Noorhidawati, et al. (Eds.): ICOLIS 2016, Kuala Lumpur: LISU, FCSIT, 2016: pp 205-222

Web/Science 2.0, Early Career Researchers and Reputation Mechanisms: Shifting the Roles of Academic Libraries

A. Abrizah[1] & David Nicholas[2,3]
[1]Department of Library & Information Science,
Faculty of Computer Science & Information Technology,
University of Malaya, Kuala Lumpur, MALAYSIA
[2]CIBER Research Ltd, UNITED KINGDOM
[3]Department of Russian History Tomsk State University,
Lenin Avenue 36 Tomsk 634050, RUSSIAN FEDERATION
Email: abrizah@um.edu.my; dave.nicholas@ciber-research.eu

ABSTRACT
This paper reports the findings on early career researchers (ECRS) opinions about Web/Science 2.0, now a well-established alternative route to disseminating scientific results. Specifically, it probes into ECRs opinion about the information-sharing platform on Web/Science 2.0 that they think contributes towards their scholarly reputation. Data are based on face-to-face interviews conducted from January through April 2016, involving a total of 12 ECRs from 5 Malaysian research-intensive universities. The study shows that ECRs reputational mechanism is still traditional and mainly paper-driven. Although they make use of scholarly metrics, they are more concerned with traditional metrics than altmetrics. ECRs agree that online scholarly networks lead to greater collaboration and/or connectivity, and help build reputation. They may want to use social media more, but traditional norms that dominate scholarly behaviour perhaps prevent them from doing so. Open access (gold) is generally thought as a good thing, to promote accessibility and visibility of research output, however institutional repositories are little known and appear an obligatory. This paper also discusses how academic libraries can foster open access to science and openness in a broader sense as an expert in scholarly communication in supporting researchers and their research processes.

Keywords: scholarly communication, open science, open acces, science 2.0, academic social networks

INTRODUCTION

This is part of a larger international study[1] that concentrated on the attitudes and practices of early career researchers (ECRs) in scholarly communication practices. On the basis of earlier works (Abrizah et a. 2015; Nicholas et al. 2015b), it seems that there are currently two contrasting assumptions about the behaviour of ECRs. On the one hand they are carrying through the new attitudes characteristic of digital natives into their

[1] Involving the USA, UK, France, Poland, Spain, China and Malaysia

research careers, which may eventually bring about fundamental changes in their scholarly communication behaviour and the current scholarly journal system. Others on the other hand have observed the way in which the ECRs have recognised their position as research collaborators, apprentices and their reliance on the guidance of mentors, which tends to make them very much collaborative, more conservative and less adventurous than established researchers (Nicholas et al. 2015b).

Our research leads us to think the truth lies somewhere between these suppositions. Traditional scholarly publishing behaviours dominate (Nicholas et al 2015a), but in places we can see the seeds of change. It seems clear that ECRs put together in research groups of their peers can take a very different view of the current scholarly communications system than when they are on their own platforms before an audience. They are an important community to research because they represent the 'new wave' of researchers, born digital or long conditioned by living in a digital environment. They are also growing rapidly in number. There are a growing number of researchers who are in some respects (economically and in status terms) early career researchers because they are not established. They, especially in the sciences, have entirely different culture of research and development activities in huge laboratories with heavy budget, dealing with big data and working in high profile networking and sharing environment. Their working environment can be clearly divided into large, intermediate and small groups. Due to this collaborative and open nature, they get published a lot in well reputed journals and have high visibility among other all groups. ECRs may differ in their beliefs and behaviours taking account of the structural changes that have taken place in the scholarly environment as a result of Web 2.0 technologies and Science 2.0 – a paradigm shift in the modus operandi of research and science impacting the entire scientific process; with focus on collaboration and sharing on social media and open access platforms.

Traditionally academic reputation has largely been measured in respect to just one scholarly activity and that is research. Research reputation has largely been measured in respect to publication in high-impact journals and the citations these publications attract. Citation indexing services such as Web of Science, Scopus and even Google Scholar understood this very early on and produced a service which exploits successfully this practice. Research universities recruit scholars on the basis of their impact scores, most notably based on citation count and h-Index. Therefore, the scholarly reputation spotlight falls on just one activity (research authorship) and one particular manifestation of that activity and its associated metrics. Clearly such a narrow view of reputation marginalises all the other scholarly activities and this skews scholarship and academe, because authors publishing in top journals would obtain the reputation. This traditional and conventional way of establishing and measuring scholarly reputation is being challenged by Web/Digital Science 2.0 developments, which have given rise to: (a) new types of 'actors' and large increases in the number of these actors (e.g. freelance scientists, citizen researchers); (b) new formats for conducting and disseminating research, such as blogs and online communities; (c) more inclusive and broader ways of measuring scholarly reputation (e.g. altmetrics) (Jamali, Nicholas and Herman 2015).

The principal aim of this paper is to understand what the above changes mean for scholarly reputation in the context of Malaysian ECRs. The key priority areas include: the

use of Web/Science 2.0, use of sharing platforms and attitudes towards sharing, both articles and data; and attitudes towards Open Access and Open Science. Might these changes lead to new practices that are more comprehensive and representative of scholarly achievement by going beyond the "publications and citations" paradigm? Also, how best can academic libraries support transformative changes in this field, if, indeed, they are needed at all?

OBJECTIVE AND RESEARCH QUESTIONS

This paper reports the findings on ECRs' opinions about Web/Science 2.0 now a well-established alternative route to disseminating scientific results. Specifically, it probes into ECRs opinion about the conditions that influence on their collaborating, networking and sharing behaviour, the quality of work and collaborative patterns on Web/Science 2.0 that they think contributes towards their scholarly reputation. This paper sought to answer the following research questions:

a) What are the information sharing platforms that ECRs think contribute to their scholarly reputation?
b) What are the views of ECRs regarding the reputational merits of Web/Science 2.0?

METHOD

Data are based on face-to-face interviews conducted from January through April 2016. A total of 12 early career researchers (ECRS)[2] from 5 Malaysian research-intensive universities[3] were sampled and they were recruited through:

a) E-mail sent to potential participants through the University of Malaya mailing list: Eight participants responded and expressed willingness to participate.
b) Purposively sampling of participants during a Journal Editor workshop conducted at the Malaysian Citation Centre, Ministry of Higher Education, of which the researcher was an invited speaker. Four ECRs, (one each from University Sains Malaysia, Universiti Putra Malaysia, University Kebangsaan Malaysia and Universiti Teknologi Malaysia) expressed willingness to participate.

The sampling strategy is less concerned with the size but more of the appropriateness and adequacy of the sample. The interviews were conducted at least once with each participant. Interviews lasted between 1 to 2 hours and were conducted in the English language; however responses were obtained in English as well as Malay language. Four participants were interviewed twice, because the interview could not be completed in due time as they had to leave for other prior engagement. All interviews were conducted in the participants' office or laboratory. Five participants gave consent for the sessions were tape-recorded. Four participants requested to view the interview questionnaire earlier, which was emailed to them a day before the interview took place. Member-checking took place during the research process an at the end of data

[2] Researchers who are not more than ten years from receiving their doctorates, who are not in established or tenured positions and who hope to make a career in scholarly research.
[3] The 11th Malaysia Plan (11MP) aims to see two of these Malaysian universities ranked among the top 100 tertiary education institutions on the QS rankings.

collection, through telephone calls, WhatsApp text messages and e-mails, providing participants with information that ensures their views have been properly captured. The data were manually coded up using a heuristic approach and a standardised thematic framework.

Participants Background and Career

The 12 interview participants came from eight broad areas of research[4]: Technology and engineering (ECR9, ECR12); Earth and environmental sciences (ECR10); Chemistry (ECR6); Physics and Astronomy (ECR8); Biology and Agriculture (ECR5); Computer and information sciences (ECR1, ECR2, ECR4); Social sciences (ECR7, ECR11); and Business and economics (ECR3). Two ECRs from Computer and information sciences are from the Library and Information Science (LIS) discipline, and in Malaysia LIS is recognized as social science although they are placed at the Computing schools. Therefore the participants comprise seven ECRs from the sciences and five ECRs from social sciences. All have PhD qualifications, six graduated from Malaysia and another six abroad. All ECRs are parts of a research group, either through a research centre (international status) or an established research group (national and/or university status). ECRs coming from research centres are affiliated to the Higher Institutions' Centre of Excellence (HICoE), which are internationally recognised, meeting global standards and in areas of national importance. Those affiliated to research centres are already in the research track. (Research universities in Malaysia are going for 3 different academic tracks – conventional, teaching & learning, and research). The rest believe that they would be put in the research track in 3-5 years. Table 1 summarizes the participants' information.

Table 1: Participants' Background Information based on Gender, Age, Academic Discipline and Research Affiliation

Gender	No	Age	No	Discipline	No	Research	No
Female (ECR1-ECR6)	6	35 and over	4	Social Sciences	5	Centre	6
Male (ECR7-ECR12)	6	30-34	8	Sciences	7	Group	6

All participants admitted wanting a career as a university researcher; 11 of them came into academia directly after the successful completion of their PhD, and one participant (ECR12, male, sciences) came into academia with three years industrial experience. Thus, all ECRs reported having between 3 to 6 years research experience after the completion of their PhD. ECRs think of a career in academia as the obvious outcome of their PhD qualification. They believe PhD is a passport for job mobility. Surprisingly they do not focus on publishing the results of their PhD thesis, i.e. they do not get the most publications from their thesis. They get the most publications from funded research, and this apply mostly to the sciences. Getting a research grant is a KPI for ECRs in the sciences.

They are currently working on 1 to 10 research projects, and everyone has had an experience being a principal investigator or leading a project before. Eight ECRs reported

[4] Ulrich Classification 2015

the existence of good mentoring, which included all six ECRs from the HICoE. ECRs from research centres are happy with their mentors. They listed the following as their research mentors: Principal Investigator (PI); colleagues, and others such as Research Director, PhD supervisor and spouse (who is a senior researcher). Seven ECRs believed that they are making progression in their career, one reported "with difficulty" whereas another four were uncertain about their career development. Ten ECRs indicated that their main motivation for doing their current research is due to curiosity or interest; another two said because of promotion. The most prolific ECR in this study also remarked the following as motivator for doing research: *contribution to the progress of science, availability of research funding* and *evidence of intellectual effort.* Six ECRs would not consider researching elsewhere, outside the university, whereas another three indicated "Yes" and "Unsure" respectively.

Characteristic behaviours of ECRs

a) Smartphone Use

ECRs highly use the smartphones and they are connected to the Internet through smartphones 24/7. They use smartphones mainly for finding and checking information on the Internet (12), communication such as using e-mails (12) and WhatsApp (9), networking (10), reading and note-taking (5), connecting to social media (3), as an organizer (GoogleCalendar) (4), taking videos/photos of experiments (2), audio-recording (2), online banking (2), online purchase (2), GPS navigation (3), video-calls (Skype) (2), entertainment (music, video) 92).

b) Social Media

All ECRs use social media to find scholarly information, however only 3 have cited social media sources in their work (all social sciences ECRs), and another 3 have used social media disseminate their research (one LIS, two sciences). Six ECRs were encouraged to use social media in their work by their PI and/or peers. All use social media to connect with other scholars and agree that online scholarly networks lead to greater collaboration and/or connectivity, and help build reputation, except for one ECR from social science (history). The same ECR also felt that the new virtual groupings, based on online social networks is not a different phenomenon from the structured research groups. Six ECRs believe that the use of social media result in them getting closer to their peers elsewhere; whereas another six believe that the use of social media results in both detachment from their institution and getting closer to their peers elsewhere.

c) Authorship and Peer Review

In general, ECRs are productive authors and they highly publish in the English language. However, the participants' productivity differ by disciplines. The sciences are very productive, have published between 9 to 23 (except for one ECR, who is highly productive, having published 78 journal articles, of which 48 papers are WoS-indexed); have written a good handful of WoS-indexed scientific articles and having acted as a reviewer for numerous prestigious peer reviewed journals. The sciences collaborate with prolific producers of high quality papers, who are directors of high institution centre of excellence (HICoE), their mentor, principal investigators in their research group. They also collaborate with their previous PhD supervisors in the UK, and non-Malaysian researchers who are based at the university. The sciences obviously prize

publications in key journals; they are highly collaborative - the physical sciences, especially collaborate with the non-sciences and publish in SSCI-indexed journals. They want to work with those who have big names, because they see them as positive, supportive and accommodating. "*The peers make effort to include me although I am an ECR*." (ECR4).

It seems that the sciences do not have issues in publishing their works in impact-factored journals. They in generals do not have complaints about the requirement that they have to publish in WoS-indexed journals. One ECR said "*Journal publishing and I have been friends*" (ECR 9). The sciences seem to contribute less in the national journals, since the requirement is to publish in WoS indexed journals. The sciences have started to publish review papers which they felt could be "easily accepted in SSCI-indexed journals". They feel that if they're not dedicated to publishing, they should question their motivation for undertaking a PhD and working in the academia.

The social sciences have published between 1-18 articles. The non-sciences start at the lower level first, publishing in Category A and B journals (journal quality criteria given by their university classification system). They publish in national journals. They have not attempted publishing in SSCI-indexed journals and would be doing so in the near future. The most productive is from LIS, has 18 publications in SSCI and Scopus indexed journals. Females (all 3) in the social sciences are more productive in research compared to their male counterparts. They seem to have better writing skills and command of the English Language compared to their male counterparts.

Six ECRs have a conscious publication strategy, which seem to do with obtaining a tenured/established position. Another six ECRs admitted not having a conscious publication strategy. Two of them indicated that they would like to publish in any relevant platforms or channels accessible to the readers. Seven prefer to make their research findings in less formal ways, such as blogs, which could make them more visible. Nine ECRs acknowledged having produced data or software in the course of their research work; this has been their main contribution and would like this aspect of what they have done to be recognised and credited. They would also like the data itself to be made more visible.

RESULTS

Research Question 1: What are the information sharing platforms that ECRs think contribute to their scholarly reputation?

a) Impact and Scholarly Reputation

We asked two questions: (a) if ECRs employ citation data, usage data, social media indicators in their daily research work; (b) how important do they think metric scores are for their reputation and career progress. What we wanted to know is whether ECRs are interested more in social media and usage metrics because citations take so long to count towards reputation.
ECRs believe that it is important for the research they are involved in to have an impact. ECRs in the sciences and LIS seem to be more familiar with scholarly metrics (e.g. impact

factor and citation). They also check usage statistics at the article level. Although they make use of scholarly metrics, they are more concerned with traditional metrics than almetrics. Specifically, they use metrics in the following ways.

- Identify Journal Impact Factor in Wos and Scopus (8)
- Track citation impact of researchers in WoS, Scopus; Google Scholar (6)
- Check downloads (4)
- Check reads (4)
- Check altmetrics of articles in Scopus (3)
- Check citations (1)
- Check shares (1)
- Check journal h-index (1)

We found that ECRs reputational information sharing platforms are still traditional and mainly paper-driven. If they had the time/opportunity to do more to increase the impact of their research, ECRs would do the following:

- Publish in reputable journals (12)
- Update Web CV (12)
- Update ResearchGate; (10)
- Create presence in ResearcherID; ScopusID; OrchidID (10)
- Strengthen impact indicators (9)
- Make appearances in mainstream media; newspapers (3)
- Archive research output in repositories (1)
- Blog about my works (1)
- Share data and research output in repositories (1)

Ten ECRs make use of scholarly metrics. They acknowledged making their research metrics openly available. The sciences are very much conscious of their productivity and citation impact; they keep track of their citations and h-index. They also have targets; a few of them talked about achieving a certain number of citations by a particular time. They are fully aware that publications and citations always stay on their CV and will be counted when they are applying for tenure and promotion years down the line. All ECRs, except one in the social sciences, think that metric scores are important for both their reputation and career progression.

All unanimously agree that their research should have impact (in order of importance) on their peers, the general public, the industry and the government (policy makers). Table 2 presents the ways to influence those groups of stakeholders ECRs think they should be reaching to. Findings indicate that the best way to influence peers is through publications; the general public through the social media; the industry through meetings and conferences; and the government through the mainstream media.

Table 2: The ways to influence stakeholders

Peers	General Public	Industry	Government
• publications (12) • invisible colleges (3) • conferences (6) • exhibitions (4) • academic social networks (2)	• social media (12) • blog (3) • newspapers (3)	• meetings (11) • conferences (11) • social media (3) • commercialization (3) • patents (3) • blog (2)	• mainstream media (12) • social media (3)

b) Sharing and Collaborating Platforms

We asked in what ways do ECRs share their (a) ideas and interim research results; (b) research findings, data and publications? ECRs, without any prompting, typically gave 2-3 outlets and, all told, more than a dozen different ones were mentioned. Table 3 lists the various platforms ECRs use for sharing of ideas, research output and collaborating[5] on social media. Invisible college through discussion forums (online) and meetings (face-to-face) is still mostly used for sharing ideas. Social media tools and social scholarly network seemed to be quite popular with a number of researchers mentioning them. ResearchGate (the largest academic social networking sites in terms of active users) is mainly used for sharing ideas (6), research output (8) and collaboration on social media (8). Facebook is also used. Archiving their research works is a non-priority (only 3 mentions), they see this as the job of the librarians or research officers hired by the faculties for this purpose (archiving in digital repositories and academic social platform, such as ResearchGate).

However, look a little further and we can see the emergence of something new. A few ECRs mentioned archiving pre-prints on Kudos, Web CV and digital repositories. Real-time open collaborative science tool such as ThinkLab and F1000Workspace was mentioned by only one ECR. The scientists seem to be more familiar with academic social network and share their publications and research data there. Three ECRs admitted not using social media for scholarly communication purpose.

[5] Collaborating is the action of working with someone to produce/create something; it is cooperation for the sake of achieving something together, whereas networking is the cultivation of relationships in order to enable the ongoing exchange of useful information or services.

Table 3: Sharing and Collaborating Platforms

Ways of sharing ideas	Ways of sharing results, data, publication	Collaborations & social media
• Invisible college (discussion forums; meetings) (9) • ResearchGate (6) • Facebook – update status (6) • E-mails (6) • Skype meeting with collaborators (5) • Real-time open collaborative science tool – ThinkLab (2) • Real-time open collaborative science tool – F1000Workspace (1)	• ResearchGate (8) • E-mail to peers (8) • Put papers in Kudos – web-based service to maximize visibility and impact (4) • Pre-prints on my Web CV (6) • Facebook – update status and link to the publication (3) • Institutional repository (library's role) (3) • ResearcherID (3) • Archiving pre-prints in library IR (1) • Pre-prints in subject repositories (1) • GoogleDocs (1) • F1000Research and F1000Workspace (tools for writing, collaborating, reference management and preparation for publishing scientific papers (1)	• ResearchGate (8) • Mendeley (5) • Academia.edu (4) • Facebook (4) • ThinkLab (2) • F1000Research and F1000Workspace (1) • Archive in subject repositories (1)

ERCs collaborate through working groups, research projects and publications. International collaboration through academic social networking sites such as ResearchGate, Mendeley and Academia.edu among ECRs is a feasible and effective means to address important challenges, by increasing opportunities for professional support and networking, problem-solving, discussion of data, and ultimately publishing. Table 4 presents the social media behaviour of the ECRs**;** the majority use social media and online social networks to look for, build and maintain reputation. ECRs admitted that their sharing/collaborating behaviour is different from that of their research mentors in current and previous jobs. They felt that their behaviour in respect to sharing/collaborating changed as they have become more experienced. All ECRs believe that there is no risk of losing their competitive edge through sharing and collaborating extensively.

Table 4: Social Media Behaviour

Behaviour statement	Yes	No
Using the social media and online social networks to look for, build and maintain reputation	8	4
Sharing/collaborating behaviour different from that of research mentors in current and previous jobs?	10	2
Change of behaviour in respect to sharing/collaborating i.e. becoming more experienced	11	1
A risk of losing competitive edge through sharing and collaborating extensively	0	12

Research Question 2: What are the views of ECRs regarding the reputational merits of Web/Science 2.0?

We asked the ECRs two questions: (a) If the technological innovations Science 2.0/Open Science mean anything to them, and if so, do they have any significance for them; (b) The advantages and disadvantages of OA publishing from their point of view.

a) Open Science and Open Access

ECRs have a general understanding (not deep) about the technological innovations Science 2.0/Open Science[6]. Open Science means the following to those ECRs who answered Yes (7) and another 3 who indicated Not Sure (all from social sciences) of the phenomenon:

- Transparent research workflow (3)
- Better return ROI for public funding (3)
- Optimise use and reuse of research output (3)
- Research contributing to societal impact (3)
- Free research tools e.g. Mendeley, Plagiarism detection software (3)
- Increase collaborators and research network (3)
- Having stronger research profile (3)
- Data sharing to increase impact (3)
- Making sure that your research work can be read (2)
- Open access of research output (2)
- Open access of scientific papers (2)
- Citation advantage (2)
- Making scientific research, data and dissemination accessible to all levels of society (1)
- Science is publicly funded, so research output should be publicly accessible (1)
- Usage denotes impact, not relying solely on citation advantage (1)

[6] Open science is the movement to make scientific research, data and dissemination accessible to all levels of an inquiring society, amateur or professional. It encompasses practices such as publishing open research, campaigning for open access, encouraging scientists to practice open notebook science, and generally making it easier to publish and communicate scientific knowledge (https://en.wikipedia.org/wiki/Open_science)

The ECRs seem to be familiar with the advantages and disadvantages of Open Access. Table 5 gives details of what was mentioned. Increased visibility and high costs fared quite strongly as the advantage and disadvantage of Open Access with the former obtaining 12 mentions and the latter 11. However, when asked if their research team/department/university have a policy in regard to OA publishing, only four ECRs (all sciences) said Yes, seven do not know, and one said No.

Table 5: Advantages and Disadvantages of Open Access

OA advantages	**OA disadvantages.**
• Immediate and increased visibility (12) • More control over the research work (can disseminate freely) (5) • Access to the literature anywhere and gratis (4) • Unrestricted access to materials (4) • Re-use rights (3) • Transparent online distribution (3) • A larger audience reading your work (2) • You don't restrict knowledge; if your work is restricted it could be ignored by other researchers (2) • Financially attractive model for journal publishers (2) • Tendency to get read and cited (1) • More control over the research work (can disseminate freely) (1)	• High costs to researchers (11) • Rise of predatory journals (4) • High cost to make your article on Open Access (Gold Road) (4) • Less established journals (3) • Less established and internationalized journals (3) • You have to pay, and university does not have provision for APC (3) • OA journals spammed potential authors (2) • Focus on quantity, not quality (1) • Less established journals (1) • Reason for Open is mainly for profit, not because of need (instead of a need for a new journal for a particular research area) (1) • Supplying publication data to AO repositories means extra work for researchers (1) • Provision for APC; support if only published in Q1 OA journals (1) • Compromise quality (1) • Proliferation of new journals that are not needed; compromise quality (1) • Hijacked journals if not careful (1)

Only three ECRs are of the opinion that that open access publishing can fast track their career/build their reputation (Nine said "No"). However, eight ECRs do publish in Open Access journals and only three depositing their research materials in institutional repositories. Open access (gold) is generally thought as a good thing, and they may publish in OA because they are easier to get into. However institutional repositories seem to be little known and appear an obligatory.

The majority of ECRs agree with the preposition that OA publishing advances science and research (8), and only one feels that OA publishing will dilute the quality of publications. Another three ECRs disagree with both propositions. Table 6 listed the explanations for the agreement/disagreement.

Table 6: OA dilutes or advances? ECRs' Explanations

OA publishing will dilute quality	• The rise of OA predatory journals • Sustainability- in the future these OA publishing will disappear since people are becoming more aware of predatory journals
OA publishing advances science and research	• New ideas can be dispersed more rapidly, widely, and in turn triggers new research. • Many people will begin to ignore the journals with restricted access, or place pressure on the authors to 'self archive' their work in order to gain access to it. • The public and business have broad access to the most recent literature and ideas, which they can buid upon. • Scientific discoveries are free online • Research is shared before publication • Various ways to share findings and not necessarily journals; can disseminate through video journals? • Can share findings in preliminary forms; can put on academic social networks, blogs • Research is available to other scientists and public as it is being developed and tested
Disagree with both prepositions (i.e. OA does both – dilutes and advances)	• Lack of quality control - Most OA journals in my disciplines are of lesser quality • Sustainability - not sustainable in the long run, since authors have to pay • does not have funding for OA publishing • OA implies wider reuse, recent knowledge can be put to immediate use in research and teaching • Researchers are rated by their ability to publish in impact factored journals, OA journals are less established, it takes some time before OA journals acquire an impact factor. Only then it would be of interest to researchers.

b) Transformations: Towards an open science publishing platform?

When asked if they have any overall picture of what form a changed system of scholarly communication might take in the advent of Open Science and Open Access, all ECRs believed that there is a big opportunity for the current generation of researchers to fundamentally change the way that the scholarly communication system works. Although there is no clear evidence as they demonstrate similar scholarly communication behavior compared to their senior counterpart, they do aim for high impact publications, and want to see fast impact. They register their academic profiles and have unique researcher ID. They really boast about their achievement. Only five ECRs felt that in 5 years from now the academics will still be typically recruited, promoted and obtain funding solely on the basis of their publication record and citation scores based accumulated reputation. All believed that journals will still have a central role five years down the line, however not everyone thought so for libraries. Table 7 presents the findings.

Table 7: The Transformation in Five Years

	Yes	No	Not sure
ECRs as change players	12	0	0
Will reputation system be the same in 5 years	5	0	7
Central role of journal in 5 years	12	0	0
Central role of libraries in 5 years	8	3	1

ECRs have an overall picture of what form a changed system of scholarly communication might take: openness and transparency in sharing of research resources, measuring impact, and providing training and opportunity to build research program and knowledge building for ECRs reflected through the following statements:

- More open – generous, sharing, giving, a larger audience (4)
- More open and transparent way of measuring impact (3)
- Support and special scheme for ECRS - training and opportunity to build promising programs of research and knowledge translation (2)
- Policy change – open and transparent, university would be corporate entities (2)
- Towards scientific and societal impact (1)
- Research grants to lead open research projects on our platform (1)
- Pay other scientists to openly share feedback and insights throughout those projects (paid based on peer assessment of the scientific value of their comments) (1)
- Open access – free to disseminate, download, edit, copy but must be given credits (1)
- Sharing of research openly, online, and in real-time, collaborating with a worldwide network of peers (1)
- Open research grants to lead and peers openly share their ideas and insights, not necessarily in the form of publications / authorships (1)

DISCUSSION: SHIFTING THE ROLES OF ACADEMIC LIBRARIES

So how does ECRs scholarly behaviour and Web/Science 2.0 change the way academic libraries provide access to scientific information? The discussion is no longer about whether open access should be promoted, but rather how it should be implemented by the academic libraries as an expert in scholarly communication.

ECRs do not "see" libraries anymore, although some still believe that libraries have a central role five years down the line. Some of them did not go to a library for years, but they still need access to publications. Libraries need to consider how to provide access to scholarly materials (and discussions) with the focus on Open Access and Open Science. Although Open Access and Open Science is said to be a valid alternative for established scholars, however research has shown that authors avoid publishing their work in open access journals (Rodriguez, 2014; Creaser 2010); believe that OA journals were less prestigious and that publishing in these journals could negatively impact chances of promotion (Coonin, 2010); and this is equally true for ECRs in this study. Nevertheless, ECRs who publish in open access journals, takes the form of publishing their article in either an open access journal or a hybrid open access journal, and they make sure that the journals are indexed by either WoS or Scopus. For ECRs who just

publish (or who are told to publish) in high-impact titles and disregard open access, this aspect is a genuine challenge that will probably need a further cultural shift.

ECRs prefer to use free online literature, but the majority do not have the tendency to deposit their research output on Open Access. Researchers should self-archive their papers if the literature is to be freed of its access and impact-barriers. Self-archiving is quick and easy, but there is no need for it to be held back if researchers feel too busy or otherwise unable to do it for themselves. ECRs see that is the role of the library to self-archive the first wave of papers by proxy on their behalf. Self-archiving will become second-nature to all researchers as the objective digitometric indicators of its effects on citations and usage that reflect scholarly reputation become available online. The library should mandate that the repository be filled. Although it has already becoming normal practise for faculty to keep and update their institutional CV online on the Web; it should be made a standard practise by both research institutions and research funders as well as research assessors that all CV entries for refereed journal articles are linked to their archived full-text version in the university's institutional repositories (Harnard 2003).

What does this study bode for libraries? The role of libraries in Open Access publishing is shifting from purchasing content and archiving research output to helping ECRs in the publication process, and the focus would be more on the beginning of the publishing cycle, as there seems to be two main reasons for ECRs not publishing in Open Access:

a) ECRs are concerned that OA is fuelled by predatory publishers; a term used by Jeffrey Beall, a librarian, to describe journals that demand publication fees without ensuring editorial and publishing standards and good practice. ECRs are aware of Beall's list that has journal titles to memorize and avoid. ECRs hope that the list will grow shorter as the reputation of open access grows even stronger and more authors would choose this route to disseminate high-quality research. Libraries can help ECRs, and researchers in general to identify high-quality Open Access publishing channels such as maintaining a whitelist of the journals.
b) ECRs are concerned about the article processing charges (APCs) as their institution will only bear the APCs for "those journals that are in Q1 of WoS (ECR6)". However, an increasing number of funders and institutions do set aside a portion of the budget for APCs, in this sense open access does require budget planning ahead of time – and if no funding at all is available, many publishers offer open access membership schemes and in some cases may offer waivers for the processing charges. Libraries can help in the following ways:

    - They collect and organise information on funding mandates and publishers' OA policies, and make this available to the researchers. It will be important to continue educating faculty on open access options, as well as renewing efforts to demonstrate that peer reviewed open access journals are of the same rigor and quality as their subscription-based counterparts.
    - They run open access funds on behalf of their universities to facilitate the processes for researchers and assist in making research more

visible. Surveys and case studies of academic libraries with open access funds to support their campus authors have examined implementation strategies, characteristics, and impact (Fernandez and Nariani 2011; Monson, Highby, and Rathe, 2014)

- Since one source of funds to pay for open access articles is the library subscription budget, library can propose a decrease in the subscription cost to the library in order to avoid 'double dipping' where an article is paid for twice – once through subscription fees, and again through an APC. Moreover, since researchers do prefer to use the free online literature, it is possible that libraries may begin to cancel journals.

CONCLUSION

Web/Science 2.0 provides a very wide range of reputational mechanisms and data. However, ECRs reputational mechanism is still traditional and mainly paper-driven. Although they make use of scholarly metrics, they are more concerned with traditional metrics than altmetrics. Citations and impact, wholly focused on papers, are of great value to them, not social media and usage metrics. They however, do not see social media as being scholarly 'noise' but useful for research purposes. ECRs agree that online scholarly networks lead to greater collaboration and/or connectivity, and help build reputation, although by no means all researchers used social media in their scholarly communications, a lot did; those who did not often felt that they should make more use of the opportunities presented and might do so in future. They may want to use social media more, but traditional norms that dominate scholarly behaviour perhaps prevent them from doing so. Social networks bring greater digital visibility, however there has been no mentions of Twitter as an important current awareness service and a tool for outreach; and ResearchGate is not heavily, used. ECRs do not have a deep understanding of Open Science. Open access (gold) is generally thought as a good thing, but not argued passionately – confined to only accessibility and visibility. Institutional repositories are little known and appear an obligatory. There is some uneasiness that open access publishing is making the playing field uneven between those researchers who can pay for it and those that cannot.

The study shows that ECRS who are more "open-minded" in Web/Science 2.0 pointed to their behaviour as being more digital, active on the social media, strategic in where they publish and interested in self-promotion. In this way, open access – together with similar initiatives such as open data – may well be a primary route to accelerate and facilitate science while ensuring reproducibility. There are still a few ECRs who can be described as traditional in their scholarly behaviour with a small dose of social media and networks. Open access certainly requires an equally open mind; ECRs may be suspicious at first, but chances are that the overall benefits will obscure the initial hurdles. In general, researchers want to publish in their preferred journals, whether or not those are open access or subscription-based, yet they demonstrate an increasing openness to sharing and a desire for the support to make that possible. This bodes well for emerging scholarly publication models and a continual shift toward more open sharing of research and data – they would benefit from the direct sale of their work, and receive greater recognition from their own research community because as researchers, they are judged by how successful their research is. As it is authors that decide how and

where their research is accessible, it is they who must be convinced of the benefits of improved access through Web/Science 2.0: that it provides greater impact, which in turn leads to greater recognition and higher reputation. Libraries have gone a long way to facilitating research workflows, and more recently on fostering open access to science and openness in a broader sense. Librarians who are committed to supporting researchers and their research processes at their institutions, should gain understanding of the implications of Open Science for these researchers, the potential opportunities and possible challenges, and check on existing best practices to deal with them.

ACKNOWLEDGEMENT

We acknowledge funding received from the Ministry of Higher Education Malaysia (HIR-MOHE) UM.C/HIR/MOHE/FCSIT/11, which made it possible to undertake this research.

REFERENCES

Abrizah, A., Fathiah Badawi, Niusha Zoohorian-Fooladi, David Nicholas, Hamid R. Jamali, Norliya Ahmad Kassim. 2015. Trust and authority in the periphery of world scholarly communication: A Malaysian focus group study, *Malaysian Journal of Library & Information Science*, 20(2), 67-83.

Coonin, B. 2011. Open access publishing in business research: The authors' perspective. *Journal of Business and Finance Librarianship*, 16, 193-212.

Creaser, C. 2010. Open access to research outputs – institutional policies and researchers' views: Results from two complementary surveys. *New Review of Academic Librarianship*, 16, 4-25.

Fernandez, L. & Nariani, R. 2011. Open access funds: A Canadian library survey. *Partnership: the Canadian Journal of Library and Information Practice and Research*, 6(1), 1-24.

Harnard, S. 2003. Open access to peer-reviewed research through author/institution self-archiving: Maximizing research impact by maximizing online access. *Journal of Postgraduate Medicin*e, 49: 337-342.

Jamali, H.R., Nicholas, D. and Herman, E. 2015. Scholarly reputation in the digital age and the role of emerging platforms and mechanisms. *Research Evaluation*, 25(1), 37–49 doi: 10.1093/reseval/rvv032.

James, Laura; Norman, John; De Baets, Anne-Sophie; Burchell-Hughes, Ingrid; Burchmore, Helen; Philips, Amyas; Sheppard, Dan; Wilks, Linda and Wolffe, John (2009). *The lives and technologies of early career researchers*. CARET, University of Cambridge, Cambridge.

Monson, J., Highby, W. and Rathe, B. 2014. Library involvement in faculty publication funds. *College & Undergraduate Libraries*, 21(2-3), 308-329. http://dx.doi.org/10.1080/10691316.2014.933088

Nicholas, D., Anthony Watkinson, Hamid R. Jamali, Eti Herman, Carol Tenopir, Rachel Volentine, Suzie Allard, Kenneth Levine. 2015a. Peer review: still king in the digital age' *Learned Publishing*, 28(1), 15-21.

Nicholas, D., Hamid R. Jamali, Anthony Watkinson, Eti Herman, Carol Tenopir, Rachel Volentine, Suzie Allard, Kenneth Levine. 2015b. Do Younger Researchers Assess Trustworthiness Differently when Deciding what to Read and Cite and where to

Publish? *International Journal of Knowledge Content Development & Technology* 5(2), 45-63

Rodriguez, J. E. 2014. Awareness and attitudes about open access publishing: A glance at generational differences. *The Journal of Academic Librarianship*, 40, 604-610.