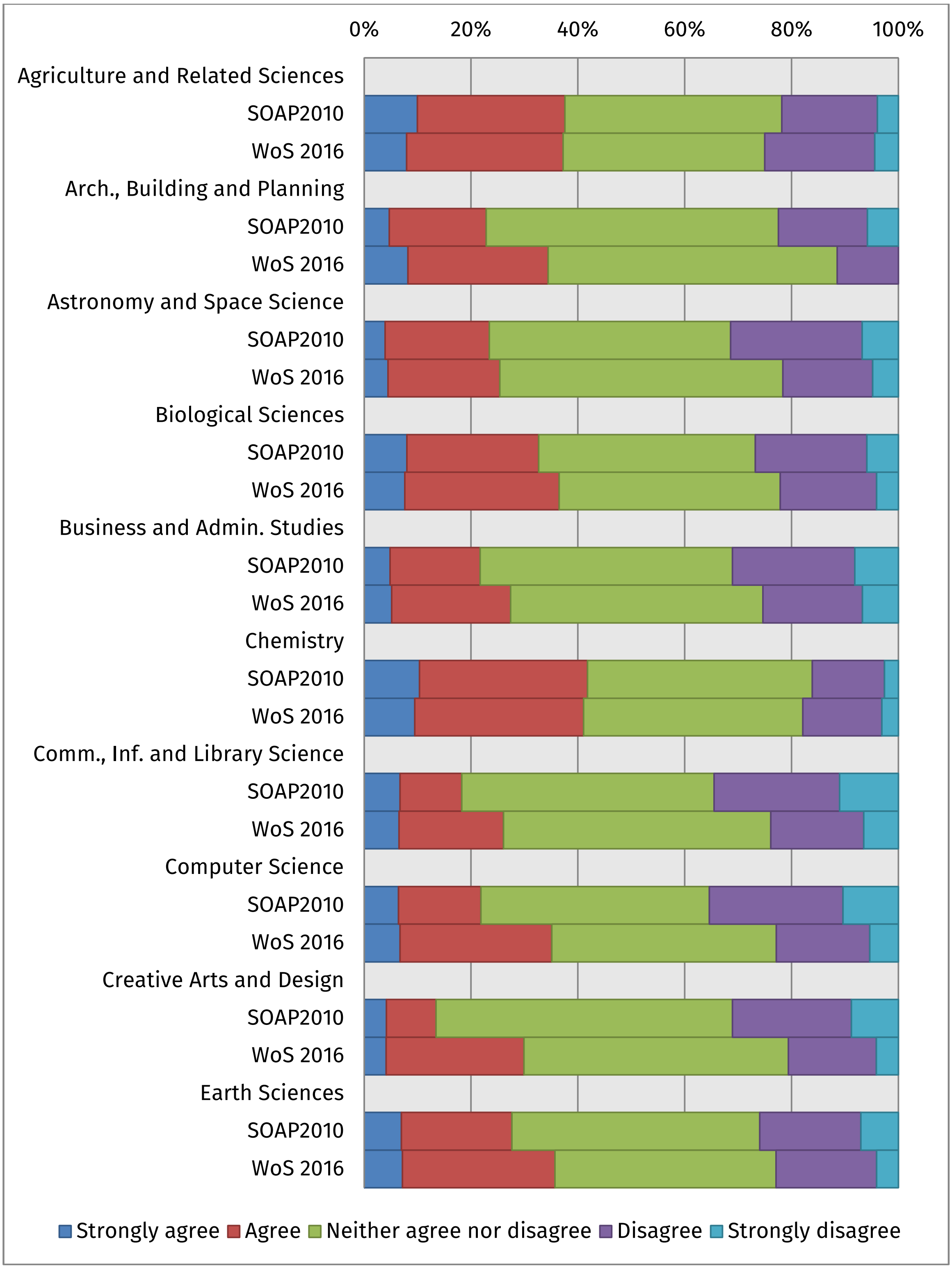
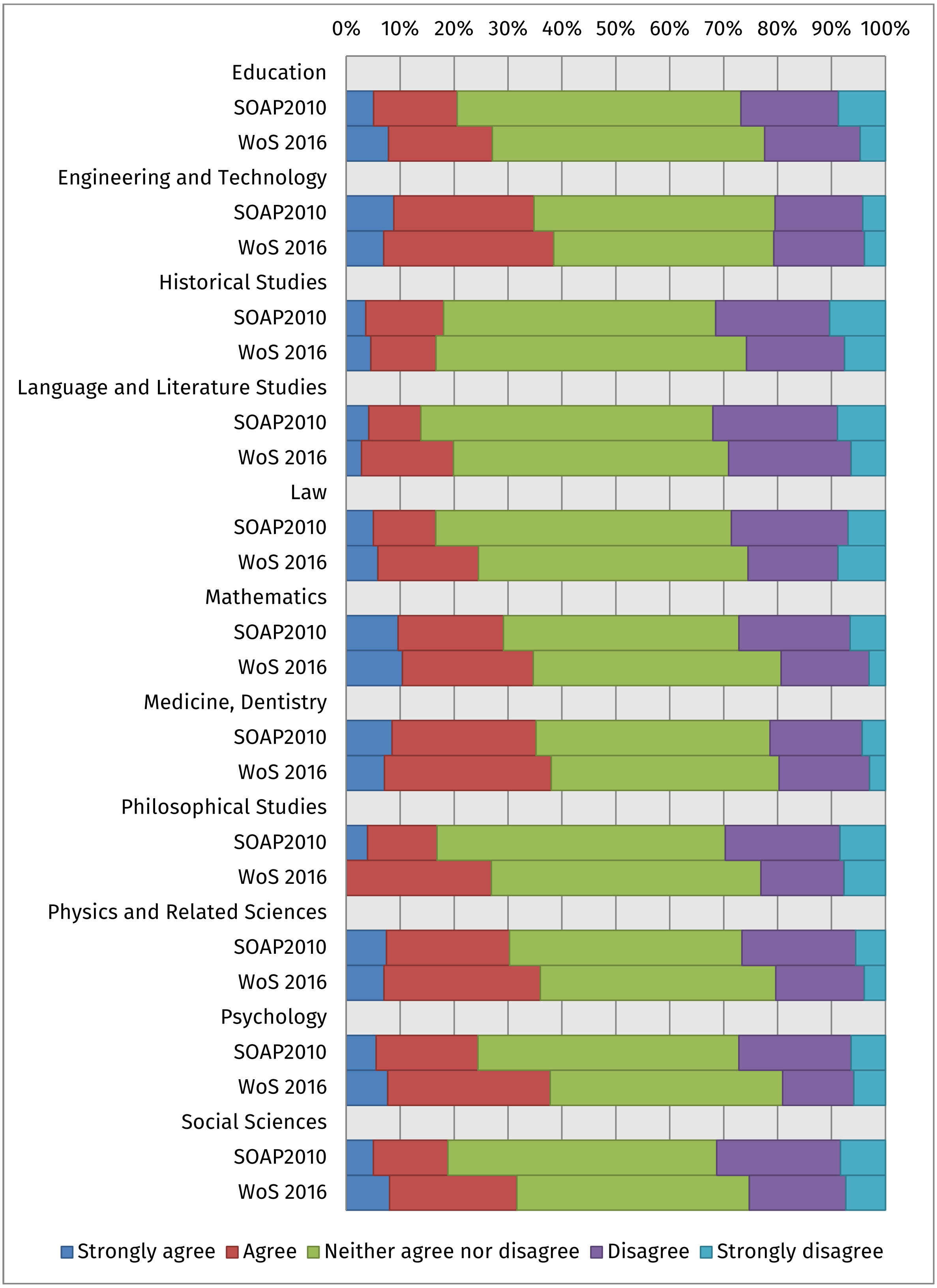


Figure 54 Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication. By discipline (SOAP 2010 n=33,075 - WoS 2016 n=15,536, $p < 0.001$)




0%
10%
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40%
50%
60%
70%
80%
90%
100%
Education
SOAP2010
WoS 2016
Engineering and Technology
SOAP2010
WoS 2016
Historical Studies
SOAP2010
WoS 2016
Language and Literature Studies
SOAP2010
WoS 2016
Law
SOAP2010
WoS 2016
Mathematics
SOAP2010
WoS 2016
Medicine, Dentistry
SOAP2010
WoS 2016
Philosophical Studies
SOAP2010
WoS 2016
Physics and Related Sciences
SOAP2010
WoS 2016
Psychology
SOAP2010
WoS 2016
Social Sciences
SOAP2010
WoS 2016
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 55 Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication. By seniority (SOAP 2010 n=24,957 - WoS 2016 n=14,136, p < 0.001)

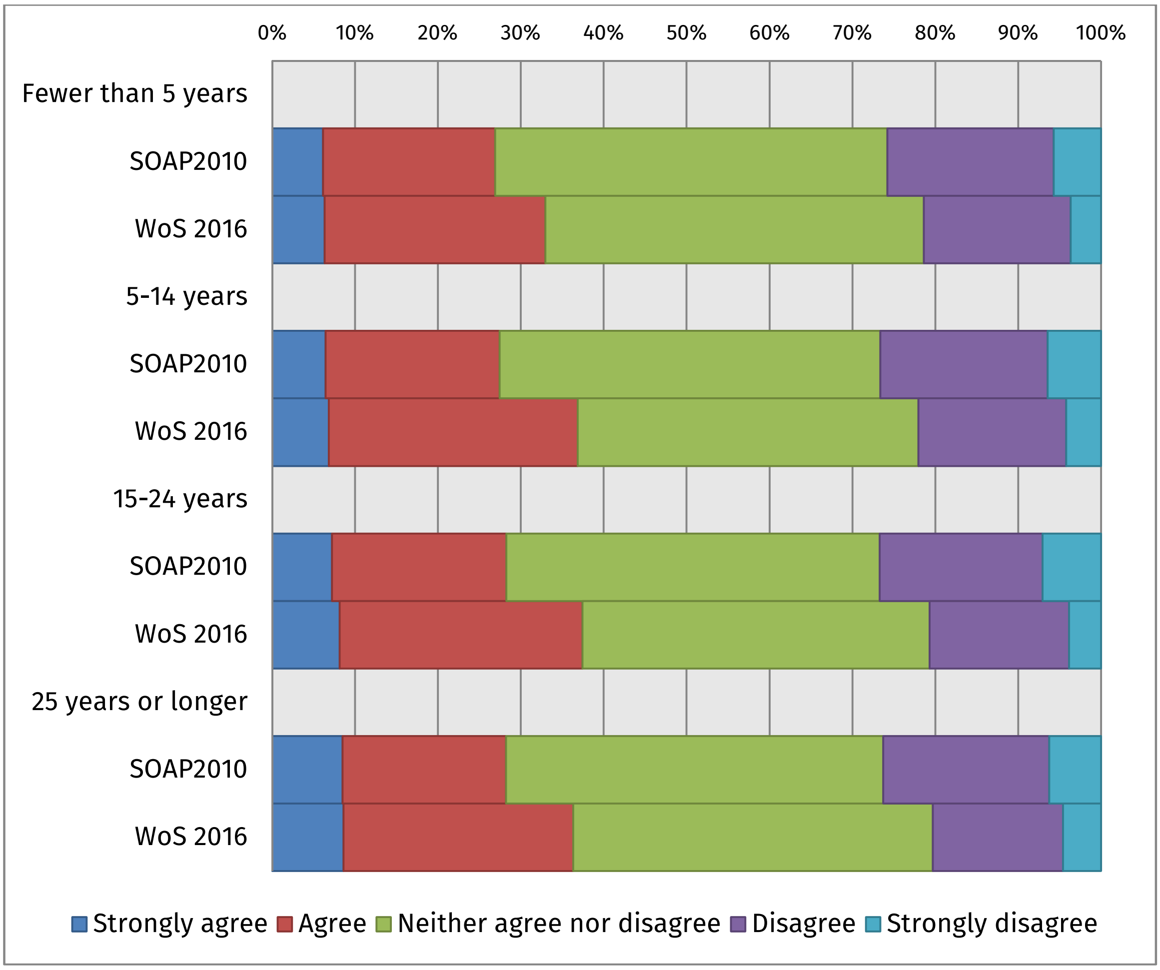


Figure 56 Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication. By regions (SOAP 2010 n=24,957 - WoS 2016 n=14,136, $p < 0.001$)

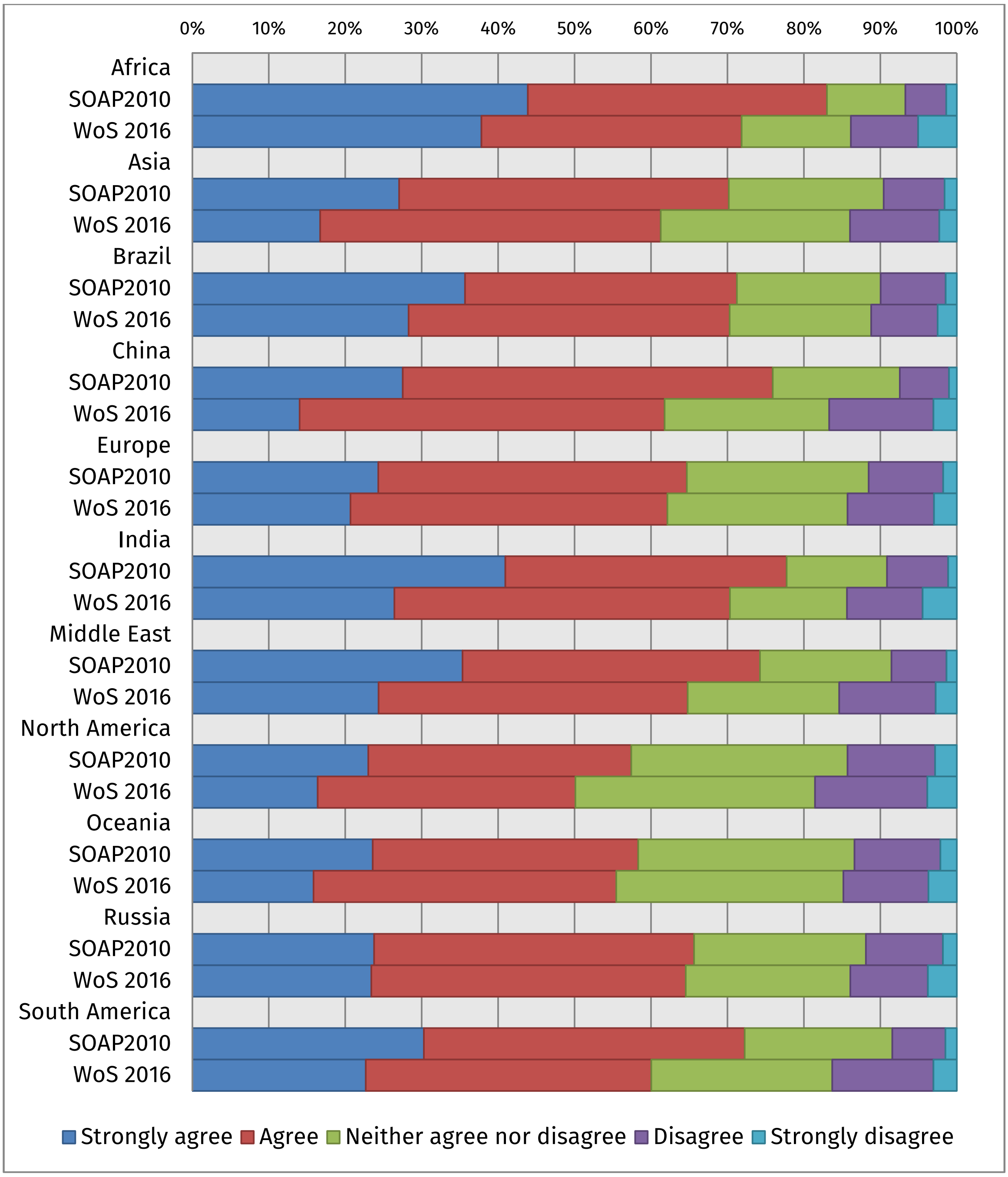


Figure 57 Open Access unfairly penalises research-intensive institutions with large publication output by making them pay high costs for publication. By European region (SOAP 2010 n=10,954 - WoS 2016 n=5,205, p < 0.001)

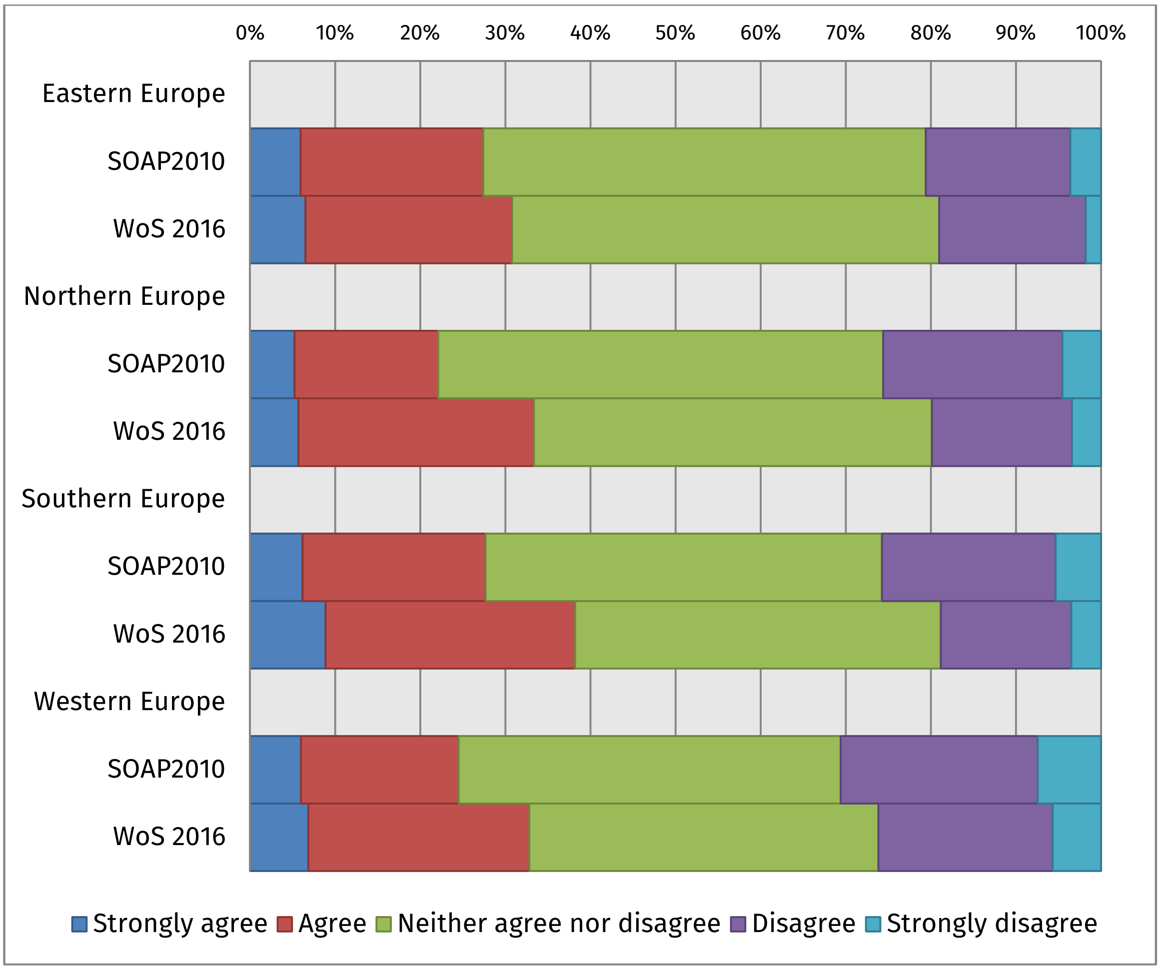
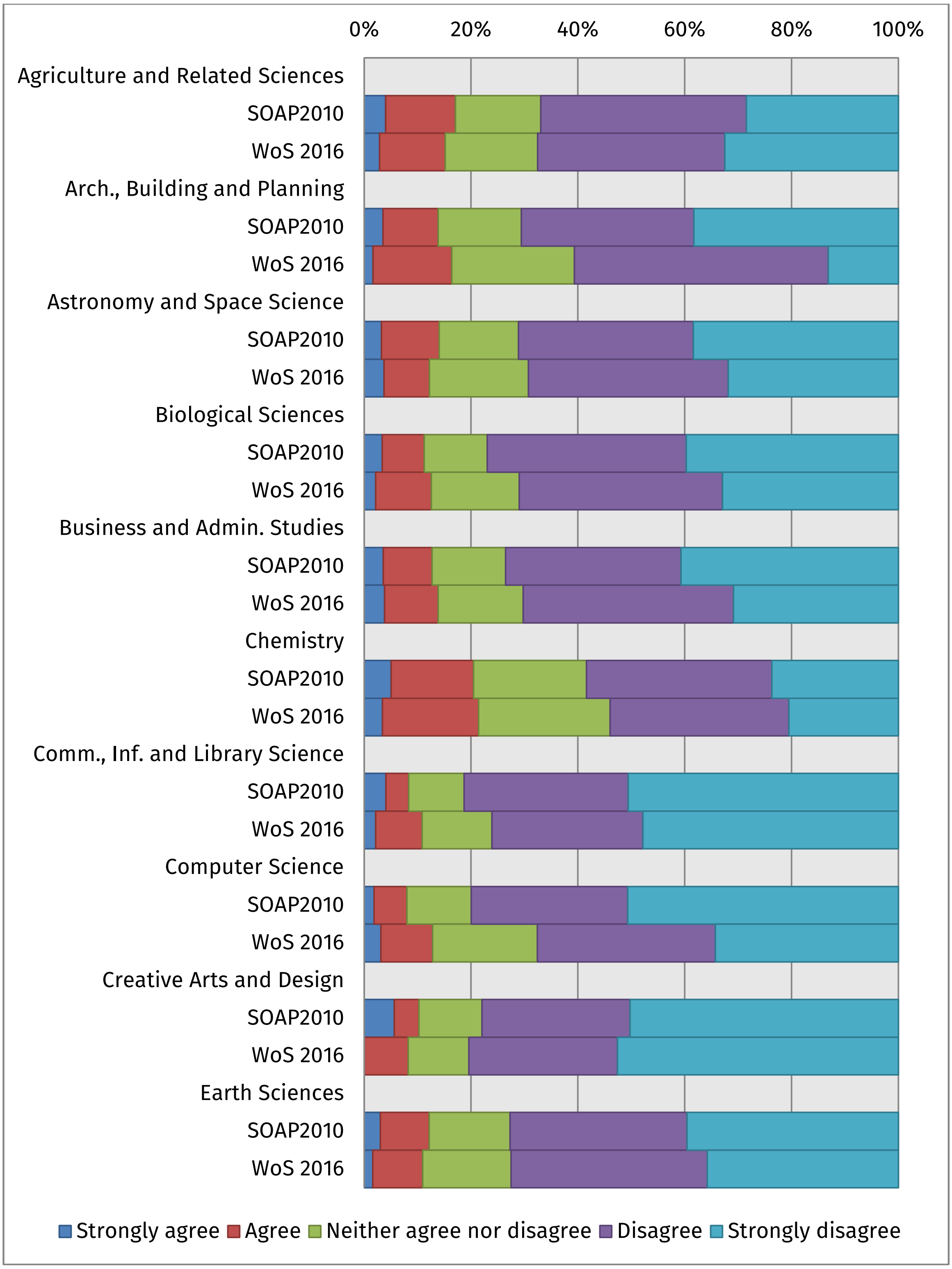
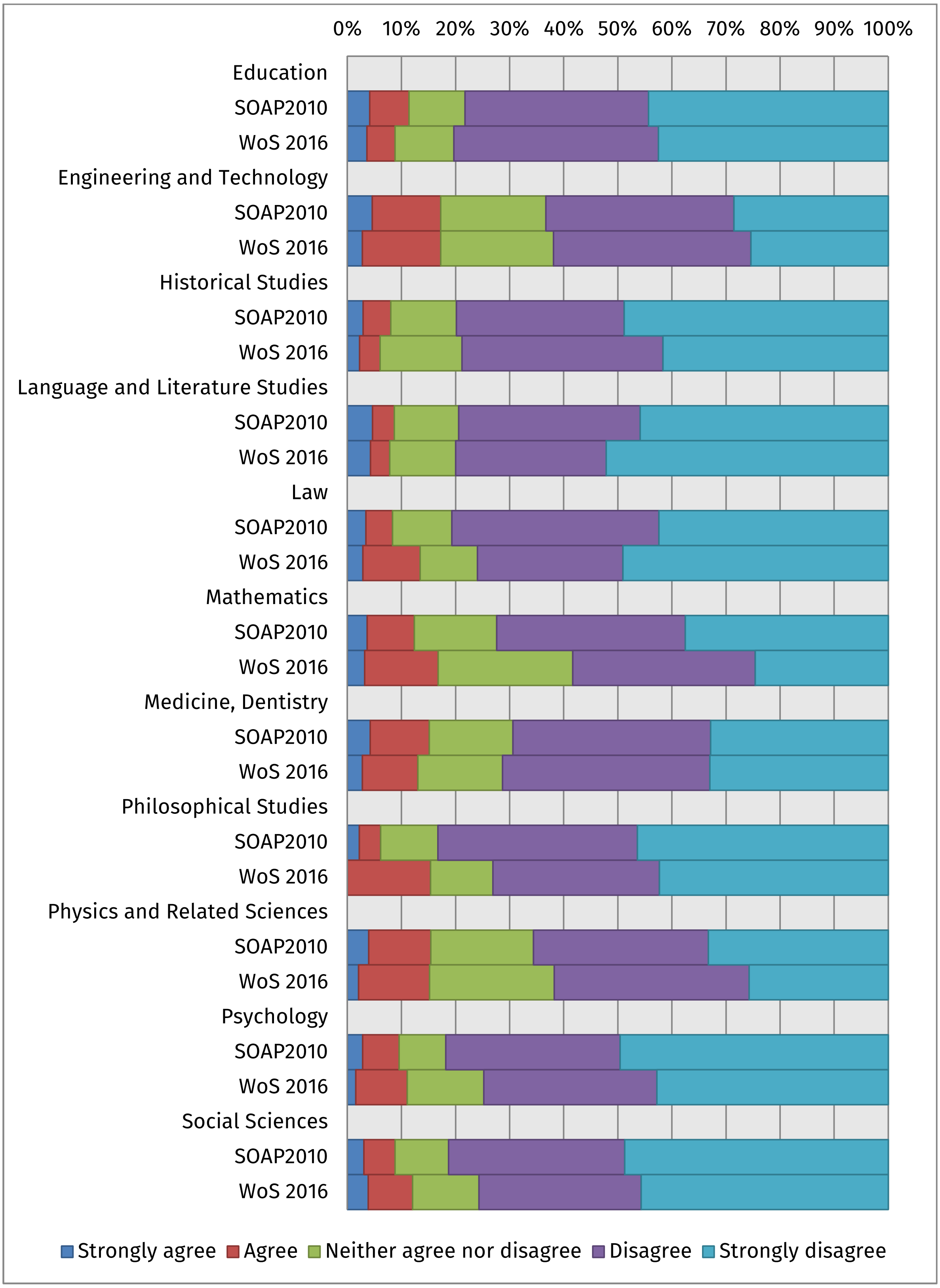


Figure 58 It is not beneficial for the general public to have access to published scientific and medical articles. By discipline (SOAP 2010 n=33,326 - WoS 2016 n=15,598, p < 0.001)




0%
10%
20%
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40%
50%
60%
70%
80%
90%
100%
Education
SOAP2010
WoS 2016
Engineering and Technology
SOAP2010
WoS 2016
Historical Studies
SOAP2010
WoS 2016
Language and Literature Studies
SOAP2010
WoS 2016
Law
SOAP2010
WoS 2016
Mathematics
SOAP2010
WoS 2016
Medicine, Dentistry
SOAP2010
WoS 2016
Philosophical Studies
SOAP2010
WoS 2016
Physics and Related Sciences
SOAP2010
WoS 2016
Psychology
SOAP2010
WoS 2016
Social Sciences
SOAP2010
WoS 2016
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 59 It is not beneficial for the general public to have access to published scientific and medical articles. By seniority (SOAP 2010 n=25,144 - WoS 2016 n=14,187, p < 0.001)

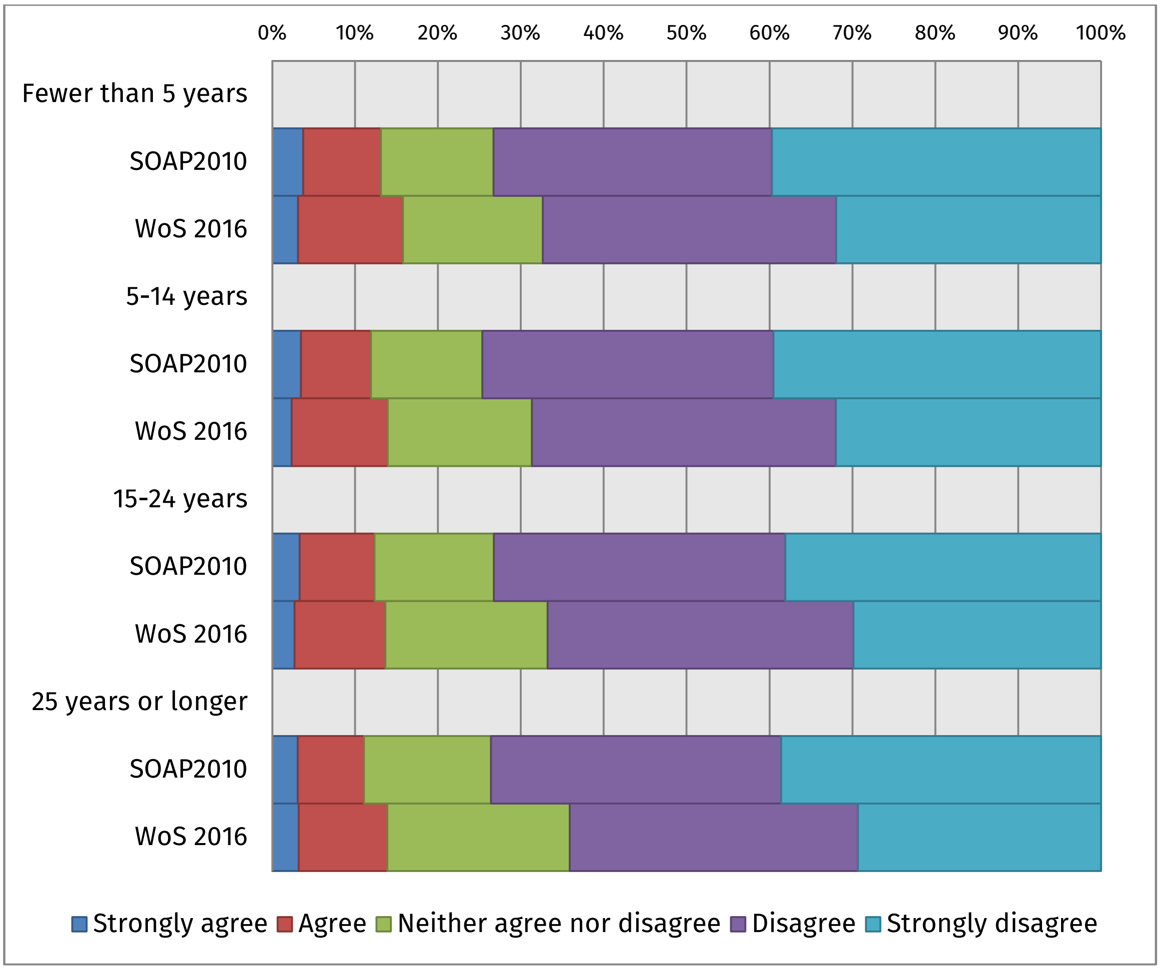


Figure 60 It is not beneficial for the general public to have access to published scientific and medical articles. By regions (SOAP 2010 n=25,019 - WoS 2016 n=14,152, p < 0.001)

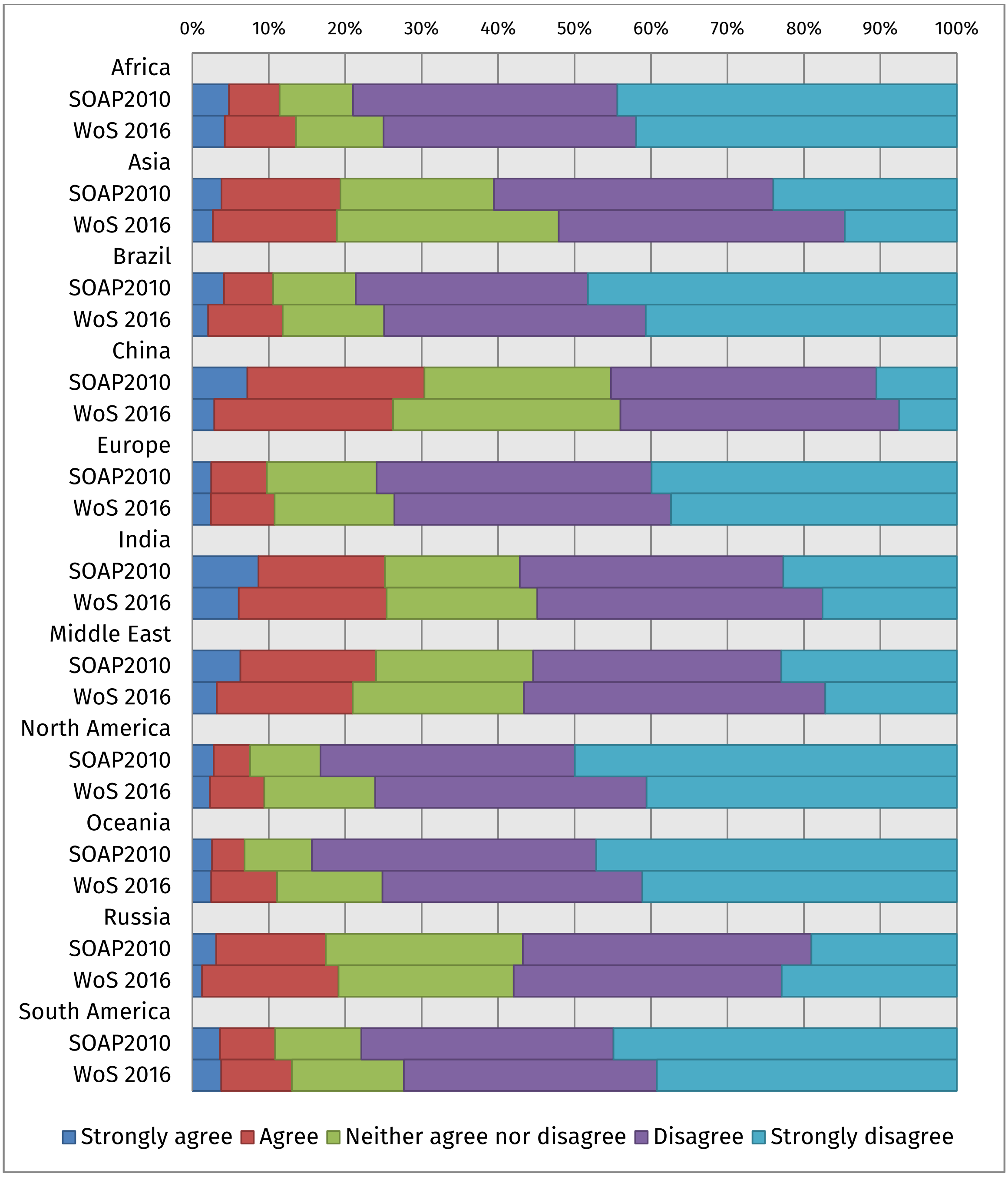


Figure 61 It is not beneficial for the general public to have access to published scientific and medical articles. By European region (SOAP 2010 n=11,022 - WoS 2016 n=5,219, p < 0.001)

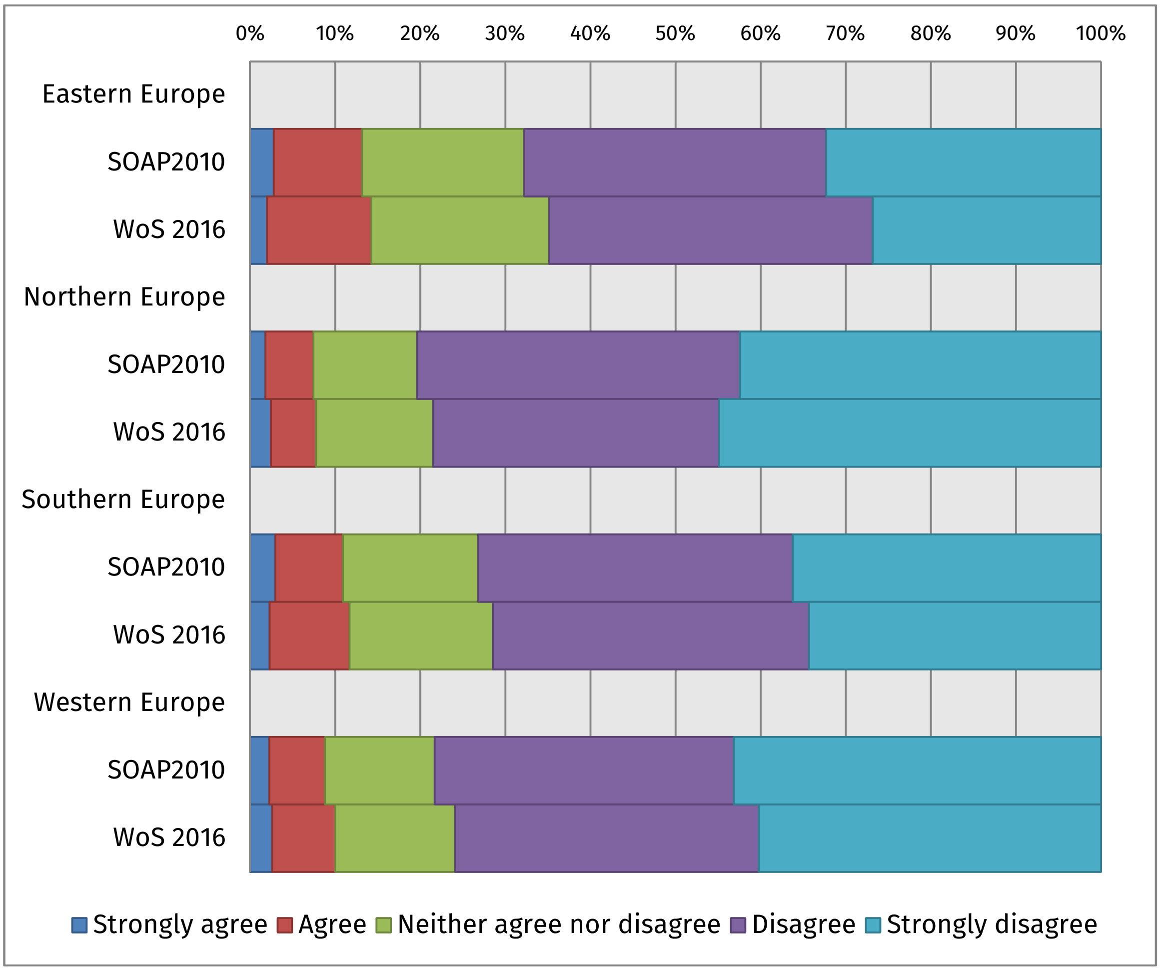
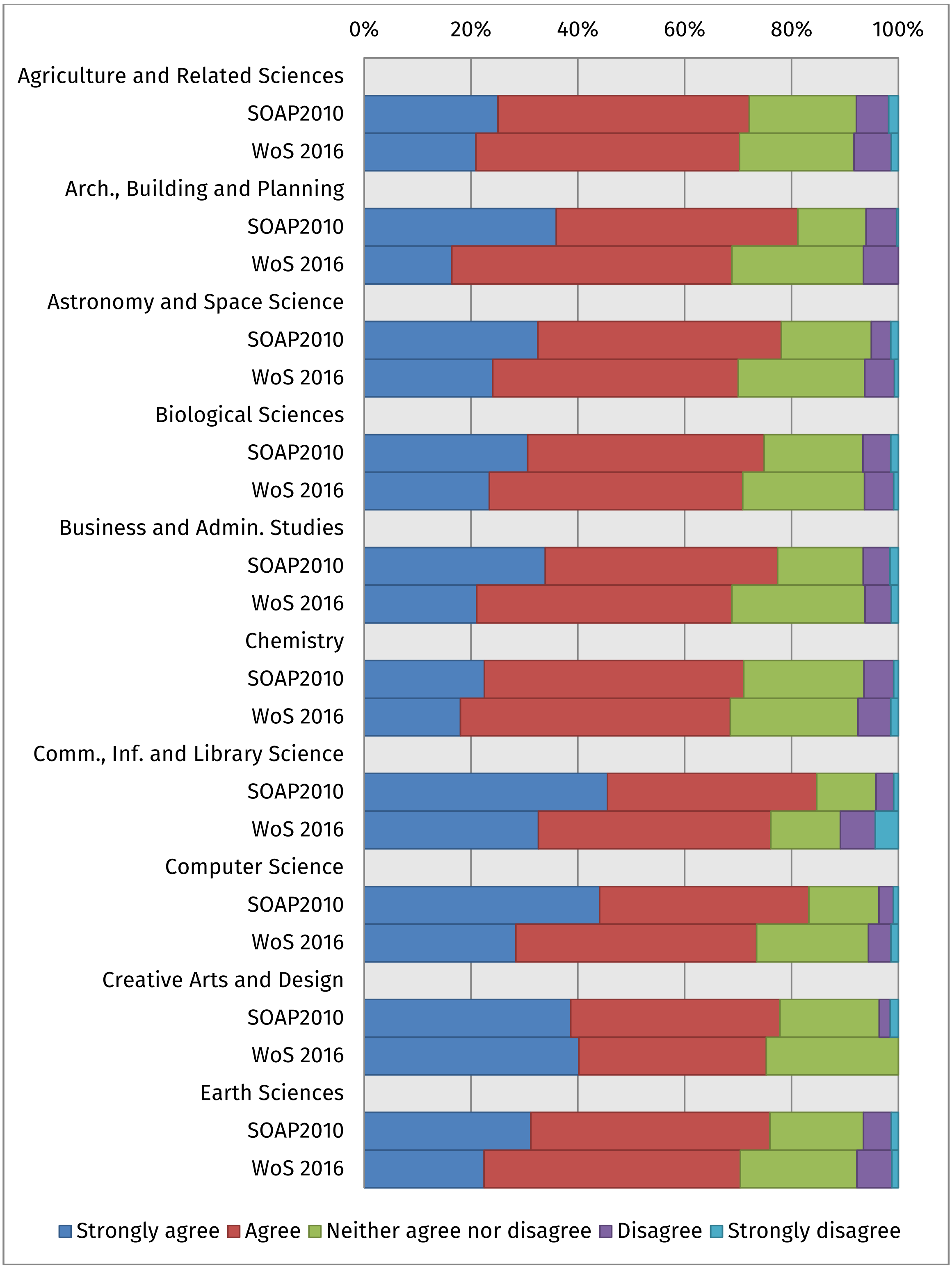


Figure 62 Researchers should retain the rights to their published work and allow it to be used by others. By discipline (SOAP 2010 n=33,338 - WoS 2016 n=15,570, p < 0.001)



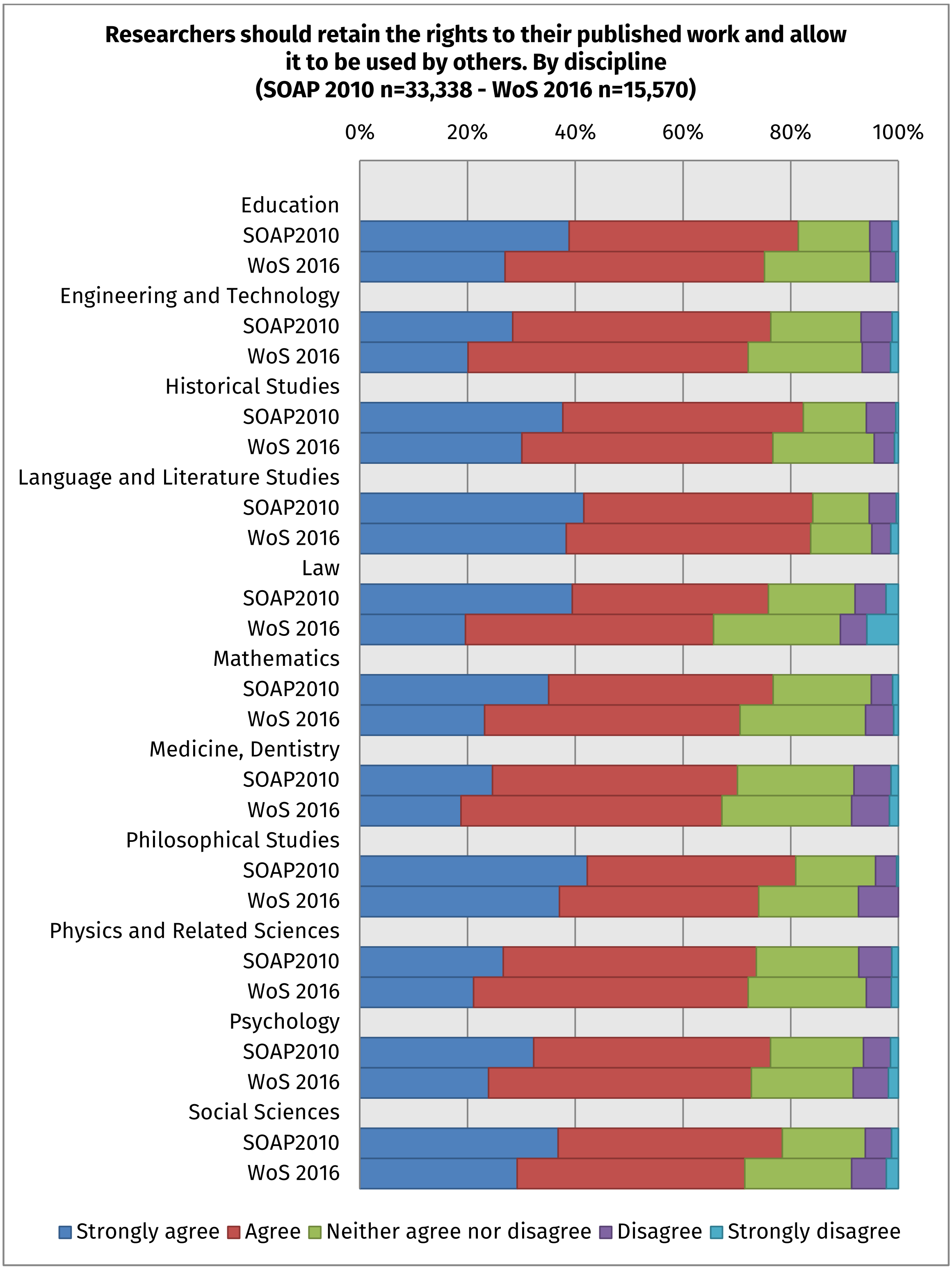

Researchers should retain the rights to their published work and allow it to be used by others. By discipline
(SOAP 2010 n=33,338 - WoS 2016 n=15,570)
0%
20%
40%
60%
80%
100%
Education
SOAP2010
WoS 2016
Engineering and Technology
SOAP2010
WoS 2016
Historical Studies
SOAP2010
WoS 2016
Language and Literature Studies
SOAP2010
WoS 2016
Law
SOAP2010
WoS 2016
Mathematics
SOAP2010
WoS 2016
Medicine, Dentistry
SOAP2010
WoS 2016
Philosophical Studies
SOAP2010
WoS 2016
Physics and Related Sciences
SOAP2010
WoS 2016
Psychology
SOAP2010
WoS 2016
Social Sciences
SOAP2010
WoS 2016
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 63 Researchers should retain the rights to their published work and allow it to be used by others. By seniority (SOAP 2010 n=25,151 - WoS 2016 n=14,163, $p < 0.001$)

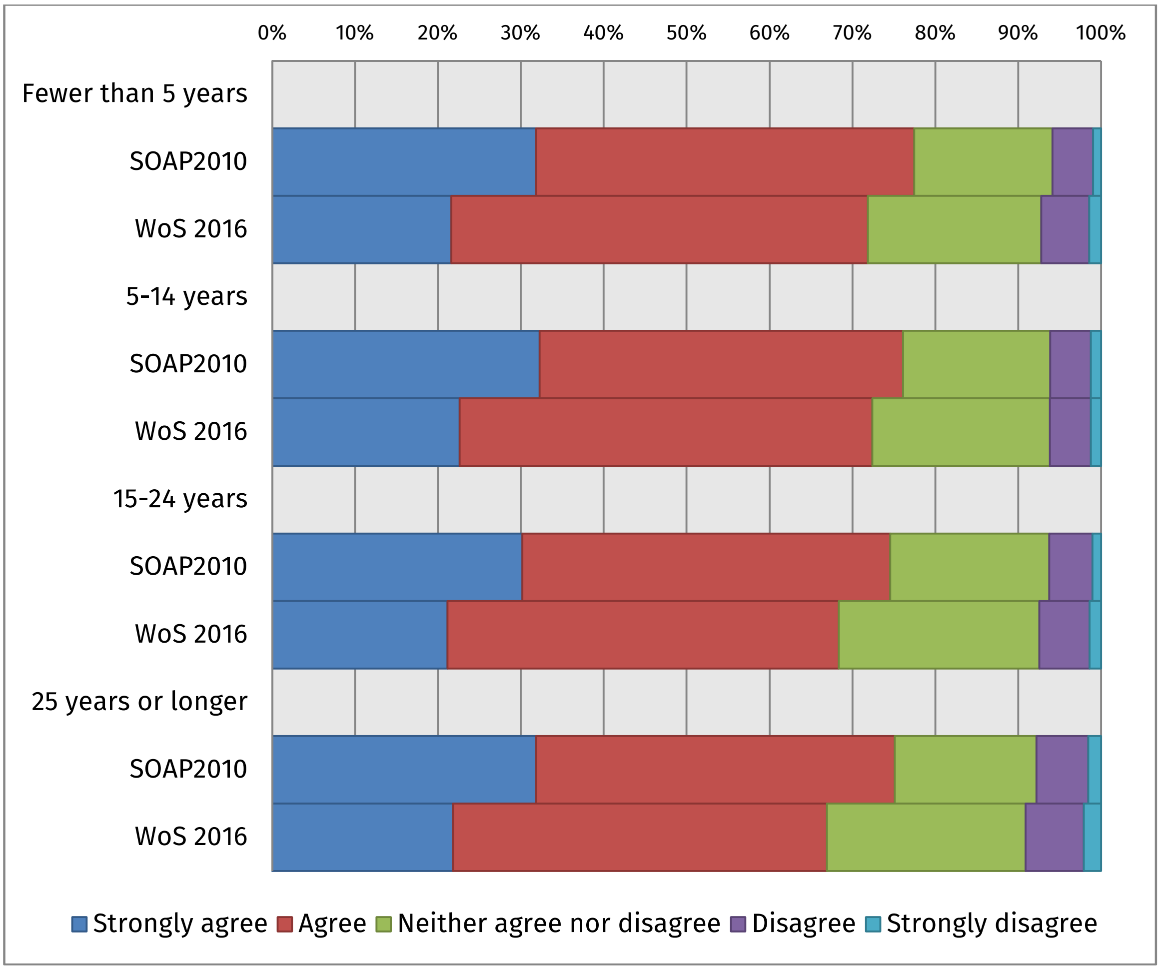


Figure 64 Researchers should retain the rights to their published work and allow it to be used by others (SOAP 2010 n=25,151 - WoS 2016 n=14,163, $p < 0.001$)

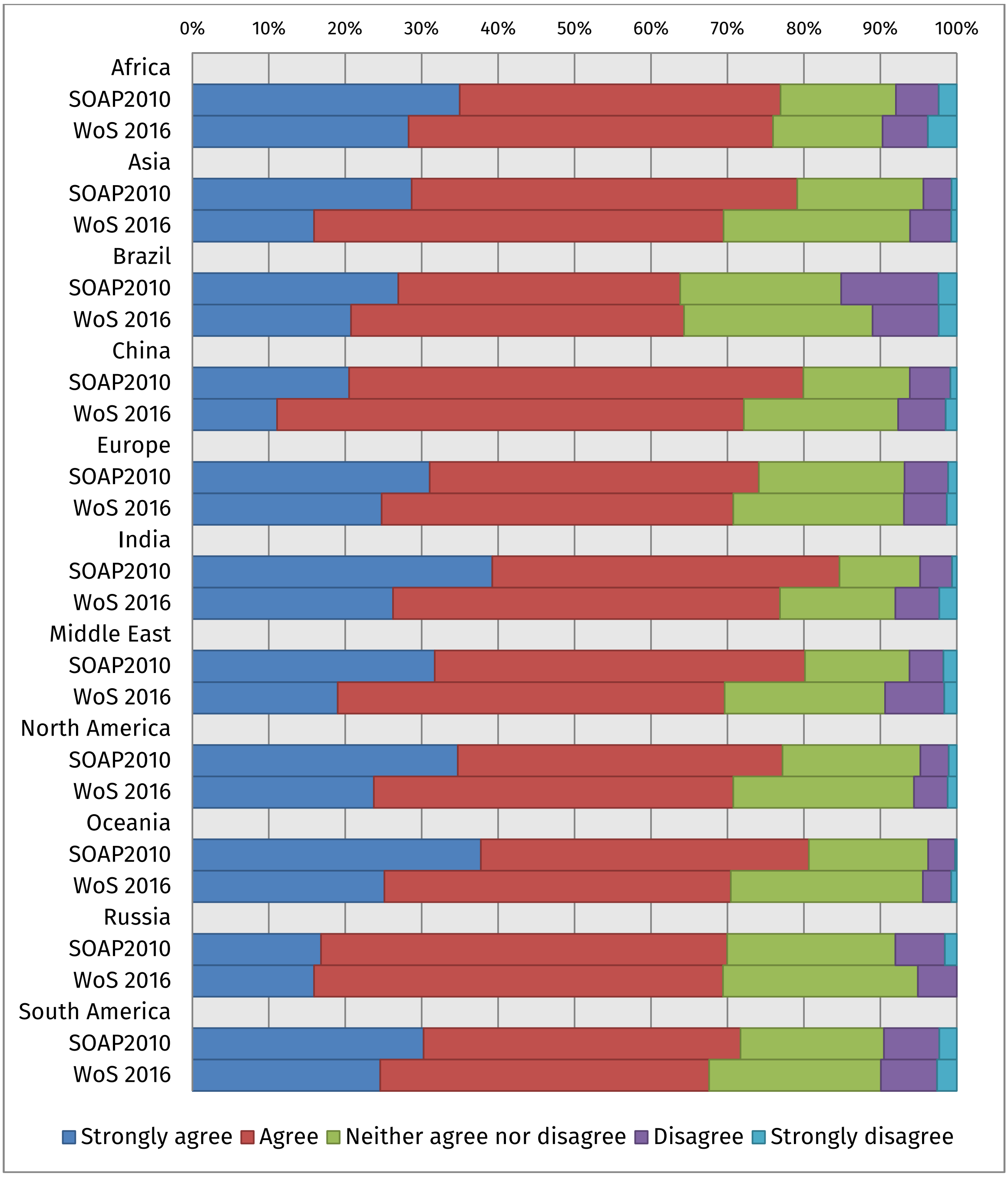


Figure 65 Researchers should retain the rights to their published work and allow it to be used by others. By European region (SOAP 2010 n=11,003 - WoS 2016 n=5,219, $p < 0.001$)

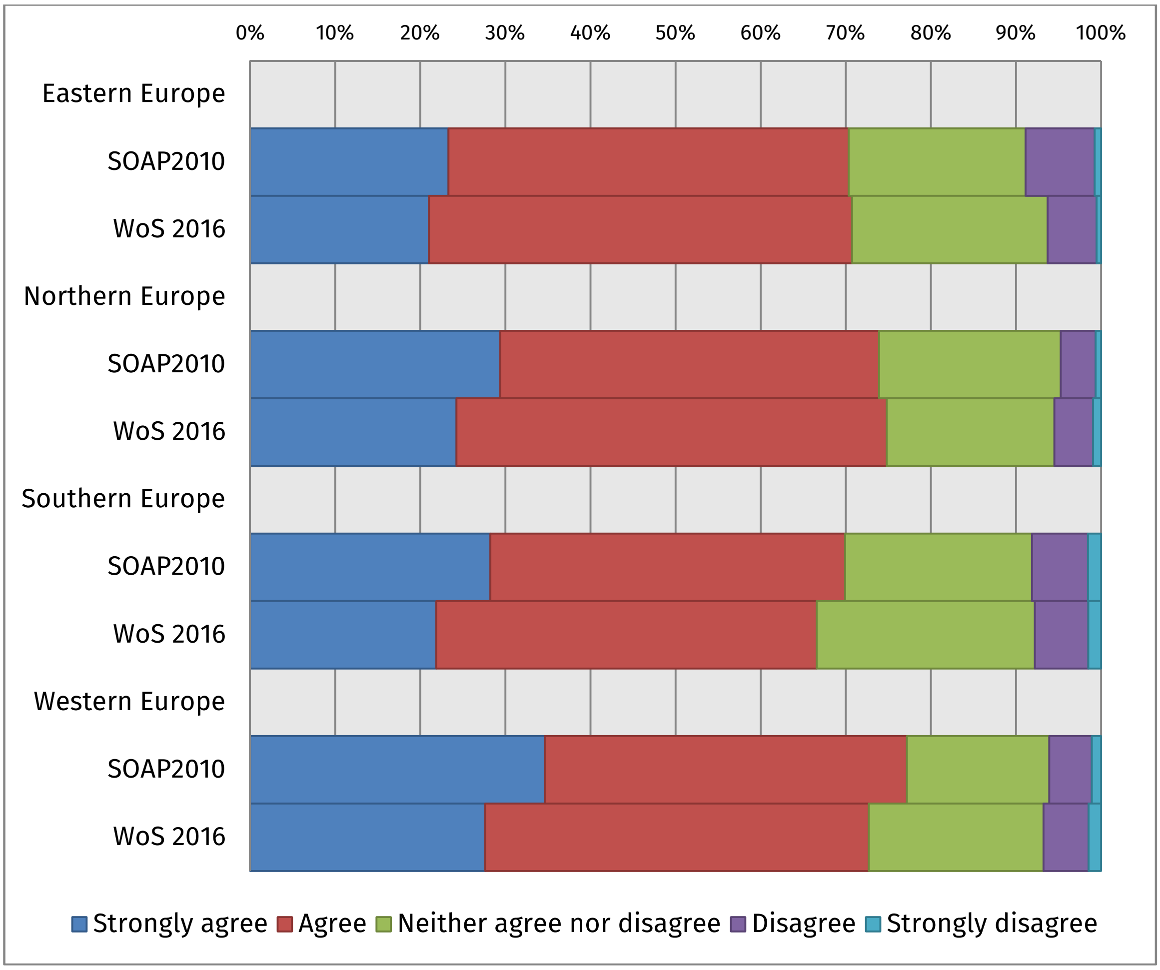
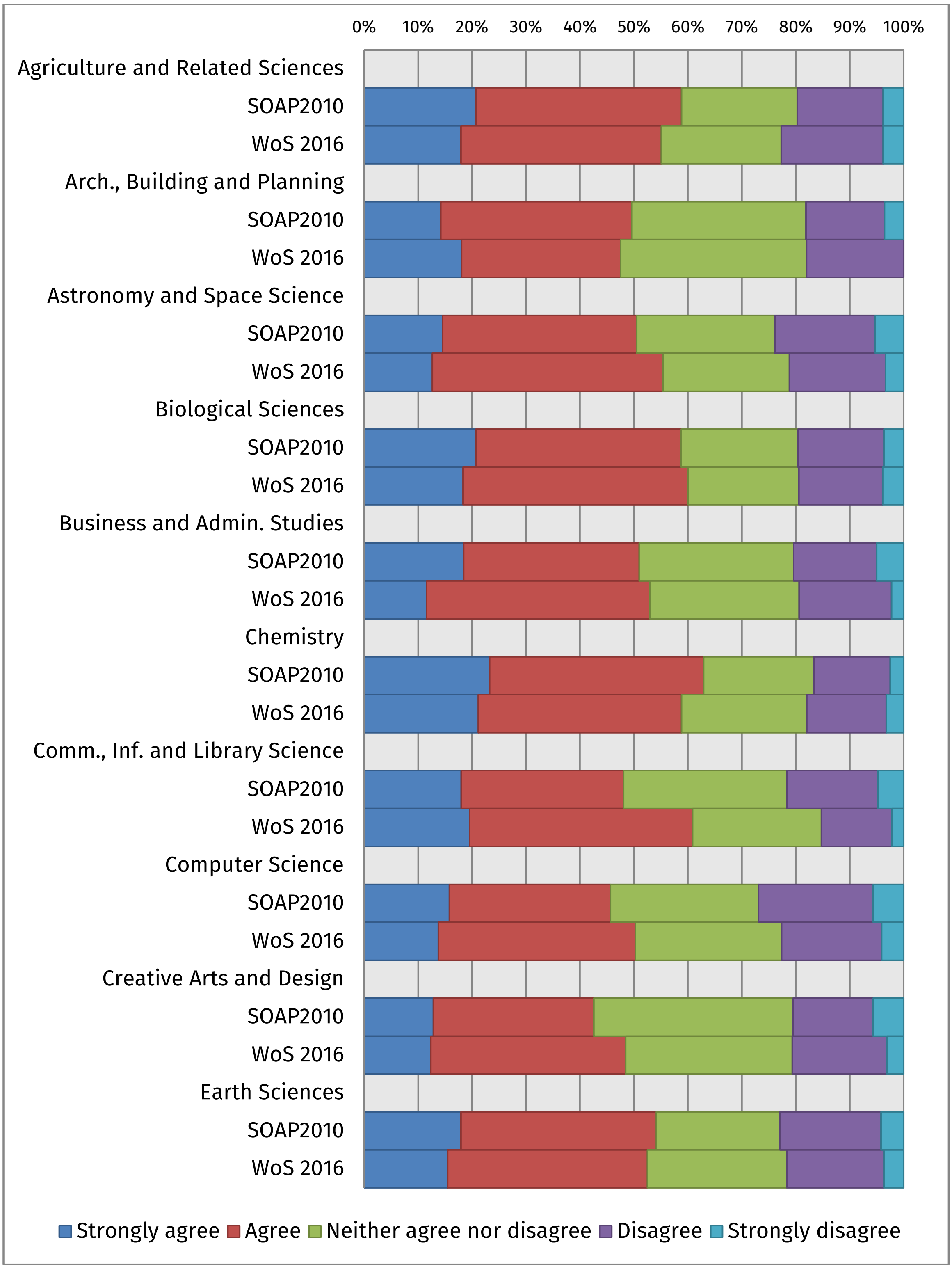
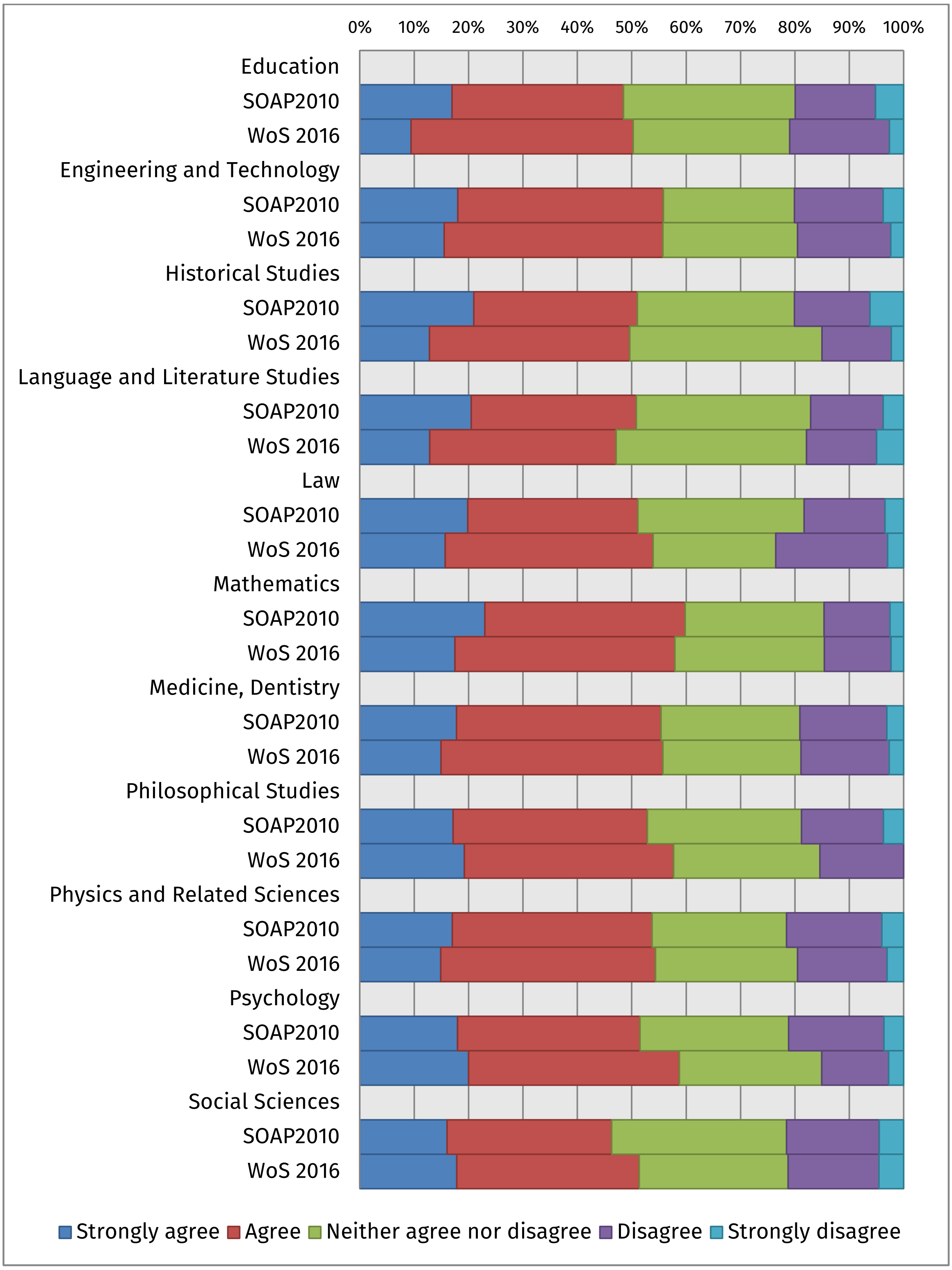


Figure 66 If authors pay publication fees to make their articles OA, there will be less money available for research. By discipline (SOAP 2010 n=33,357 - WoS 2016 n=15,598, p < 0.001)




0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Education
SOAP2010
WoS 2016
Engineering and Technology
SOAP2010
WoS 2016
Historical Studies
SOAP2010
WoS 2016
Language and Literature Studies
SOAP2010
WoS 2016
Law
SOAP2010
WoS 2016
Mathematics
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WoS 2016
Medicine, Dentistry
SOAP2010
WoS 2016
Philosophical Studies
SOAP2010
WoS 2016
Physics and Related Sciences
SOAP2010
WoS 2016
Psychology
SOAP2010
WoS 2016
Social Sciences
SOAP2010
WoS 2016
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 67 If authors pay publication fees to make their articles OA, there will be less money available for research. By seniority (SOAP 2010 n=25,170 - WoS 2016 n=14,192, $p < 0.001$)

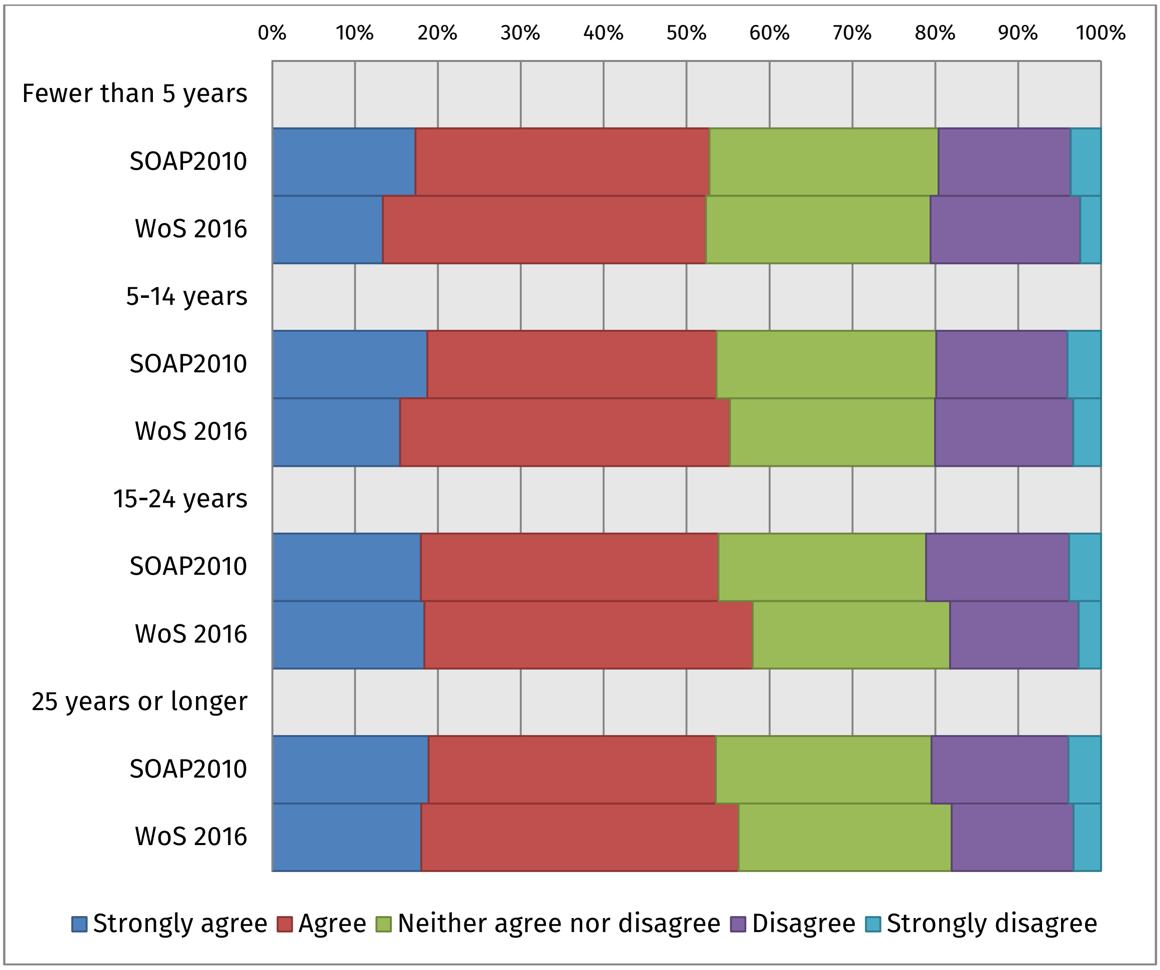


Figure 68 If authors pay publication fees to make their articles OA, there will be less money available for research. By regions (SOAP 2010 n=25,170 - WoS 2016 n=14,192, p < 0.001)

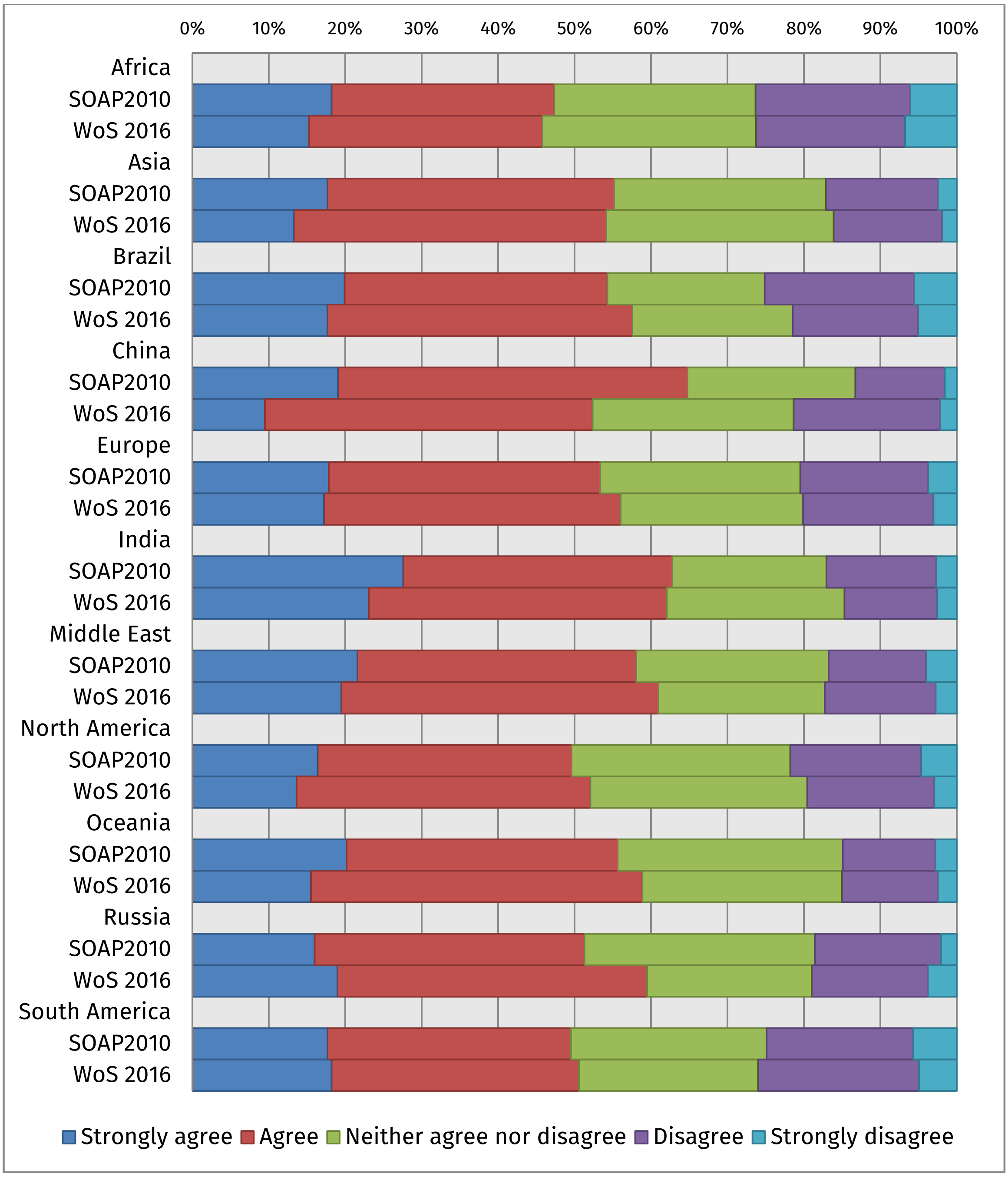
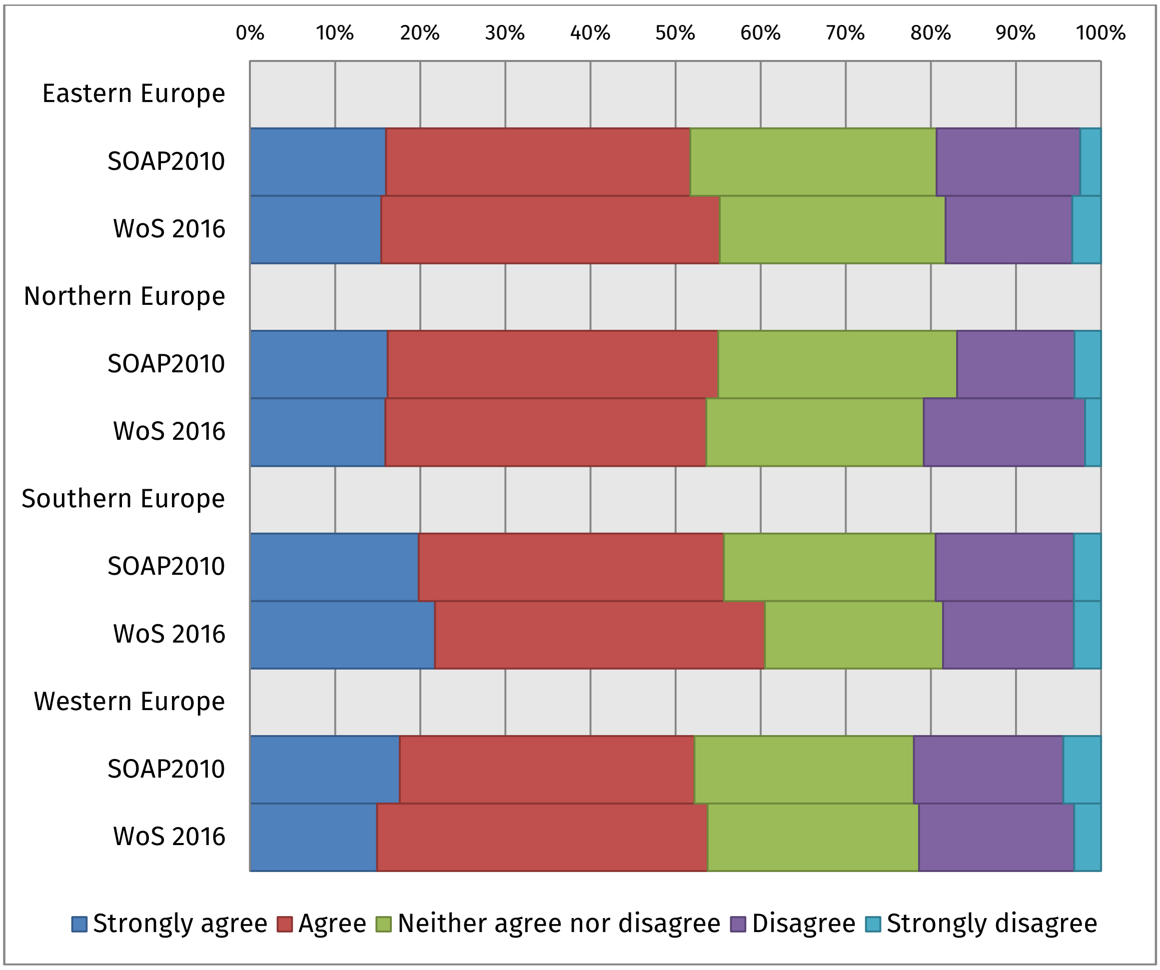


Figure 69 If authors pay publication fees to make their articles OA, there will be less money available for research. By European region (SOAP 2010 n=11,034 - WoS 2016 n=5,219, $p < 0.001$)



Annex V.2 Practice

Figure 70 How many peer reviewed research articles (Open Access or not Open Access) have you published in the last five years? By region (SOAP 2010 n=11,598 - WoS 2016 n=5,498, $p < 0.001$)

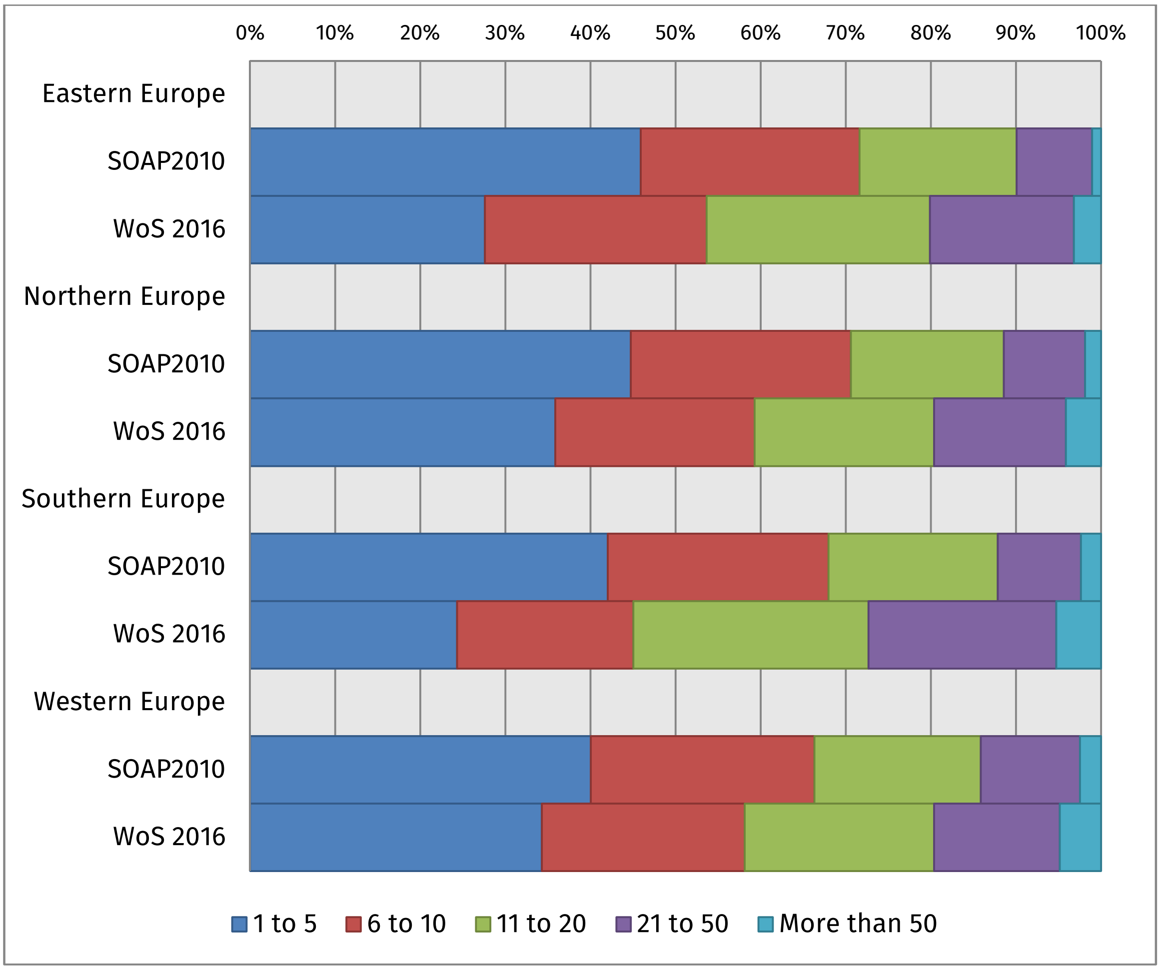


Table 2 Importance of factors when selecting a journal to publish in. Relevance of the journal for my community. Distribution by discipline (SOAP 2010 n=33,897 - WoS 2016 n=16,553, $p < 0.001$)

	SOAP 2010				WoS 2016			
	Extremely Important	Important	Less important	Irrelevant	Extremely Important	Important	Less important	Irrelevant
Agriculture	39.6%	47.4%	10.7%	2.2%	42.1%	46.1%	10.3%	1.6%
Architecture	49.7%	41.4%	6.9%	2.1%	28.4%	61.2%	10.4%	0.0%
Astronomy	66.1%	28.2%	5.0%	0.8%	55.1%	37.2%	5.4%	2.4%
Biological Sciences	50.0%	39.8%	7.6%	2.7%	43.2%	46.4%	8.4%	2.1%
Business and Administration	48.2%	41.7%	8.4%	1.8%	44.4%	41.9%	10.8%	2.9%
Chemistry	45.4%	42.9%	9.4%	2.2%	44.7%	42.4%	10.5%	2.5%
Com., Inf. Lib. Science	53.0%	37.7%	7.2%	2.1%	50.0%	44.0%	4.0%	2.0%
Computer Science	58.8%	36.9%	3.2%	1.2%	45.3%	45.9%	6.4%	2.4%
Creative Arts	53.7%	31.8%	10.9%	3.5%	43.3%	43.3%	7.7%	5.8%
Earth Sciences	57.5%	35.7%	4.7%	2.1%	46.8%	43.5%	7.5%	2.1%
Education	56.1%	37.0%	5.7%	1.2%	58.5%	34.2%	5.7%	1.6%
Engineering	50.9%	39.9%	6.9%	2.3%	42.6%	46.1%	8.7%	2.6%
Historical Studies	53.1%	36.6%	7.6%	2.7%	54.3%	37.1%	5.0%	3.6%
Language and Literature	50.9%	37.8%	8.0%	3.3%	58.4%	31.8%	7.1%	2.6%
Law	51.5%	40.6%	6.0%	1.9%	44.0%	45.9%	7.3%	2.8%
Mathematics	51.6%	38.8%	7.3%	2.3%	38.5%	46.9%	10.4%	4.1%
Medicine, Dentistry	46.1%	42.7%	9.2%	2.1%	42.7%	46.5%	8.8%	2.0%
Philosophical Studies	50.4%	36.8%	9.0%	3.8%	48.1%	44.4%	3.7%	3.7%
Physics	54.5%	36.6%	6.5%	2.3%	44.8%	45.2%	8.0%	1.9%
Psychology	51.4%	38.3%	7.8%	2.5%	49.3%	42.5%	6.2%	2.1%
Social Sciences	49.1%	39.7%	8.4%	2.8%	51.3%	39.5%	6.5%	2.7%

Figure 71 Importance of factors when selecting a journal to publish in. Relevance of the journal for my community. Distribution by seniority (SOAP 2010 n=25,581 - WoS 2016 n=15,059, p < 0.001)

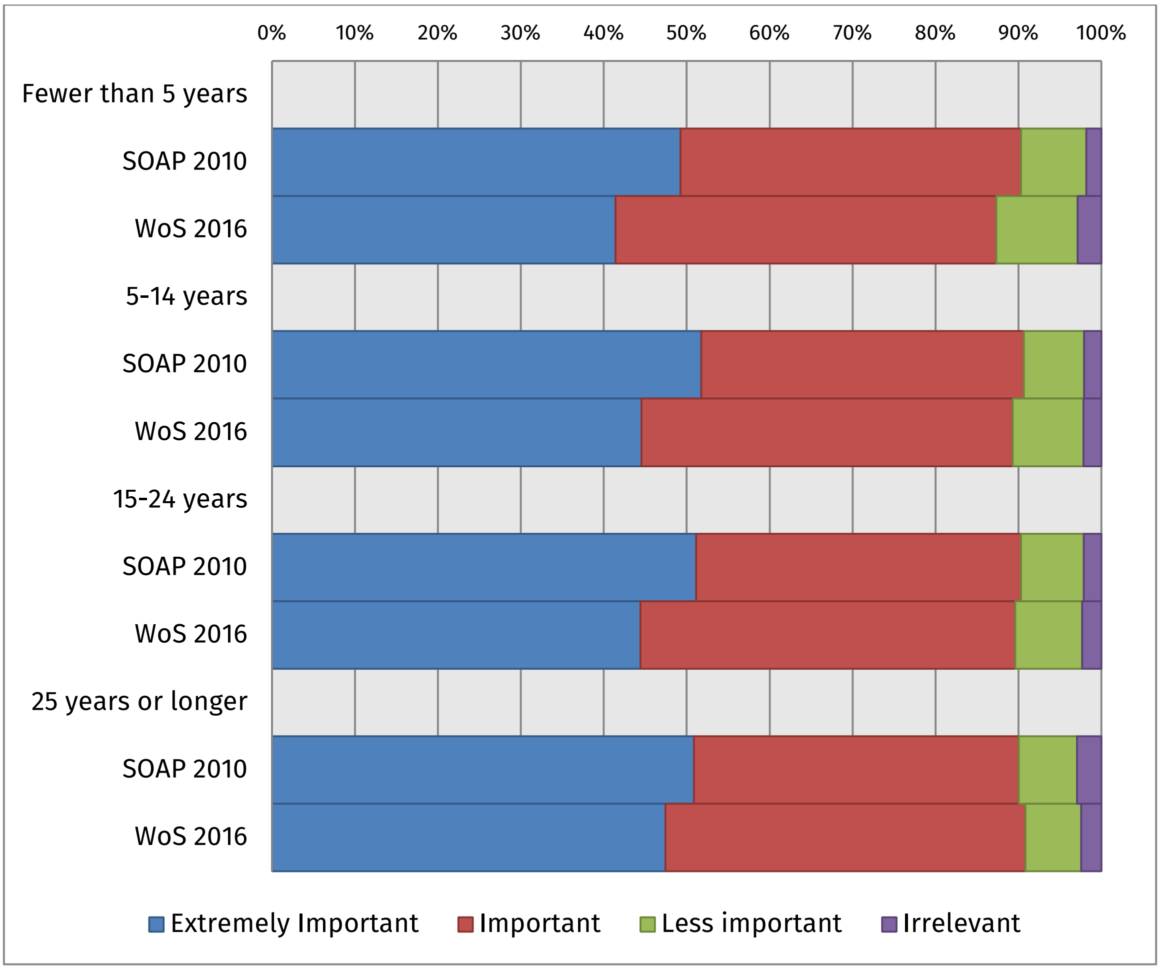


Figure 72 Importance of factors when selecting a journal to publish in. Relevance of the journal for my community. Distribution by geographicla region (SOAP 2010 n=25,581 - WoS 2016 n=15,059, p < 0.001)

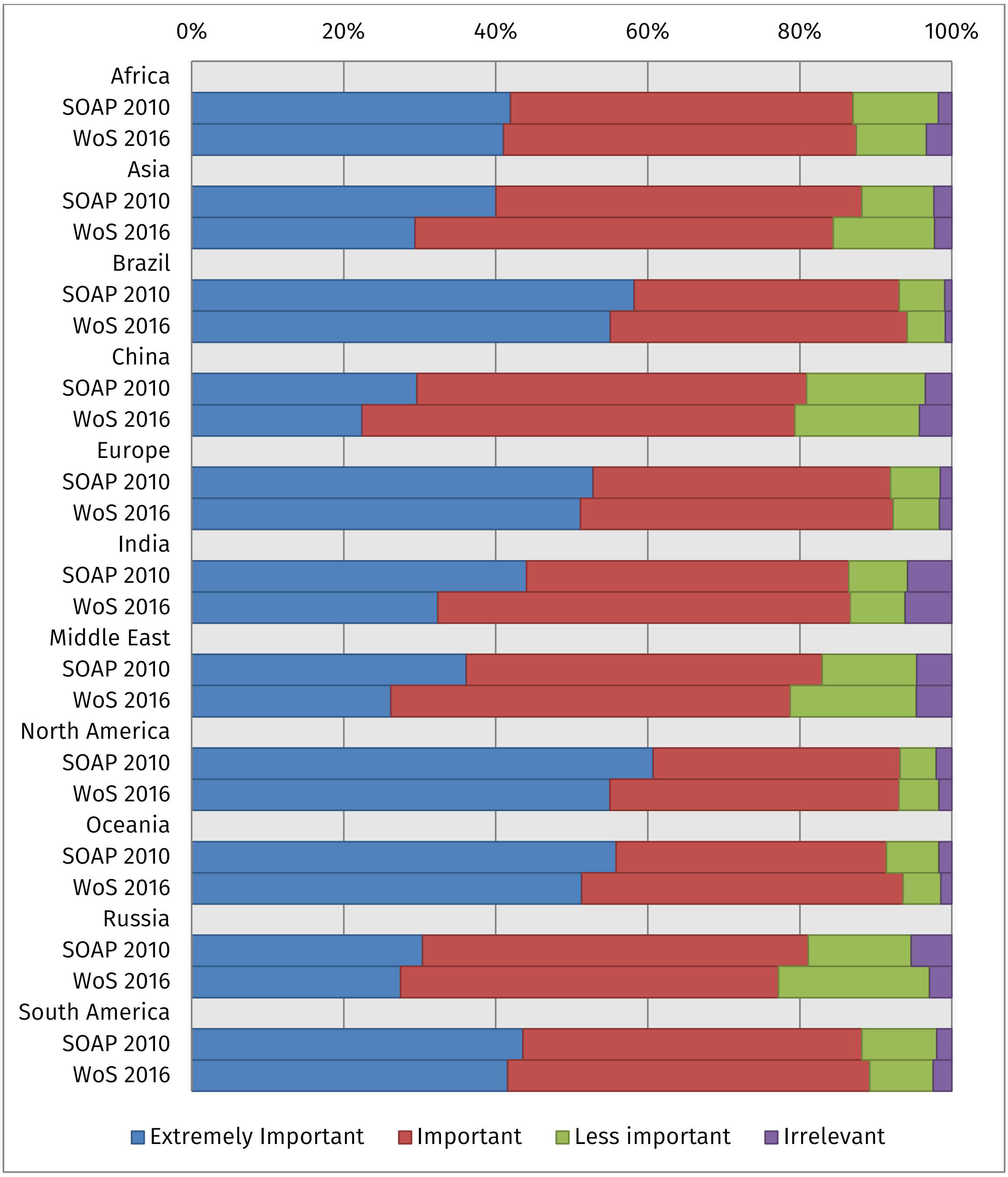


Figure 73 Importance of factors when selecting a journal to publish in. Relevance for the community. By European regions (SOAP 2010 n=11,216 - WoS 2016 n=5,477, p < 0.001)

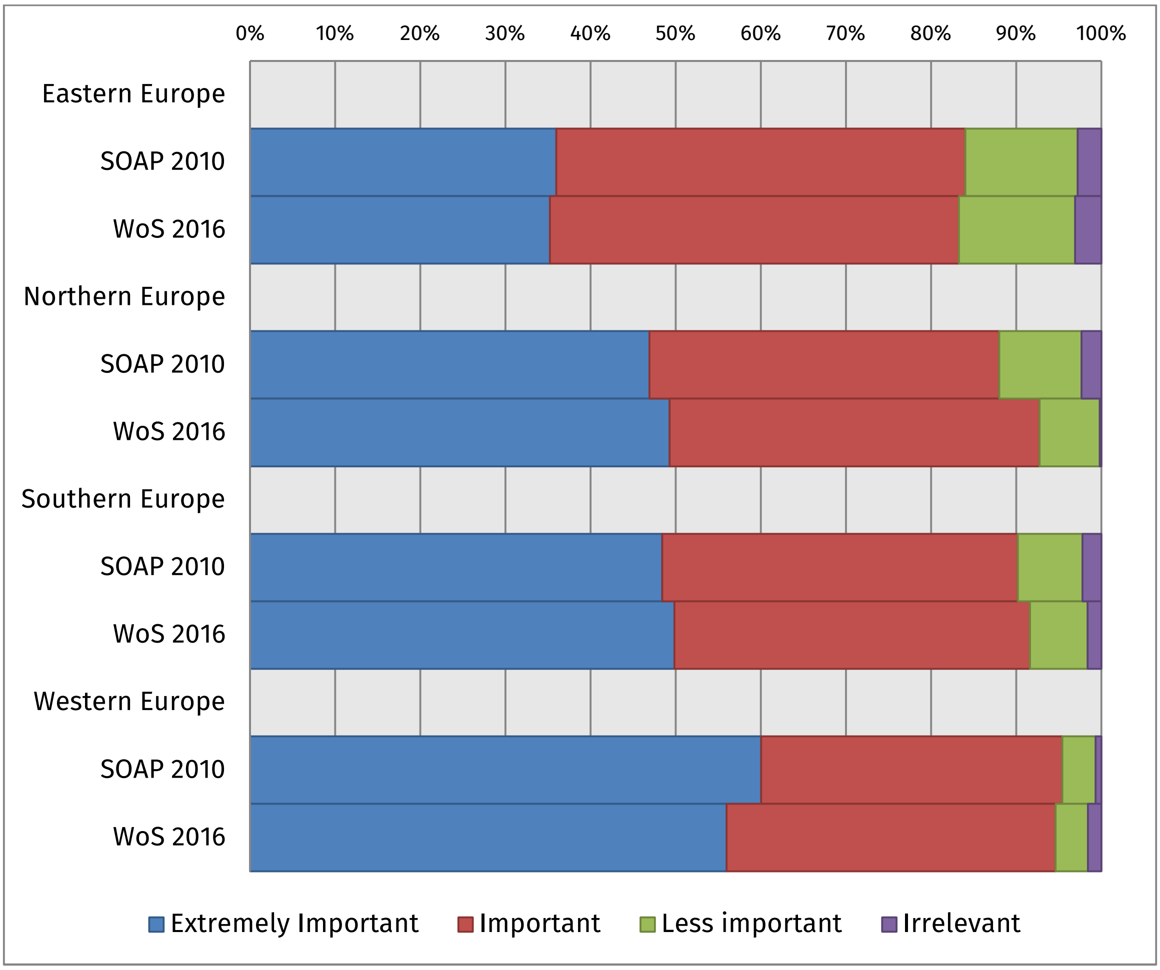
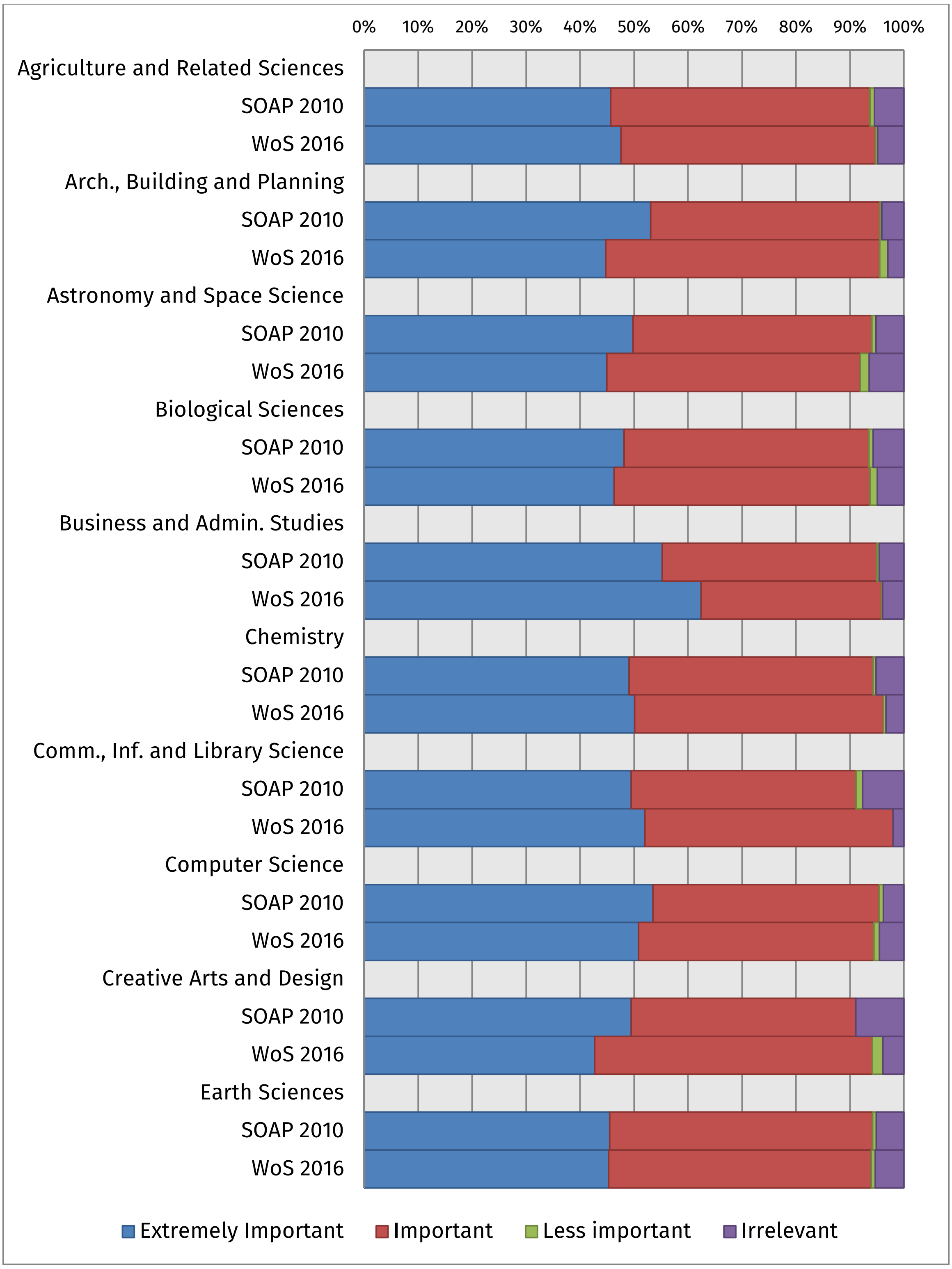


Figure 74 Importance of factors when selecting a journal to publish in. Prestige/Perceived quality of the journal . By discipline (SOAP 2010 n=33,931 - WoS 2016 n=16,568, p < 0.001)



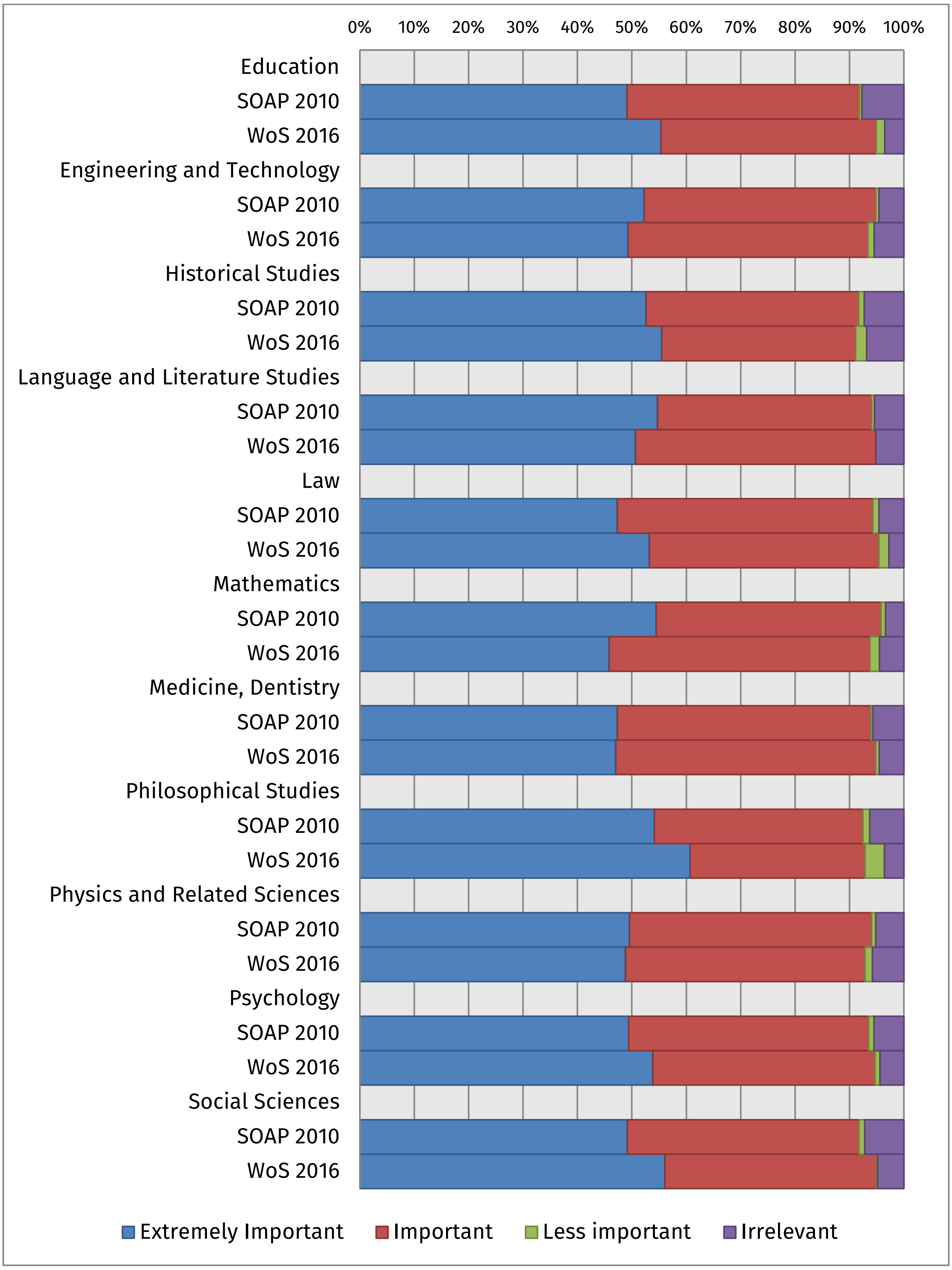

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Figure 75 Importance of factors when selecting a journal to publish in. Prestige/Perceived quality of the journal. By seniority (SOAP 2010 n=25,608 - WoS 2016 n=15,077, p < 0.001)

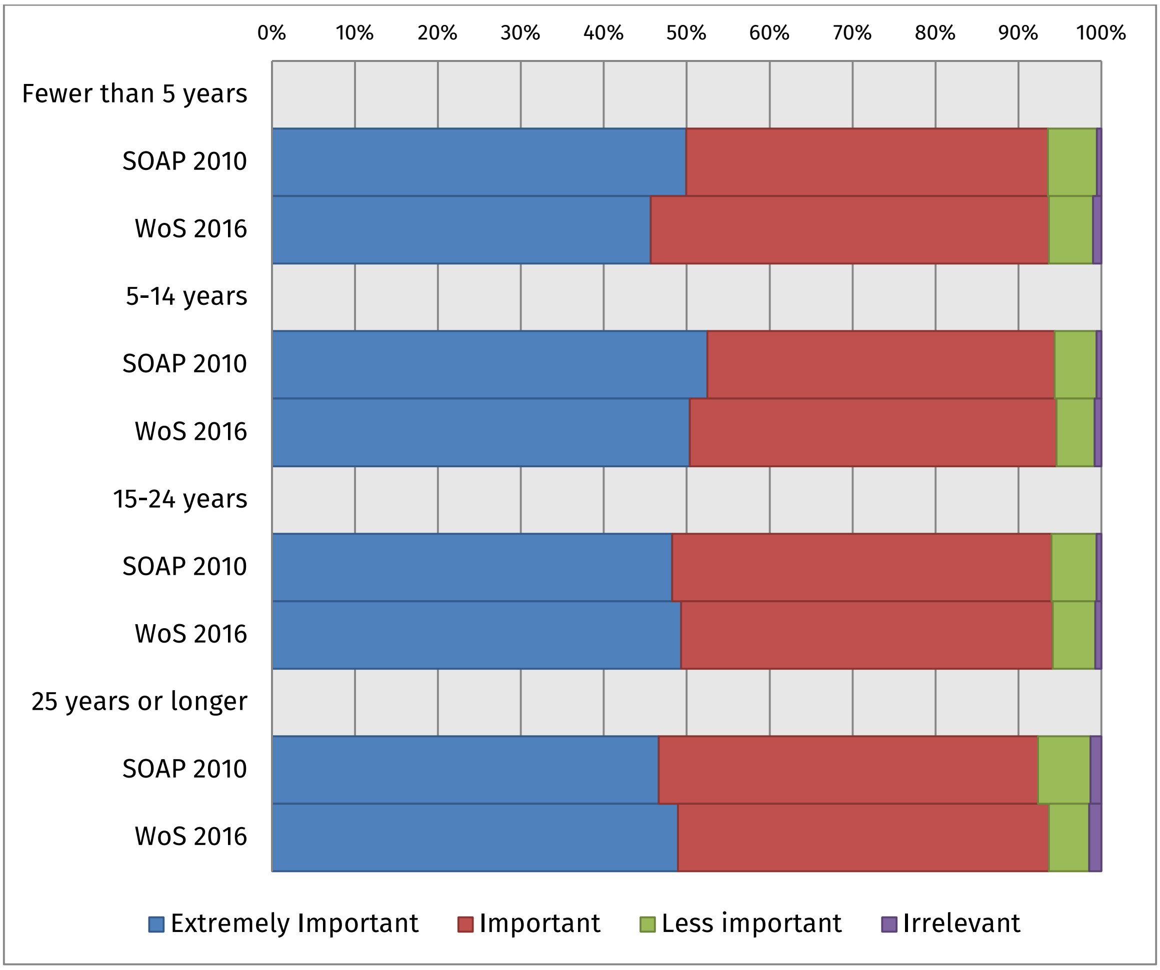


Figure 76 Importance of factors when selecting a journal to publish in. Prestige/Perceived quality of the journal. By regions (SOAP 2010 n=25,608 - WoS 2016 n=15,077, p < 0.001)

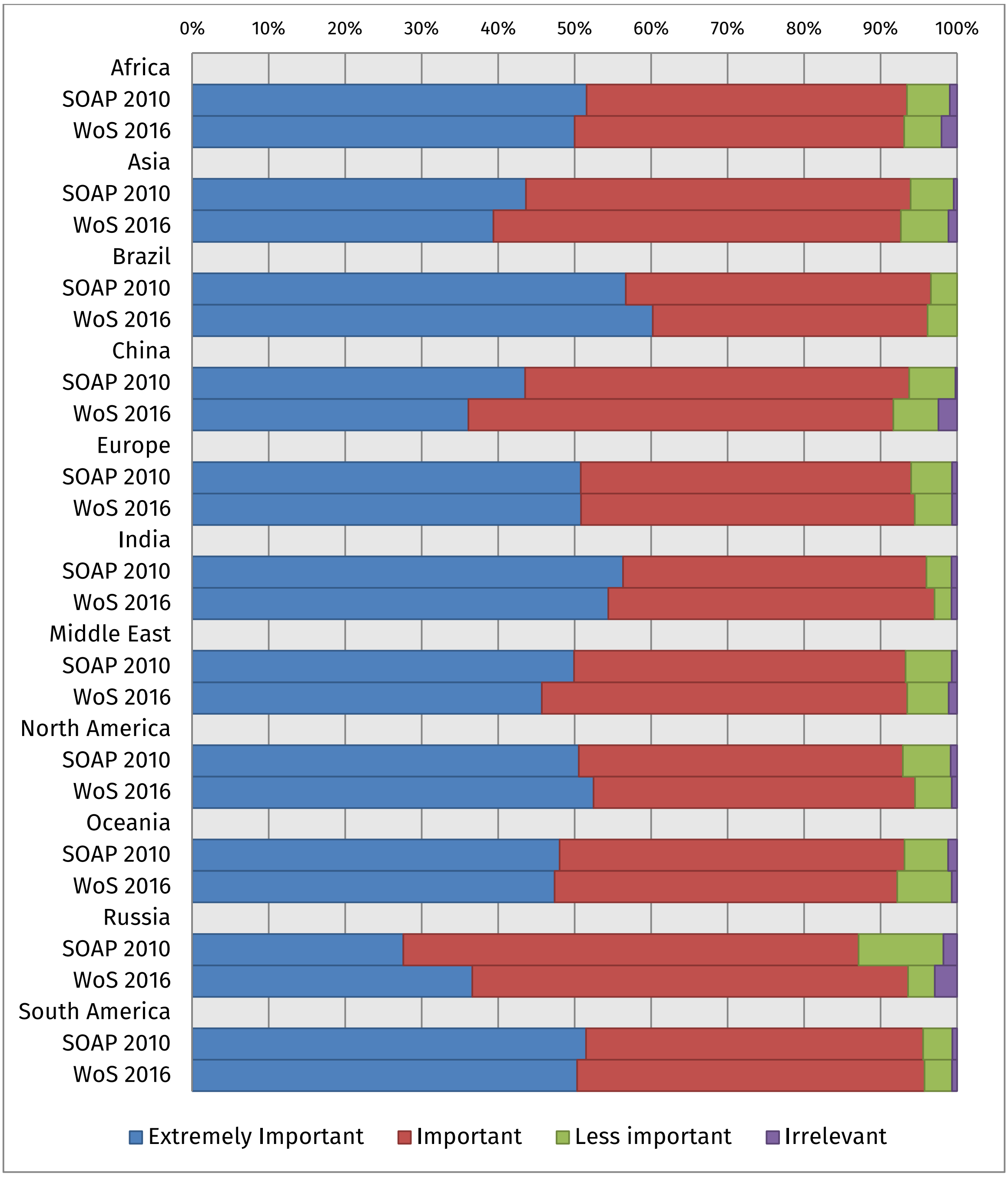


Figure 77 Importance of factors when selecting a journal to publish in. Prestige/Perceived quality of the journal. By European regions (SOAP 2010 n=11,232 - WoS 2016 n=5,483, $p < 0.001$)

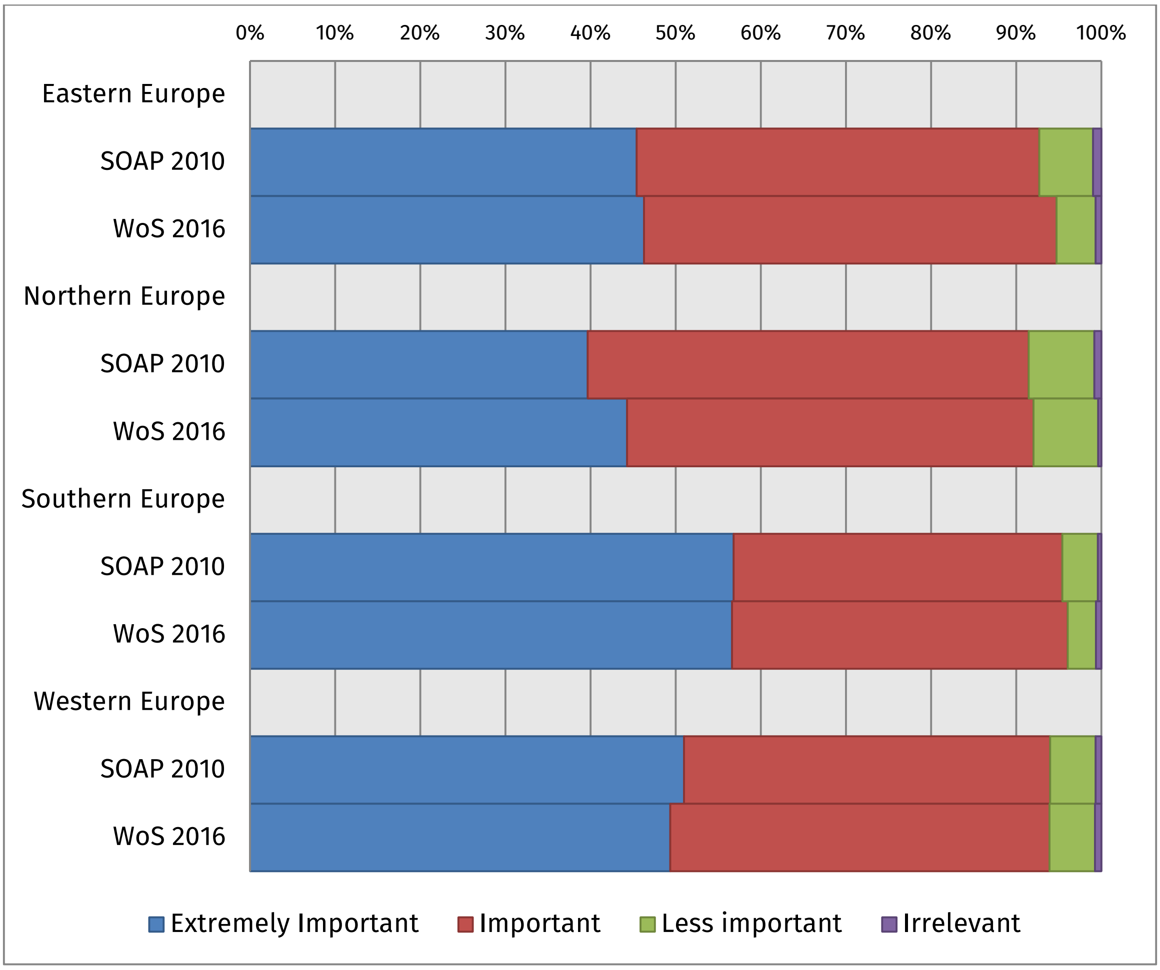
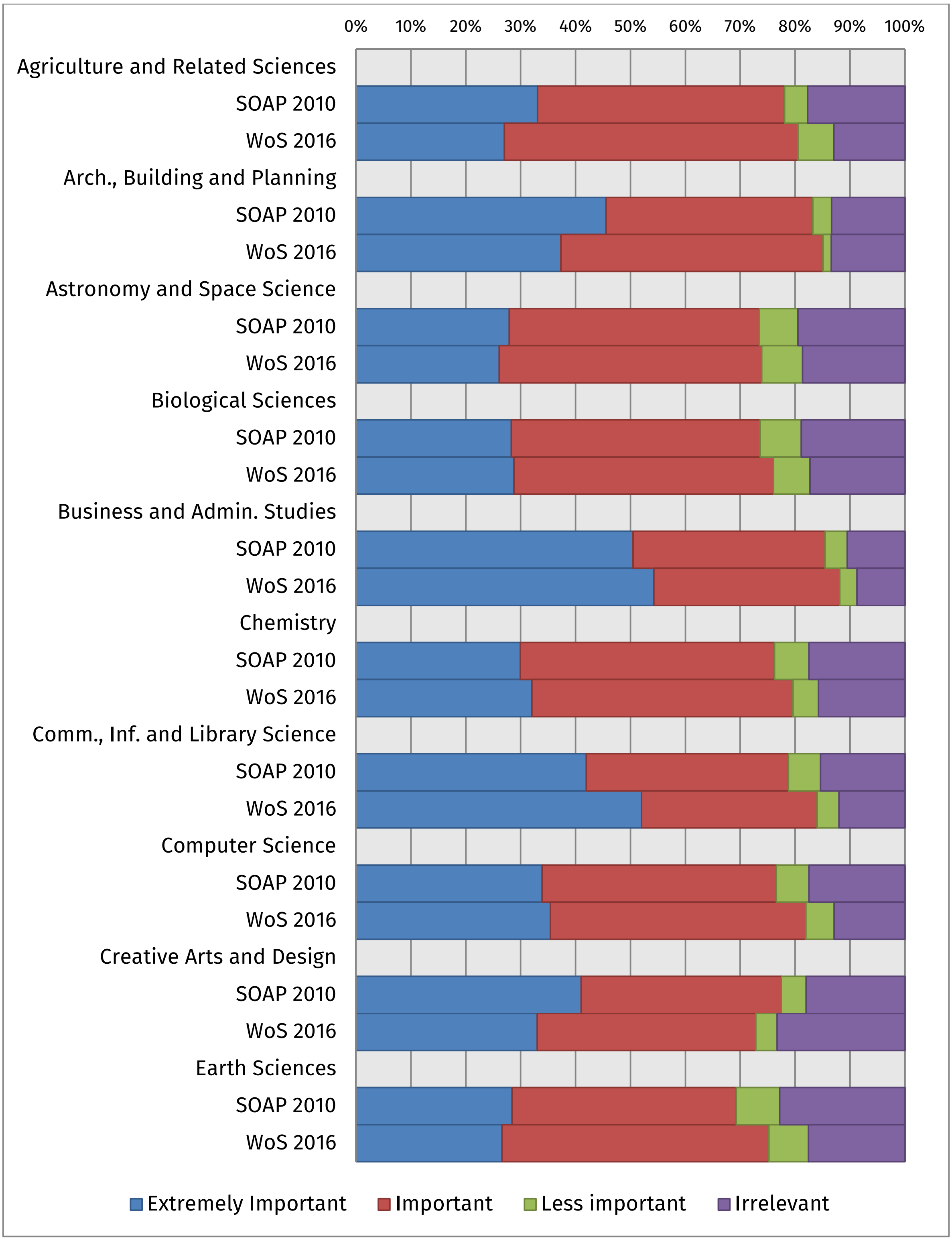


Figure 78 Importance of factors when selecting a journal to publish in. Importance of the journal for academic promotion, tenure or assessment. By discipline (SOAP 2010 n=33,836 - WoS 2016 n=16,581, p < 0.001)



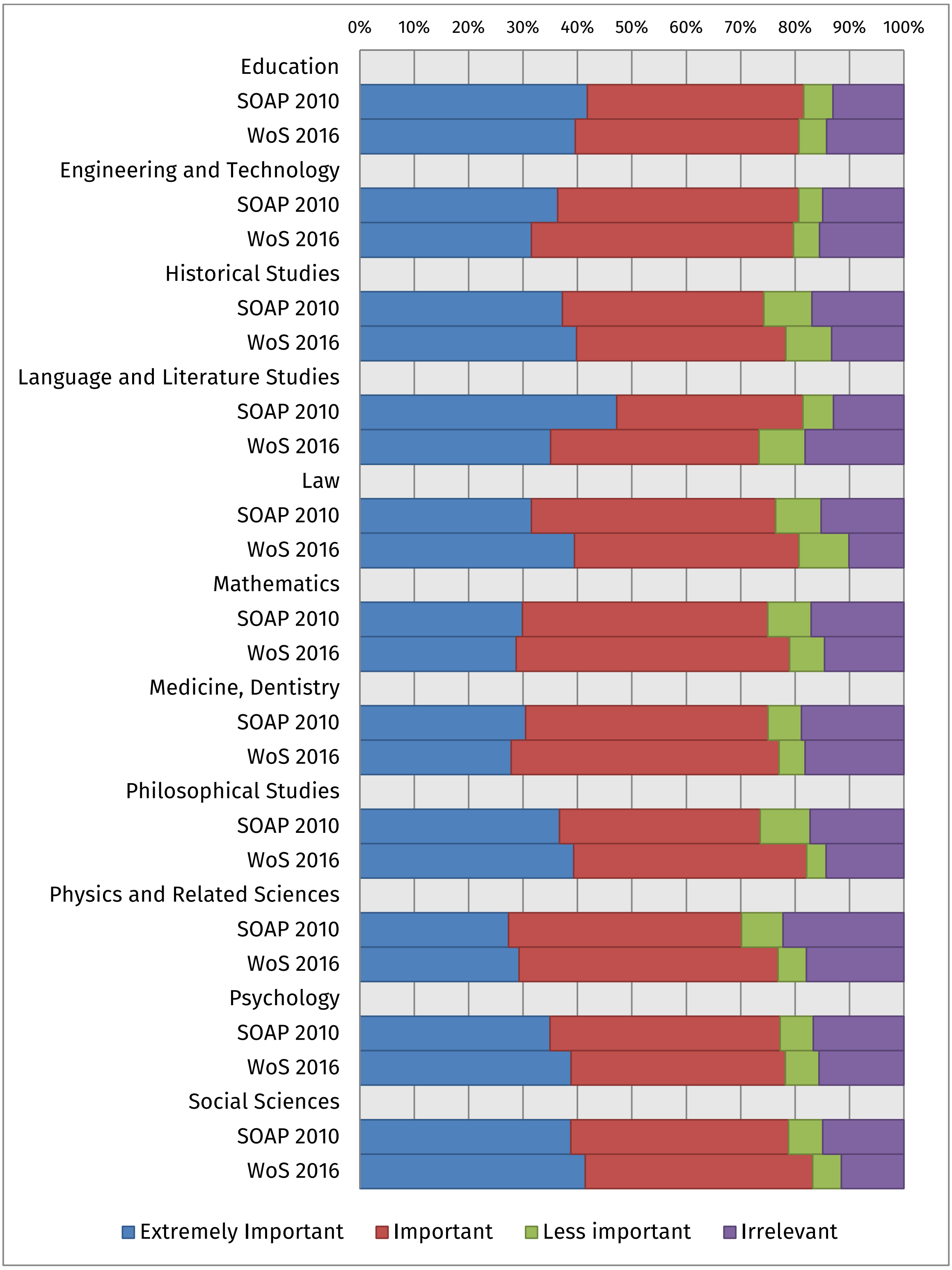

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Figure 79 Importance of factors when selecting a journal to publish in. Journal Importance of the journal for academic promotion, tenure or assessment. By seniority (SOAP 2010 n=25,528 - WoS 2016 n=15,085, $p < 0.001$)

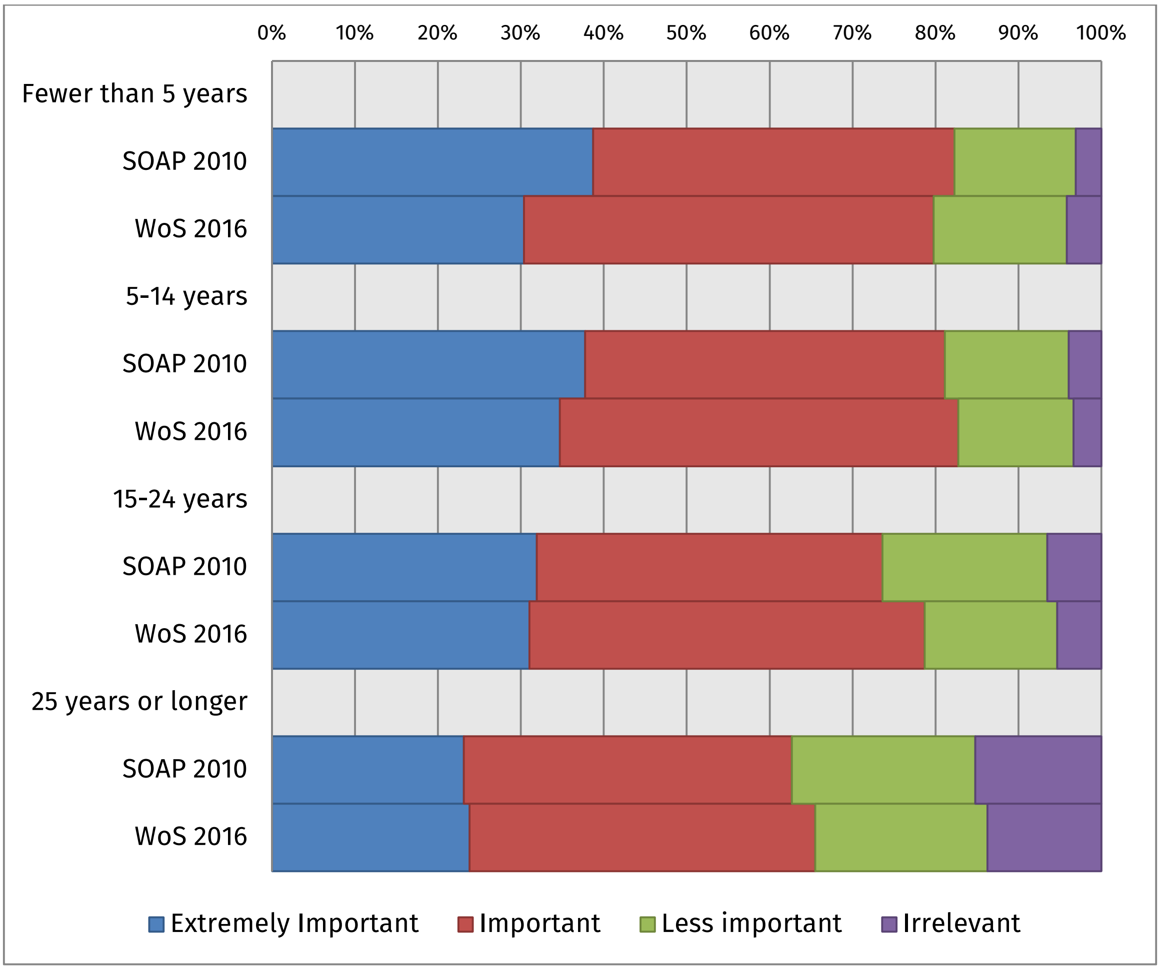


Figure 80 Importance of factors when selecting a journal to publish in. Importance of the journal for academic promotion, tenure or assessment . By regions (SOAP 2010 n=25,528 - WoS 2016 n=15,085, p < 0.001)

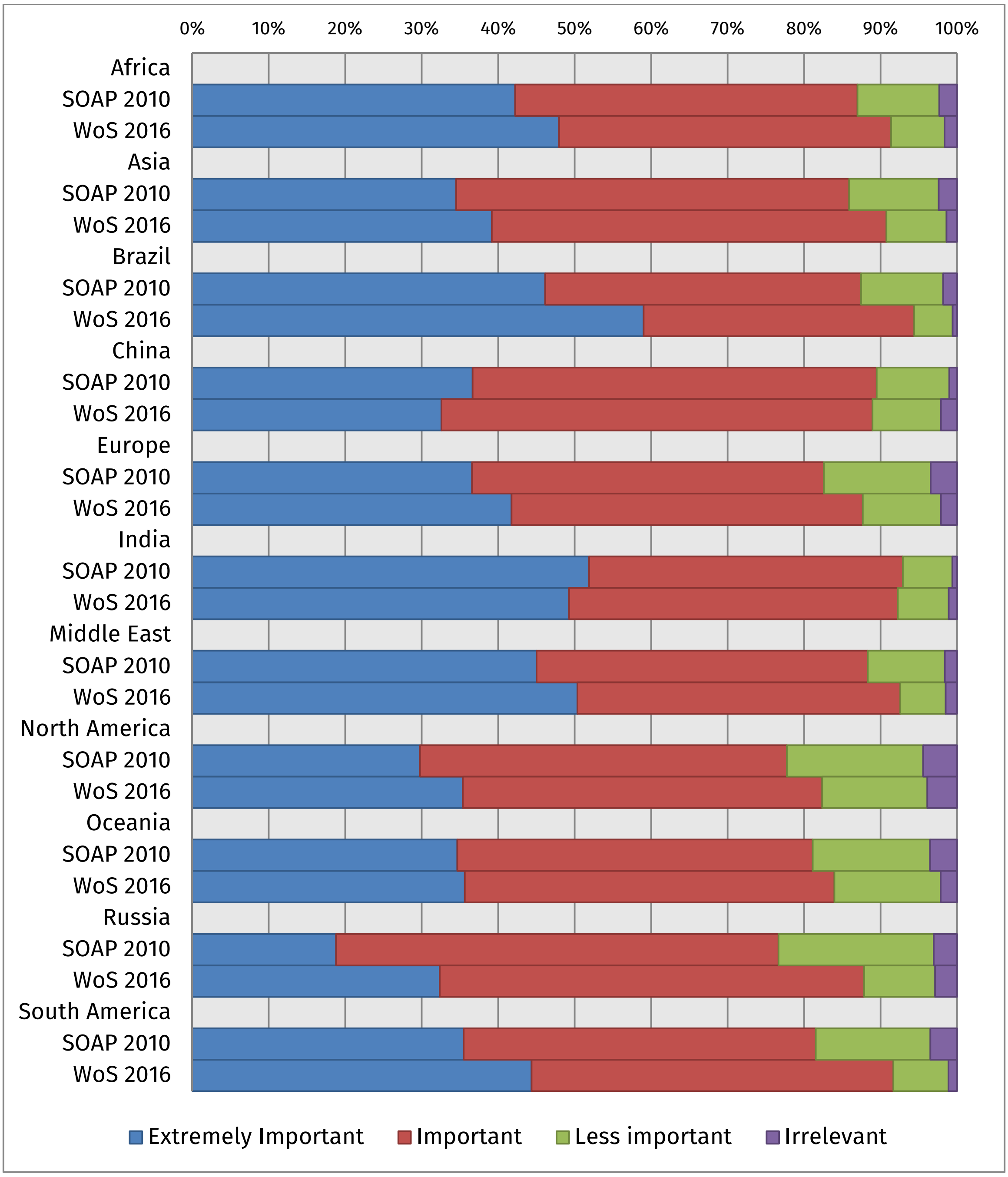


Figure 81 Importance of factors when selecting a journal to publish in. Importance of the journal for academic promotion, tenure or assessment. By European regions (SOAP 2010 n=11,176 - WoS 2016 n=5,479, p < 0.001)

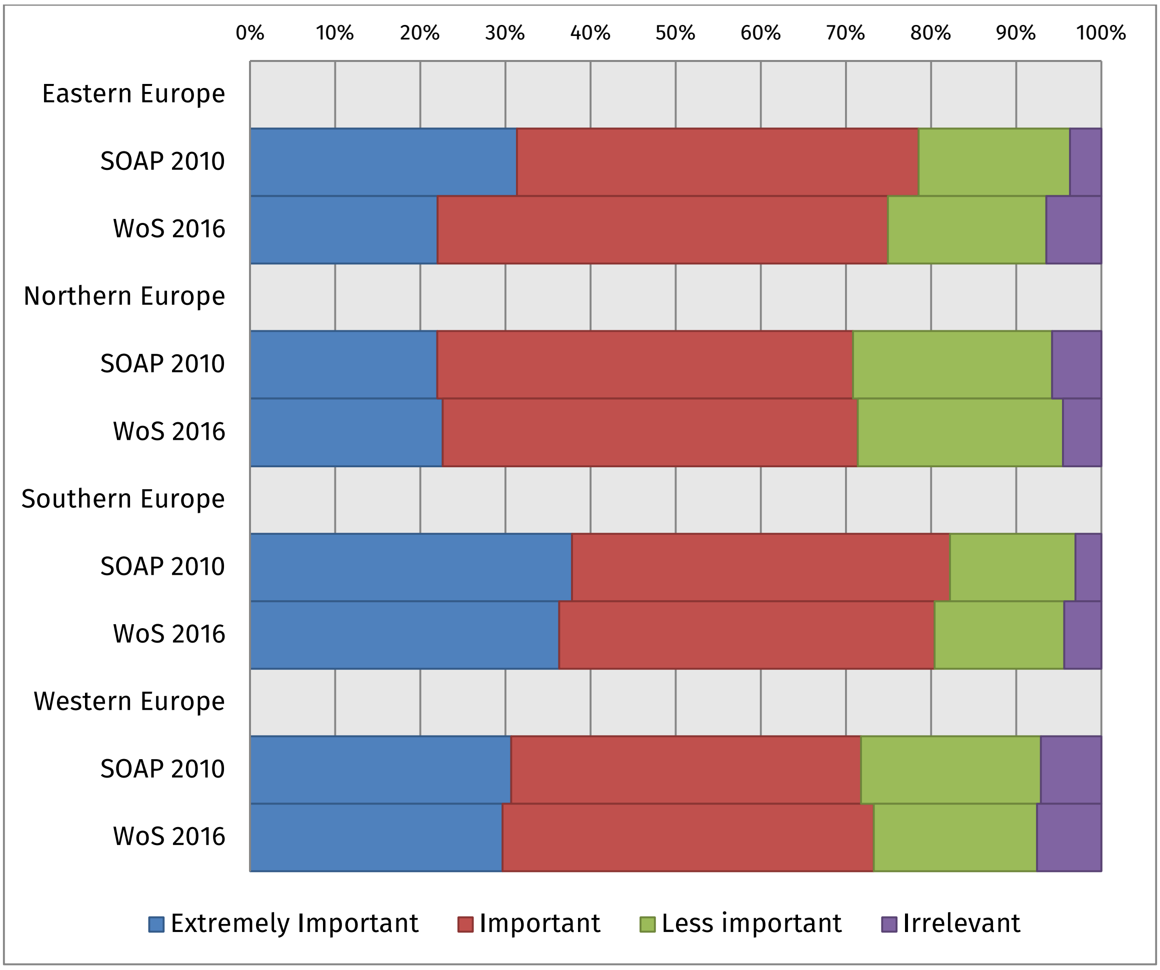
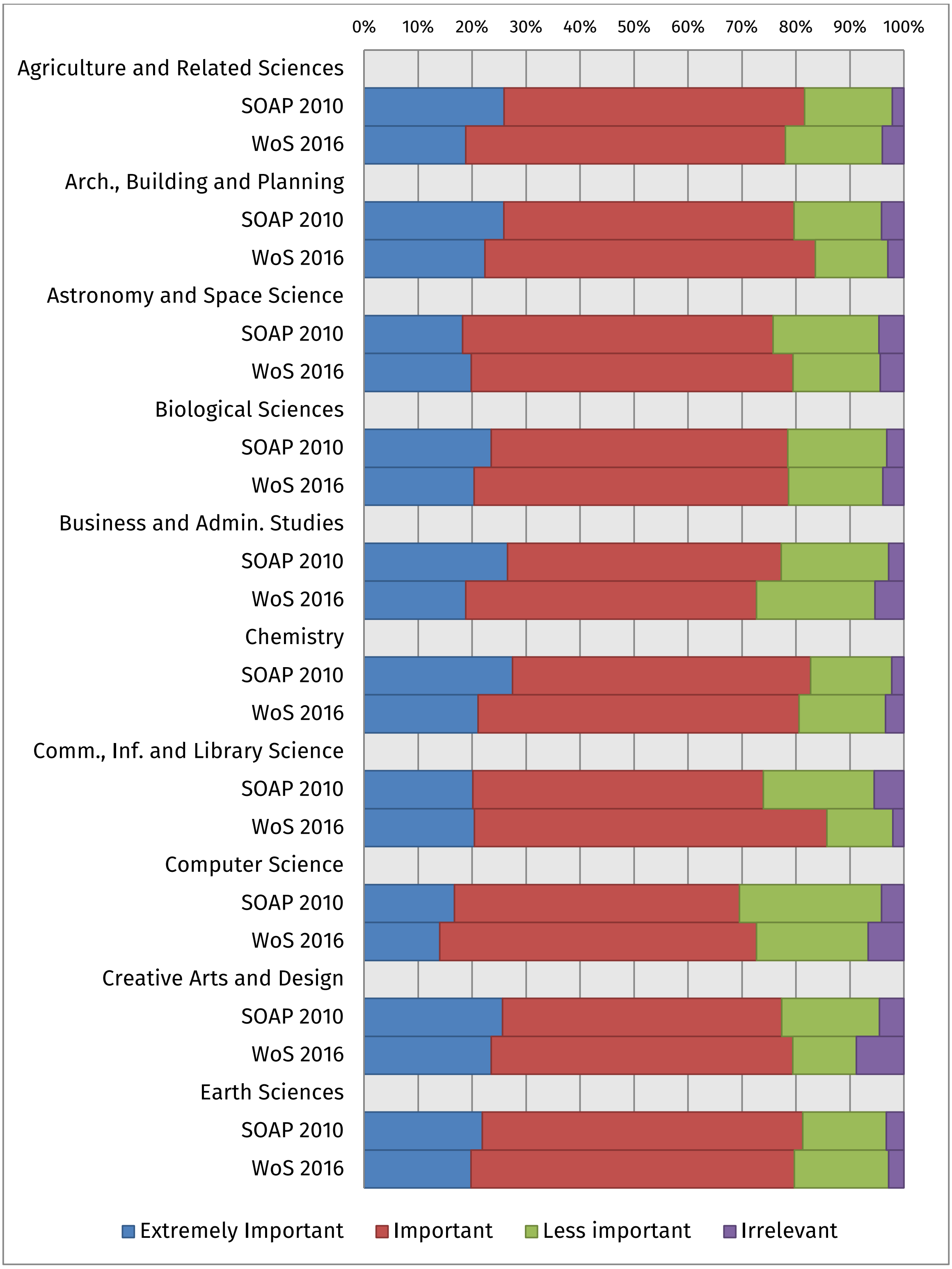


Figure 82 Importance of factors when selecting a journal to publish in. Positive experience with publisher/editor(s) of the journal. By discipline (SOAP 2010 n=33,715 - WoS 2016 n=16,584, p < 0.001)



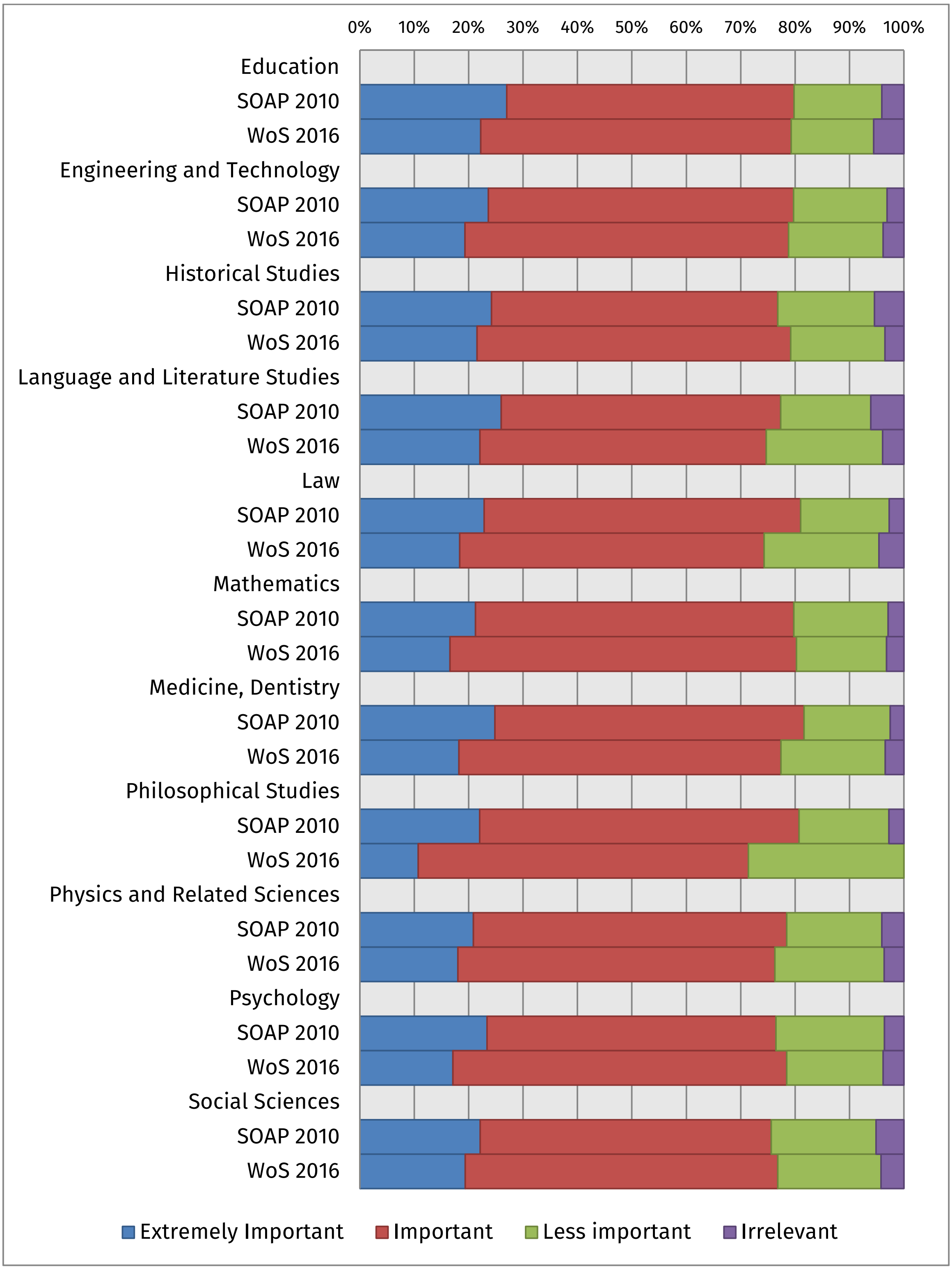

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Figure 83 Importance of factors when selecting a journal to publish in. Positive experience with publisher/editor(s) of the journal. By seniority (SOAP 2010 n=25,448 - WoS 2016 n=15,085, $p < 0.001$)

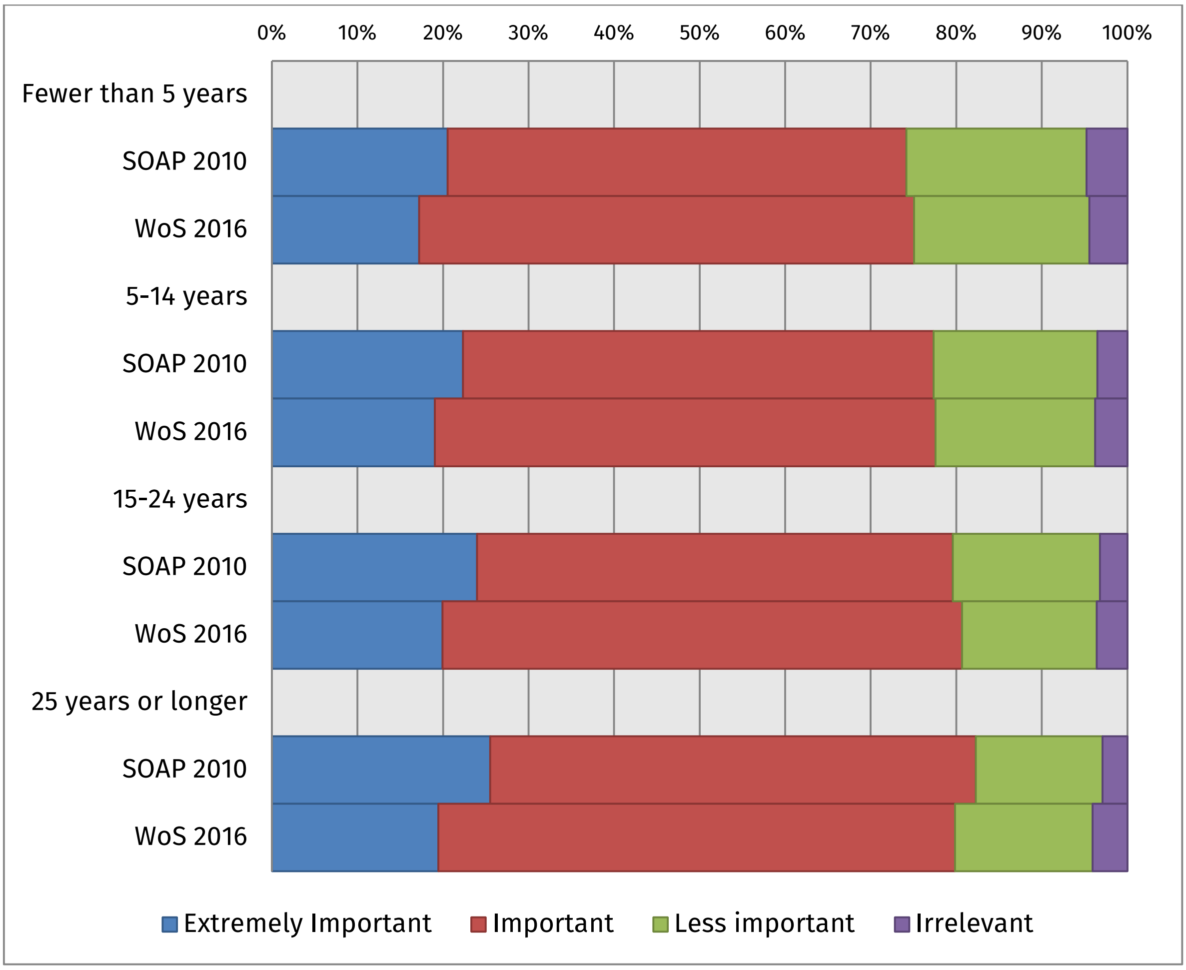


Figure 84 Importance of factors when selecting a journal to publish in. Positive experience with publisher/editor(s) of the journal. By regions (SOAP 2010 n=25,448 - WoS 2016 n=15,085, $p < 0.001$)

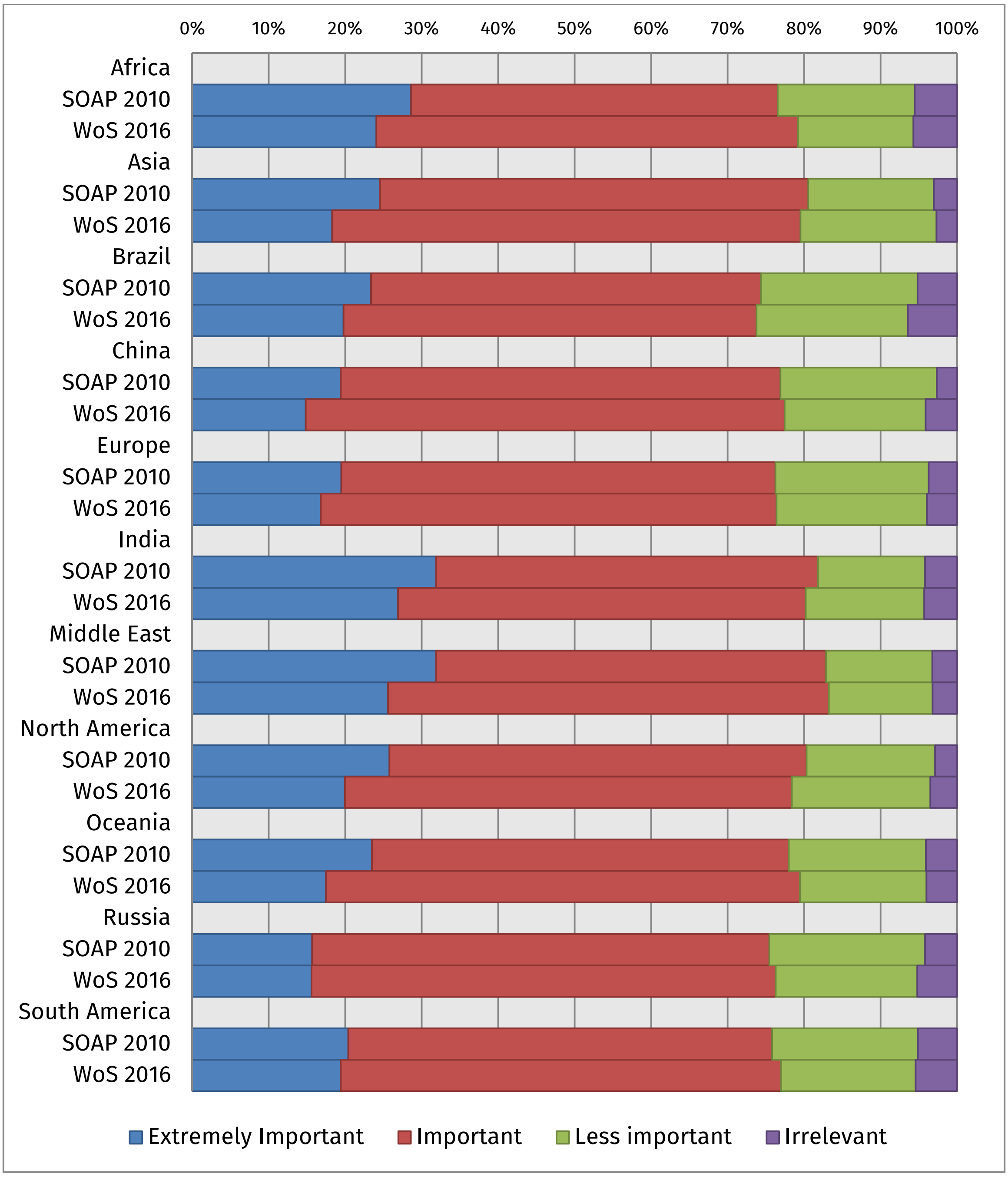


Figure 85 Importance of factors when selecting a journal to publish in. Positive experience with publisher/editor(s) of the journal. By European regions (SOAP 2010 n=11,166 - WoS 2016 n=5,489, p < 0.001)

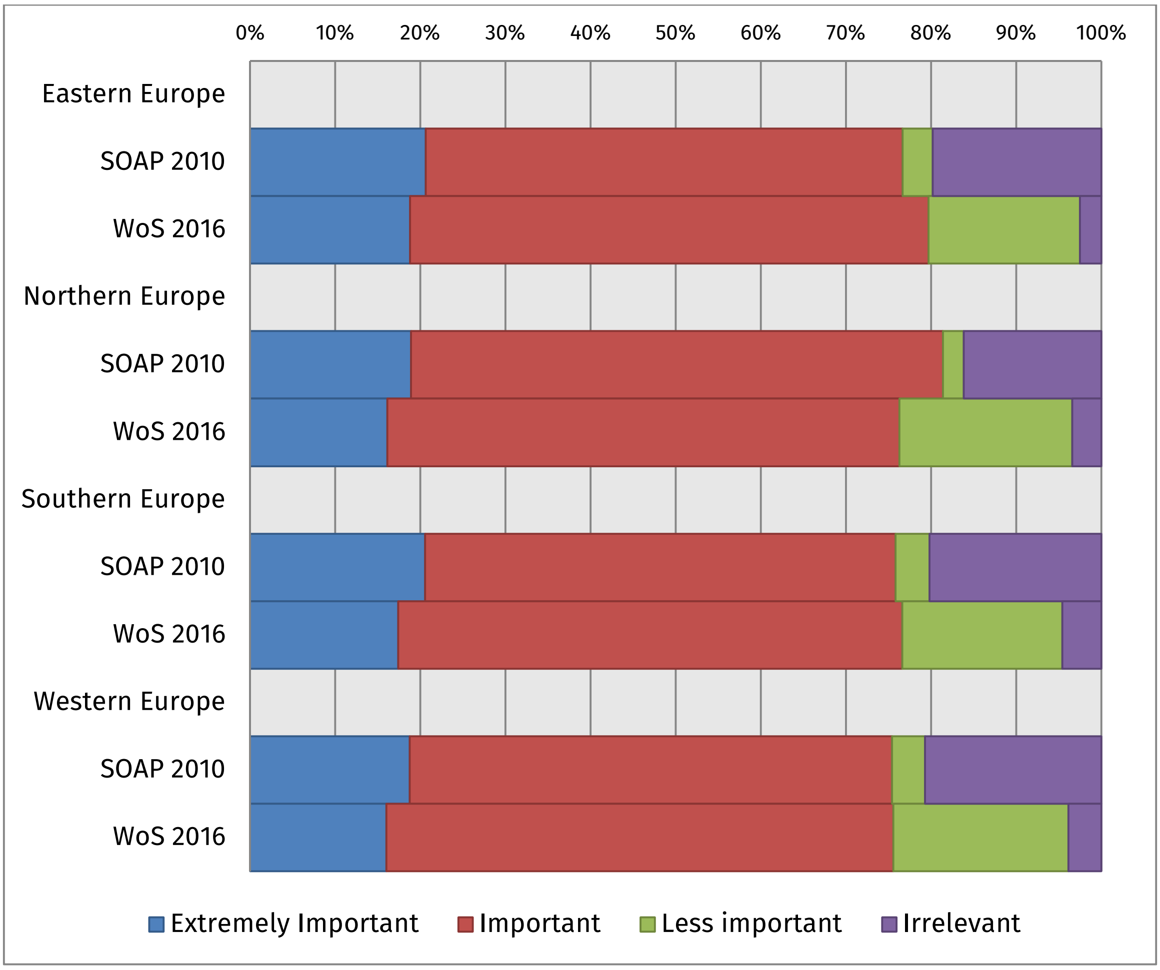
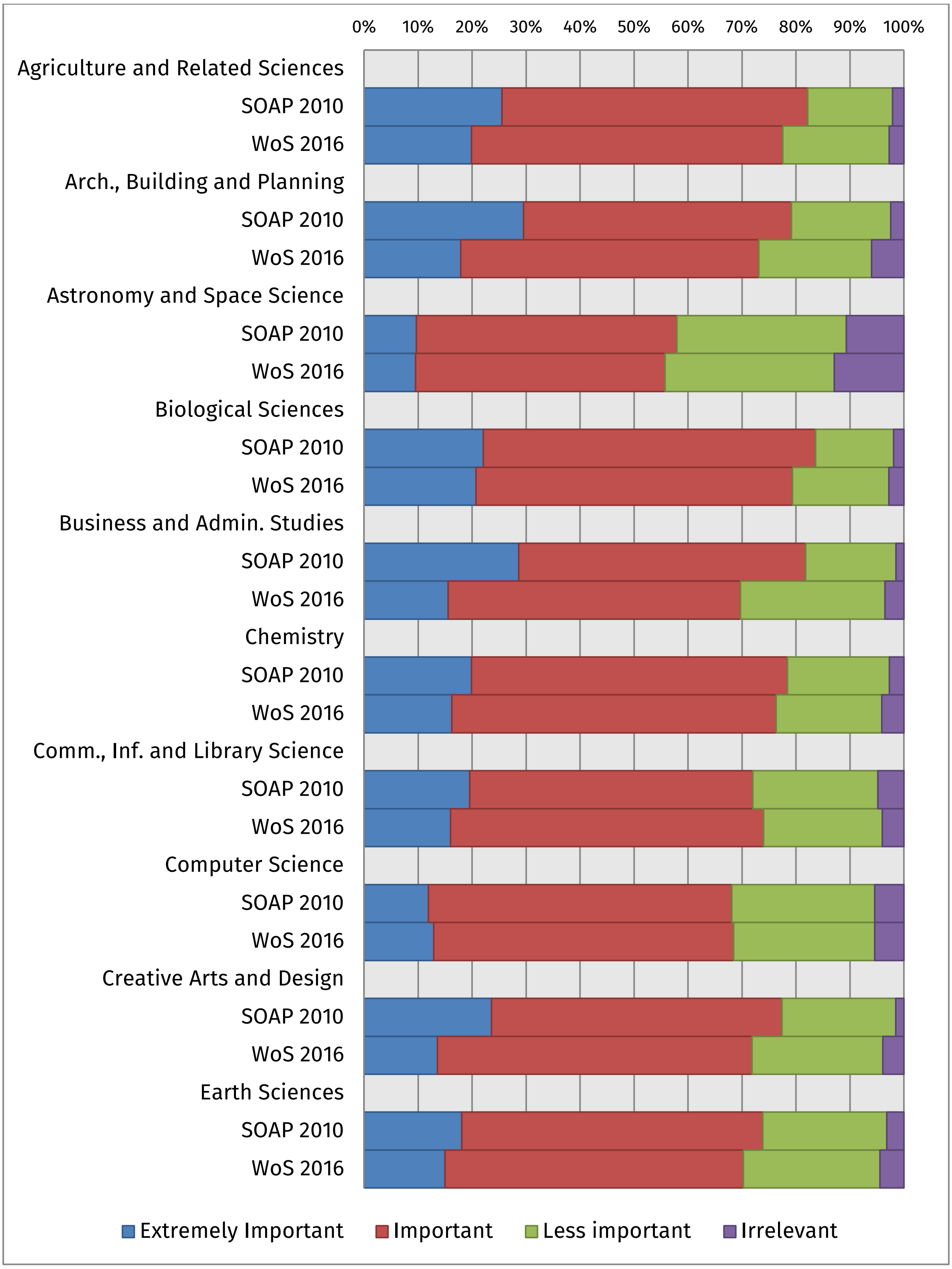


Figure 86 Importance of factors when selecting a journal to publish in. Likelihood of article acceptance in the journal. By discipline (SOAP 2010 n=33,627 - WoS 2016 n=16,514, p < 0.001)



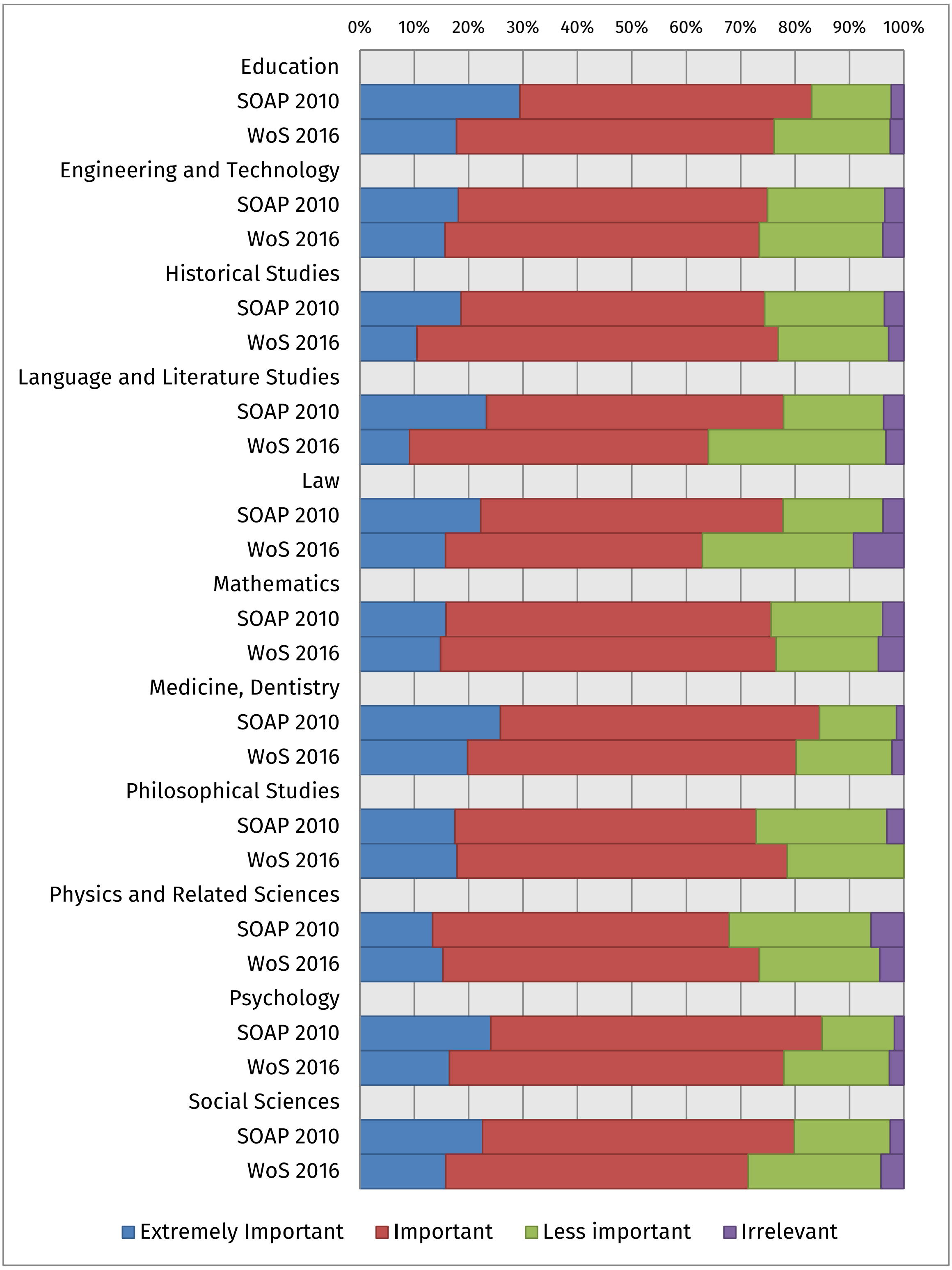

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Figure 87 Importance of factors when selecting a journal to publish in. Likelihood of article acceptance in the journal. By seniority (SOAP 2010 n=25,391 - WoS 2016 n=15,021, p < 0.001)

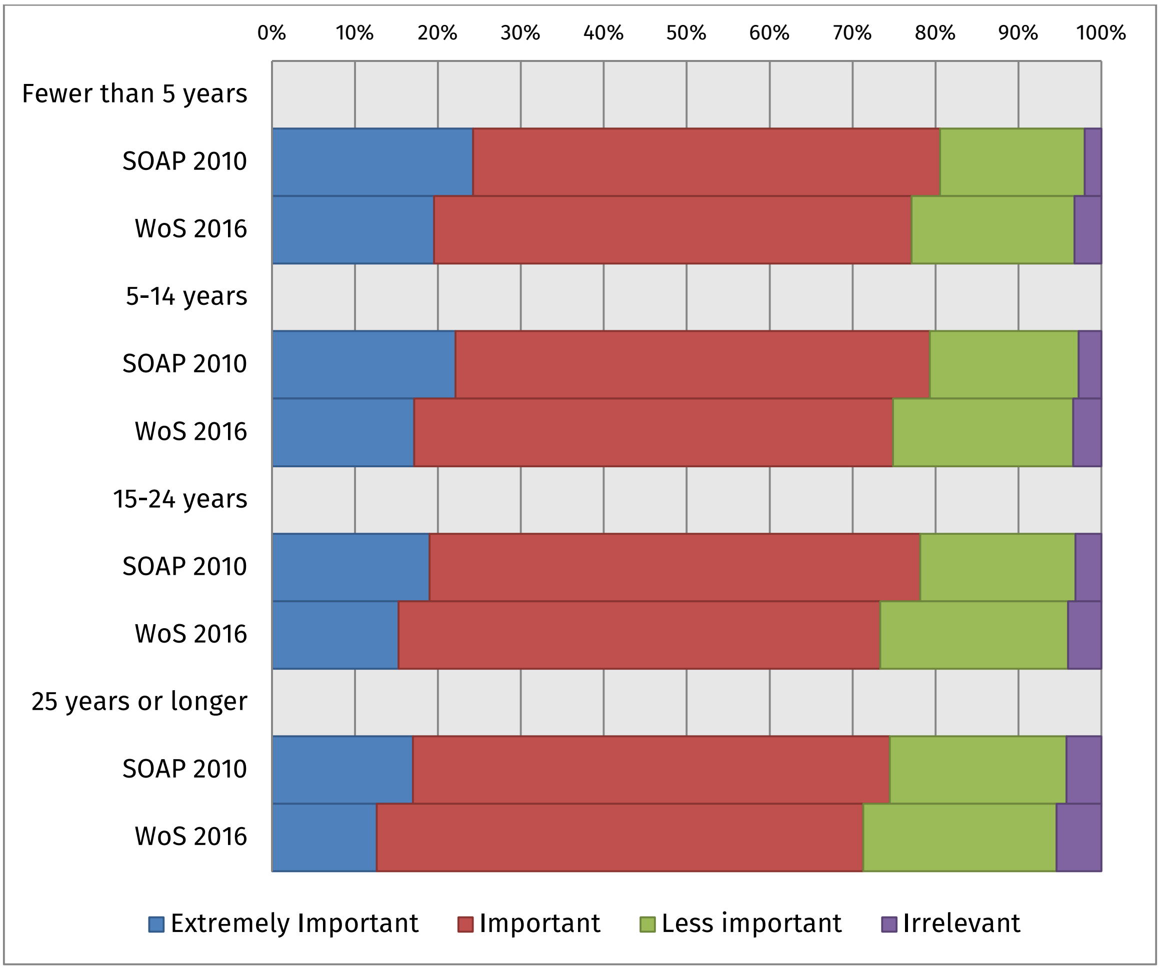


Figure 88 Importance of factors when selecting a journal to publish in. Likelihood of article acceptance in the journal. By regions (SOAP 2010 n=25,391 - WoS 2016 n=15,021, p < 0.001)

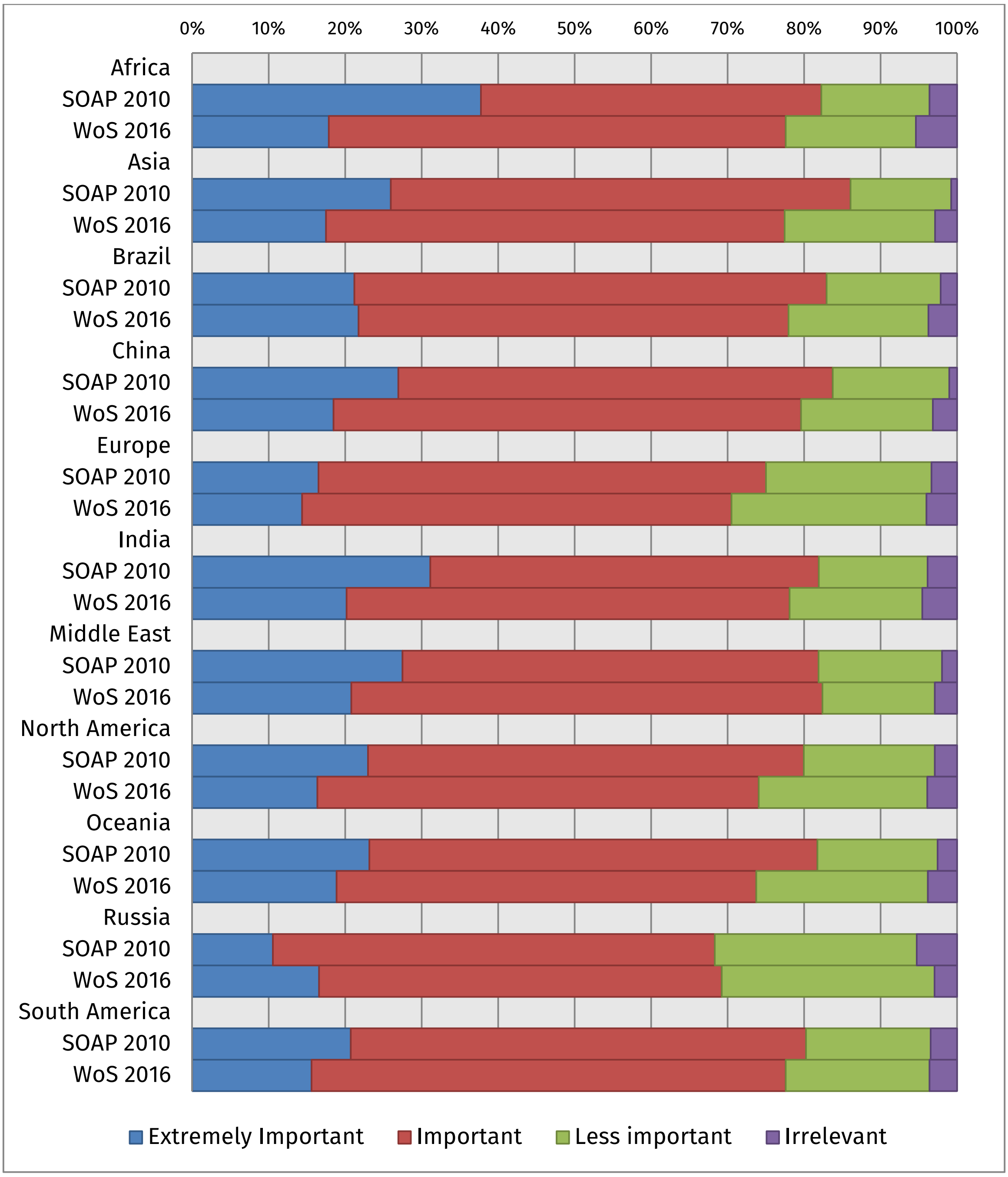


Figure 89 Importance of factors when selecting a journal to publish in. Likelihood of article acceptance in the journal. By European regions (SOAP 2010 n=11,121 - WoS 2016 n=5,463, $p < 0.001$)

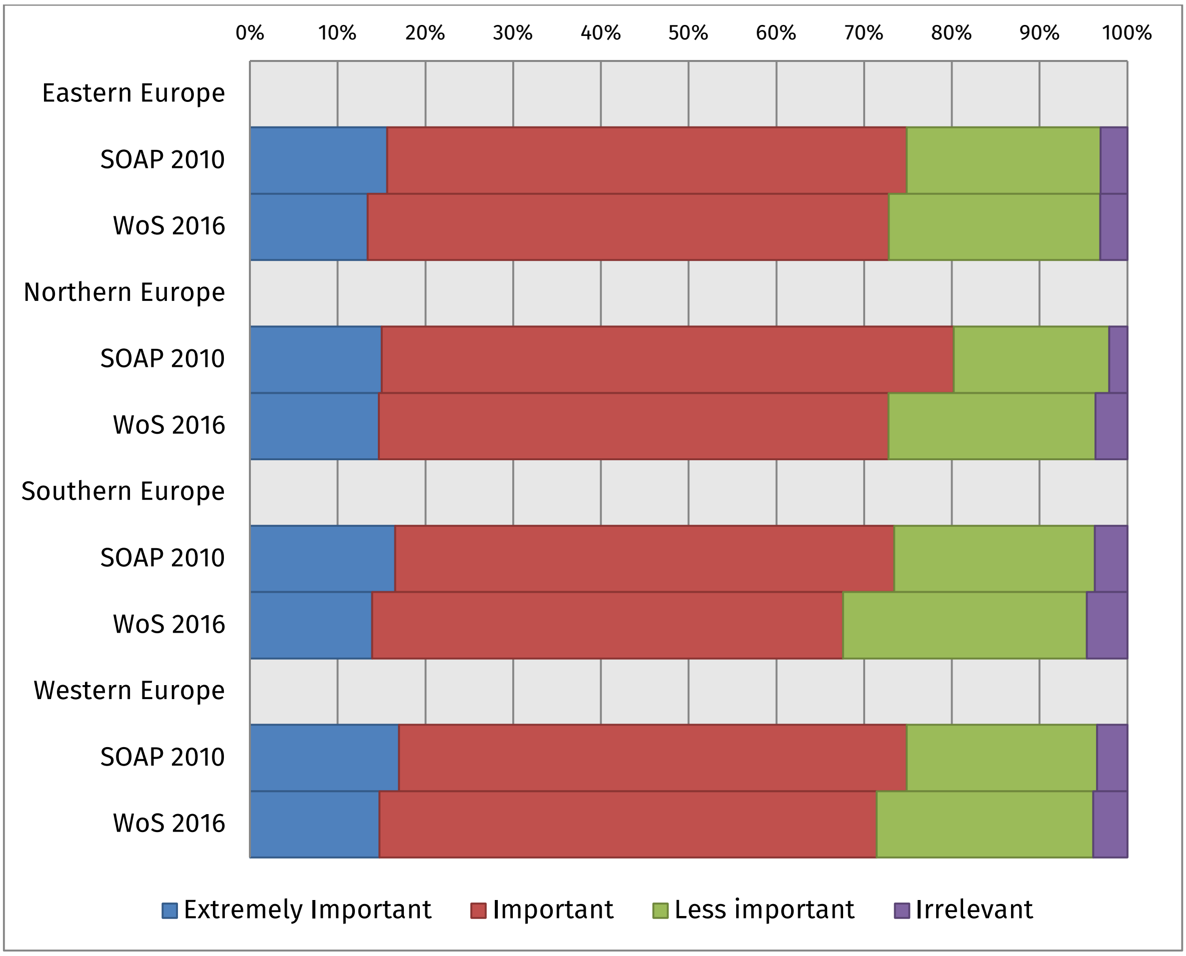
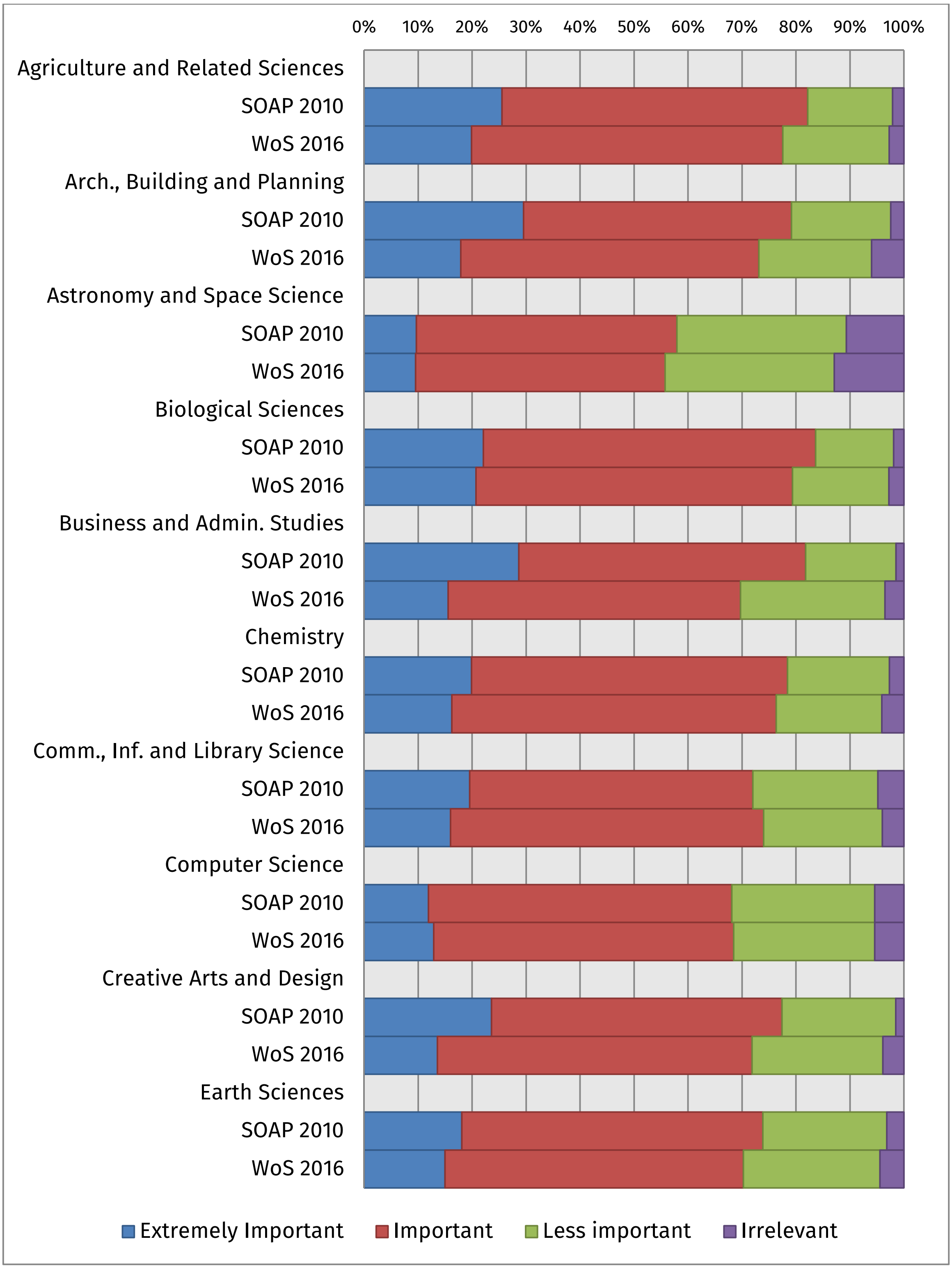


Figure 90 Importance of factors when selecting a journal to publish in. Recommendation of the journal by my colleagues. By discipline (SOAP 2010 n=33,546 - WoS 2016 n=16,504, p < 0.001)



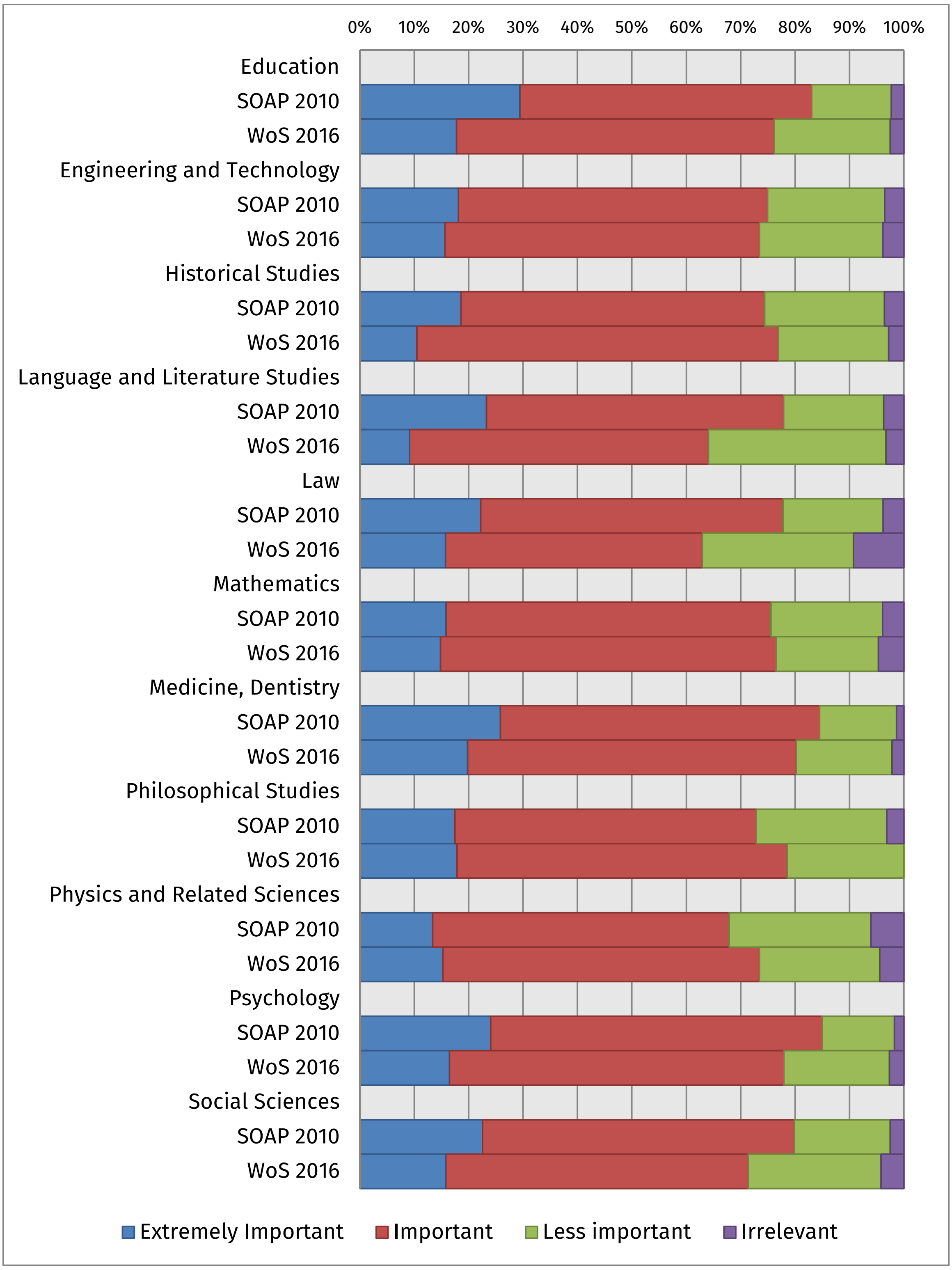

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Figure 91 Importance of factors when selecting a journal to publish in. Recommendation of the journal by my colleagues. By seniority (SOAP 2010 n=25,331 - WoS 2016 n=15,011, p < 0.001)

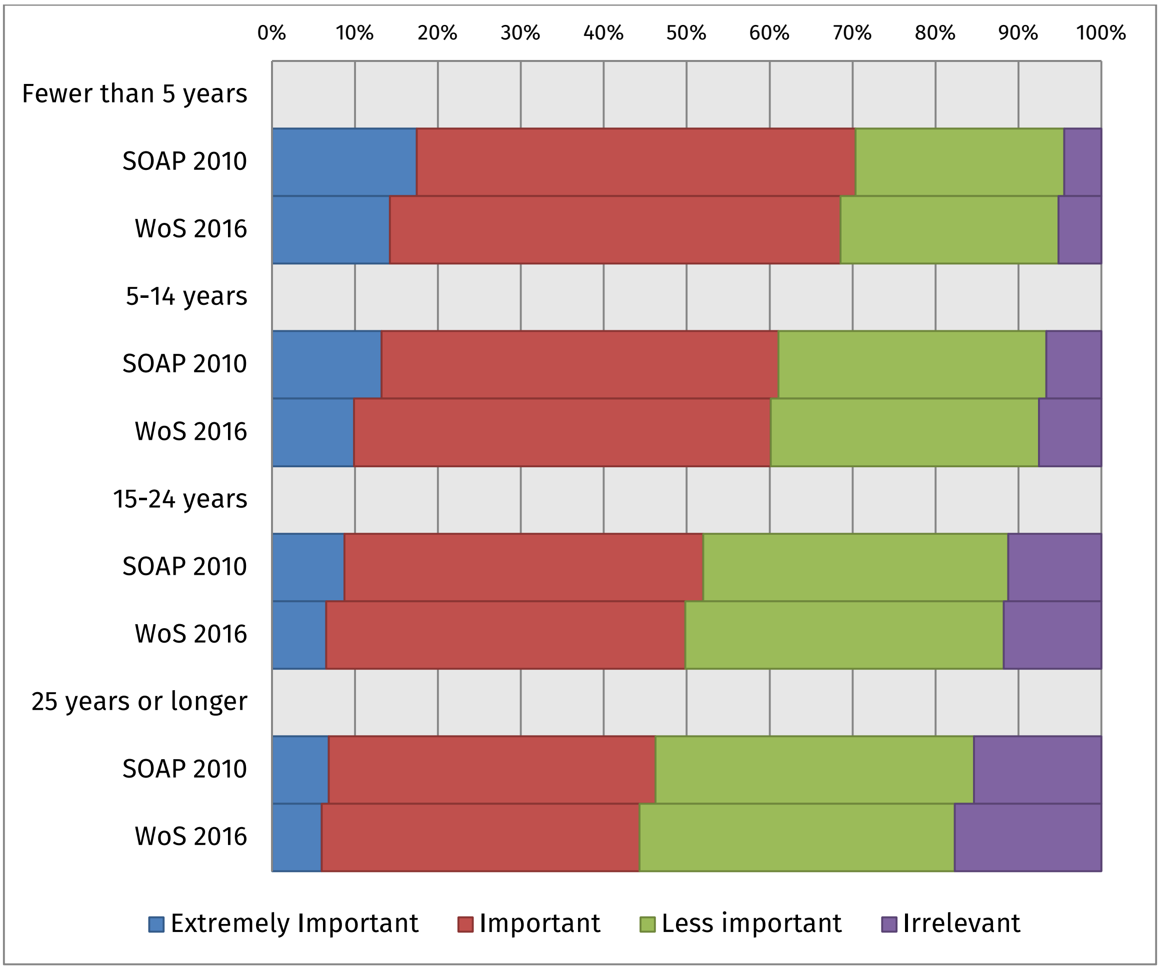


Figure 92 Importance of factors when selecting a journal to publish in. Recommendation of the journal by my colleagues. By regions (SOAP 2010 n=25,331 - WoS 2016 n=15,011, p < 0.001)

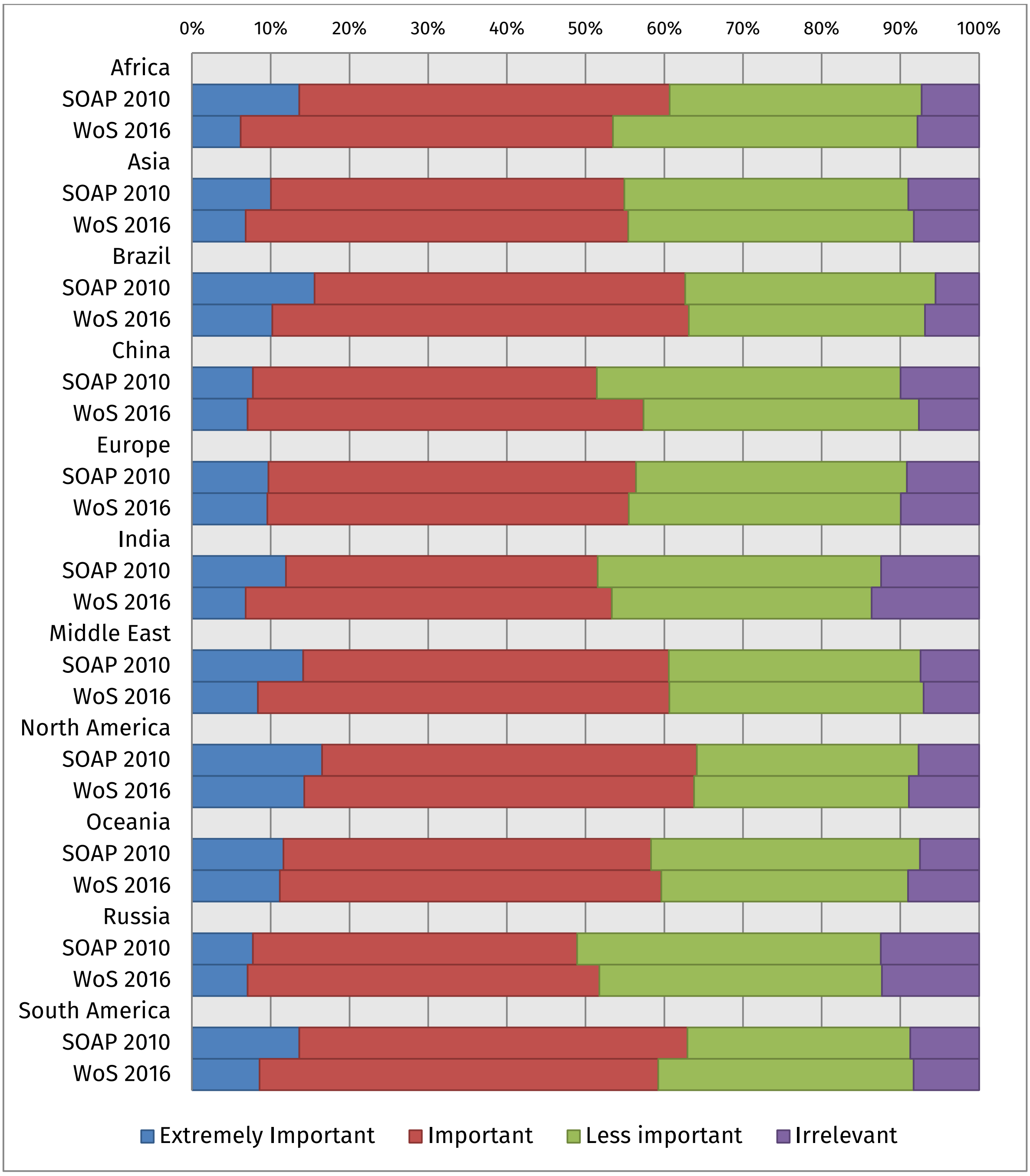


Figure 93 Importance of factors when selecting a journal to publish in. Recommendation of the journal by my colleagues. By European regions (SOAP 2010 n=11,096 - WoS 2016 n=5,463, $p < 0.001$)

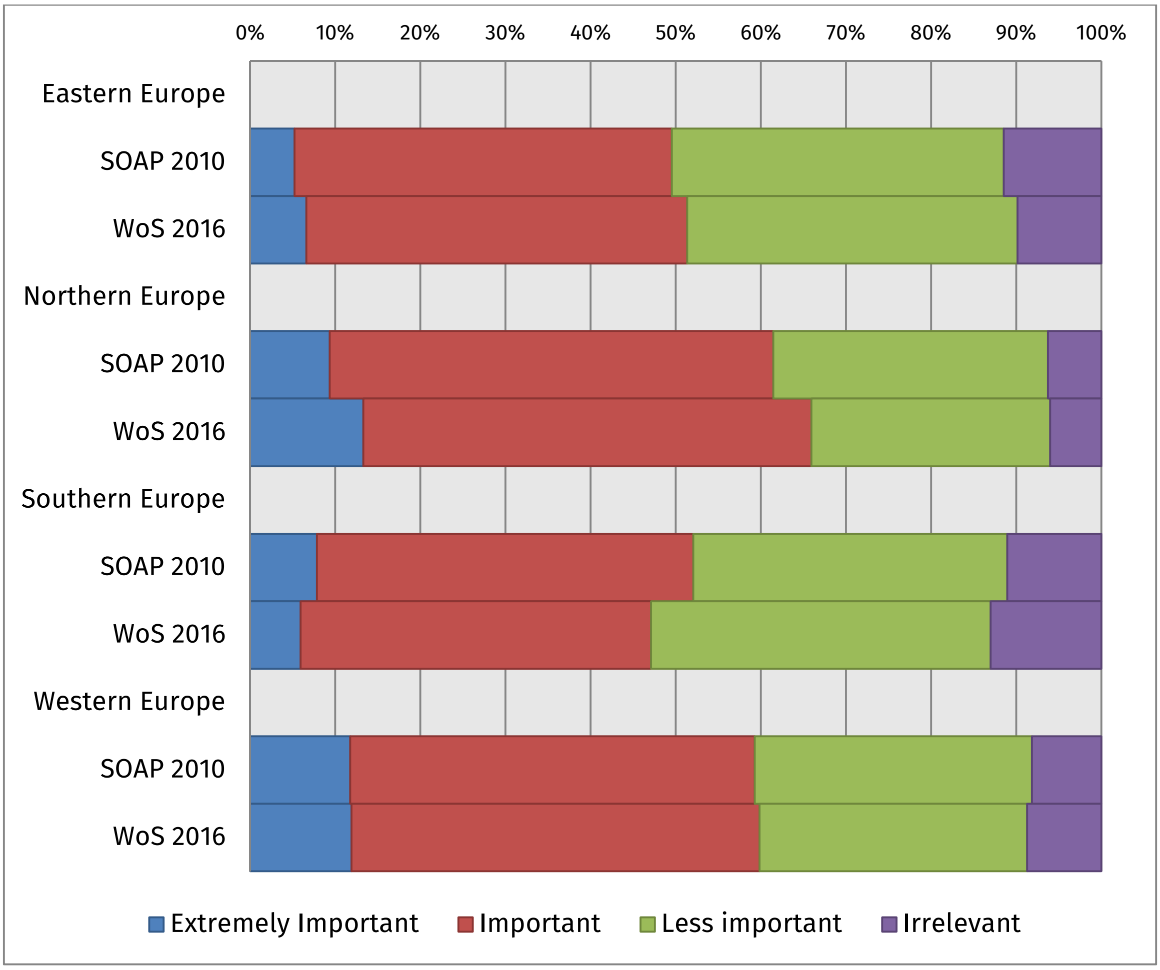
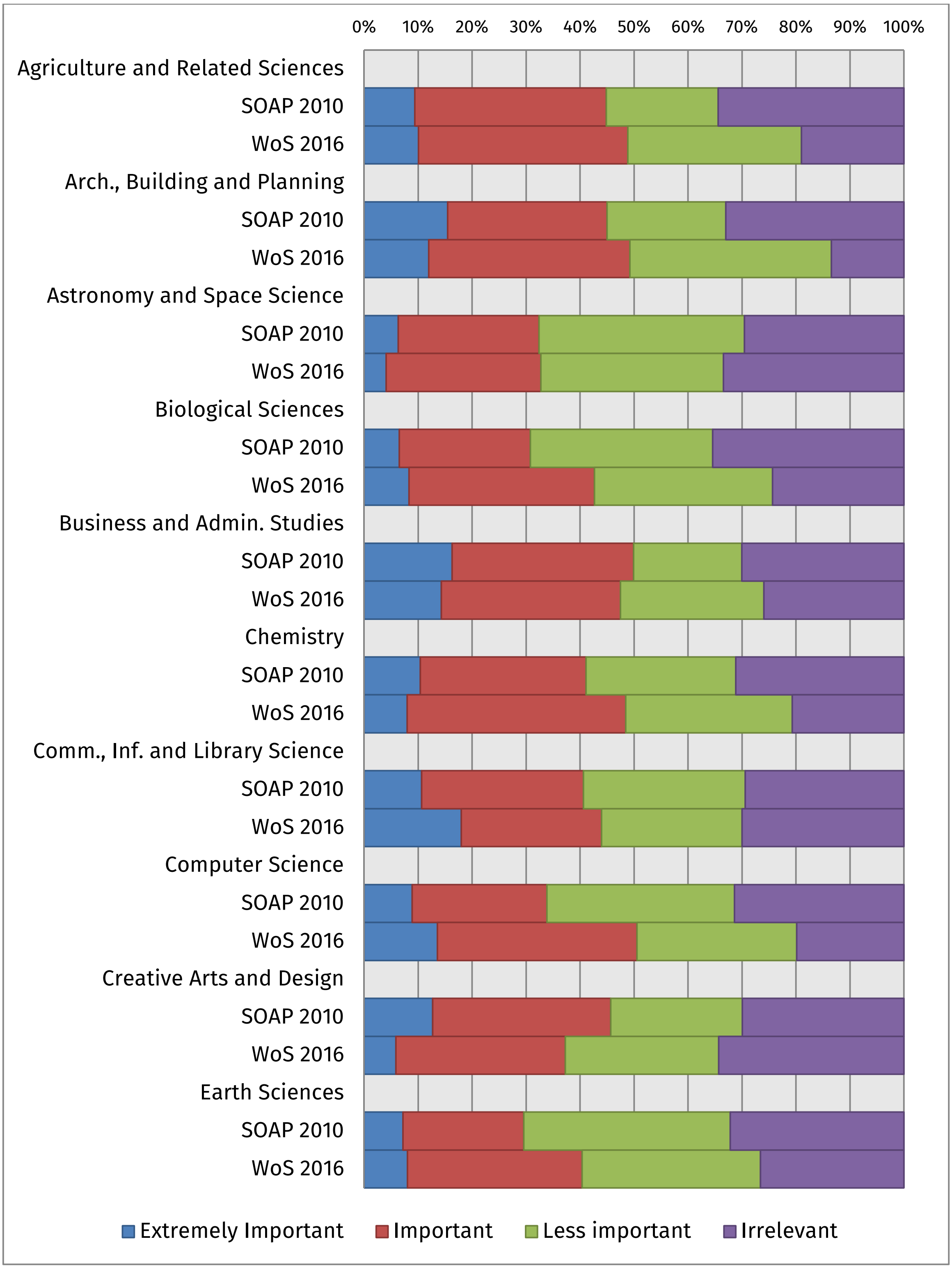


Figure 94 Importance of factors when selecting a journal to publish in. The journal fits the policy of my organization (SOAP 2010 n=33,400 - WoS 2016 n=16,457, p < 0.001)



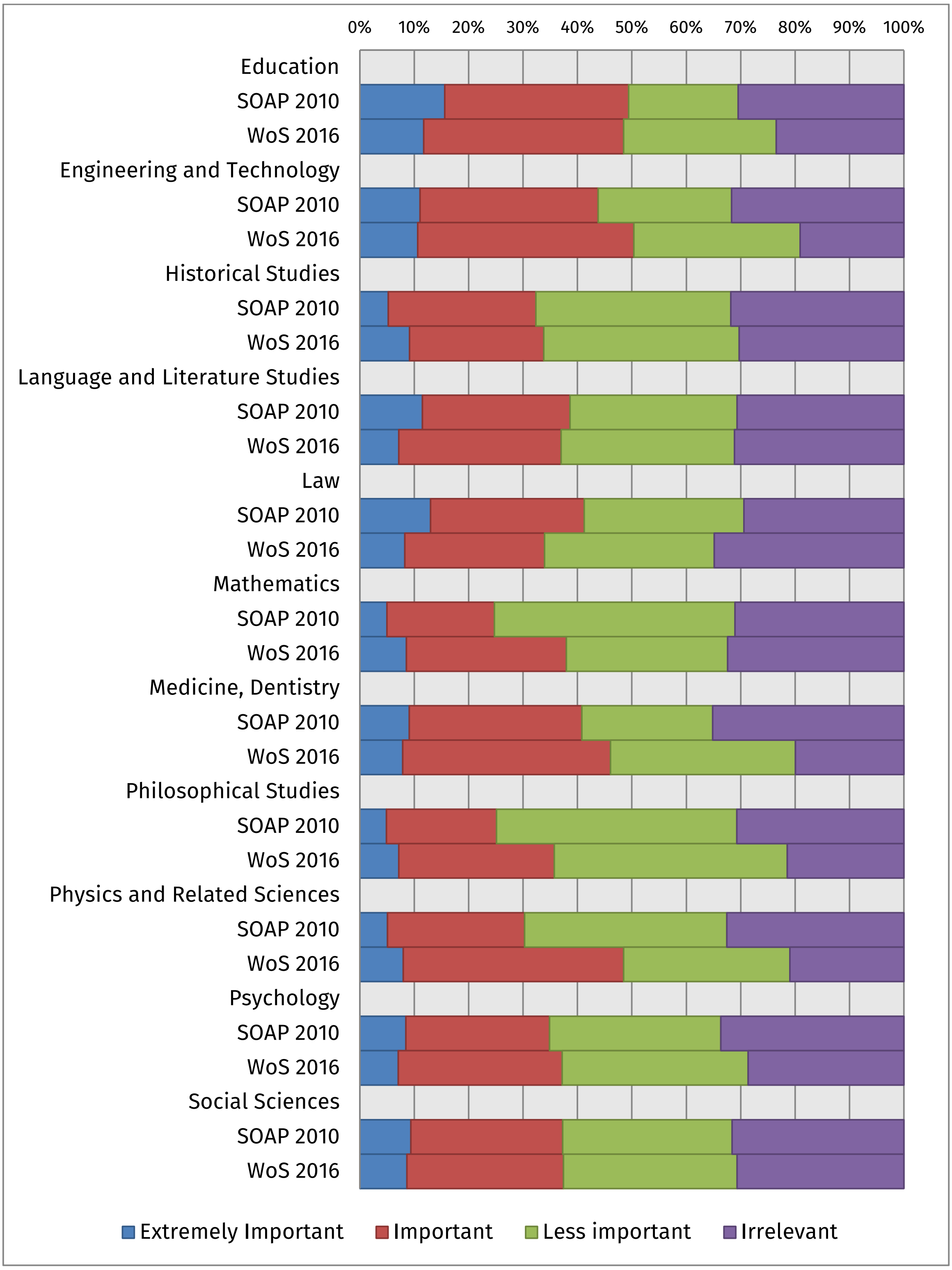

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Figure 95 , Importance of factors when selecting a journal to publish in. The journal fits the policy of my organization. By seniority (SOAP 2010 n=25,209 - WoS 2016 n=14,974 p < 0.001)

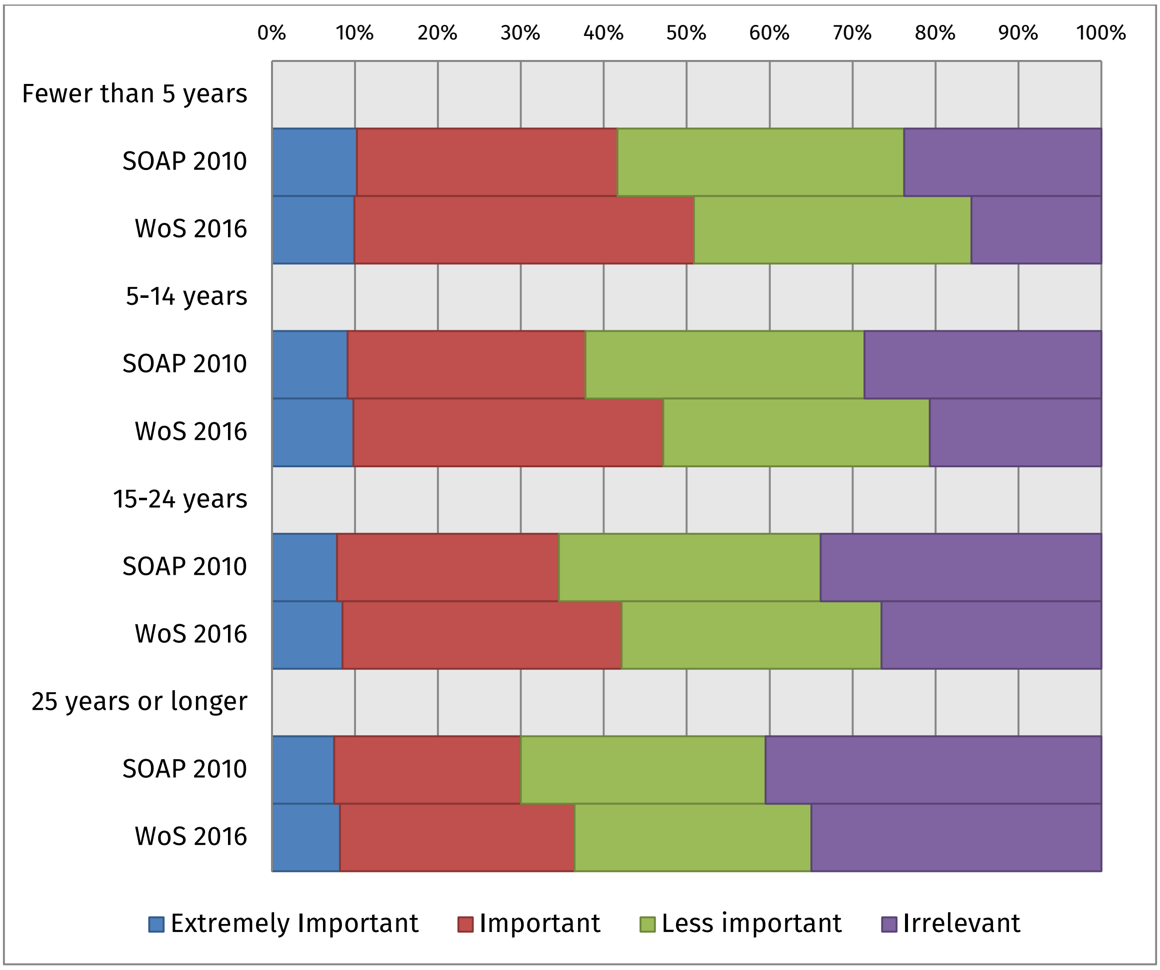

Figure 96 Importance of factors when selecting a journal to publish in. The journal fits the policy of my organization. By regions (SOAP 2010 n=25,209 - WoS 2016 n=14,974 p < 0.001)

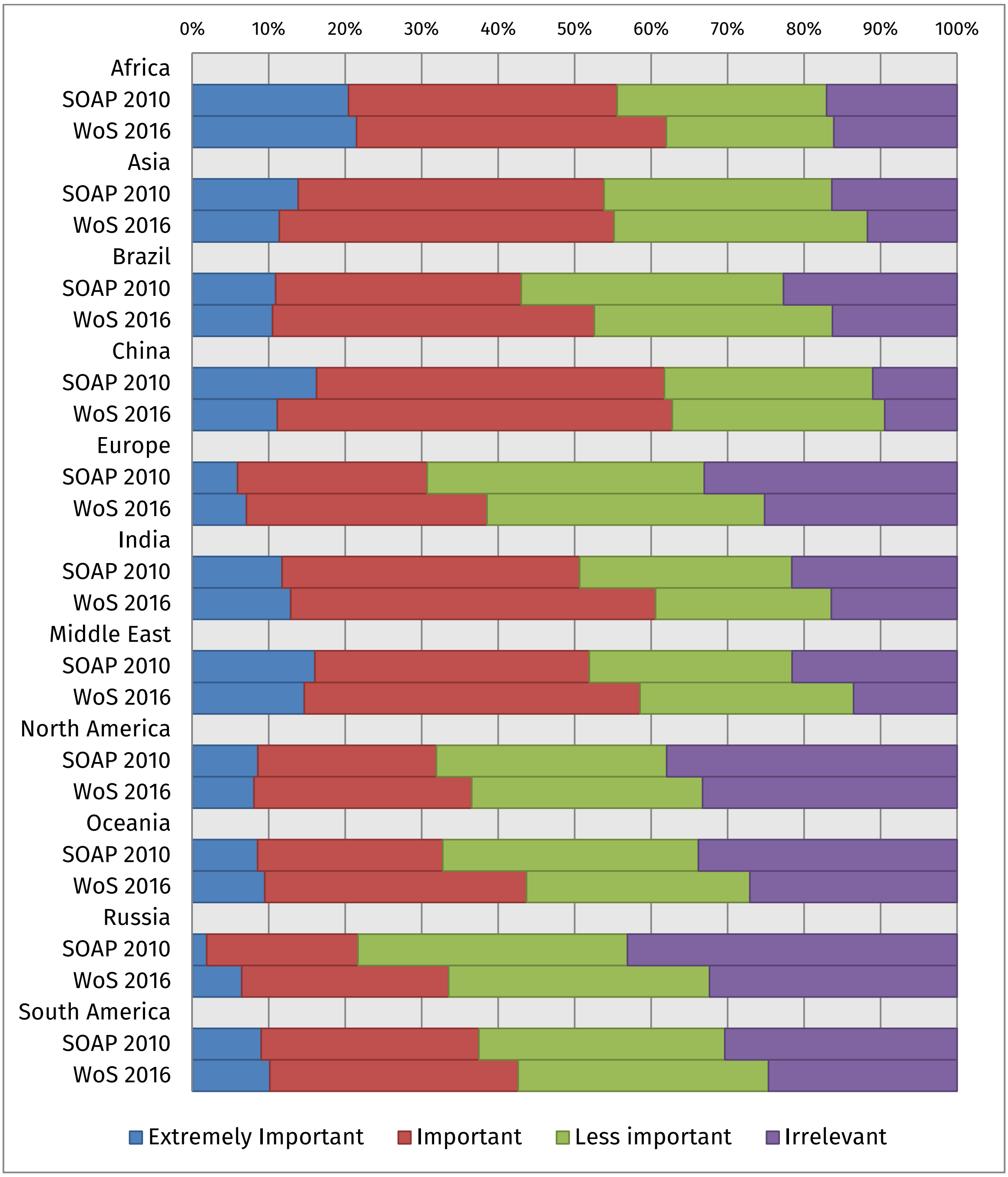
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Figure 97 Importance of factors when selecting a journal to publish in. The journal fits the policy of my organization. By European regions (SOAP 2010 n=11,054 - WoS 2016 n=5,441 p < 0.001)

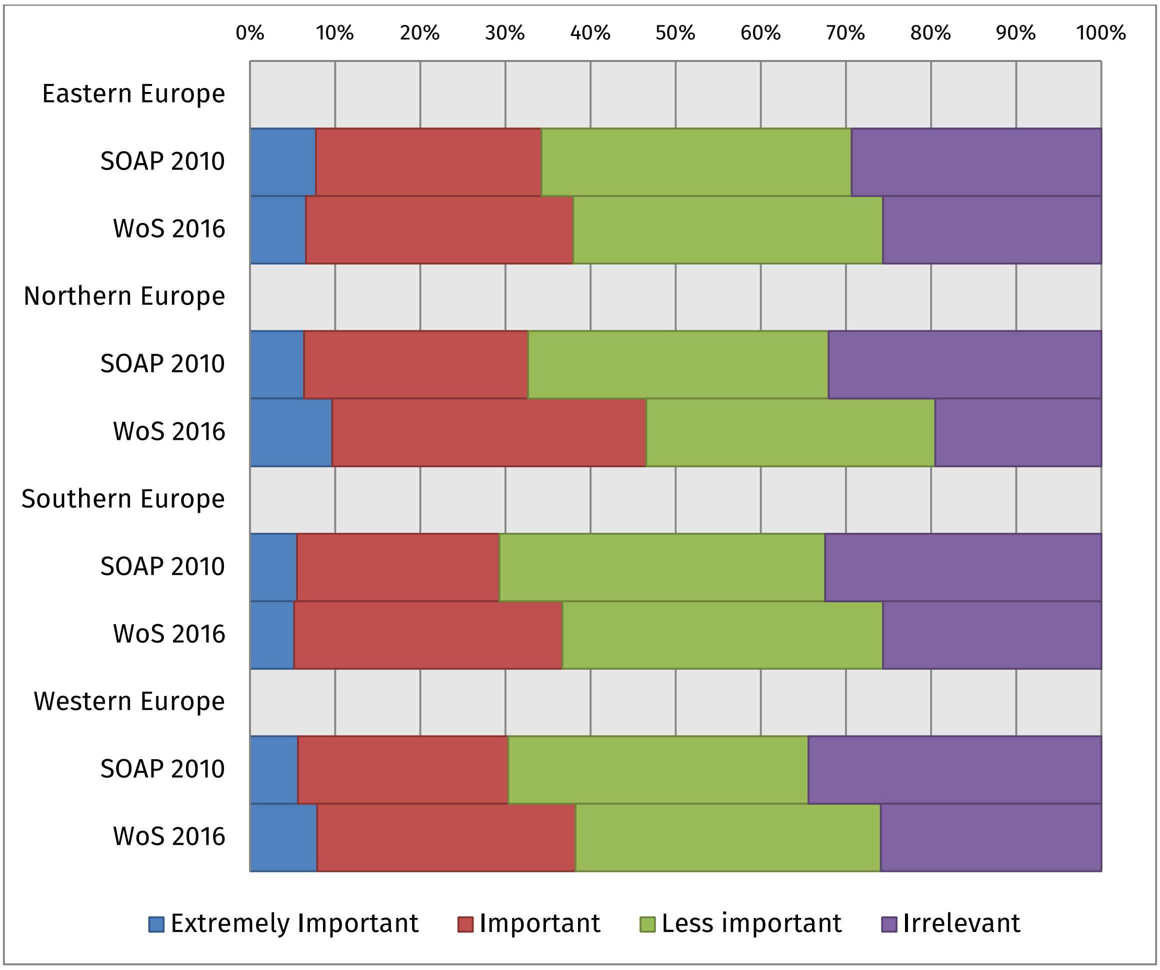
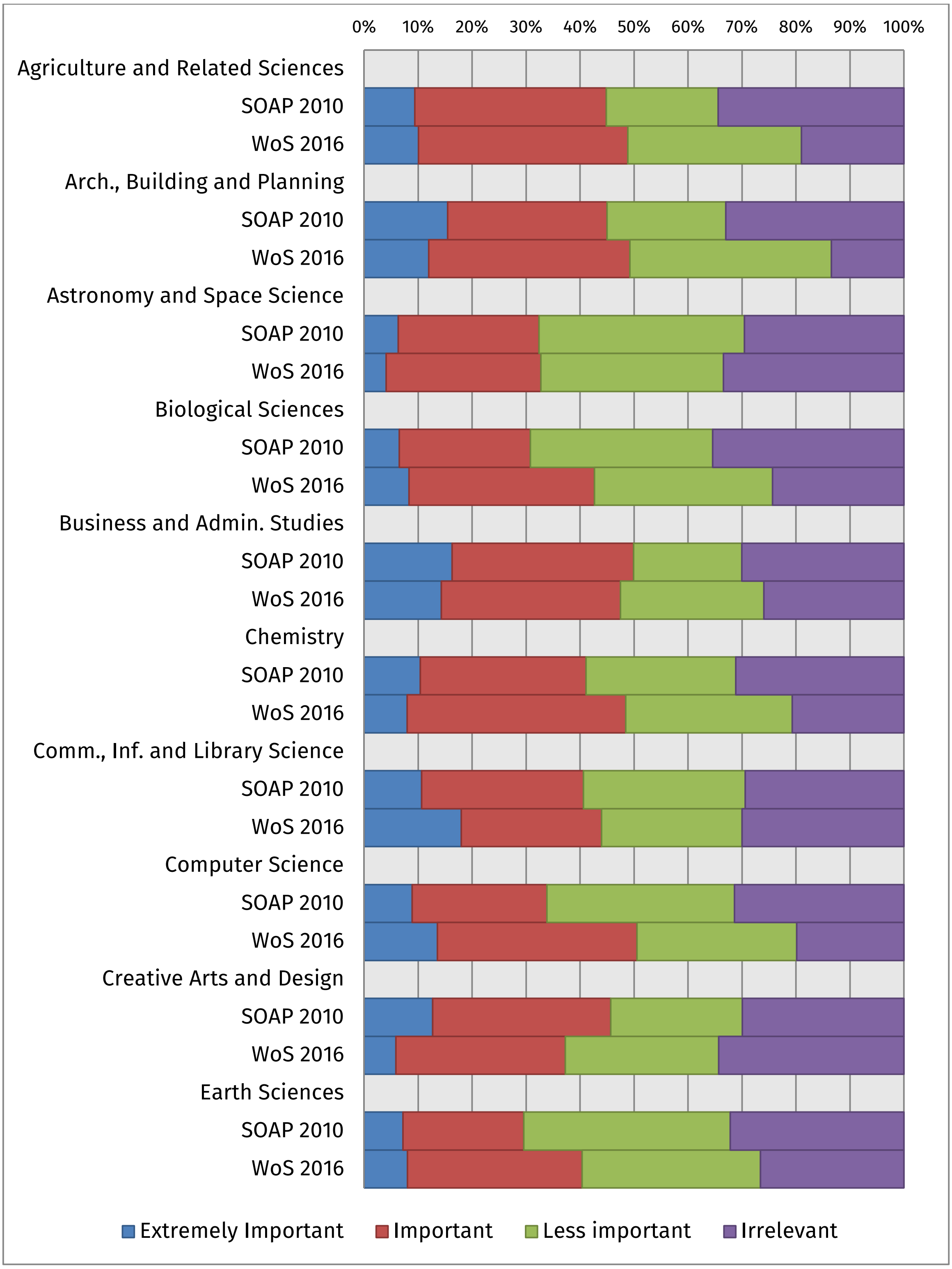


Figure 98 Importance of factors when selecting a journal to publish in. Copyright policy of the journal (SOAP 2010 n=33,480 - WoS 2016 n=16,502 p < 0.001)



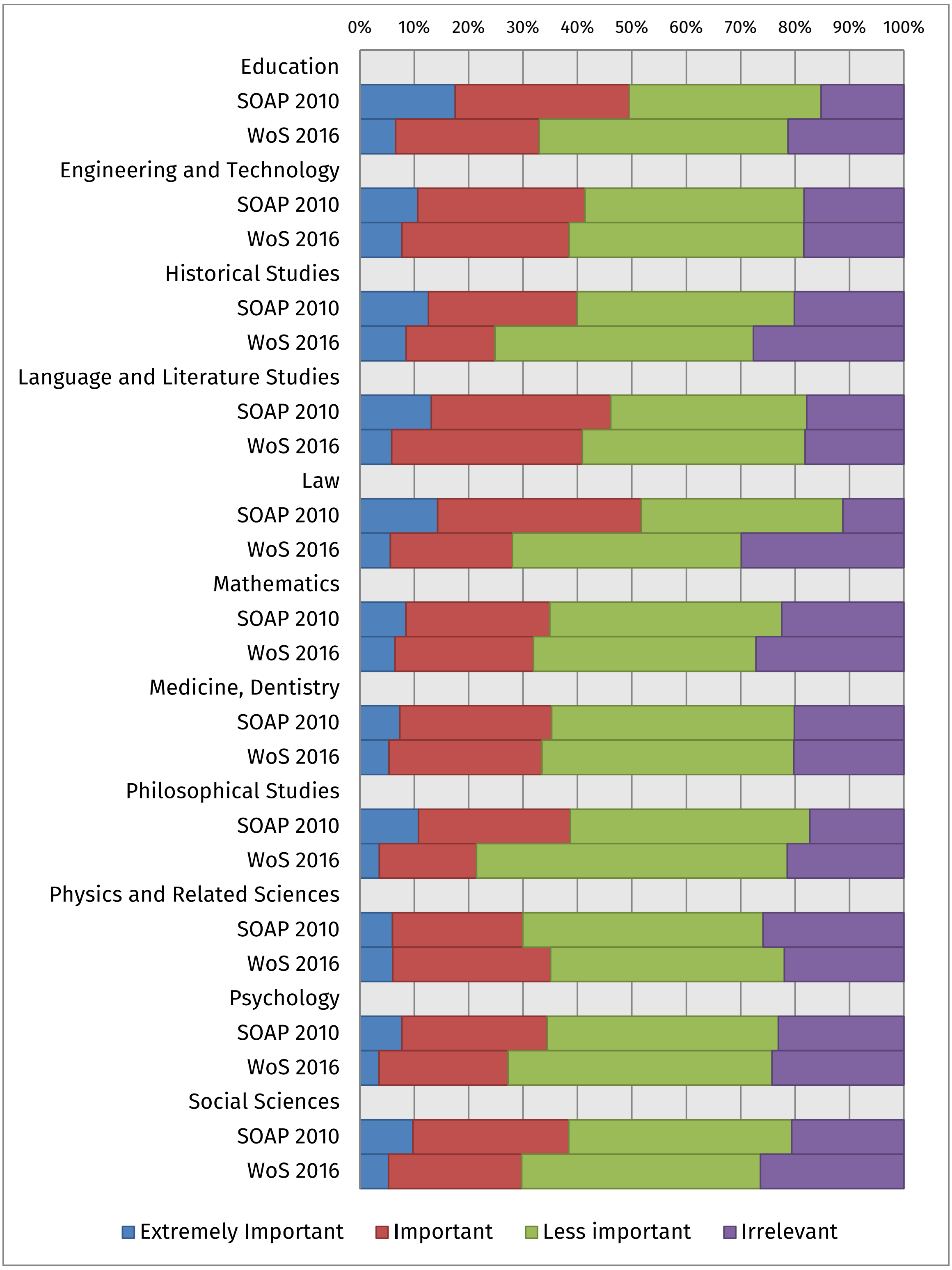

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Figure 99 Importance of factors when selecting a journal to publish in. Copyright policy of the journal. By seniority (SOAP 2010 n=25,275 - WoS 2016 n=14,974 p < 0.001)

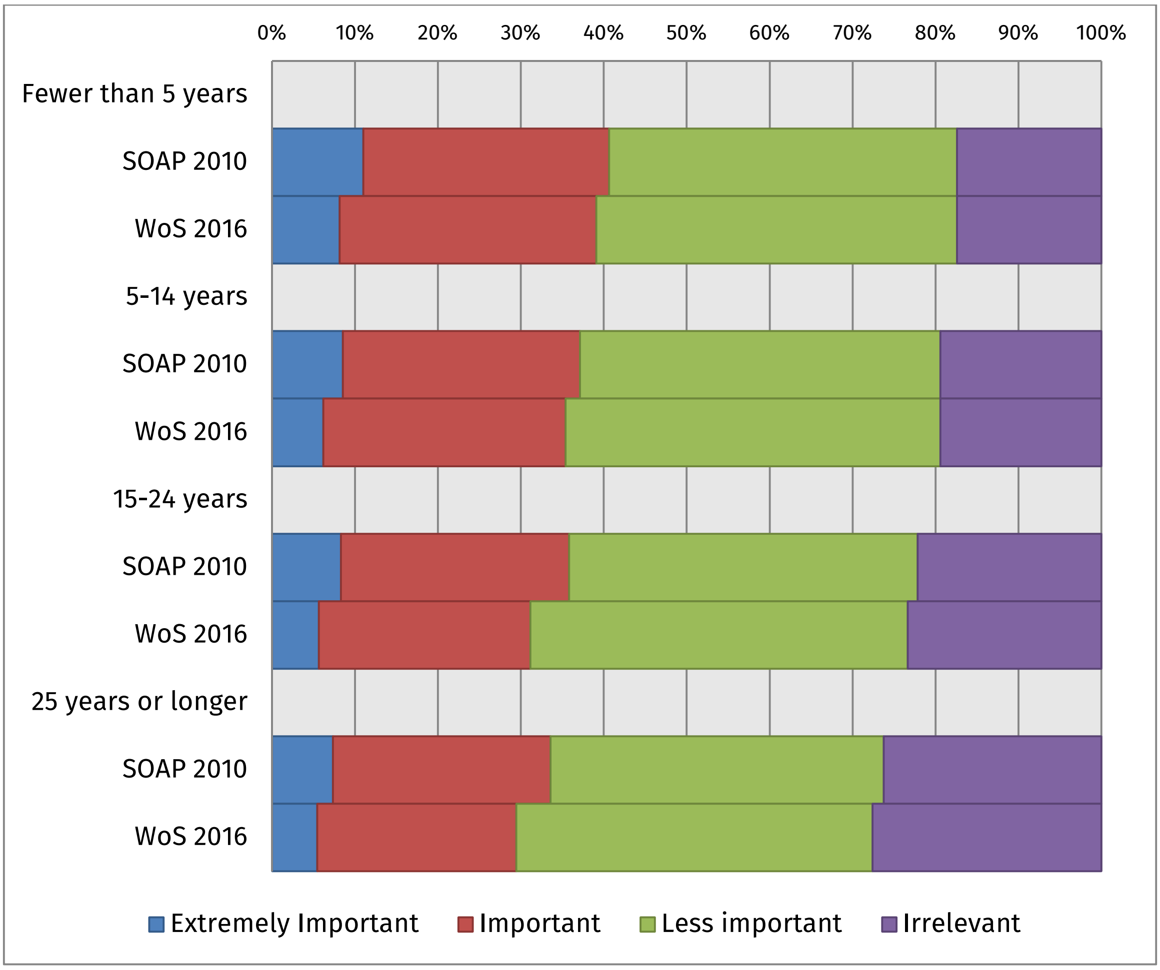

Figure 100 Importance of factors when selecting a journal to publish in. Copyright policy of the journal. By regions (SOAP 2010 n=25,275 - WoS 2016 n=15,014, p < 0.001)

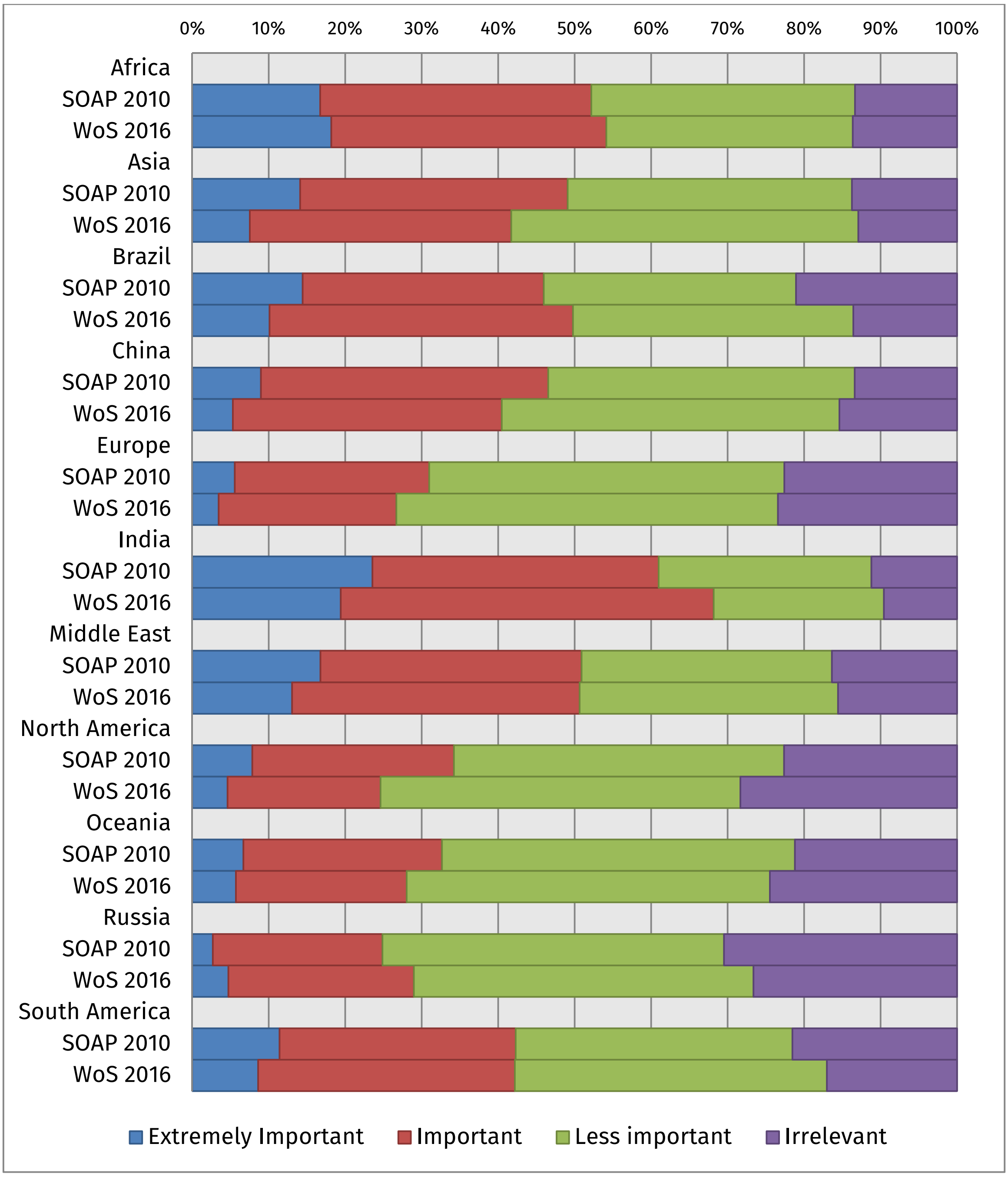

Figure 101 Importance of factors when selecting a journal to publish in. Copyright policy of the journal. By European regions (SOAP 2010 n=11,073 - WoS 2016 n=5,449, $p < 0.001$)

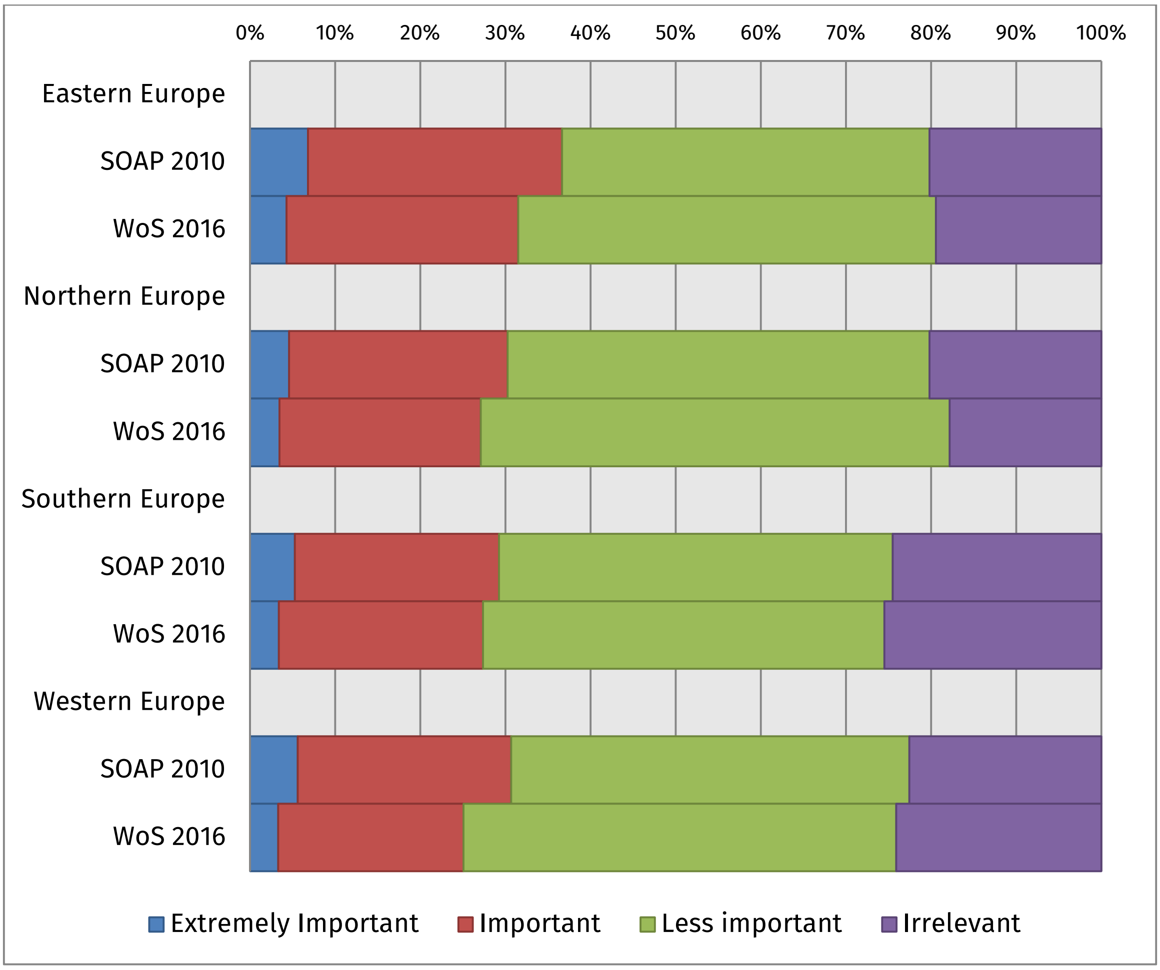

Figure 102 Importance of factors when selecting a journal to publish in. Absence of journal publication fees. Distribution by seniority (SOAP 2010 n=25,519 - WoS 2016 n=15,091, $p < 0.001$)

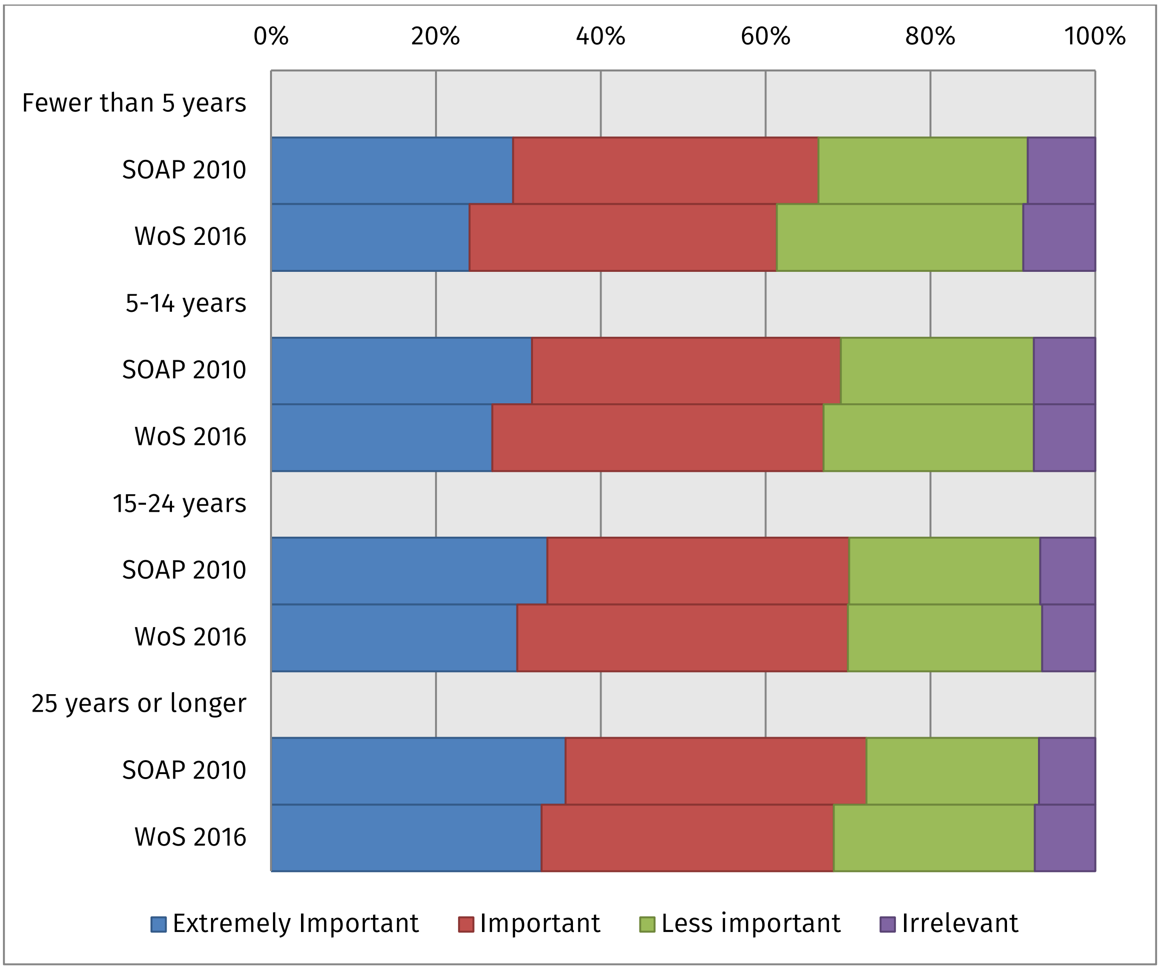

Figure 103 Importance of factors when selecting a journal to publish in. Speed of publication of the journal. By seniority (SOAP 2010 n=25,534 - WoS 2016 n=15,076, $p < 0.001$)