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Impact of Institutional Repositories' on Scholarly Practices of Scientists

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Abstract: Institutional Repositories (IRs) are established mainly to provide access to information resources which are otherwise not easily accessible in digital format. Many institutions across the world and particularly in India have successfully developed their own IRs but have not attempted to assess their importance and impact on the Users. This study conveys the findings of the survey conducted at research centric CSIR (Council of Scientific and Industrial Research) laboratories of India to determine the scientists' and research scholars' preference for publishing their research materials; to measure the impact of IRs on their scholarly practices and to recommend future changes for inviting more participation in an IR. The study deduced that 'Peer- Review scholarly Journals' are preferred medium for publishing research content and 'Increase in the access to grey literature' is the most significant impact of IR on respondents. The findings of this research paper provide insight to the IR managers and administrators of low-deposit and low-usage repositories about the contributors' apprehensions. The study will also help them to define and adopt policies that will eventually enhance their IRs visibility and impact.

Keywords: Institutional repository, Scholarly Practices, Impact, Scientists, CSIR, India

Introduction: The exponential growth of internet in global communication has made speed the most crucial element of communication process(Weintraub, 2000)¹. Scientific information is ever increasing, ever-changing and advances over time. It becomes obsolete as soon it is replaced by new findings and developments. Scientists and research scholars are constantly in search of new publishing mediums to convey and disseminate their research findings to global audience before it gets redundant.Until recently scientists and research scholars have accepted commercial journal publishing as the primary means for communicating results of their research works but the emerging open access movement has revolutionized the whole scholarly communication process. Open access mechanisms have now being strongly supported by scientists and researchers for scholarly discourse and sharing of new research. Open access mechanisms include OA journals , digital e-print archives and institutional repositories(Bergman, 2006)².

Institutional repository is "a digital archive of the intellectual product created by the faculty, research staff and students of an institution and accessible to end-users both within and outside of

the institution with few if any barriers to access" (Johnson, 2002) ³. Institutional repositories are now serving as a sustainable and viable alternative to the current scholarly publishing models and users are also aware about its advantages as put forward by Westell(2006) ⁴ that " most importantly, they ensure the long term preservation of an institutions academic output. They also increase its visibility and prestige, and act as an advertisement to attract funding sources, potential new faculty and students. For the individual, they provide a central archive of a researcher's work, they increase its dissemination". Institutional Repositories (IRs) play a fundamental role in centralizing, preserving, and making accessible institution's intellectual capital and, at the same time, they form part of a global system of distributed and interoperable repositories that provide the foundation for a new disaggregated model of scholarly publishing (Paul, 2012) ⁵.

Inspite of all the efforts world wide IR's are still facing the threat of less contributions from the scholars. Scientists and research scholars are well aware about the benefits of open access IR's but still are hesitant to disseminate their scholarly research results by using this medium. Therefore, this paper attempts to investigate the reasons for publishing and not publishing in an IR and measures the impact of IR on research and publishing practices of Scientists and research scholars of research intensive laboratories of India.

Literature Review: The notion of Institutional repository first appeared in 2002 with the publication of SPARC(scholarly publishing and academic resources coalition) position paper by Ryam Crow who gave the most appreciated and quoted definition of IR which describes IR as " digital collections capturing and preserving the intellectual output of a single or multi university community"⁶. After that many definitions and view points have been put forth by different authors in their studies at both International and national levels on IR and its various aspects including IR development, IR growth in various countries and authors' attitude towards self-archiving and depositing in an IR. In the plethora of articles on IR, a set of articles based on the authors' attitude towards contributing and using an IR were examined. In spite of the availability of adequate literature on IRs , Impact of IR has not been assessed in the earlier conducted studies. In the following sub-section studies related to the current study have been reviewed:

International status:

Faith Oguz and Shimelis Assefa(2014) ⁷ investigtaed the perceptions of faculty members towards self-archiving and examine the factors that facilitate or impede their participation in Institutional repositories. The study concluded that faculty's perception of IR and willingness to contribute to the IR were closely associated with scholarly productivity rather than prior knowledge and experience with IRs. Daphne Kyriaki-Manessi...et al (2013) ⁸, conducted a survey of the library of TEI, Athens

to explore the faculties attitude towards the IR and Self Archiving. The study indicated that faculty members were positive towards depositing their work in an IR. Almost all Faculty members were willing to learn self-archiving procedures as well as uses of the IR. Feria Wisna Singeh, A.Abrizah and Noor Hasan Abdul Karim (2013)⁹ surveyed Malaysian authors' acceptance to self archive in Institutional repositories. The study revealed that performance expectancy, effort expectancy, social influence and facilitating condition did not influence authors' behavioral intention to self-archive and they are not willing to embrace self-archiving in IR. Mohamed Boufarss (2011)¹⁰ observed in his study that the majority of academics have no or little knowledge of, or experience with, institutional repositories and are unfamiliar with self-archiving opportunities but most of them endorse the principle of open access and are willing to contribute content to an institutional repository. Muluken W.Alemayehu (2010)¹¹ in his master thesis on researcher's attitude to using IR in Oslo University has reported that Researchers have low level of awareness of IR but are interested to contribute or publish in an IR. The study by Russell and Day (2010)¹² mainly focused on researchers as content creators as well as content users. The study further revealed that users did not perceive the relevance of the IR due to the lack of awareness about its scholarly context. Creaser et al(2010)¹³ investigated the awareness of scholarly authors towards open access repositories and factors that motivate users to use repositories. The survey reported disciplinary differences among scholars regarding their understanding of IR and reasons for depositing within them. The findings of the study by Jantz and Wilson(2008)¹⁴ indicate that faculty participation is either very low or non-existent at ARL libraries. IR deposits also have disciplinary differences where humanities faculty depositing less compared to science faculty. Kim (2007)¹⁵ investigated the motivating and impeding factors which influence faculty's contribution to IR. He reported extrinsic and intrinsic benefits that are related to faculty's contributions to IR.

Worldwide IRs are struggling to deal with the problem of less contribution and usability of IR. Many benchmarking articles such as study by Davis and Conolly (2007)¹⁶, Watson (2007)¹⁷, Swan and Brown (2007,2005)¹⁸, Van westerienen and Lynch (2005)¹⁹, Foster and Gibbons (2005)²⁰, Rowlands and Nicholas (2005)²¹, Pellizari (2003)²² and Lawal (2002)²³ have all reported in their survey's that authors have very little knowledge and motivation to use Institutional Repositories. The participation of faculty members is very low and due to issues like fear of plagiarism, lack of technical skills and confusion with copy right.

National Status:

Goutam Dutta and Dibyendu Paul(2014)²⁴ have reported the results of suevey conducted at University of Calcutta to find out awareness about IR and the willingness to participate in an IR among faculty memebers. The study concluded that faculty members attitude for IR is more or less

positive and faculty members prefer to submit post-published articles in an IR rather than Pre-published works. Dhanavandan and Tamizhchelvan (2013)²⁵ have discussed in their paper the awareness of IR and open access publishing among Faculty Members. The study resulted that 95% faculty members confirmed the benefits of open access in publishing and expressed desire for depositing their work to an IR. The study of Shampa Paul(2012)²⁶ gives a detailed account of the users views on benefits of IR's and incentives of publishing in an IR. The study further resulted that most of the users do not publish their research in an IR and major concern about publishing in an IR is the potential for plagiarism and lower control over one's work.

In their paper Sambhu Nath Halder and Surva Chandra (2012)²⁷ examined the awareness of Institutional Repository (IR) in an academic institution and different aspects associated with it. They reported that academicians are aware but reluctant to deposit or publish via an IR.

Manjunatha and Thandavamoorthy (2011)²⁸ explored in their study the rank wise and discipline wise difference between the contributors of IR. They reported that majority of the scholars are aware of and positive towards depositing in an IR. Sawant, S.(2011)²⁹ in one of her preliminary study on Indian IRs, has reported the respondents views on anticipated benefits and inhibitors of Institutional Repositories. In one of her another detailed survey based study Sawant, S.(2012)³⁰ has covered 16 major Indian IRs and investigated the experience, contribution and opinions of users regarding Institutional Repositories. It was observed in the study that most of the respondents were aware about IR services but their participation in IRs was insignificant. Most of the respondents felt that IRs are easy and fast way to communicate their research results and the biggest encouragement for contribution was preservation of documents for the future.

Most of the earlier studies have covered various perspectives on user awareness and attitude towards institutional repositories but none have tried to assess the impact of Institutional Repositories on contributors' professional and publishing practices and preferences. This study attempts to fill this gap.

Research Design:

There has been a glaring lack of Indian as well as international studies covering users opinion about possible impact of Institutional repositories on their scholarly practices. For filling this research gap, current study was carried out. The main objectives set out for the study are:

1. To determine the scientists and research scholars preference for publishing their research works.
2. To examine the reasons for publishing and not publishing in an Institutional repository To

examine the reasons for not publishing in an Institutional repository.

3. To measure the impact of Institutional repository on scholarly(research and publishing) practices of scientists and research scholars.
4. To recommend future changes for facilitating more publication through IR.

For the purpose of this study, a well structured questionnaire was prepared. The questionnaire was supplemented with personal interview to clarify any confusion faced by the respondents. Total population of the survey was 822, which included 328 scientists and 494 research scholars from all 4 scientific research laboratories. However, a sample of about 60 percent of the total population was used for the survey. Thus, 500 questionnaires were e-mailed and personally administered to the participants(as per their preference) of the survey in the month of oct-nov 2013 and many follow up reminders have been sent in January, March and May. As the result of constant pursuation , 400 questionnaires complete in all respect were considered for analysis. The data was collected from the following 4 research intensive science laboratories of India who also have well established Institutional Repository:

1. Central Drug Research Institute, India
2. Central Institute of Medicinal and Aromatic Plants, India
3. Indian Institute of Agricultural Research, India
4. Indian Institute of Petroleum, Dehradun

Results and discussion: The data collected with the help of the survey instrument was statistically analyzed using Chi-Square test of independence to ascertain relationship between variables. After analysis the data has been duly presented and discussed in the following section:

Table 1: Preference for publishing

Preferences	Scientists	%	Research Scholars	%	Total
Peer- Review scholarly Journals	103	58.86%	122	54.22%	225(56.25%)
Open Access Journals	09	05.14%	18	08.00%	27(6.75%)
Instituional Repositories	37	21.14%	62	27.55%	99(24.75%)
Seminar and Conference Proceedings	23	13.14%	16	07.11%	39(9.75%)
In House publications	03	1.71%	07	3.11%	10(2.50%)
Total	175	100%	225	100%	400(100%)

$\chi^2=48.03;$

$p<0.001;$

Research Question 1: Where do you prefer to publish your research works?

This survey tries to examine the publishing preferences and possible impact of IR on respondents' scholarly practices, the table 1 above explains the preference of scientists and research scholars regarding publishing their research works. Responses clearly suggest that 58.86% scientists and 49.78% research scholars prefer to disseminate their research findings through 'Peer-review scholarly journals'. Scholars highly value the role of journals in the widespread dissemination of their research, as well as in building up their own reputation through the reputation of the journal itself (Creaser et al, 2010) ³¹. 'Institutional repository' is also preferred by 24.75% respondents where slight difference is reported in the opinions of scientists and research scholars while 27.55% research scholars prefer IR in comparison to 21.14% scientists. Other options such as seminar and conference proceeding, open access journals and In-house journals do not get much preference for publishing research works.

The chi square(χ^2) statistics reflect that the relationship between variables is highly significant. The difference between calculated value (48.03) and tabulated value (9.49) deduct that 'Peer reviewed sholarly journals' as the preference for publishing and 'user groups' are strongly associated.

Table 2: Reasons for Publishing in an IR

Reasons	Scientists	%	Research Scholars	%	Total(%)
Global exposure to the author	20	11.43%	59	26.22%	79(19.75%)
Easy accessibility and quick dissemination	39	22.29%	43	19.11%	82(20.5%)
Cost Effective & Affordable	24	13.71%	46	20.44%	70(17.5%)
Mandated by Instituion to publish	22	12.57%	18	8.00%	40(10.00%)
Long term preservtaion of research materials	53	30.29%	29	12.88%	82(20.5%)
Counted among quality publications	17	9.71%	30	13.33%	47(11.75%)
Total	175	100%	225	100%	400(100%)
$\chi^2 = 31.62$					$p < 0.001$

Research Question 2: What are the reasons for publishing in an IR?

Several past studies like Foster and Gibbons(2005) , Davis and Connolly(2007) , Kim(2007) , Abrizah(2009) ³², Cullen and Chawner(2011) ³³, Manjunatha and Thandavamoorthy(2011) and shukla and khan(2014) ³⁴ have examined the users perception about reasons for contributing in an IR . In this study also respondents were asked to specify reasons for publishing in an IR. Results shown here in table 2 report difference of opinion among both user groups. While 30.29% scientists prefer to publish in an IR due to reason 'long term preservation of research materials' only 12.88% research scholars favoured this reason. Long term Preservation has been cited as the prime reason and incentive for contributors' publishing interest in an IR as resulted in the studies by Foster and Gibbons(2005) , Davis and Connolly(2007) , Kim(2007) , Paul(2012) and Shukla and Khan(2014).

Research scholars' opinion regarding reason for publishing or contributing in an IR is little different from Scientists. 26.22% Research scholars prefer to publish due to reason 'Global exposure to the author' followed by reason 'cost effective and affordable'. As reflected in the follow up interview of the respondents, Research scholars said that due to lack of funds and financial assistance they prefer to publish in the medium which is cost-effective. In the developing country like India publisher's demand publishing fee in the form of subscription charges from authors which increases Researchers' interest in publishing through cost effective mediums like IR.

In over all responses 20.50% scientists and research scholars publish in an IR due to reasons ' easy accessibility and quick dissemination' and 'long term preservation of research materials' followed by reasons 'global exposure to the author'(19.75%) 'cost effective and affordable' (17.50%),' counted among quality publications'(11.75%) and 'mandated by instituion to publish'(10%).

The chi square(χ^2) analysis shows the Chi value of 31.62 which falls over the table value of 9.49 @ 5% level of significance results in the acceptance of the significant relationship between 'easy accessibility and quick dissemination 'and 'long term preservation of research materials' as reasons for publishing in an IR and user groups.

Table 3: Reasons for not Publishing in an IR

Reasons	Scientists	%	Research Scholars	%	Total(%)
Better reputation of scholarly journals	97	55.43%	112	49.77%	209(52.25%)
Lack of review mechanism in IR	20	11.43%	16	7.11%	36(9.00%)

Difficulty in self archiving	09	5.14%	15	6.66%	24(6.00%)
Concern about copyright issues and plagiarism	31	17.71%	69	30.66%	100(25.00%)
IR ignorance and technical barriers	18	10.29%	13	5.77%	31(7.75%)
Total	175	100%	225	100%	400(100%)
$\chi^2 = 12.21$					$P < 0.0159$

Research question 3: What are the reasons for not publishing in an IR?

Scientists and research scholars were also surveyed to specify the reasons for not publishing in an IR. 52.25% scientists and research scholars opined that 'better reputation of scholarly journals' resists them from publishing in an IR. As Young(2002)³⁵ stated that "scholarly journal system can be an obstacle to free sharing of content and to advances in sciences, since it strongly influence faculty members' habits". The prestige attached with publishing in an academic scholarly journal creates inertia against change among contributors' and makes IR as an unpreferred medium of scholarly publishing. Across disciplines, publishing in journals has been the standard for over 100 years, and integrating a new genre into scholarly communication is a significant challenge. Faculty depend on the traditional genre of communication not only to disseminate research, but also to get tenure and establish themselves in their field (Jenkins et al, 2005)³⁶.

Option like 'Concern about copyright issues and plagiarism'(25.00%) is also a prime reason for respondents' disinterest in publishing in an IR specially research scholars(30.66%) who find this reason as big inhibitor than scientists(17.71%). Some earlier studies conducted by Foster and Gibbons(2005), Davis and Connolly(2007), Abrizah(2009), Manjunatha and Thandavamoorthy(2011) & shukla and khan(2014) have also quoted this as major resistant for publishing in an IR. Other reasons such as 'lack of review mechanism in IR '(9.00%), 'IR ignorance and technical barriers' (7.75%) and 'difficulty in self archiving' (6.00%) being meagerly voted as reason for non-participation.

The statistics of Chi Square (χ^2) shows that calculated value(12.21) is higher than tabulated value(9.49) i.e, there is a significant difference between values which confirms a statistically strong relationship between ' better reputation of scholarly journals' as the reason and user groups(scientists and research scholars). The level of significance is kept at 0.05 and degree of freedom is 4.

Table 4: Impact of IR on Research Practices

Impact	Scientists	%	Research Scholars	%	Total(%)
Increase in the wider accessibility of research	58	33.14%	52	23.11%	110(27.50%)
Increase in the impact of the Research	36	20.57%	22	09.77%	58(14.50%)
Increase in the collaboration with peers	21	12.00%	49	21.77%	70(17.50%)
Promotes interdisciplinary and advanced research	07	04.00%	12	5.33%	19(4.75%)
Increase in access to grey literature	53	30.29%	90	40.00%	143(35.75%)
Total	175	100%	225	100%	400(100%)
$\chi^2 = 22.87$			$P < 0.001$		

Research Question 4: What are the possible impact of IR on research practices?

This study mainly attempts to find out the impact of IR on scientists and research scholars research and publishing practices. As it is discernible from table 4 the impact of IR on research practices of users report difference. Most of the scientists(33.14%) expressed that 'increase in the wider accessibility of research' is the biggest impact of IR on their research purposes as supported by Crow (2002) in his paper that the potential benefit of an IR, are the possibility of enhanced professional visibility and increased discovery of their creative materials being available in an open access resource. Casey (2012)³⁷ referred to 'increased accessibility of published materials' for tenured faculty and 'increased impact of their research work' for untenured faculty as the big factors while considering implications of IR.

In the survey 40% research scholars expressed that 'increase in access to grey literature' is the major impact of IR on their research practices along with 30.29% scientists who also upheld this view. Grey literature is generally defined as academic literature that is not formally published. It is that informally published written material that may be difficult to trace via conventional channels(wikipedia). Institutional repository is one such unconventional channel which provides open access to institutional grey literature. IRs allow scholars the platform to share not only formal but also unpublished publications which otherwise known as Grey literature and which is most difficult to access and preserve over a long period of time. Other options such as 'increase in the collaboration with peers' and 'increase in the impact of the Research' also get worthwhile support. Abrizah(2009) and Cullen and Chawner(2011) have cited 'desire to share their works with others' as an important motivator for IR deposition.

The chi square(χ^2) statistics also corroborate the same results. The difference in the calculated and tabulated values of chi confirm a strong relationship between variable impact and variable user groups which means 'Increase in the access to grey literature' is most significantly associated with scientists and research scholars. The level of statistical significance is kept at 0.05 and degree of freedom is 4.

Table 5: Impact of IR on Publishing Practices

Impact	Scientists	%	Research Scholars	%	Total(%)
Increase in Timely Publication	37	21.14%	56	24.88%	93(23.25%)
Increase in the reach of publication	38	21.71%	66	29.33%	104(26.00%)
Increase in the self archived publication	14	8.00%	09	4.00%	23(5.75%)
Increase in citation of publication	54	30.86%	29	12.88%	83(20.75%)
Decrease in the cost of publishing	32	18.29%	65	28.88%	97(24.25%)
Total	175	100%	225	100%	400(100%)
$\chi^2=25.42$					<i>P<0.001</i>

Research Question 5: What are the possible impact of IR on publishing practices?

The explosion of research information in the field of science and technology is exponential. Scientists and research scholars are actively involved in disseminating and publishing their research findings. The table 5 here depicts the possible impact of IR on publishing practices of users. The responses reflect variation in the opinion of scientists and research scholars while 30.86% scientists responded that 'increase in the citation of publication' is the biggest impact, whereas 29.33% research scholars weigh impact 'Increase in the reach of publication' as the strongest. The opinion of scientists' has been supported by Rowland(2005) and Crow(2002) where they suggest that faculty must understand that open access articles can be more cited and that's the greatest benefit for them Rowland(2005). Further, Research has demonstrated that, with appropriate indexing and search mechanism in place, open access online articles have appreciably higher citation rates than traditionally published Crow (2002).

In over all responses 'Decrease in the cost of publishing(24.25%) option is emphatically favoured by respondents. In the follow up interview of the respondents a misconception came out where they

thought that IRs does not involve any cost as they disseminate research materials without any access barriers. As Bailey(2005) and Gibbons(2004) in their study stated that open access doesn't mean that IRs are costless. Open access proponents can perceive IRs as cheap to support and quick to implement but librarians may tend to consider additional costs, such as staff and user training and support, IR advocacy and promotion, metadata creation and maintenance and long term digital preservation Gibbons (2004); Bailey (2005). Harnad (2004) also pointed out that costs' haven't vanished but this cost takes about 10% of traditional publishing process' total cost.

Other options like 'Increase in Timely Publications'(23.25%), and 'Increase in the self archived publication'(5.75%) have also been backed-up as the impact of IR on publishing practices. Davis and Connolly(2007) conducted survey at Cornell university which reported that they find 'timeliness of the research appearing' as one of the important factor in an IR which is also corroborated in this study where 23.25% respondents validate 'increase in timely publication' as a major impact of IR.

The statistical analysis of Chi-square(χ^2) shows difference in calculated(25.42) and tabulated values (9.49). The larger calculated value establishes a strong relationship between variables. It further confirms that variable 'increase in the reach of publication' is the strongest impact of IR on variable user groups' publishing practices .The level of significance is 0.05 and degree of freedom is 4.

Table 6: Recommendations for Future changes

Policies	Scientists	%	Research Scholars	%	Total(%)
Adoption of Strict Institutional policy to Mandate Deposit	13	7.43%	31	13.77%	44(11.00%)
Provision of Strict Policies on Ownership, IR contents, quality standards and Copyright issues	47	26.86%	79	35.11%	126(31.50%)
Adoption of comprehensive Promotion and Publicity Policy	16	9.14%	10	4.44%	26(06.50%)
Provision of Better Review Mechanism	21	12.00%	34	15.11%	55(13.75%)
Provision of Feed Back Mechanism	23	13.14%	19	8.44%	42(10.50%)
Provision of incentives for publishing in an IR	55	31.43%	52	23.11%	107(26.75%)
Total	175	100%	225	100%	400(100%)

Research Question 6: Suggest some measures to establish IR as an effective publishing

medium in future?

Repositories, specially in India, are facing the problem of insignificant contributions from users. Users recognise the need of IR to promote scholarly communication in open access but are reluctant to publish via this medium. This study invites the suggestions of scientists and research scholars to promote publishing through IR and further increase the contributions by implementing these suggestions. Table 6 shows difference in the opinions of both user groups. While 31.43% scientists suggest the 'provision of incentives for publishing in an IR', most of the research scholars(35.11%) recommend 'Provision of Strict Policies on Ownership, IR contents, quality standards and Copyright issues'. As a matter of fact large number of past studies have also resulted that Copy right infringement and plagiarism is the major issue with contributors' participation in the institutional repositories Foster and Gibbons(2005), Davis and Connolly(2007), Abrizah(2009), Sawant(2011) Manjunatha(2011) and it must be resolved by providing legally sound atmosphere.

Among other options 'provision of better review mechanism'(13.75%), 'adoption of strict institutional policy to mandate deposit'(11%) , 'provision of feed back mechanism'(10.50%) and 'adoption of comprehensive promotion and publicity Policy'(6.50%) have also been recommended by respondents.

Major Findings:

The major findings of the study are presented in the following subsections:

Publishing preference:

Most of the scientists and research scholars prefer to publish in ' peer-reviewed scholarly journals'. Institutional repositories are also preferred by respondents for publishing but after reputed journals. Scholarly journals due to their strong peer-review mechanism ensure quality in publication therefore hold good reputation among contributors especially scientists and research scholars. As the survey by Creaser et al(2010) report that about 53% survey respondents perceive repositories as challenge for the predominance of subscription based journals in scholarly communication but they are (scholarly journals) still highly rated when compared to IRs.

Reasons for Publishing in an IR:

While most of the scientists publish in an IR due to the reason 'long term preservation of research materials' , Research scholars publish because it gives 'global exposure to the author'. In collective responses 'easy and quick accessibility to larger audience' and 'long term preservtaion' both reasons

are given equal importance.

Reasons for not Publishing in an IR:

After analysing the reasons for not publishing in an IR it is deduced that almost half of the respondents find 'better reputation of scholarly journals' as the biggest resistance to publish in an IR followed by 'concern about copyright issues and plagiarism' which has been a prime reason for non-participation in an IR as quoted in several past studies.

Impact of IR on Research Practices:

It is found in the course of survey that biggest impact of IR on research practices of scientists and research scholars is the 'increase in the access to grey literature' followed by 'increase in the global accessibility of research'. Grey literature is that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers(Gelfand, 2005). As Ware (2004) remarked that grey literature have great consideration in the new scholarly communication paradigm, since it covers almost 60% of content in Institutional repositories. The same has been upheld by the results of this study. Access to grey literature is one of the most important implication of IR on users.

Impact of IR on Publishing Practices: After asking from respondents about the possible impact of IR on their publishing practices most of the respondents agreed that 'Increase in the reach of publication ' is the strongest impact followed by 'Decrease in the cost of publishing' and 'Increase in timely publication'. Wider accessibility and quick dissemination are two main factors that attract users to publish or prefer to publish in an IR.

Recommendations for Future changes:

Suggestions were invited from respondents for encouraging publishing through IR in future and it was found that most of the respondents' recommend 'Provision of Strict Policies on Ownership, IR contents, quality standards and Copyright issues' and 'Provision of Incentives for publishing in an IR'.

Conclusion and recommendations: The study was mainly taken up to identify the possible impact of Institutional repositories on scholarly practices of scientists and research scholars of 4 scientific and industrial research laboratories of India. The study also aims to find out the reasons for publishing and not publishing in an IR. Another purpose of the study is to put forward some suggestions for encouraging the contributors to publish in an IR. The results of the study show that

'better known scholarly journals ' are the preferred choice for scientists to publish their research findings.'Quick accessibility and dissemination' and 'Long term preservation of the research materials' are the main reasons behind publishing in an IR.' Better reputation of journals' is the main reason for contributors disinterest in publishing in an IR. Scientists responded that 'increase in the global accessibility of the research' is the biggest impact of IR on research practices and 'increase in the reach of publication' is the most evident impact of IR on publishing practices of scientists. Scientists have also put forth some suggestions for the establishment of IR as useful and effective publishing medium.

Based upon the major findings of the study and the opinion of contributors' pertaining to possible impact of IR on their scholarly practices, following recommendations have been made:

1. Institutions, specially research intensive institutions all over the world, should promote the implementation of the institutional repositories for the global dissemination of their institutional research output.
2. More stress should be given on the marketing (promotion and publicity) of IRs within the institution to highlight their importance and make them understandable for inviting more contributions.
3. Institutions should prepare mandatory policy for the submission of all types of intellectual output of the instituion including grey literature.
4. Strict enforcement policy regarding Copyright issues, quality of content and IR accessibility should be adopted.
5. Incentives and benefits should be offered to Contributors for depositing their research output and should be encouraged for more contributions.
6. Formal training must be provided to the users in IR deposit and searching procedures. Their self-archiving fears should be properly dealt with.

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