UNDERSTANDING THE ADOPTION AND USAGE OF RESEARCHER TOOLS AND SERVICES IN INDIA

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ABSTRACT

Research is a process of systematic investigation which includes different steps including data collection, documentation, analysis and interpretation of findings. Different fields and academic disciplines are guided by different research methodologies. The advent of information technology has led to fast growth in the number of researcher tools and services that are available to automate, fasten, or simplify several tasks associated with conducting and publishing research. To realize further efficiency gains in conducting research, one needs to analyse the uptake and adoption of researcher tools and identify remaining gaps. This paper seeks to provide a comprehensive overview of the different tools used by researchers in India by discipline and level. It also compares the uptake of different researcher tools in India to the rest of the world and offer possible explanations for the variance. It is observed that Indian researchers are keen to share their research, workflows, and academic achievements with their peers to reinforce their academic influence. Further, the research supports the conclusion that free tools or those available at a negligible cost have witnessed the highest adoption. It is also observed that Indian researchers continue to rely on traditional metrics of success e.g. impact factors or Scopus indexation grappling with the pressure to publish or perish. Findings in most cases hold true for all disciplines and types of researchers in India, showing how research lifecycle transcends different boundaries.

***Keywords:** Research, Research Life Cycle, IT Tools, Scopus, ResearchGate, Google Scholar.*

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Introduction

The research lifecycle is the process that a researcher undertakes to complete a study from its inception to completion [4]. The research process seeks to evaluate the validity of a hypothesis and disseminate the acquired knowledge among others. It also generates questions for future research. It includes various phases like conception, data collection, analysis, manuscript writing, publication, and dissemination of results. The different stages of research can be broadly segmented into:

- Discovery
- Analysis & Writing
- Pre-publishing and Publishing
- Outreach

In the absence of internet and World Wide Web, many tasks associated with the research process had to be undertaken manually e.g. preparing reference cards to keep track of important research. The advancements in the field of information technology have led to a massive growth in the number of tools and services that are available to aid the process of conducting research.

Different tools are available for each research stage:

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Solutions for Discovery

- **Content Discovery (Engines and Indexes)**

It includes search and discovery platforms that allow researchers to find and access research contents. There are large online libraries of data that allowed researchers to access more data faster. The popular tools include Google Scholar, PubMed, Web of Sciences, Directory of open access journals, Research Gate, etc. for content discovery.

- **Content Curation**

Content curation includes aggregators of specialised content and/or services that summarise research developments in a specific manner. Moreover, Personalised recommendations have made it easier for researchers to stay up-to-date with the new findings in their fields. Popular tools include SCITRUS, JOVE, Researcher-app etc. for content curation.

- **Researcher Social Networks (for Discovery)**

It includes communities, supported by technology platforms that allow for peer-to-peer sharing and collaboration. Researcher social networks also called scholarly networks allow access to research papers written by peer groups and connections. Popular tools include Mendeley, GoogleScholar, JournalTOC, F1000Prime, BrowZine etc. for researcher social networks.

Solutions for Analysis & Writing Collaboration and storage Technology Platforms

These services allow researchers to store research output in cloud and collaborate remotely. Not only this, but these platforms also make it easier to save data for future use and allow researchers to share large datasets with other researchers and academicians. Popular tools for collaboration and storage technology platforms are Dropbox, GoogleDrive etc.

Authoring Solutions and Templates

Authoring solutions and templates tools used to prepare and write manuscripts. These tools not only make the manuscript preparation task easier, but also increase the speed of processing and formatting. The popular tools used now a day are MSWord, LaTex, GoogleDocs etc.

Citation and Reference Management Tools

Citation and reference management tools and services allow researchers to manage reference papers and citations. These tools make it easier to track citations and references. Further, they also help researchers format the exported citation in the desired format. The popular tools are endNote, Citavi, Mendeley etc.

Advanced Analysis Solutions

Advanced analysis solutions are research specific equipment and analytical tools to automate the analysis stage of research. These tools facilitate data manipulation at scale for e.g. statistical, mathematical, and scientific functions can be easily applied to and insights be processed. The popular tools commonly used now a day, for analysing the data are MSExcel, SPSS, Matlab etc.

Other Tools and Services for Pre-Publishing & Publishing Tasks Pre-publishing Services

Pre-publishing services tools provide pre-submissions services like journal selection tools, Author support services etc. these tools assist the researcher with expert guidance and advice on various factor including which journals to target, language polishing, editing services. The popular tools of current era are PeerWith, Research Square, and Author Services etc.

Alternative Platforms (e.g. Immediate Publishing)

Alternative platforms act as pre-print server that provides immediate publishing for research articles alongside post-publication open peer review. Further, these tools include platforms that enable researchers to publish their articles rapidly, in some cases with the due peer-review processes. The popular tools for this include F1000 Research, Gates Open Research, Scienceopen.com etc.

Data Repositories

Data repositories are storage facilities provided by various companies where researchers can preserve, share and access research outputs including figures, data sets etc. also, these tools facilitate the discovery of underlying research data for other stakeholders. The popular tools for data reposition are figshare, Datahub, dataverse etc.

Outreach

- **Researcher Social Networks (for Outreach and Dissemination)**

Research communities, supported by technology to allow widespread sharing of research within likeminded individuals are researchers' social networks that allow dissemination of novel findings among researchers less complicated, faster and, targeted audience. Popular networks are mendeley, ReserchGate, Academia etc.

- **Generic Social Networks**

Traditional social media platforms are increasingly being used to share and consume academic research content by researchers. As the traditional social networks have vast network of users so that they can help in improving the visibility of findings. The popular generic social networks are Facebook, Twitter and YouTube

Metrics & Measurement

Metrics & measurement are useful to enhance the impact of published articles. These tools allow researchers to capture the impact of their research beyond traditional metrics such as Journal impact factors. The popular tools include SciVal, Plum, Altmetric, NewsFlo, CiteScore etc. for measuring the impact.

While some of the above-mentioned tools have gained widespread acceptance within the researcher community others continue to be used niche disciplines.

Review of Literature

An evaluation of the past studies indicates that while many researchers have studied the adoption and impact of a tool [3] [7] [8] [12] [13] [15], fewer researchers have focused on analysing geographical nuisances associated with the usage and uptake of different researchers' tools [1][11].

Specifically, for India, a study conducted by Asmi & Margam (2018) found that researchers in Central Delhi universities are aware about scholarly social networks and use them for finding relevant material, downloading research papers, and finding other research scholars. Similar studies have been undertaken to evaluate the uptake of such scholarly networks among other researcher communities [6]. Kumaren & Sivakumaren (2019) observed the awareness level in Tamil Nadu state universities and found the awareness to be quite low. They then suggested that different awareness workshops and training programmes should be organised to improve the uptake of these tools. Similarly, a study conducted by MS & Pai (2019) highlighted the awareness and use of various research support tools among researchers of Manipal Institute of Technology, Manipal and found that some of the researchers are not aware about the availability of new research support tools like discovery service, remote access facility etc. but the tools like bibliographical databases and anti-plagiarism software are widely used and appreciated by the research scholars [9].

Ortega (2015) studied disciplinary differences across every platform and concluded that Academia.edu is more popular in humanists and social scientists [10], while RG is popular among biologists. Das & Banerjee (2020) studied five tools used for reference management and citation and concluded that Scopus and Web of Science citation tools are favoured by world's top universities [2].

Research Methodology

This paper uses published survey data made available by researchers Kramer B and Bosman J [5]. They undertook an online survey of 20,663 researchers, librarians, and other groups to capture quantitative usage data on different tools. To complement the quantitative results and better understand Indian researchers' usage, questionnaires from 65 faculty members and research scholars all over India along with telephonic and personal interviews with them were also conducted.

This paper has analysed the survey responses with a focus on comparing the usage of different tools by Indian researchers with their international counterparts. It seeks to explain the reasons behind the varying adoption of different tools and services in India. The paper analysed tool classes at an aggregate level to assess what percentage of the respondents are using at least one tool both in India and rest of the world. The current research also analysed the relative popularity of different tools within a class to observe potential differences between Indian researcher and international counterparts. Further, the paper also analysed how uptake by Indian researchers varies by discipline (Science vs Arts) and role (faculty vs research scholar vs others). Moreover, the paper describes the reasons and motivations behind the use of different tools specifically by Indian researchers.

Hypothesis Tested

H₁: The Indian researchers are well aware of tools that are used for sharing their workflow, posters & research

H₂: The uptake of free software is higher than paid premium products by Indian Researchers

T-test was used to check the hypotheses.

Table 1: Showing Populations

Total Number of Respondents – India						Total
Faculty		Research Scholars		Others (Industrialist/Freelancers etc.)		
Arts	Science & Technology	Arts	Science & Technology	Arts	Science & Technology	
95	150	61	86	23	35	**450**
Total Number of Respondents – Rest of World						**Total**
Faculty		Research Scholars		Others (Industrialist/Freelancers etc.)		
Arts	Science & Technology	Arts	Science & Technology	Arts	Science & Technology	
3765	4600	2948	4947	1852	2101	**20213**
Total Number of Interviewed Respondents-India						**Total**
Faculty			Research Scholars			
Science	Engineering and Computer Science	Arts & Commerce	Science	Engineering and Computer Science	Arts & Commerce	
12	13	10	10	10	10	65

The different tool classes were analysed like discovery, analysis and writing, pre-publishing and publishing, outreach etc. Questions in the survey allowed respondents to choose more than one tool. Different options were provided for each that has been listed in the Table 2.

Observations and Results

Across researcher services, the number of researchers using at least one tool was compared (Table2). The results are provided in the table below. Highlighted fields indicate tool classes where percentage of Indian researchers' using at least one tool is materially different (defined here as a difference of more +/ - 5%) from the rest of the world.

Table 2: Percentage of Respondents Using At-least One Tool

S. No.	Step of Research life Cycle	Popular Tools	% of Indian researchers' using atleast one tool	% of Rest of world researchers' using atleast one tool	Difference
1.	Searching Literature/Data	Google Scholar, Web of Sciences, Scopus, Mendley, worldCat, PubMed	99.11	98.6	0.51
2.	Literature/Data Access	Institutional access, Pay per view on published platform, Research Gate, Research4Life, Open Access, DEEPDYVE and by emailing the author	97.7	97.7	0
3.	Getting Recommendations/alert	Google Scholars, JournalTOCs, Browzine, Mendeley, F1000Prime, Sparrho, ResearchGate	97	97	0

4.	Read, View or annotate	Adobe acrobat, HTML view, iAnnotate, ReadCube, Mendeley and Hypothesis	96	97	-1
5.	Data/Text Analysis	R, SPSS, Ms-Excel, MatLab, iPython NoteBook, RopenSci, DHbox	92	89	3
6.	Notebooks/ Protocols / Workflow sharing	OSF, myExperiment, BenchLing, Scientific Protocols, Protocol Online,	41	29	12
7.	Preparing	MS-Word, Google Drive/ Docs, LaTex, the Over Leaf, Scrivener, Scalar, manuscript	98	99	-1
8.	Reference Management	EndNote, Zotero, RefWorks, Mendeley, Papers, REfME, Citavi	73	77	-4
9.	Archive/ share Publications	arXiv, PubMed Central, Institutional Repository, working papers, ResearchGate, SSRN	84	74	10
10.	Archive/Share Data/ Codes	GitHub, FigShare, Zenodo, Dryad, Dataverse, Pangaea, BitBucket	30	29	1
11.	Decide which journal to submit the manuscript	JCR (Impcat Factors), DOAJ, Scopus, Sherpa Romeo, QOAM, SCImago Journal Rank, Jornalysis	74	54	20
12.	Decide where to publish research	Topical journal (traditional publisher), Topical journal (OA publisher), MegaJournal(traditional publisher), Megajournal (OA publisher), Data journal, Winnower	78	74	4
13.	Archive/share presentations / posters	Speakerdeck, SlideShare, F1000Posters, ScienceOpen Posters, FigShare, Zenodo, Vimeo	48	31	17
14.	Dissemination of Research outside academia	Wikipedia, ResearchBlogging.org, Wordpress, Kudos, FameLab, Pint of Science, Twitter	59	52	7
15.	Researcher Profile	Google Scholar Citations, ResearchGate, ORCID, Academia.edu, ResearcherID, Profile page at own institution	95	88	7
16.	Peer review beyond that organized by Journals	Publons, PubMed Commons, PubPeer, PaperCritic, RubriQ, Academic Karma	30	13	17

17.	Measure impact	JCR Impact Factor, Altmeric, Scopus, ImpactStory, PLoS article level metrics, Web of Science, Harzing Publish or Perish	71	61	10

During analysis, the study observed that no significant differences in the uptake across searching literature and data, literature access, getting recommendations/alert, read/view/annotate, data analysis, reference management, and journals for publications.

The tool classes tools for protocol/workflow sharing, archive or sharing data, taking decision where to publish research, archive/share presentation/posters, Dissemination of Research outside academia, Research Profile creation, peer reviewing beyond that is organised by journals, impact measurements showed that a higher percentage of users were using at least one tool in India compared to rest of the world.

It was also interesting to observe that tools for data/codes sharing, and peer reviewing other than those provided by the journal have seen relatively lower adoption in the research community.

Tools/sites they used to Search Literature / data:

The popular tools include Google Scholar, Web of Science, Scopus, Mendeley, WorldCat and PubMed for searching literature/data by researchers. In terms of relative popularity, the top three tools in India were Google Scholar, Scopus, Pubmed whereas top three tools in ROW were Google Scholar, Web of Science, and Pubmed (Chart –I).
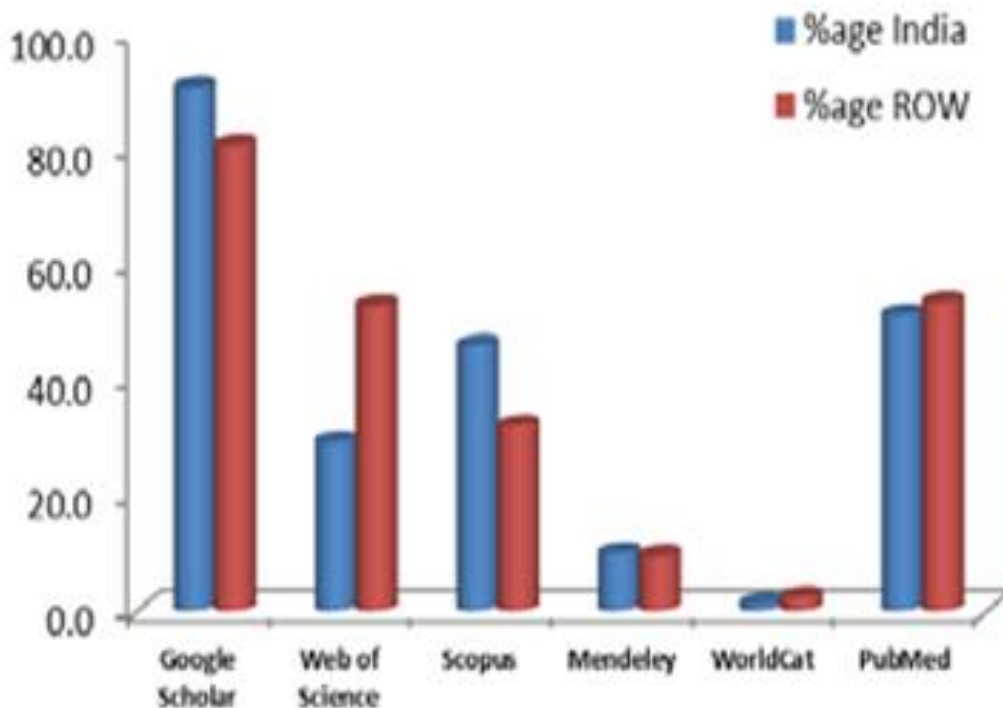
Chart 1: Tools / Sites Used to Search
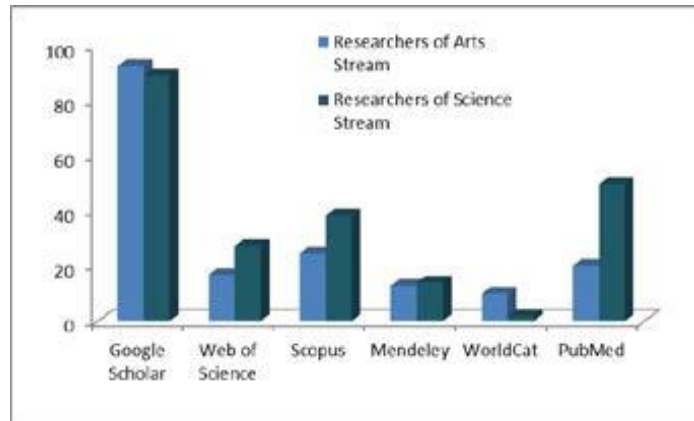
Chart 2: Tools/Sites Used to search

Indian Researchers of Arts stream prefer PubMed after Google Scholar. However, Science stream researchers prefer Scopus over Pubmed (Chart 2).

Respondents mentioned that Google Scholar is available easily and freely- making it their preferred choice. Some respondents in the Arts and Commerce discipline (4/20) did not view google scholar and google as different tools. The popularity of Scopus and Pub Med was largely attributed to the availability of good articles and papers.

Tools/sites they use to get access to literature / data

The popular tools include Institutional access, Pay per view on published platform, ResearchGate, Research4Life, Open Access Button, DEEPDYVE and by emailing the author for getting literature and data. In terms of relative popularity, popular tools in India were Institutional Access, Research Gate, Open Access Button (Chart –3). In ROW emailing to the author is preferred over Open Access Button. No noticeable differences were observed in terms of uptake by different Indian researchers by discipline or level. Open Access Buttons provides access to free legal research articles and therefore it was hypothesized that the higher adoption in India will be driven by Arts students. However, the results do not bear this out. It is therefore postulated that the Indian researchers answering this question mistook Open Access Buttons as simply other open access tools available to access research papers.
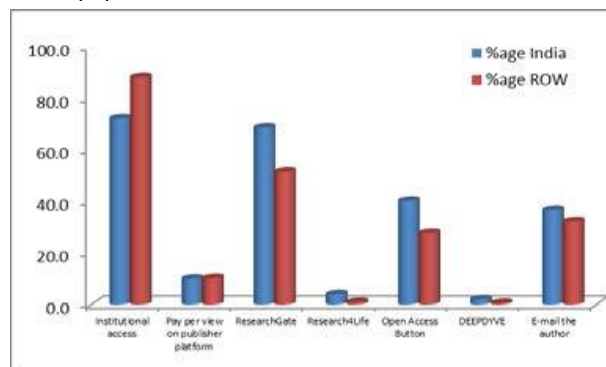
Chart 3: Tools used for Literature Access

Interviews with researchers provide evidence for the above hypothesis. None of the respondents were aware about Open Access Button but mentioned they knew about open access resources or the free availability of papers. However, researchers also believed that good papers are never available for free. Hence, they do not devote significant time in looking for them online but instead email the author to provide access.

Respondents also mentioned that they use SciHub to access paid articles for free. They were aware that in many cases this was considered "illegal". It was not their first port of call but in situations where there was a paid article they were unable to access, they would happily use SciHub.

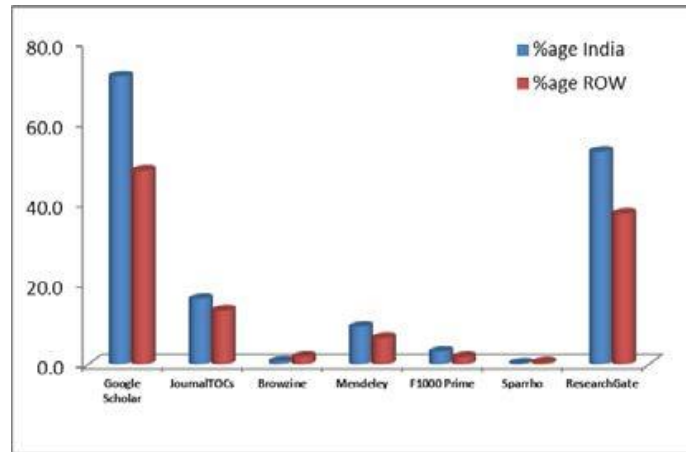**Tools/Sites used for Recommendations/Alerts**

Chart 4: Tools used for Recommendations/alerts

The popular tools for recommendations/alerts include Google Scholar, JournalTOCs, BrowZine, Mendeley, F1000 Prime, Sparrho and ResearchGate. Google Scholar and ResearchGate are the most popular tools to receive recommendations by both Indian and international researchers. Other tools like Journal TOCs and Mendeley are picking up, but still significantly behind the front- runners (Chart-4).

ResearchGate was found more popular among researchers of Science (61%) as compare to researchers from arts (41%) stream (Chart 5)
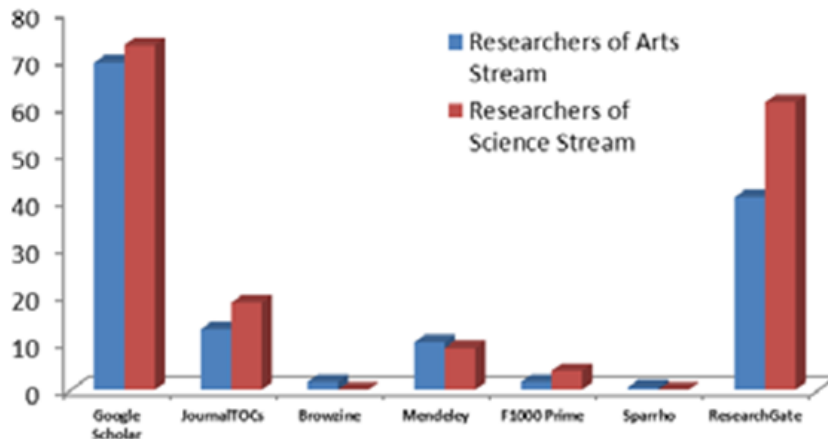
Chart 5: Tools/Sites used by Indian Researchers for Alerts/Recommendations

Interviewed respondents were using Google Scholar for alerts/recommendations as they already have an account with Google Scholar. It was also uncovered that several faculty members have been asked by their colleges and Universities to provide their google scholar citation index. The index is now being used by many third party agencies issuing ranking to the colleges and universities.

Tools/sites they use to Read/View/Annotate

At an aggregate level, 96-97% respondents indicated that they have used atleast one tool for reading/or annotating like Adobe acrobat, HTML view, iAnnotate, ReadCube, Mendeley or Hypothesis etc. 92% Indian respondents use adobe acrobat whereas only 48% of ROW respondents use it. Another striking difference is visible in the usage of tool Hypothesis. While it is the second most used tool in ROW, it's usage in India is abysmally low (Chart 6).
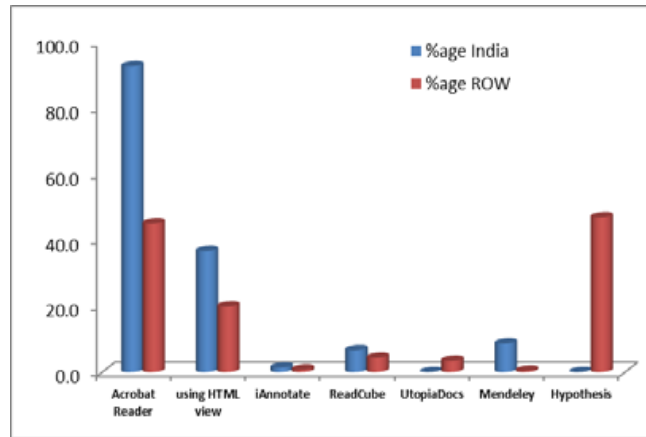
Chart 6: Tools for Read/View/Annotate

In our interview set, only faculty members from Computer Science and a few members from engineering background field were able to use HTML view to read or annotate as they knew about the basics of HTML. The others were aware about pdf extensions and we understand that this is the primary reason for continued popularity of Acrobat Reader.

Tools/sites Used to Analyze Data / Texts

The popular tools for analysing the data are R, SPSS, Mat-Lab, Excel, Ipython notebook etc. Ms-Excel and SPSS were found popular among both Indians and ROW respondents. However, R is more popular in ROW whereas, Indian researchers prefer Matlab (Chart-7). While studying Indian Researchers, it was also observed that Matlab is popular among researchers in Science stream and SPSS is more commonly used by researchers from Arts in India (Chart-8)
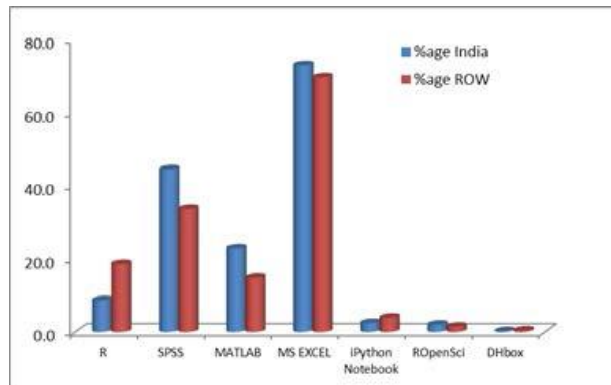
Chart 7: Tools used for analysing the data
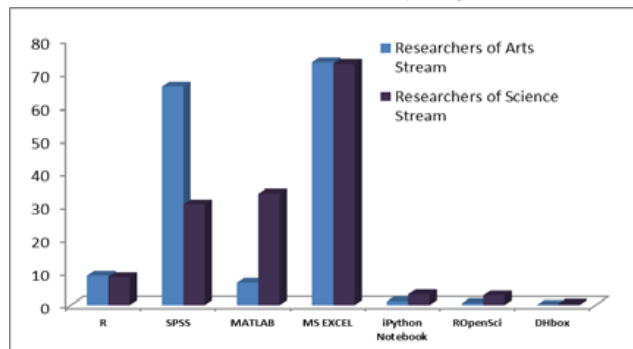
Chart 8: Tools used by Indian Researcher for Data

Within our interview set, we observed differences between senior vs junior professors and research scholars. Senior professor, especially from business and arts background were not aware of the different IT tools and indicated that their research can be undertaken with the help of MS-Excel or   simple "T-tests".

Junior researches were aware of the tools. In most cases, they mentioned that they knew about the tools as their university had offered them training. In absence of university-led initiatives, the overall   awareness of these tools was sub-standard within our interview set.

Tools/sites used share notebooks / protocols / workflows

OSF (Open Science Framework), myExperiment, Benching, Scientific protocols and Protocols Online are commonly used for sharing purposes. Very few researchers from rest of world (29%) are using at least one tool but 41% of Indian Researchers indicated that they are using at least one tool (Chart 9).
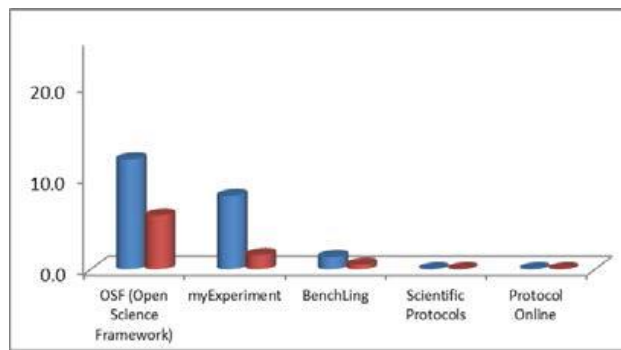
Chart 9: Tools used for Sharing notebook/workflow/protocols

One possible explanation for the variation is the relatively high acceptance of social sharing within the Indian research community. This can be observed by the high adoption of scholarly research networks as supporting evidence.

None of the interviewees in our set were aware of any of these tools and services. Some of them looked up the websites while we were conducting our interviews and indicated that they had never come across them before.

Tools/Sites used to write/Prepare the Manuscript

Popular tools for preparing a manuscript include MS-Word, Google Docs, LaTex, OverLeaf, Scrivener, and Scalar. Survey indicates that MS-Word and Google Docs are the most popular tools among the researchers (Chart 10). No significant difference was observed between Indian researchers and Rest of World researchers. Further, there were no noticeable differences among Indian researchers based on their level or by discipline.
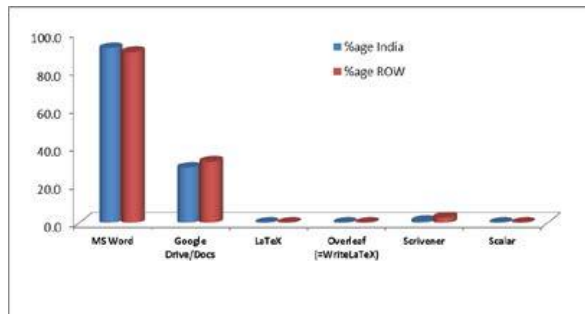

Chart 10: Tools used for preparing manuscript

Indian researchers were questioned about why they prefer to use MS-word for preparing manuscripts; they replied that it was always available on their Laptops and PC. The faculty members who indicated that they had started using LATEX said that some of the journals demanded a manuscript in Latex, motivating them to make the transition.

Tools/sites used for Reference Management

EndNote, Zotero, RefWorks, Mendeley, Papers, REfME, Citavi tools were compared for reference management. Almost all the tools have seen uptake by different researchers, but the most popular ones were EndNotes and Mendeley. Zotero and Papers are also popular among Indian Researchers (Chart 11).
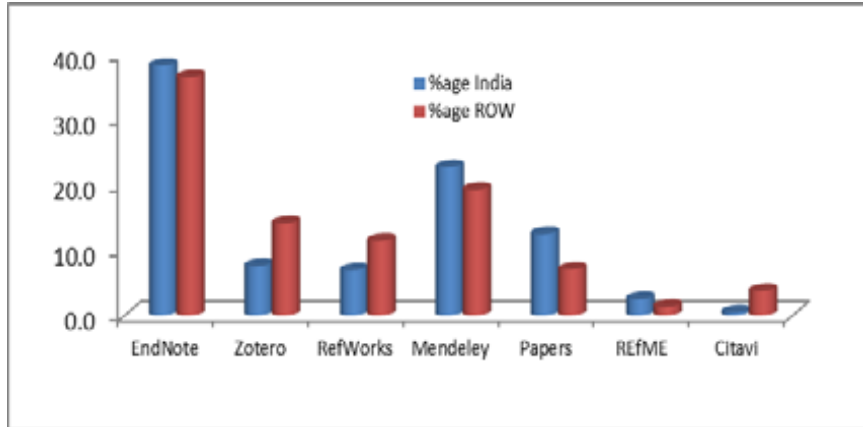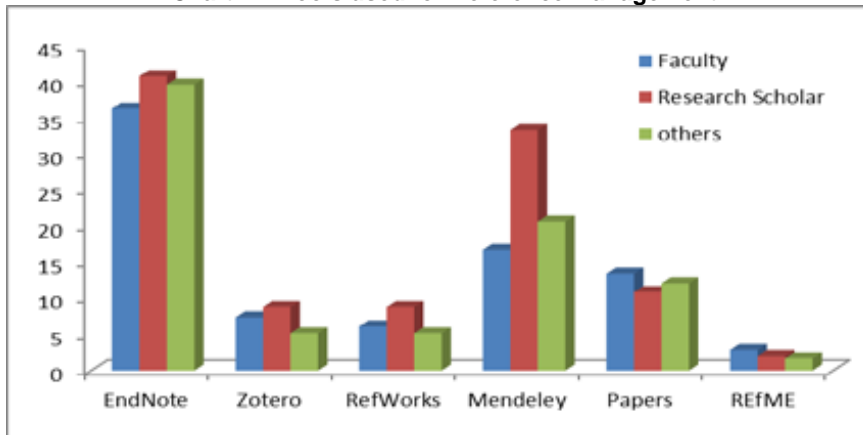

Chart 11: Tools used for Reference Management

Chart 12: Tools/Sites used by Indian Researchers for Reference Management

The percentage of Indian research scholars (33%) using Mendeley is higher as compared to faculty members (16%) and others (21%) (Chart 12)

Few of the interviewed researchers were still not aware about these tools/sites for reference management; they continue manually manage references. Many of them had started working on EndNote and Mendeley after gaining knowledge from their colleagues and other researchers. Conferences and seminars are the place where they had gained information about these tools and sites.

Tools/Sites used to Archive/share Publication

Popular tools for archiving/sharing publication include arXiv, PubMed Central, Institutional Repository, working papers, ResearchGate, and SSRN. Research Gate and Institutional repositories were found to the most popular tools for both Indian researchers and ROW Researchers (Chart 13).

Almost all the researchers in our set indicated that they prefer ResearchGate due to the fact it helps increase their citation index. They can track the number of views for their papers that helps them understand the popularity and impact of their research. Researchers also post on institutional repository to meet administrative requirements.
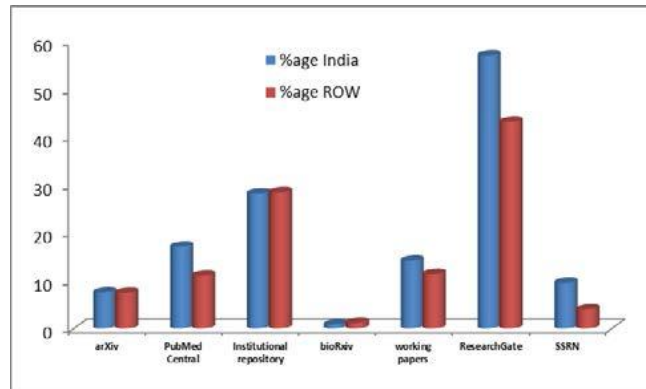
Chart 13: Tools/sites used to archive/share publication

Tools/sites used to Archive/share Data/Codes

Popular tools for deciding where to publish include GitHub, FigShare, Zenodo, Dryad, Dataverse, Pangaea, and BitBucket. GitHub were found to the most popular tool for ROW researchers, while Indian Researchers prefer both GitHub and FigShare. Almost same percentage of Indian researchers was also found comfortable with DataVerse (Chart 14).
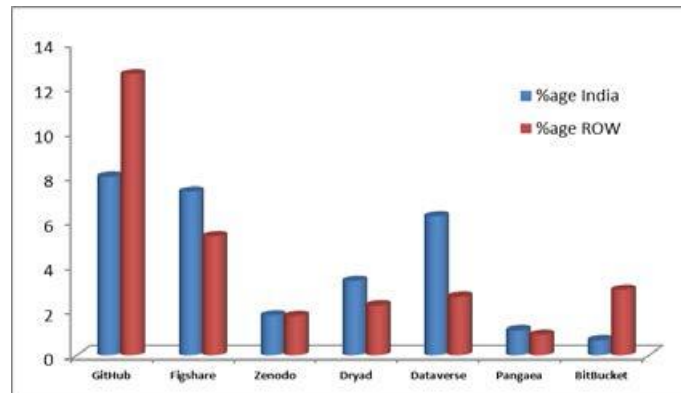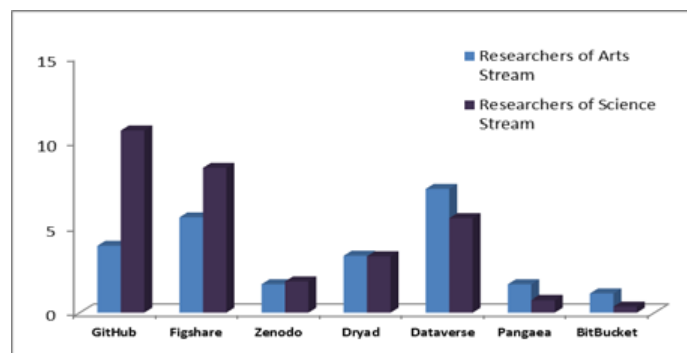

Chart 14: Tools/sites used to share data/codes

Chart 15: Tools/sites used by Indian researchers for Sharing Data/Codes

Researchers of Science discipline are more aware of these tools as compared to arts discipline in India (Chart 15)

During interviews, it was observed that GitHub is quite popular with researchers and faculty members within Computer Science and IT disciplines. During various refresher programs, researchers used GitHub (repository of codes) for searching codes and later also published their codes there.

Tools / Sites used to decide where to Publish

Popular tools for deciding where to publish include JCR (impact factors), DOAJ, Scopus, Sherpa Romeo, QOAM, SCImago Journal Rank, Journalysis. Scopus journals were found to the most popular tool for Indian researchers, while ROW relies heavily on impact factors. The higher adoption of Scopus can be at least partially explained by the fact that university professors and research scholars in India are increasingly required to mention their number of papers published in Scopus indexed journals. In some cases, overall college rankings are also linked to the publication laurels of the professors – one notable field is the number of papers in Scopus indexed journals (Chart 16).
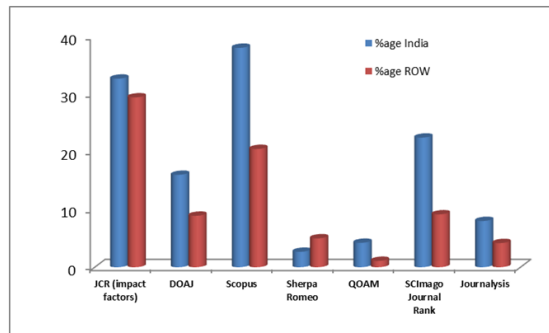
Chart 16: Tools/Sites used to decide where to publish

Several interviewees mentioned that that they had to publish at least one or two research articles in Scopus journals for completion of their PhD degree. Two faculty members also mentioned that they have to mention the number of Scopus indexed articles in their self-appraisal form and at the time of their promotions.

Tools/ Sites to Publish the Manuscript

Tools used to publish manuscript include Topical journal (traditional publisher), Topical journal (OA publisher), Megajournal (traditional publisher), Megajournal (OA publisher), Data journal, and Winnower. Topical Journal of traditional publishers is the most popular service / tool among the academicians from both India and ROW. Indian researchers prefer Mega Journal of traditional publishers over Topical journals of Open Access publishers. However, ROW researchers prefer Topical Journal of Open Access publishers (Chart 17).
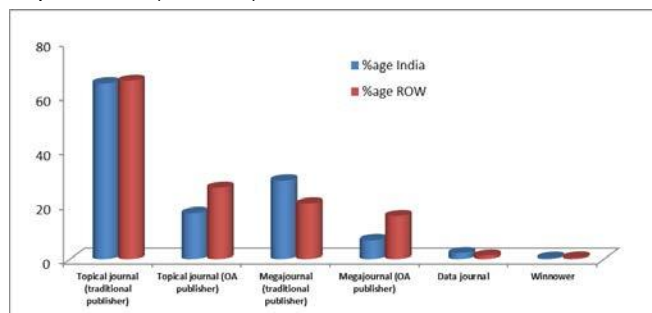
Chart 17: Tools/Sites used to publish the manuscript

This chart helps elucidate the point that Indian researchers continue to value traditional metrics of success i.e. journal impact factors and publisher reputation. Researchers believed that OA was perceived to be lower quality of research within their circles. The fact that a paper is easily available was taken to mean that the research was not robust / innovative enough.

Tools/Sites used to Archive/Share Presentations/Posters

Popularly used tools for archiving or sharing presentations/posters are Speakerdeck, Slideshare, F1000Posters, ScienceOpen Posters, Figshare, Zenodo and vimeo.

Slideshare was the most popular tool among both Indian Researchers and ROW researchers. However, the percentage varies greatly from 30% in Indian researchers to 16% in ROW researchers (Chart 18).
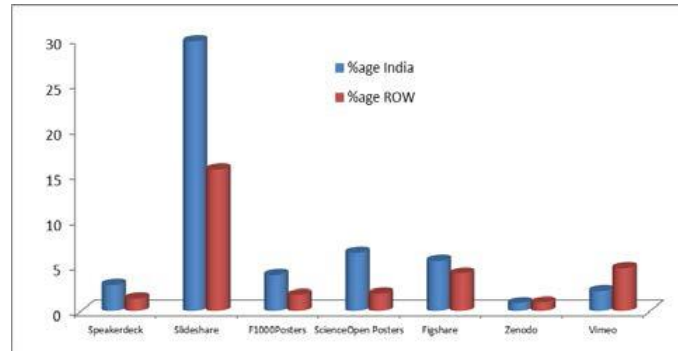

Chart 18: Tools/Sites used to share Presentations/Posters

Researchers indicated that whenever they presented their paper in a conference – they would be required to prepare a presentation. They thought posting the slides on SlideShare helped maintain a digital copy and provide an additional avenue for the work that they had already done.

Tools/Sites used to Tell about Research Outside Academia

Popularly used tools for communication research include Wikipedia, Research Blogging, WordPress, Kudos, FameLab, pint of Science and Twitter. Wikipedia was the most popular tool among Indian researchers whereas Twitter was the most popular for ROW (Chart 19).
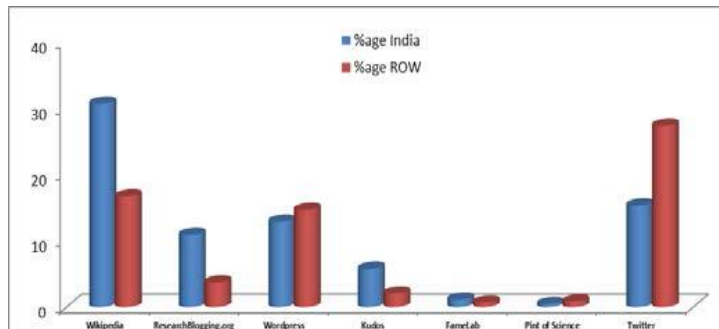

Chart 19: Tools/Sites used to disseminate information outside Academia

Analysis for Indian researchers shows that the percentage of others (industrialists etc.) communicating their research outside academia is higher than research Scholars and faculty members. This seems intuitive as the others would be more interested to collaborate with stakeholders outside academia. Wordpress shows up as popular tool for Indian research Scholars (Chart 20).
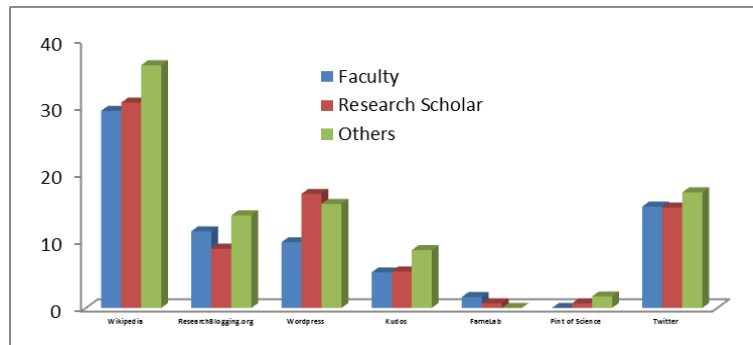

Chart 20: Disseminating Research outside Academia by Indian Researcher

Respondents in the interview did not consider communication research outside of the academia as a key priority. They seem to be quite focused on improving their academic influence in their own institutions. We did not include industry researchers in our interviews.

Research Profile used

Popular tools for creating researcher profiles include Google Scholar, ResearchGate, ORCID, Academia, Research ID or their own Institutional profile. While 95% of Indians have at least one profile, only 88% of international researchers maintain a profile. Research Gate and Google Scholar are the two most popular tools to create profiles. Further analysis of Chart 21: Research Profile used by researchers
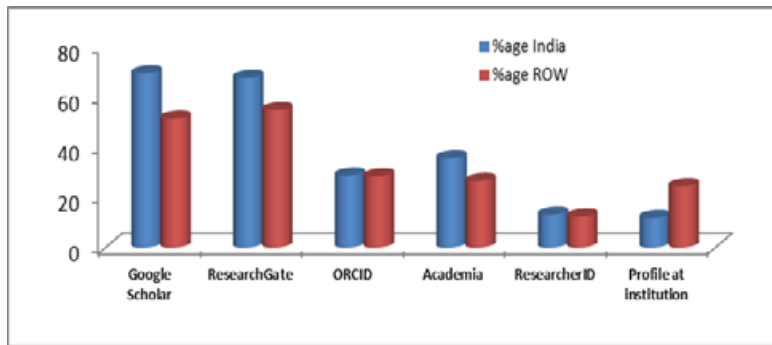
Indian researchers showed that Academia is more popular among Research Scholars relative to Faculty members and others (Chart 21). At a discipline level, Chart 22 clearly shows that Faculty and Research Scholars of Science and Technology prefer ResearchGate whereas researchers belonging to
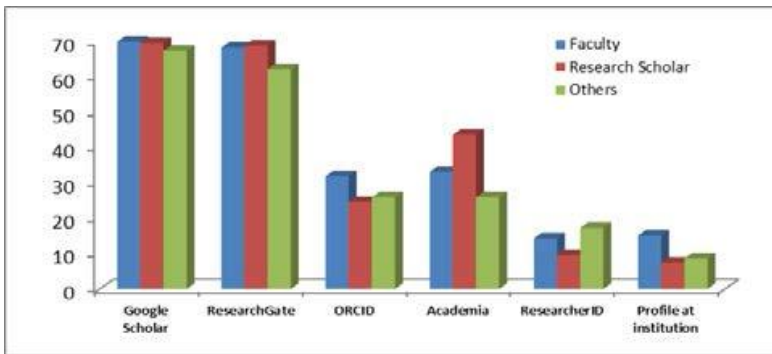

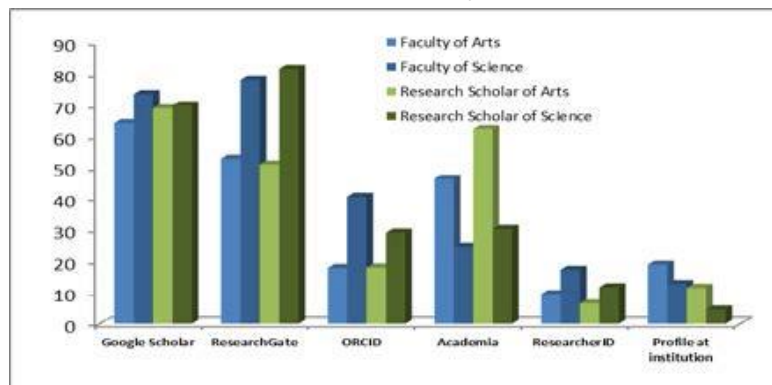**Chart 22: Research Profile used by Indian Researchers**

Chart 23: Research Profile used by Indian Faculty and Research Scholars

Arts prefer Google Scholar (Chart 23).

Almost all interviewees in our set were aware of ResearchGate. Researchers also indicated that they like "social networking" aspect of RG. It helped them interact with researchers while keeping up-to- date with achievements of peers.

Tools/Sites used for Peer Reviewing beyond Provided by Journal

Popular tools for peer reviewing other than provided by the journal itself are Publons, PubMed Commons, PubPeer, PaperCritic, RubriQ, Academic Karma. No noticeable differences were found among Indian researchers and ROW researchers. Top three popular tools were Pubmed, Pubpeer and Publons (Chart 24).
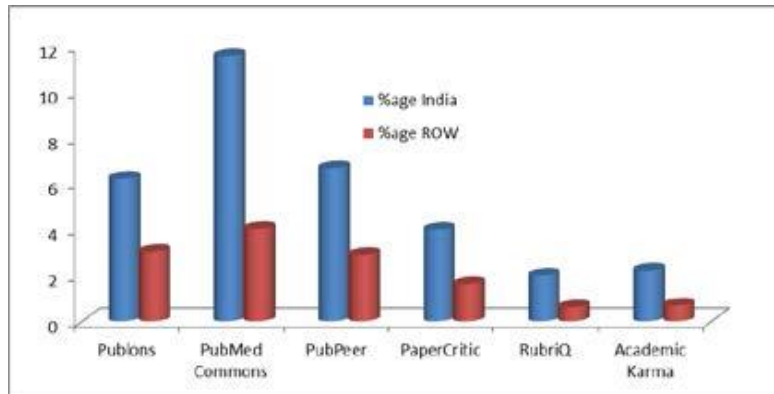

Chart 24: Tools/Sites used for peer reviewing

Interviewees indicated that they like to explore opportunities to peer-review as it helps them improve their own CV. They were only aware of the PubMed portal but seemed very interested to learn about other platforms.

Tools/sites used to Measure Impact

Popular tools for measuring impact are JCR (Impact Factor), Altmetric, Scopus, Impact Story, PLoS article level metrics, Web of Science, Hazing Publish or Perish. In terms of relative popularity, the top three tools in India were Scopus, JCR (Impact Factor), Web of Science whereas top three tools in ROW were Web of Science, JCR (Impact Factor)and Scopus (Chart 25). No significant differences were observed in terms of uptake by different Indian researchers by discipline or level.
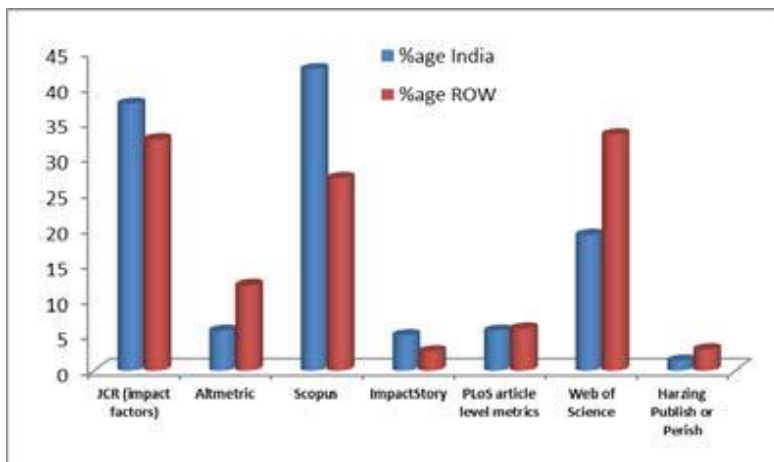

Chart 25: Tools/Sites used to measure Impact

Interviewees mentioned that in some cases they do not think their research is strong enough to be accepted by top indexed journals with high impact factors. In such cases, they strive to get their research paper published in a journal that is at least Scopus indexed. Scopus-indexing is increasingly being recognized by universities as a metric for success.

Hypotheses Testing

Standard t-test was used to check the hypotheses

Discussion and Conclusions

Based on the above, there were few common themes around the use and adoption of researcher services and tools in India were identified. Firstly it is concluded that Indian researchers are keen to share their workflows and research while interacting with peers. This is evidenced by the fact that a higher percentage of Indian researchers are using tools that share their workflows, posters, publications. Further, it is also been observed that a larger percentage of Indian researchers maintain a profile – commonly ResearchGate and Google Scholar. A study conducted by Williams & Woodacre (2016) found that Indian researchers tended to believe that their academic influence and reputation could be increased by using ResearchGate [14].

It has also been discovered that uptake of free software is significantly higher than paid premium products by Indian researchers. Products such as Google Scholar and ResearchGate that are available free of cost as well as traditional software like Adobe Acrobat, MS Excel that are accessible at a negligible cost (owing to presence of pirated copies) have seen highest uptake. This seems intuitive and easy to believe, especially as it is well-documented, that researchers often struggle to manage measly budgets for undertaking research. It is further hypothesized that institutional access for some premium paid products e.g. Mendeley will likely translate into higher uptake. This is evidenced by the fact that more than 70% of survey respondents rely on institutional access for discovery of literature (one of the services that may otherwise entail spend from researcher wallet)

Next, it is observed that there is limited differentiation exists between Indian researchers across academic disciplines. Across most tools, the uptake is similar for Science and Humanities researchers. Few notable exceptions include – analysis software i.e. SPSS and MatLab. Like other markets, researchers in India grapple with the publish or perish problem. While choosing the journals to publish in, researchers in India continue to rely on Scopus and impact factors. This is driven by the fact that incentives for Indian researchers e.g. promotions, rankings of their institutions are tied into the number of articles published in Scopus-indexed journals and/or high impact factor journals.

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