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Research Output Availability on Academic Social Networks: Implications for Stakeholders in Academic Publishing

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Abstract

A recent disruption in academic publishing are Academic Social Networks (ASN), i.e. web platforms such as ResearchGate and Academia.edu that have provided new ways for researchers to disseminate, search for, and retrieve research articles. ASNs are still a grey area in terms of implications for involved stakeholders, and research on them has so far been scarce. In an effort to map out factors related to ASN use this article provides a multi-method case study of one business school (Hanken School of Economics, Finland) that incorporates 1) a bibliometric analysis on the full-text availability of research output on ASNs for research published 2012-2014 by Hanken affiliated authors, 2) semi-structured interviews with faculty active in publishing in order to gain insight into motivations for use and use patterns, and 3) a survey distributed to all research-active faculty and doctoral students in order to gain a wider perspective on ASN use. ASNs have for many become the primary way to provide access to one's research output, outpacing all other types of online locations such as personal websites and repositories. Based on the case study findings, earlier research, and recent industry developments, the article concludes with a discussion about the implications that the current trajectory of ASN use has on major stakeholders in academic publishing.

Introduction

Academic publishing is an increasingly crowded field where authors compete for attention and scientific impact. The volume of articles published in academic journals has been increasing steadily at a pace of 3-3.5% annually since at least over two centuries ago, and today there are over 28 000 active journals publishing over 2.5 million articles a year (Ware and Mabe 2015). Many researchers call out for new methods for harnessing the benefits of interactive web technologies like open peer review, more nuanced authorship and acknowledgement systems, and open access (Ponte and Simon 2011). However, these kinds of innovations have not yet been able to compete with the career-boosting weight that is still associated with publishing in prestigious subscription-based journals that make up the top ranked outlets within many research disciplines.

In efforts to make organizational research output more visible and accessible despite being published in subscription-based journals, universities have been active in facilitating their faculty members to submit manuscript versions of authored research publications to be made available on institutional repositories (Spezi, Fry, Creaser, Proberts, and White 2013; Vincent-Lamarre, Boivin, Gargouri, Larivière, and Harnad 2015). Reasons for faculty non-participation include the time and effort required, uncertainty about copyright, questions related to scholarly credit and re-use, assumptions that open access material is of low quality, and a lack of mandatory policies (Kim 2010; Rowlands and Nicholas 2006; van Westrienen and Lynch 2005). So far, institutional repositories have usually not lived up to their potential and expectations for unlocking near-universal access to research publications (Sawant 2012; Abrizah et al 2015). And while the right for authors to self-archive their work in a repository is free and without any direct cost, maintaining individual repositories is expensive. A UK report claims that costs for the institutional repositories in 166 higher education institutions in Britain are around 23 million pounds per year, which is nearly 15% of the annual journal subscription budget of UK universities (around £150 million) (Swan 2010).

In the last five years Academic Social Networks (ASNs) have become an option for researchers to further disseminate their research beyond primary publication in a scholarly journal, conference proceeding, or book. ASNs are social web platforms whose features are tailored specifically to the needs of researchers; however, the feature of particular relevance to this study is the functionality of making research publications available for anyone to download for free. As such we limit this study to ASNs that support that feature, e.g. ResearchGate and Academia.edu. Services such as e.g. Mendeley, Bibsonomy, Zotero, and CiteULike provide some ASN functionalities, such as personal profiles reference management and sharing, communication, listing of research outputs, and providing links to other researchers (Thelwall and Kousha 2014). However, they are not capable of providing publications available for download so the services fall outside the scope of the study. In addition, other general social networking sites such as Facebook and LinkedIn are outside the scope of this current work, since they do not host document files in a meaningful systematic way and are not exclusively directed at academics.

Making articles available for download on ASNs is more than just another location to self-archive research; the nature of the services adds to the visibility and discoverability of publications which can in turn lead to added citations. A recent study has given indications that papers uploaded to Academia.edu gained more citations over 1, 3, and 5 year time periods, even compared to the control group of articles that were also made freely available online but not uploaded to Academia.edu (Niyazov et al. 2016). Though the element of self-selection cannot be omitted, i.e. that authors more frequently upload the work they are most proud of to ASNs, the notion that these services can facilitate visibility and discoverability is important to acknowledge. Through article discovery and

suggestion functionality they provide additional value to users, compared to just making publications freely available elsewhere on the web e.g. through institutional repositories or personal websites.

Longitudinal surveys of journal article reading patterns among US University science and social science faculty has indicated that the mean number of articles read per person per year grew for three decades in a row (150 articles for 1977, 188 articles for 1993, 281 articles for 2005), but a plateau seems to have been reached based on the most recent measurement which was 264 articles for 2012 (Tenopir, King, Christian, Volentine 2015). Tenopir, King, Christian, and Volentine (2015) could also identify a longitudinal growth with regards to the influence other sources than traditional published or interpersonal information sources have on triggering a reading of an article, a category which includes all web services outside of the journal website. So researchers' capability to read more seems to be stagnating, and methods to discover and filter through potentially interesting publications are changing. This is one of the key purposes that document-hosting ASNs aim to fulfill, and no other web service can currently compete with it when it comes to scope of coverage and convenience of accessing interesting content.

As of February 2016, ResearchGate reports to have over 8 million registered users and provides access to 19 million full-text articles (ResearchGate 2016). Academia.edu's corresponding figures are over 31 million registered users and over 9 million articles (Academia.edu). What needs to be noted is that the numbers of users are not directly comparable for interpreting the popularity of the two services among researchers. ResearchGate primarily only accepts users affiliated with an academic institution (based on e-mail address domain), while Academia.edu does not have this restriction. Furthermore, documents made available on ResearchGate are available for download by anyone without registration, while Academia.edu requires registration for PDF download and only allows for in-browser reading without an account. What is also good to keep in mind is that global representations of members and uploaded publications to ASNs are uneven when put into relation of country research output. Countries like the United States, Japan and Canada have been found to have the highest proportion of publications available on ResearchGate while China, Russia and Iran were among the lowest (Thelwall and Kousha 2015).

Both ResearchGate and Academia.edu are non-publicly traded commercial enterprises backed by venture capital, and the business models of ASNs are still in an experimental state. Currently both Academia.edu and ResearchGate have incorporated some advertising in the form of job listings. Academia.edu has expressed an interest in generating additional income from selling analytics on what research is trending to R&D institutions (blogs.scientificamerican 2012). Some of the potential business models from ASN operators include author-paid primary publication on the ASN platform itself, and pay-to-promote schemes where authors can pay a fee in order to make their content more

likely to be suggested to other users of the ASN (Matthews^b 2016). However, for now the main focus seems to remain on accruing as many users and as much content to the websites as possible rather than maximum monetization.

Nevertheless, what makes the current situation concerning from a sustainability standpoint is that almost no journal publishers allow distribution of even accepted manuscripts on third-party commercial domains which are not in full control by either the author or their employer (Laakso 2014). However, based on the massive numbers of documents uploaded to ASNs such restrictions have not yet stopped authors from distributing their works due to lax compliance enforcement by publishers so far.

ASNs as providers of access to organizational research output

The share of recently published (2011-2013) scientific journal literature available on the open web across all sciences was pegged at nearly 54% based on a sampling of 514,000 articles out of a 4.6 million article population: 12.1% of articles could be retrieved from full open access journals, 5.9% of articles from repositories, and 30.9% were retrievable by unknown mechanisms (Archambault et al. 2014). It is unfortunate that the study, which is the largest in scope so far, did not incorporate a more granular web location classification to cover the ‘unknown mechanisms’ more exactly since ASNs have shown to be major contributors to the free access to journal articles retrievable directly through web search engines.

Jamali and Nabavi (2016) explored the availability of article full-texts published during the timeframe of 2004-2014 through Google Scholar, querying each research discipline category on the service with discipline-relevant keywords and recording data on the first page of query results. Of the 7244 articles queried for, 61.1 % (4426) contained a link to a full-text document. 80.8 % of full-text articles were the final publisher version. ResearchGate was the most frequent source of full-text documents, accounting for 10.5% (466) of all full-text articles found. The instrumental role that ResearchGate has come to play in providing full-text content to Google Scholar entries has also been corroborated elsewhere. ResearchGate was found to be the second most frequent source of free full-text access (after the US National Institute of Health) for a sample of 64,000 highly cited articles published during the timeframe of 1950-2013 (Martín-Martín, Orduña-Malea, Ayllón, & López-Cózar 2014).

Two organizational case studies on ASN adoption have recently been published: Ortega (2015) which focused on employees of the Spanish National Research Council, and Mikki, Zygmuntowska, Gjesdal, Al Ruwehy (2015) which focused on authors affiliated with the University of Bergen in Norway. Both studies were based on a similar methodology where ASN websites, including Academia.edu and

ResearchGate, were scraped for data about how authors affiliated with the organizations have populated the services and their profiles. Both studies give useful indications that ASNs have disciplinary clustering, i.e. that certain sciences are more present on one service than others. Mikki et al. (2015) further presented that professors have the highest share of registered profiles, with all lower academic ranks having lower relative presence. Neither Ortega (2015) nor Mikki et al. (2015) discerned article upload and sharing as part of the studies, focusing rather on the number of bibliometric entries registered to each profile – not whether or not the entries had a freely downloadable full-text document attached.

To summarize this section, most research focusing on ASNs from the perspective of its adoption among the members of an organization has up to this point focused more on their adoption for profile creation and the amount of article metadata each author has on their profile (e.g. Ortega 2015; Mikki et al. 2015), overlooking how much full-text content is actually made available through the services. When it comes to studies on the development of open access to research, ASNs are often sidelined and not properly acknowledged (e.g. Archambault et al. 2014; Björk, Laakso, Welling and Paetau 2014). This is, to our knowledge, the first study that focuses on the degree of full-text access that ASNs provide as a share of total research output of an institution – both seen independently and, in particular, placed in relation to other web locations where full-text copies can be found.

After this review of the scarce extant literature, we now move to the empirical part of the manuscript.

Methodology

The study was conducted at the Hanken School of Economics in Finland (from here onwards referred to just as ‘Hanken’), a university-level business school with faculty and students at two locations, in Helsinki and Vaasa. Hanken is a relatively small but multidisciplinary business school that provides a diverse yet practically manageable research context. To give some sense of scale, faculty fulltime equivalent at the end of 2014 was 125 and the number of MSc and BSc students was 2295 (hanken.fi). The study is part of a project funded by the Finnish Ministry of Education and Culture where the circumstances for increasing access to research publications are explored and facilitated.

Though self-archiving has been an accessible option for researchers at Hanken by having the functionality of attaching a document file as part of the research reporting process, use of the functionality has remained low (around 10% of annual publications are self-archived). In order to better understand how researchers at the institution made their research available, we posed the following two research questions.

Research questions

RQ1: To what extent are research publications authored by Hanken-affiliated authors available in full-text on the web, and how does the share provided by ASNs compare to the availability through other web locations?

RQ2: What are the key motivations for registering, visiting, and uploading publications to ASNs among Hanken-affiliated authors?

RQ3: What can the ASN adoption and use observations obtained at Hanken indicate for the wider field of academic publishing?

RQ1 was deemed to be best explored through a bibliometric analysis where availability of research output on the open web was evaluated. Using Hanken's research database to gather metadata records for all peer-reviewed publications (journal articles, conference proceedings, book chapters) published during a three-year period (2012-2014), bibliometric metadata could be collected for 587 unique publications. To look for full-text copies of these publications on the open web Google and Google Scholar were queried with the title of each publication, collecting observational data for up to three full-text copies available on the web. For each copy found the document version was classified as either the 'publisher version', 'the author's accepted manuscript', 'preprint' (i.e. prior to peer-review), or 'unknown version' (if it was impossible to discern). The web location of any found copies were classified as 'publisher webpage', 'institutional repository', 'subject repository', 'personal website', 'academic social network', 'other website', or 'Hanken's institutional repository'. Data collection was conducted in the summer of 2015. Utilizing Google for ultimately defining what is available and what is not has both benefits and limitations. Among the major benefits is that Google and Google Scholar are popular tools for students and academics, thus the data collection is grounded in the everyday practice of information seeking for many individuals within and outside of academia. The drawback is that Google is assumed to be aware of all uploaded material, and be capable of presenting links leading to the requested material when an appropriate search string is triggered. However, as document repositories, ASNs, and other locations for storing documents can be assumed to be designed in such a way that indexing for search engines is facilitated this concern is not a substantial obstacle for conducting the study. Furthermore, would ASNs or other web locations be searched within directly, bypassing Google, the retrieved hits would likely not correspond to what anyone can actually retrieve if the material is there but not easily discoverable.

The bibliometric analysis gives no answers with regards to why Hanken's authors have or have not registered and distribute their publications on ASNs, so RQ2 was explored through a combination of semi-structured interviews and a survey. Both the interviews and the survey were executed during autumn of 2015 and were informed by the results from the bibliometric analysis in order to further explore interesting initial findings.

Semi-structured interviews were conducted with several prolific researchers at Hanken (including researchers from both the Helsinki and Vaasa locations). In selecting which researchers to contact, a list of the academic output of researchers at Hanken was compiled for the years 2012-2014. From that list, fifteen of the most prolific academics were contacted, requesting an interview. This led to a total of ten unique interviews. The interviews were conducted in either English or Swedish, depending on the interviewee's preference. On average, the interviews lasted between 15 and 25 minutes each, and were recorded and transcribed. The interviews were semi-structured, and conducted using an interview guide of our design, centering on themes related to RQ2. The interviews aimed for a holistic understanding and interpretation of the results of the bibliometric analysis.

A survey was circulated both in paper format during a school-wide research seminar day as well as through e-mail to researchers at Hanken. In total, 43 responses were collected. In addition to basic background questions about the respondents, specific questions were formulated for gathering views on disseminating publications on different types of web locations, including ASNs. Respondents were asked to rate each question/claim between 1=I strongly disagree to 5=I strongly agree. Below is an example question group, the one most important for this study:

Evaluate the following claims regarding archiving your publications in academic social networks (e.g. ResearchGate, Academia.edu). Rate from 1=I strongly disagree to 5=I strongly agree)

They enable enhanced dissemination of my research results

They might increase the citation rates of my research publications

They are easy to use

They have social elements to enable an efficient network of communications among researchers

I like getting information about the number of downloads, views, social bookmarks

They are popular among my research community

Other (Please specify) _____

Results

This section presents the results of the three stages of the study at Hanken: the bibliometric analysis, the semi-structured interviews, and the survey.

Bibliometric analysis

Looking through the web for freely accessible copies of all of Hanken-affiliated authors’ published peer-reviewed research (publication years 2012-2014) generated surprising results, particularly concerning the role of ASNs. Figure 1 provides a visualization of where freely accessible full-text documents could be retrieved, and in what document version they were available. Each of the 587 publications could have 0-3 web observations attached to it (so as to provide a more complete picture of availability).

The overall availability of publications was 41% for 2012, 49% for 2013, and 37% for 2014. ASNs turned out to be the most prevalent source of full-text publications (93 out of 587 publications, 15.8%), with the majority being publisher version PDFs (70 out of the 93 publications, 75.2%). Surprisingly, institutional repositories at other universities had more of Hanken-affiliated authors’ publications than Hanken’s own repository (66 versus 58 publications), both of which came in as the second and third most frequent web locations respectively. The fourth most popular category was other websites, i.e. not belonging to any of the other categories (50 publications). The least popular web location category for full-text publications was personal websites (12 publications).

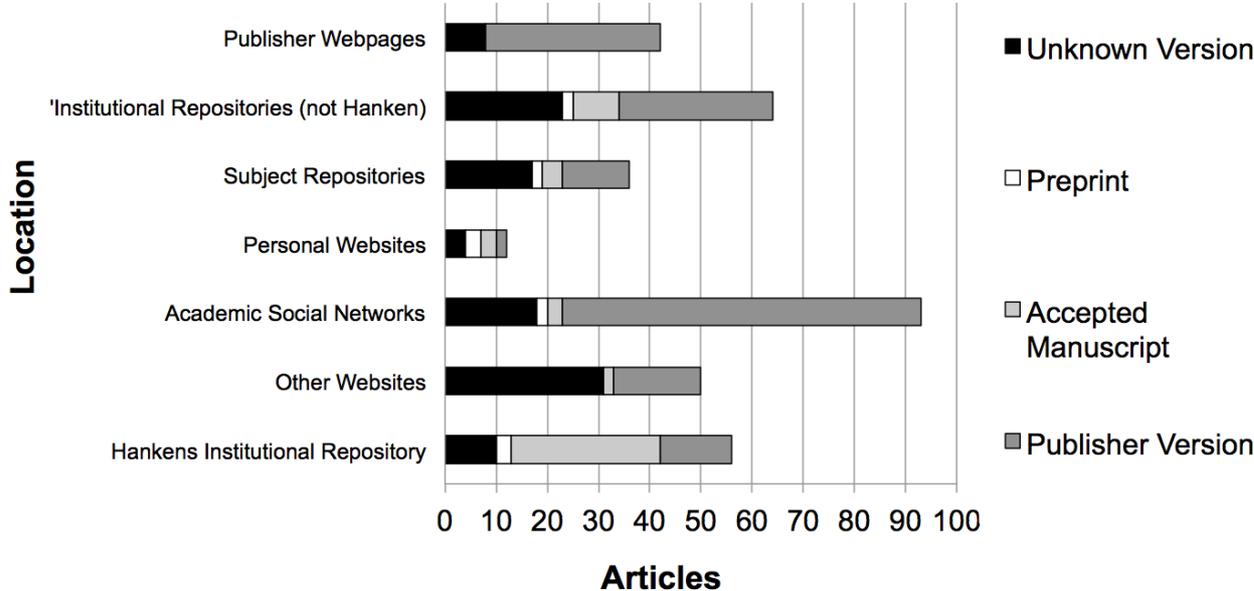


Figure 1 - Result of bibliometric analysis of web availability of peer-reviewed publications published by Hanken-affiliated authors 2012-2014 (N=587, each publication represented by 0-3 observations)
 As each publication can be represented with up to three full-text copies in Figure 1, the insight into which web locations are the most critical, or volatile, for providing access to full-text copies is limited. As such, Table 1 provides a supplementary, narrower perspective on the findings; this time

considering which publications had a full-text copy available only at one single type of web location. From the analysis it is evident that ASNs also contribute the most unique access to full-text copies (67 publications) with institutional repositories coming in second place (41 publications).

| Web locations | Number of full-text copies found (unique and exclusive) |
|----------------------------|--|
| Publisher Websites | 28 |
| Institutional Repositories | 41 |
| Subject Repositories | 11 |
| Personal Webpages | 8 |
| Academic Social Networks | 67 |
| Other websites | 31 |
| Hanken's Repository | 16 |

Table 1 - Publications found on only one type of web location

ResearchGate was the most prominent ASN providing access to full-text documents. We then looked at the share of Hanken-affiliated authors whose articles were included in the data to see how many of them had a profile on the service. Of the 187 unique authors 116 (62%) had a profile on the service while 71 (38%) did not (as of February 2016). Overall the bibliometric analysis provided useful information about the general picture of the free full-text access that ASNs provide, being clearly the most popular web location.

Semi-structured interviews

The 10 interviews conducted with prominent scholars at Hanken explored the key motivations for registering, visiting, and uploading manuscripts to ASNs. Below is a summary of the most important aspects that emerged during the interviews.

Despite Academia.edu's significantly larger reported membership numbers, more researchers at Hanken were familiar with ResearchGate than with Academia.edu. Of those researchers that were members of one or more ASN, there was only one researcher who was a member of Academia.edu and not ResearchGate. Thus, though the questions asked concerned ASNs in general, the answers should be interpreted as more focused on ResearchGate specifically. This largely mirrored the distribution obtained from the bibliometric analysis as well.

On the topic of how researchers came to join ASNs, the interviewees commonly noted that they were invited, or brought in, by co-authors or friends. Half of the researchers interviewed reported being either not very active or only somewhat active on ASNs. A third of the interviewees were neither members of any ASNs nor of social networks of any other kind (e.g. Facebook). Only one interviewee considered themselves an active user of ASNs. From this it can be gathered that the marketing

techniques implemented by ASNs work well to bring in new members, and that usage of ASNs is mostly sporadic. The most common reason given for visiting ASNs was to check on one's metrics. This seemed to occur primarily as the result of an e-mail sent by the ASN in which the researcher's metrics were briefly summarized. However, the issue of e-mails was brought up also in a negative light, with one researcher noting they regretted having joined, since it had led to a large amount of "spam" emails from the ASN. These findings further support the notion that usage of ASNs is sporadic, non-intensive, and usually triggered by an external factor such as an e-mail sent out from the service. Unsurprisingly, those who uploaded their own papers to ASNs did so in order to increase the availability and dissemination of those articles. However, very few researchers were actually active in systematically uploading their papers to ASNs. While many had papers on ASNs, the interviews showed that it was common for the interviewees to add their papers as the result of an e-mail from the ASN asking "is this your paper?" with the metadata already in place. Alternatively a co-authored publication could also have been uploaded by another author and thus also populate the publication list of all other co-authors on the ASN.

In summary, the interviews indicated that very few are active users of ASNs, and around a third are not at all interested in ASNs. Some explanations for this, offered by the researchers, were that they were uninterested in social media; that they felt they did not have the time for it; and that they did not consider it a significant or necessary channel for disseminating their work since their papers were already published in the original journal. The majority were happy to have their publications available, but were generally not interested in putting in any considerable effort towards achieving that availability. Overall, most interviewed ASN users seemed passive, leading us to believe that for instance ResearchGate's success in attracting registered users is in no small part due to its automated marketing features.

Survey

The third and last part of the results deal with the survey that was responded to by 43 of Hanken's faculty and doctoral students active in research. Looking at ASNs specifically, Figure 2 presents a summary of respondent opinions to claims related to various features of ASNs. The claims with the strongest agreement were related to ASNs enhancing the dissemination of one's research, and the possibility that ASNs might help increase the citations to one's publications. Access to metrics was the feature that generated most disagreement, yet over half of the respondents liked getting such information. ASN popularity within a research community, and social elements for communication showcased similar answer patterns with over 60% agreeing or strongly agreeing to both claims.

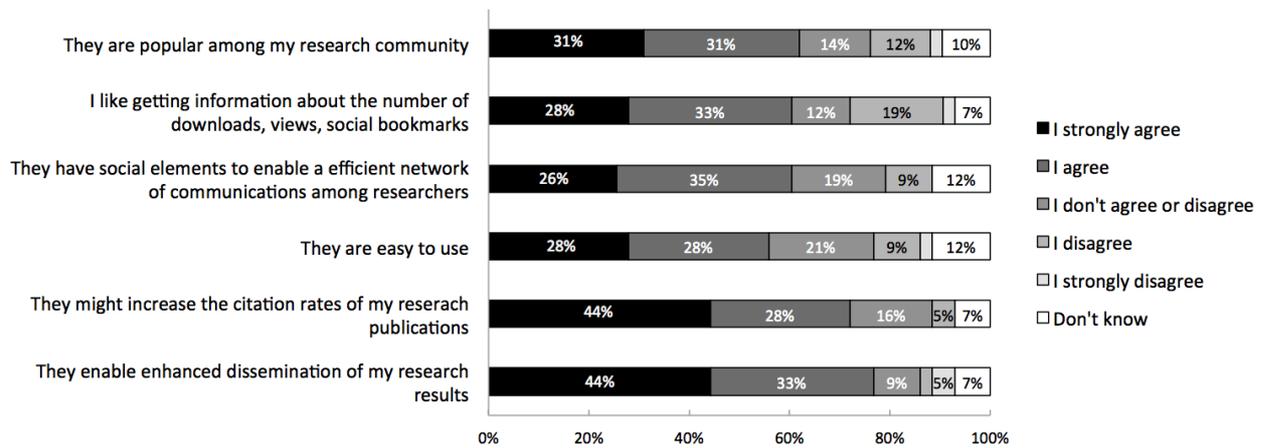


Figure 2 - Summary of answers to question: Evaluate the following claims regarding archiving your publications in academic social networks.

Summarizing the results generated by the three methods of data collection regarding ASN use at Hanken it can be concluded that interpreting the results for each method separately only paints a partial picture. Though the bibliometric findings indicate a dominant adoption of ASN use for disseminating research, exploring the level of attachment and investment that users have with the services revealed through the interviews suggests a weak and sporadic relationship between the authors and the ASNs. A large number of publications are being provided by authors on ASNs as final publisher versions, which is often in breach with publisher copyright agreements. However, the threat of publisher action was mostly perceived as a non-issue among authors and convenience of use trumped assured long-term archival. The following section reserved for discussion of the results focuses on the potential implications that the findings have for the wider field of academic publishing.

Discussion

This study has shown how ASNs have come to overshadow other online outlets for making research publications available, both through a look at recent previous research as well as through our case study of the Hanken School of Economics in particular. Assuming that ASNs continue to grow on the trajectory they have established so far, both when it comes to registered users and hosted documents, the shift we are witnessing has implications for the major stakeholders in academic publishing. One of the key issues is whether different methods to increase availability should be seen as competing or complementary to each other, and where researcher's priorities should lie if maximum benefits from disseminating one's work are to be achieved. In order to enable a structured discussion about the topic the following paragraphs summarize stakeholder perspectives for publishers, university libraries, authors, and ASNs themselves.

Publishers

The data collection from the case study strongly suggested that journal publishers have little to fear in terms of ASNs replacing them on the author-side as desirable primary outlets for formal scholarly communication. Rather future uncertainty was generated on the side of potential readers, as most journals are still based on a subscription-based business model. Publishers can to a point exist in a symbiotic relationship with ASNs even as the situation currently stands. In particular journal publishers benefit from content being available on ASNs as it increases readership and thus likely even citations without sacrificing subscription income. However, if a point in time comes when content coverage on ASNs grows so comprehensive that it discourages current subscribers from renewing their agreements with publishers, we are likely to witness action to curb the free and fully open distribution of publisher property. Evidence of recent publisher action in this vein can be seen in the legal action publishers have taken against Sci-Hub, a web service that provides illegal free access to millions of published articles (Bohannon 2016).

Publishers are already looking into ways that the current landscape of article sharing can better be controlled, where one alternative is increased collaboration between ASNs and publishers. The STM Publishers Association, an industry interest group backed by commercial publishers including among others Elsevier, Springer Nature, Wiley, and Taylor & Francis have recently formulated “Voluntary principles for article sharing on scholarly collaboration networks” which have been put forward in order to create consensus between publishers, third-party scholarly web-services (like ASNs), and authors on practices for sharing of scholarly content (STM 2015). The principles are restrictive to full article sharing in any form, suggesting that sharing should be limited to research groups unless the article has been published open access in a journal only article metadata sharing is encouraged. For authors the STM association has recently launched the howcanishareit.com website which is directed at informing authors how they are allowed to share publications they have authored. It is not completely unrealistic that publishers that are members of the STM Association are going to require article sharing on third-party websites to happen only on services adhering to the voluntary principles. As of June 2016 ResearchGate and Academia.edu are currently not signatories of the voluntary principles and look unlikely to be able to accommodate them without a major cleanup of already uploaded content.

Some publishers have also started to counter demand for having copies of articles uploaded to the web at all, where copying is hard to control once made available by providing temporary read-only access links that authors can distribute. Elsevier refers to their implementation as ‘Share Link’, where authors of articles accepted for publication receive a freely shareable hyperlink that can be shared freely on social media, or even ASNs, but which does not enable download of the PDF file and will become inactive after 50 days (elsevier.com 2016).

Another potential outcome are publisher ASN-mergers, which would solve both the business model conundrum of ASNs since they would no longer have to be independently profitable, and the dilemma of how publishers better can control publication distribution with the added bonus of gaining access to a valuable network of academic users. A not too distant parallel to this can be seen in Elsevier recent purchase of the Social Science Research Network (SSRN) (Elsevier 2016), which is a well-established discipline-specific repository for authors within the social sciences to openly distribute their published or unpublished article manuscripts. Through the case study data collection it was clear that SSRN is the most popular subject-based repository for authors at Hanken School of Economics. Immediate concern in the academic community was raised for potential changes in policy for using the service, with Elsevier denying any immediate changes being planned for the service (Mathews^a 2016).

University libraries

University libraries and the institutional repositories they operate are no longer the only channel through which researchers can disseminate their works further. The bibliometric findings from the case study already alluded to a low usage rate of Hanken's institutional repository, but the interviews further highlighted that researchers often perceive the repository more as an administrative system rather than something that is set up for their benefit. Modern user-friendly web services have come to compete with institutional repositories for researchers' time and effort when it comes to facilitating the visibility of one's research, an aspect that was not as alarming even five years ago. The convenience that ASNs provide by not being strict with copyright enforcement, often 1-click article uploads since metadata is pre-populated, and allowing co-authors of the same article to share the same document file across profiles, is something institutional repositories cannot compete with. Institutional repositories have the benefit of offering long-term archival, something ASNs do not promise. However, as long as no corrective action is taken from publishers this benefit remains in the theoretical sphere rather than the practical which would facilitate higher levels of usage of institutional repositories. Based on the findings it would be beneficial if there would be more cross-collaboration, interoperability, and integration among institutional repositories. This would enable university libraries to offer ASN-like features through their interconnected institutional repositories.

Individual authors

For authors the growing popularity of ASNs have no major immediate implications, and it is hard to argue against something that is convenient and "just works". It is exactly this aspect that became apparent from all directions in the case study at Hanken. A low user threshold has been the key for both facilitating profile creation and publication uploads to ASNs. The increased availability that ASNs can provide for publications is likely to increase readership of and citations to research output. However, when uploading articles to ASNs, authors should be aware of the risks: authors operate in a grey area if they upload publisher versions publications to the ASNs if they do not have permission to

do so. For the time being authors can continue uploading copies to ASNs, but knowing that the copy might not be there tomorrow. There is nothing in the way for websites to simply be closed down overnight, or undergo a sudden change of policies without advance warning. Alternatively, the process might be more akin to a silent gradual fading due to lack of support, which happened to Microsoft's answer to Google Scholar, Microsoft Academic Search (Orduna-Malea, Martin-Martin, Ayllón & López-Cózar, 2014). The private commercial ownership that underlies most ASNs has recently been the subject of both discussion and awareness-raising events among researchers (eventbrite.co.uk).

ASNs

ASNs have several benefits that they can offer as a unified global web service compared to what one individual institutional repository can. Bibliometric metadata is likely of higher quality due to increased numbers of users inputting and correcting erroneous data. Usage metrics go beyond just number of views and downloads, e.g. it is possible to see from which disciplines and universities scholars are reading one's work. High user counts and more robust bibliometric metadata makes it easier to leverage author information for marketing purposes to grow user numbers even further, e-mail addresses can be harvested from many different sources including existing user's contact book or scraped from co-authored papers. As mentioned in relation to the publisher perspective, ASNs might be forced to accommodate publisher demands should open distribution become too prevalent. One option is subscription-access authentication to content on their services where published content is not necessarily hosted on ASNs anymore, but provided as an embedded service through the publisher, only accessible to users with subscription-access to the journal.

Limitations and future research

The main limitation of this study is the focus on only one organization. While there is no strong reason to believe that Hanken would in any key way be different from any other university-level institution within the social sciences when it comes to author behavior, the limited population and number of respondents for the interviews and survey hinder more than just descriptive findings to be extracted. However, we believe the small scale of the organization to have worked in beneficial ways as well by being able to exhaustively explore the availability of research publication output on the web.

Future research on the topic of ASNs could take many interesting directions. Another organization adopting a similar methodology to study research output sharing on ASNs would provide an important step towards theory-building. Basing a research methodology on focus groups has proven promising for discovering central constructs for understanding ASN use (Bullinger, Renken and Möslein (2011)). The rise of ASNs has been happening in tandem with the open access movement seeing major growth and developments in both science policy and academic publishing. However, ASNs have so far been almost forgotten in that context. Thus it would be important for anyone studying or establishing

policies for the academic publishing landscape to properly acknowledge the impact that ASNs have; the scale of the phenomenon is too large in order for it to not be acknowledged properly.

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