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THE NEW WAVE OF UNIVERSITY RESEARCHERS AND LIBRARIES

This paper examines changes in attitudes and behaviours of the new wave of researchers (early career researchers) regarding the academic library and its functions in seven countries around the world. It documents trends and establishes the direction in which things are heading. Data were collected from over 100 researchers from the sciences and social sciences through interviews, repeated annually for 3 years. Findings show that attitudes towards libraries and their use have barely changed over the years and they remain largely invisible to ECRs, although in the case of China, attitudes are distinctly negative and use declined and in Poland sentiment appears to be rock bottom. Libraries, when used are really mainly used for one purpose only, which is to get hold of the full text of papers. The danger is that ECRs are decoupling from libraries.
Keywords: *early career researchers; scholarly communication; libraries; changes; interviews.*

Introduction

The Harbingers study[1] from which this paper emanates sought to determine whether early career researchers (ECRs) – the new wave of researchers, with their millennial beliefs of openness, sharing and transparency and fondness for the social media and smartphones are disruptive agents of change when it comes to scholarly communications [1–5]. The full results of the study can be found on the CIBER website[2]. This paper, however, focuses solely on one aspect of the research, which, perhaps, is one of the most eye-catching finding of the study, and that is the changes in attitudes and behaviours of ECRs towards libraries. What makes the findings especially interesting is that libraries were asked about them in the context of a specific scholarly aspect relevant to researchers, mainly in connection with search and discovery, institutional repositories and scholarly transformations (i.e. what their future is thought to be).

Early career researchers

ECR is a term variously defined by universities, funders, and governments, but most tend to define them in terms of the number of years since completing a PhD, typically 10 years, which means they are a very large body of researchers defined by their relative 'newness' and juniority. However, this definition was not fit for purpose as the project's interest lay primarily in the new wave of youngish, untenured researchers (the Millennials), who might or might not have been doing a PhD at the same time. Thus, the working definition was "Researchers who are generally not older than 35, who either have received their doctorate and are currently in a research position or have been in research positions, but are currently doing a doctorate. In neither case are they researchers in established or tenured positions."

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[1] http://ciber-research.eu/harbingers.html
[2] Ibid.

ECRs are not only interesting in terms of their newness and their millennial beliefs, there is also the fact that they are:

• Not just the new wave, but also the big wave. The largest body of researchers in higher education in most countries.

• They provide a powerful lens through which to investigate the scholarly communications process because they are the research workhorses. Our data [6] show that they are authors; reviewers (usually as proxies for their mentors); and, sometimes, sit on editorial boards and lead research groups and undertake most of the fundamental research tasks, such as searching, discovery, and referencing.

• In the scholarly communications frontline, so if want to know what is going on then, in respect to the role of libraries, we should ask them and not just their senior colleagues, which is too often the case.

Methods

A fuller explanation of the project's methodology and the nature of the sample can be found in Nicholas et al. [7] and also in project reports on the CIBER website[1]. Here we provide the broad features of the methodology and any additional methodologies special to the analysis of the libraries.

Over three-years (2016–2018), nearly 120 ECRs were subject to annual, repeated, in-depth, semi-structured interviews. Such interviews were used because it was felt that they are best-suited to asking questions about scholarly topics that might not be fully understood because of their novelty, such as altmetrics and open science.

Interviews were largely conducted, remotely (Skype or telephone) or face-to-face, by domestic university researchers in their home country and in their own languages. The exception was the US, which was also covered by the UK interviewer who was conversant with the US scholarly scene. The interview schedule was sent to interviewees ahead of time and contained around 60 largely open-ended questions (Table 1 shows how they were allocated across the scholarly communication spectrum). Interviews were not recorded because of cultural sensitivities and notes taken instead. Transcripts were returned to interviewees to confirm and correct. They were translated into English for all non-English-speaking countries and manually coded using a heuristic approach and a standardised thematic framework[2]. Selective data were then transferred to spreadsheets for further analysis.

A convenience sample of 116 ECRs was initially derived, the number dictated by available funding and the resource-intensive, longitudinal nature of the study. The characteristics of the sample was shaped by the funder's (Publishing Research Consortium) subject and geographical interests, the availability and co-operation of interviewers on the ground. ECRs came from 7 countries – China, France, Malaysia, Poland, Spain, UK and US. Interviewers for the case-study countries were provided with a recruitment quota. Within these parameters, the aim was to recruit a sample that would be around two-thirds sciences and one-third social sciences (reflecting the larger numbers of ECRs in science), be reasonably balanced in terms of gender, include researchers from a mixture of universities and some research groups outside universities, and feature ECRs in their twenties and thirties. ECRs were approached via publisher and learned society lists and research networks within individual countries. Table 2 provides the characteristics of the ECR sample.

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[1] http://ciber-research.eu/harbingers.html
[2] http://ciber-research.eu/download/20160916-Harbingers-research_instruments.pdf

Table 1. **Main scholarly communication aspects covered**

Scholarly aspect*	Scope of questioning
Access (4)	Ability to identify, obtain and make use of information needed (the full-text). Resources used to access/use documents. Role and use of libraries in the process
Altmetrics (3)	Alternative metrics to citations. Term altmetrics was not used directly because it was not understood, instead, examples were given: article downloads and pageview and social media indicators, for instance, mentions on Twitter
Authorship (8)	Contribution to articles, extent of influence; authorship policies; criteria used in submission; publishing in open access mega journals; reproducibility of research
Career (7)	Aims, ambitions, motivation, achievements, progression, pressures
Collaboration (3)	National, international and inter-disciplinary research collaboration (networking is not on its own regarded as collaboration)
Data (3)	Production of software, data and making it open/more visible and reasons for not doing so; method of publishing data
Discovery (4)	Resources used to first find documents; Role and use of libraries
Ethics (4)	Unethical behaviour, misconduct and policing
Impact (4)	Notion of research impact in respect to various audiences
Jobs (9)	Number of projects/role/status training, employment conditions and treatment; assessment policies
Mentoring (1)	Existence, nature and quality of mentor
Metrics	Conventional citation-based measures fundamental underpinning many scholarly aspects (e.g. impact, publishing, document selection & reputation); data culled from many aspects
Online communities (5)	Scholarly social network sites, such as ResearchGate, Mendeley and Academia.edu and local equivalents in China.
Open access (5)	Gold and green publishing. Involvement of libraries in institutional repositories
Open science (1)	Concept in general
Peer review (7)	Regarding being reviewed and being a reviewer
Publishing (3)	About publishing strategies in the broad
Reputation (3)	Questions about building reputation on SSNs, OA contribution, future reputational systems
Sharing (4)	The sharing of research results and activities
Smartphones (2)	For scholarly purposes; discovery and access
Social media (6)	General social platforms such as Facebook, Twitter and Snapchat
Transformations (6)	To the scholarly communications system in the future (5 years), including libraries

* Aspects represent the main interests of our funders, a consortium of big and small learned publishers; number of questions and sub-questions in brackets (some questions deliver on more than 1 aspect.

Table 2. **Characteristics of the original early career researcher sample (N = 116)**

Country	No. of ECRs	Social Sci. (%)	Science (%)	Male (%)	Age 20s (%)	Age 30s (%)	Post-doc (%)
China	13	31	69	54	46	54	92
France	14	21	79	64	64	36	100
Malaysia	12	42	58	50	0	100	100
Poland	10	20	80	60	40	60	50
Spain	18	22	78	56	39	61	72
UK	21	38	62	62	24	76	67
US	28	21	79	61	29	71	64

By the end of the project, the original panel of 116 was reduced to 103, largely because of ECRs leaving their jobs as researchers. People who moved to a tenured position or moved to another research job elsewhere continued to be interviewed. In addition, a few ECRs stopped co-operating because of job and time pressures.

Data collection and analysis

As previously mentioned, information on libraries came mainly from questions on 3 scholarly aspects and the data used for this article comes from interviews held in the final year of the study (2018):

1. <u>Search and discovery</u> – once the exclusive domain of libraries, but now dominated very much by search engines (most notably Google Scholar and sharing platforms, such as ResearchGate) and impacted upon by open access policies, which are breaking down the library paywalls. What we wanted to discover is who are the main players and where does the library figure in it at all and, if so, in what – searching or discovery or both? Initially, we did not mention libraries unless they were raised by ECRs, but because most ECRs hardly mentioned library systems, not it turns out because they did not use them, but because they used them remotely, anonymously and without thinking. For instance, as they might do for electricity. So, we prompted them a little more in the following years.

2. <u>Institutional repositories</u> (green open access) and the involvement and role of libraries. Libraries have been big advocates of green open access and we wanted to know whether ECRs are depositing their papers and what they thought or knew of the involvement of libraries.

3. <u>Scholarly transformations</u> (i.e. big and dramatic changes to scholarly communications). As part of questioning on transformations to the scholarly communications system ECRs were asked whether libraries would have a central role of libraries in 5 years' time. We wished to determine how libraries are likely to fare in the future in the hands of the born digital generation, with smartphones in hand and social media platforms at the ready. This question was asked beside questions on the perceived futures of the two other great pillars of scholarly communication – publishers and journals.

Results

What is unusual about the project reported here, is that it gathered information for a period of 3 years, which means that we were able to measure changes in attitudes and behaviour towards libraries in various scholarly contexts and establish trends. For ease of calibration and comparison, we pieced together the annual data obtained about libraries, mostly obtained from the questions mentioned about access, discovery, open access (institutional repositories) and scholarly transformations (future of libraries) to see what the attitudes and behaviours were and whether they were changing in any way. It was the direction of travel (i.e. backwards, forwards) which we were primarily interested.

Change was measured both in respect to attitudes / sentiment and practices / usage. The distinction is an important one because changes in attitude, while arguably a softer form of change, might signal big changes in practice down the line, thus providing advanced intelligence of further change to come. Because change can be a positive or negative variable or, indeed, not occur at all it needs to be calibrated carefully. Thus:

• With regard to changes in attitude (2016–2018): we used more positive (P), more negative (N), and the same (S). Positive change can mean: (a) a greater understanding, confidence, or awareness of libraries; (b) more positivity being shown towards libraries; (c) greater interest being shown in libraries; (d) more satisfaction expressed with libraries; e) more importance being attributed to libraries; and (e) whether libraries have been integrated into ECRs scholarly ecosystem. Negative change, on the other hand, means developing a more critical attitude towards libraries and its various functions.

• With regard to changes in practice (2016–2018): we used, more practice (M), less practice (L), the same (S), and variable practice (V). 'Same' here means that practice is on an even keel throughout the 3 years, and 'variable' means that there is no real trend and things move one way and then the other. 'More' is used for greater engagement. Negative change would constitute a decreasing frequency of usage.

Scholarly communication has many aspects to it, of course, and overall these aspects were found not to be changing at the same pace or rate. Thus, of the 22 scholarly communication aspects and functions covered by the interviews, libraries proved clearly to be the outlier in that they lag behind all other scholarly aspects in terms of increases in positive sentiment and usage. Table 2 shows this in the context of a selection of scholarly aspects that are closest or most relevant to libraries. Sentiment towards libraries and the use of them can be seen to have barely changed over the three years of the study, indeed, showing a marginal decline in practice. With libraries seemingly treading water in a dynamic scholarly communications world, where nearly everything is registering double digit growth. Depending on your take of this finding libraries are either stagnating (a negative take) or simply stable having being around for so long and having reached maximum penetration and obtained great maturity (a positive one).

Examining the low net change figures for libraries a little more closely it can be seen that ECRs are, in fact, somewhat divided. Thus, in terms of attitude, 18% are more positive and 17% more negative and when it comes down to usage 10% are using libraries more and 9% less. This is partly down to the fact that, opinions and behaviour varies by country (Table 4). Thus, in some countries, libraries are viewed more positively than others. Thus, Malaysia shows a 33% net increase in attitude, although this does not translate into an increase in use. Libraries tend to perform worse in Poland and China. In the case of the former, by the final year of the study no one thought that libraries will have central role in the future, and, yet they all use them to access databases provided by the university library, which is clearly regarded as a valuable utility. In China as well, ECRs do not believe libraries will have a future, but they, like others, think publishers have.

In addition to country, there is an age factor at work, too, with sentiment and use declining with age, which might be worrying down the line if it turns out to be a long-term trend (Table 5). In the case of those ECRs 32 and under, both attitude and practice in regard to libraries is in negative territory and, especially, notable in the youngest age group of all (27–29) where there are significant declines of minus 15% for both. As research novices – and so in theory requiring more support from libraries – one might have expected the trend to be the other way, but that is not how it turned out.

Returning to Table 3 and looking at the access and discovery generally (of course, a much-trumpeted central functions of the library offering) attitudes and practice have improved here more. How then do we reconcile this with the poorer general library performance we have described? The most plausible reason is that ECRs are using more and more platforms for discovery and access and library platforms, clearly still used (but not always acknowledged) for this purpose, are just becoming a smaller part of the ecosystem, in which Google does much of the heavy lifting. The case of Spanish ECRs is illustrative, where for information discovery, the library platform is not central to them anymore. Google, as elsewhere is

the king. However, although Spanish ECRs do not go or connect physically to the library, they obtain information through library subscriptions and they are aware of this. For them, providing access to scientific information is the sole role of the library, but as more and more papers are published openly, the role of the library is seen to be less and less important. A sober message for libraries here.

By way of contrast, millennial-favoured activities, such as participating in social media-based activities and social platforms attract much greater positivity and increased use (25–32% net change). The main action is obviously elsewhere for ECRs.

[insert table 3 and 4 here]

Table 3. **Changes in scholarly communications attitudes and practices for selective scholarly aspects (2016–2018)**

A selection of scholarly aspects	Attitude			Practice				Net change	
	More positive	More negative	Same	More	Less	Variable	Same	Attitude	Practice
Libraries	18%	17%	64%	9%	10%	3%	79%	1%	–1%
Access (obtaining content)	16%	1%	83%	18%	8%	7%	67%	15%	11%
Collaboration	46%	5%	50%	46%	8%	2%	45%	41%	38%
Discovery (finding content)	17%	0%	83%	20%	3%	9%	68%	17%	17%
Online community platforms	40%	8%	52%	34%	12%	5%	50%	32%	22%
Open access	34%	9%	57%	24%	12%	5%	59%	25%	13%
Peer review	35%	6%	59%	31%	8%	10%	51%	29%	23%
Smartphones	32%	5%	63%	29%	3%	5%	63%	27%	26%
Social media (Face-book, twitter)	41%	9%	50%	36%	15%	16%	34%	32%	21%
Transformations	29%	56%	15%	10%	70%	12%	9%	15%	–2%
All aspects	30%	8%	62%	25%	9%	5%	61%%	22%	16%

Table 4. **Country comparisons in regard to library attitudes and behaviour**

	Attitude			Practice				**Net** change	
	More positive	More negative	Same	More	Less	Same	Variable	Attitude	Practice
All	18%	17%	64%	9%	10%	79%	3%	1%	–1%
China	0%	15%	85%	0%	8%	92%	0%	–15%	–8%
France	7%	0%	93%	0%	7%	93%	0%	7%	–7%
Malaysia	33%	0%	67%	33%	33%	33%	0%	33%	0%
Poland	0%	80%	20%	0%	0%	100%	0%	–80%	0%
Spain	31%	38%	31%	13%	6%	69%	13%	–6%	6%
UK	19%	0%	81%	13%	6%	81%	0%	19%	6%
USA	27%	9%	64%	5%	9%	82%	5%	18%	–5%

Table 5. **Age comparisons in regard to library attitudes and behaviour**

Age	Attitude			Practice				Net change	
	More positive	More negative	Same	More	Less	Variable	Same	Attitude	Practice
27–29 (13)	8	23	69	0	15	8	77	–15	–15
30–32 (26)	15	27	58	0	4	8	88	–12	–4
33–35 (38)	16	16	68	8	18	0	74	0	–10
36–38 (16)	19	13	68	25	0	0	75	6	25

Discussion and conclusion

It has to be seen as worrying that libraries are right at the back of the pack when it comes to change and especially so in the case of the youngest of the cohort. There is also a general lack of interest in them and rarely were they mentioned or name volunteered in the conduct of an interview; to get a response you had to prompt and remind. And all this in respect to a community/audience that might be expected to need them more. After all, ECRs are relatively scholarly novices and are also heavily involved in literature searching and writing components and so they might be expected to interact with libraries much more than they do, but that is not the case. Worryingly, again, as a sure sign of these digital times many ECRs claim to have never entered a library in years. Libraries have become invisible. Libraries are largely used (often unconsciously) for one purpose and one purpose only – obtaining remote accessing the full-text of papers and open access, Sci-Hub and ResearchGate are busy chipping away at that territory. As one ECR said *I think Google Scholar will replace research library in the future.* There is even worse because of the increasing and unstoppable drive towards open access, ironically much promoted by libraries, this will inevitably mean that researchers will need to resort to library subscriptions less and less. We have entered a borderless and open information environment and the gatekeeper is now Google and not the library, the platform is the smartphone. Disintermediation reigns and we are all librarians now.

It was not so long ago when there would have been little dispute that libraries constitute one of the three pillars of the scholarly communications system, the other pillars being journals and publishers. But there must be concerns now whether libraries will remain a pillar for surely the message is already on the wall. The two other pillars are doing quite nicely.

In a period of rapid and unprecedented change in the scholarly communications environment libraries have become invisible in the minds of the new wave of researchers, although, perhaps, not in the minds of librarians, who still believe they have something unique to offer to researchers. This gap in comprehension can only lead to a schism between libraries and their users and there is only one winner.

The big question has to be with the scholarly world all moving inexorably to a borderless and remote digital environment how can the library as the ultimate gated community, survive? One ECR provided an answer *"My university library provides lovely environment for study, comfortable sofa, coffee machine, free computers and printing service. The role of library has already been changed to environment provider rather than information service provider."* But that largely means libraries decoupling from the research function which I doubt any of them want.

Finally, with university libraries largely invisible to this new wave of researchers they are losing a very strategic user community (future Professors, VCs and Nobel prize winners – the people who determine library budgets) and once you lose them you will not get them back in today's competitive and crowded information environment.

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This paper highlights some of the work of the Harbingers research project which sought to discover whether the new wave of millennial researchers is going to be the agents of change when it comes to scholarly communications. Specifically, it examines changes in the attitudes and behaviours of the new wave of academic researchers (early career researchers) towards the academic library and its functions in seven countries from around the world (UK, US, China, France, Malaysia, Poland and Spain). It documents and calibrates trends and establishes the direction in which things are heading for libraries. Data were collected from over 100 young researchers from the sciences and social sciences through 90 minutes, semi-structured interviews, repeated annually for the period 2016-2018.

Findings show that attitudes towards libraries and their use have barely changed over the 3-year study (when everything else has seen big and rapid change) and they remain for the most part largely invisible to ECRs. They never step into them, for instance, and some have not done so for the past five years. In the case of China, attitudes are distinctly negative and use has visibly declined, while in Poland sentiment appears to be rock bottom. Libraries appear to be most appreciated in the UK and US and this might be because they have greater resources. Libraries, when used are really mainly used for one purpose only, which is to get hold of the full text of papers. The danger for librarians is that ECRs are decoupling from libraries and they are only being used as a warehouse and this latter function is now under threat from reputational platforms such a Research Gate Academia.com, pirate services, such as Sci-Hub, and, of course, open access in general, which is leading to an open and borderless information environment.

All this does not auger well for the long-term growth of libraries. After all, today's ECRs will be tomorrow's senior professors, departmental heads and deans who are the very people who will be in charge of library budgets.