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EDITORIAL

The conceptualization of linked data has marveled Internet and WWW with data links within and outside a site to a multitude of locations. The basic Internet tools, the search engines, meta-search engines and the search tools provided by the e-mail service providers like google.com, rediff.com etc., have exploited this concept to create links back-and-forth to hypermedia – text to images, audio-videos and back to text and so on. Since their inception these tools have transformed from simple keyword search facilities to the website to a dynamic media to provide myriad of services that can be explored and exploited in the context of the social media dynamics. One of the most important features of these tools is information visualization, an area of intensive research in the semantic web and digital libraries.

It is common perception that search engines have been most useful in locating the websites and navigate web-pages using a common and most conventional search interface – the keyword searches. The Internet information deluge has created an awesome information ocean and has camouflaged other landscapes of information where some specific and even some most fascinating events are reported and yet ignored by the users.

This issue contains five papers contributed by authors in different aspects of LIS. The first article deals with an analytical approach to user-based studies of five Jawahar Navodaya Vidyalaya Libraries of West Bengal. Leadership is one of the importance challenges in every organisation – both profit and non-profit. Leadership skills, approaches and models are essential for modern librarianship. One paper highlights various leadership skills required to manage future generation libraries. The UNESCO rightly considered public libraries as people's universities. Public libraries have to spread social, economic, cultural, political, recreational and scientific information to empower the knowledge society. One paper presents a case study of ARS Inamdar Public Library, Pune. The metric analysis is gaining momentum to know the scientific productivity of a country, an organisation, an institution or an individual; it also maps the research trends in different domains of universe of knowledge. In this context an article discusses research and publishing trends by agricultural scientists. The final paper briefly presents bio-bibliometric study of contributions of Sir C.V. Raman to the literature in physics using SAO/NASA Astrophysics Data System. We hope the issue will be interesting to the readers of the *Journal*.

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An Analytical Approach to Users-based Studies of Five Jawahar Navodaya Vidyalaya Libraries of West Bengal: Stark Realities

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ABSTRACT

The paper discusses the prerequisite of user study in the recent information technology-enabled environment where libraries have to face a great challenge. The present study covers five selected Jawahar Navodaya Vidyalayas (JNVs) of West Bengal situated in Howrah, Mursidabad, Durgapur, Nadia and Bankura. The main objective of a JNV's Library is to computerize library operations and services and to develop library infrastructure for providing equitable services to all of its students and staff of JNVs. Libraries serve as a center for providing the right information to the right people at all times. Evaluation of the library and information services is one of the major concerns and an integral part of library and information science practitioners. User studies are to be recognized as an important part of the information packages. Information providers like the library and information centers need to be aware of their users' information requirements as well as their information seeking and information retrieving methods in order that they might be able to provide better services. This paper presents to study the library services and its users in JNVs Libraries. This study examines several aspects of library use, including frequency of visiting the library, user satisfaction from library services and library collection. The study also covers the use of computer base services in the library. Some suggestions are also provided on the basis of study for enhancing the user satisfaction level. The understanding of user behavior that can be gained through a particular user study must be valuable enough, in terms of improving the practice of library professionals. A rationale for evidence based librarianship, based on studies of user behaviors and the information needs that motivate those behaviors will be presented. This paper undertakes to study the library services and its user's behavior in JNVs library.

Key Words: Information Resources, User studies, JNVs library, users, library service

1. INTRODUCTION

The National Policy on Education, 1986 stresses the establishment of one Jawahar Navodaya Vidyalaya (JNV) in each of the districts of the country. Jawahar Navodaya Vidyalayas¹ are operated by the Navodaya Vidyalaya Samity (NVS), an autonomous organization under the Ministry of Human Resource Development, Department of Secondary and Higher Education, Govt. of India. It has Eight Regional Offices spread all over India. The main objectives of these *vidyalayas* are to provide modern education for rural talented children, inculcation of cultural values, competency in three languages (English, Hindi and regional language), promotion of adventurous spirit, national integration and holistic growth of the personality of the children. Region-wise JNVs are shown in Fig. 1.

All JNVs have an enriched and well equipped library. It may be said that collection and services of the JNV libraries are the best among the other residential and non-residential school libraries. Librarians are aware of their duties and responsibilities so that all the young learners take the opportunity to enhance their reading and writing skills. The students are being informed about the latest information. This type of school is a place where all teachers and librarians work jointly to a plan, implement and evaluate resources to build a family-like atmosphere. Librarians are working for the benefit of the students and staff members of the library. The collection of JNV libraries include different categories of books for different groups of students, i.e., 6 to 12, depending upon their interests and knowledge. JNVs follow three-language system as a result of which books are available in the three languages. There are books and documents available in the different subjects like science, literature, adventure, sports, technology, culture, arts, music competitive examinations, career guidance, health and hygiene and other books. Beside printed materials, non-printed material like CDs, DVDs, and e-books are also available in JNV libraries. They maintain a rich collection of books of different

subjects and display separately in open book cases to be visible the titles clearly to children. Encyclopedias, dictionaries and other reference books are generally arranged in a separate place to be easily accessible for the students and staff. JNV libraries follow the Bureau of Indian Standard (BIS) according to the collection of the library books needed every student. The libraries are started with the collection of 1500 books at its inception. The collection is being continuously upgraded from time to time by the authorities. There are journals, periodicals, and the daily newspapers available in the library for students and teachers. JNV's librarians are sufficiently qualified and well-trained in their profession. Almost in each and every year NVS organizes orientation course of librarians to train them in recent technological developments in the field of library and information science. This course is valuable for every librarian for providing the best service among the JNV students and staff.



Figure1: Region-wise JNVs in India.

2. PRESENT STUDY

Most of the students at JNV come with different social, educational and cultural backgrounds; some possess better skills to utilize library materials, while others have not enough skills in using library materials such as computer, Internet, and library catalogues. Library conducts user orientation programs for students but still there are some students who face difficulties in accessing and using library materials. They take time

to understand how to use the library. So this study is undertaken to find the problems of students and find out the solutions so that the materials in the library can be put into maximum utilization.

2.1. Purpose of the Study

The study has the following objectives:

- (a) To know the categories of users to the library
- (b) To find out the awareness and use of e-resources by the students
- (c) To determine the extent of use of library resources
- (d) To ascertain the usefulness and adequacy of information sources and services
- (e) To find out the type of information sources used by the students
- (f) To know how often the students visit the library
- (g) To know the purpose of visit to the library
- (h) To establish the level of satisfaction of needs
- (i) To know the purpose of seeking information, and
- (j) To establish the problems that the students encounter in information seeking

3. METHODOLOGY

A questionnaire-based survey method which was less time-consuming was used for this study. The population of the study consisted of 610 students. The members of the staff are not included in the survey. The survey comprises of 10 questions on personal information such as gender, information sources used by the students, use of a library, adequacy of library collections, library use and computing skills of students, and the use of IT-based library sources and services. Required information was also collected through personal face-to-face discussion with the students as well as librarians of the concerned libraries. The collected data were analyzed, classified and tabulated by employing simple percentage methods.

4. DATA ANALYSIS & INTERPRETATION

The analysis is based on the questionnaire collected from the students. The data collected from the students are analyzed and tabulated. Table 1 shows the number of students of five selected libraries of west Bengal. In order to save time and ensure better response rate, 587 questionnaires were personally distributed to students in their class of which 566 filled-in questionnaires were returned while 21 were not returned (Table 2).

Table 1: Number of students

Place of JNV	IX		X		XI-Sc		XII-Sc		Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
Howrah	19	15	18	10	16	7	17	12	114
Mursidabad	28	13	21	13	13	07	12	13	120
Durgapur	19	13	21	11	30	08	14	02	118
Nadia	22	12	26	16	20	15	15	9	135
Bankura	20	14	18	12	17	14	17	11	123
Total	108	67	104	62	96	51	75	47	610

Table 2: Overall response

Class	IX	X	XI	XII	Total
Questionnaires	175	166	147	122	610
Distributed	165	160	142	120	587
Returned	158	155	136	117	566
Not returned	07	05	06	03	21
% of return	90.28	93.37	92.51	95.90	92.78

Table 2 shows the overall response of the students. Of the total 610 students of class IX to XII of five selected JNVs, 587 (204 (36.04 percent) girls and 362 (63.95 percent) boys) participated in the survey who were given the questionnaire, of which 566 (92.78 percent) were returned. The rate of response is the highest

among class XII students (95.90 percent) and the rate of response is the lowest among class IX students (90.28 percent).

Table 3: Awareness of e-resources in the library

Awareness of e-resources	Boys (%)	Girls (%)	Total (%)
Yes	323 (89.22)	177 (86.76)	500 (88.34)
No	39 (10.78)	27 (13.24)	66 (11.66)
Total	362 (100)	204 (100)	566 (100)

Table 4: Satisfaction with the services available in the library

Satisfaction of library services	Boys (%)	Girls (%)	Total (%)
Satisfied	342 (94.47)	192 (94.11)	534 (94.29)
No	20 (5.53)	12 (5.89)	66 (5.71)
Total	362 (100)	204 (100)	566 (100)

Table shows the level of satisfaction with the availability of service in the library. It is seen that 42 percent students rated the services very good while 15.54 percent rated the services excellent. Only about 11 percent rated the services as poor.

Table 5: Level of satisfaction with the services available in the library

Satisfaction level	Boys	Girls	Total (%)
Poor	37	23	60 (10.60)
Good	117	62	179 (31.62)
Very good	156	83	239 (42.22)
Excellent	52	36	88 (15.54)
Total	362	204	566 (100)

It is seen from Table 6 that most users (95.93 percent) visited the library to borrow books and browsing (93.28 percent) the shelves. Other than borrowing the books the users visit the library for using the reference material which is about 55.65 percent; some users (41.69 percent) visit the library

to know the latest arrival of the books and journals. Visiting library for browsing the electronic resources is encouraging at it stands for 63.07 percent. Comparing gender wise for the purpose of visit, males show more interest in all aspects except in using of reference materials and knowing the latest arrivals.

Table 6: Purpose of visit to the library

Purpose	Boys (%)	Girls (%)	Total (%)
Studying	281 (77.62)	148 (72.54)	429 (75.79)
Borrowing books	352 (97.23)	191 (93.62)	543 (95.93)
Browsing shelves	342 (94.47)	186 (91.17)	528 (93.28)
Use reference materials	212 (58.56)	103 (50.49)	315 (55.65)
Know latest arrivals	142 (39.22)	94 (46.07)	236 (41.69)
Read newspaper and magazines	323 (89.22)	183 (89.70)	506 (89.39)
Browse e-resources	233 (64.36)	124 (60.78)	357 (63.07)
Total	362 (100)	204 (100)	566 (100)

Table 7 shows the use of library resources and services. It is found that a majority of the students use issue /return (38%) and then reading newspapers. The students are less interested to get the benefit of reference service (26%); rather they are not aware regarding the service.

Table 7: Use of library resources and services

Service	Boys (%)	Girls (%)
Issue/return	352 (97.23)	196 (96.07)
Reference service	236 (65.19)	131 (64.21)
Newspaper reading	337 (93.09)	192 (94.11)
Total	362 (100)	204 (100)

Table 8 shows that the students use the library mainly for career development and to keep them up-to-date. It also shows that boys are very eager for career development than the girl students. A point to be observed here is that boy students are reluctant to write their project reports by consulting resources of the library.

Table 8: The purpose of seeking information

Purpose	Boys (%)	Girls (%)
For career development	336 (92.81)	185 (90.68)
To solve immediate practical problem	288 (79.55)	167 (81.86)
To keep up to date	341 (94.19)	154 (75.49)
Total	362 (100)	204 (100)

Table 9 shows the problems faced by the students while seeking information. Students want photocopying service. However, 94.47% boys and 96.07% girls are not availing the reprographic service. It is also noted that 83.97% boys and 79.41 percent girls are not finding out right documents while 53.86 percent boys and 45.58% girls are facing problem with browsing e-resources.

Table 9: Problems faced by the students while seeking information

Problem	Boys (%)	Girls (%)
Browsing e-resources	121 (33.42)	78 (38.23)
Finding out right documents	67 (18.50)	32 (15.68)
Limitation of resources	143 (39.50)	85 (41.66)
Lack of reprographic service	342 (94.47)	196 (96.07)

5. RECOMMENDATIONS

Based on analysis of user study the following recommendations are made:

- Attractive posters describing the services and scope of the collections of JNV libraries should be walled up; the librarian should be creative in producing posters and postcards depicting library topics.
- Librarians should demonstrate the library services organise workshops and publicize services through pamphlets and library website.
- Students should also properly be initiated and guided into being good information resource users so that they do not depend mainly on lecture notes to accomplish their knowledge goals.
- E-books and journals are commonly perceived as offering great potential for learner support but

also as struggling to compete with print due to limited range of titles offered. Since most of the new library members are not familiar with the library collections and services, there should be an orientation programme for them and also for using online databases. The facilities available in the JNV library should be fully notified to the students and other users.

- Librarian should display library regulations in general and provide information about latest arrivals in the library.
- Library personnel should publish articles, news releases and short communications in the prospectus or information brochure for catering information regarding the libraries of JNVs.
- Teachers should take the lead in initiating library use to their students; they should be guided and informed about the library. Teachers should also recommend books to be used by students.
- Teachers should encourage the students to consult the library books for writing projects or reports for approval. If the students write the projects or reports by browsing books in the library, they will be attracted to the library easily.
- Library resources should be up-to-date; they should be chosen to attract the students.
- Students must be aware of the reference service and information related service.
- JNV authority should build up a network like INFLIBNET by joining all JNV libraries.
- Facility of inter library loan should be initiated immediately as the cost of resources is very high and non-availability of all resources in all the libraries
- Librarians need to teach students about using library and searching information from web.

6. CONCLUSION

Library resources are expensive. The librarians needed to manage these resources and make them accessible

to all the users to attain cost effectiveness in library services and promoting the use of library information resources. This study aimed to establish ways of improving the information-seeking behaviour of the students. To understand the actual needs of users, steps should be taken through formal in-depth studies of users of JNVs libraries. Librarians should redesign strategies according to the need and demand of users for improving the provision of library services in present electronic environment. User study is a very good tool to measure the performance of the staff and users interest. User study helps the librarian not only to know the categories of users but also to be informed about the problems faced by them and their needs and demands. Accordingly the librarians can change the service and procure resources as per the demand. So, the user based study not only bridges the gap between haves and have-nots but also helps to build a more sophisticated library.

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Leadership Skills for Future Generation Libraries

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ABSTRACT

History has shown that every time there has been a major change in the consciousness of the people in the world, the dominant sector in society has provided a leading role. The industrial revolution bears testimony to this, science having taken up the reins. Prior to that the basic influence had been religion. Now globalization and consumerism are the words on everyone's lips. Unfortunately cut throat competition and cut policies have taken their toll on the work force and the word stress is not only common, but affects each and everyone in a very big way. At this stage, the organizations are discovering that they cannot survive unless they make drastic fundamental changes in their policies. Present time is demanding a new way of looking rather than jumping out. It means there is a need to redefining the role of the leader. This paper emphasizes on main qualities of leader, roles, competencies, need for leadership skills for future librarians.

Keywords: Leadership, Managing Leadership, Self Managing leadership, Leadership qualities, Leadership Needs

1. INTRODUCTION

A professional experiences the charisma of contentment through his inner qualities. The traditional roles of libraries are no longer adequate to support the changing environment. It is observed in many Indian libraries that leadership is lacking leading to an unhealthy environment. This becomes an obstacle for development of library to achieve the desired goals. Hence, in present days a new kind of leadership is required to achieve desired goals. How does one enhance these abilities and powers to be effective in the present environment? There are some core values. When one becomes aware of them and practices those

values, then the abilities and powers are naturally developed. When one has these qualities there is job satisfaction or inner contentment that is derived from one's own performance. To work successfully in digital library environment, the new generation should adopt adequate leadership qualities.

2. LEADERSHIP

According to George R. Terry, "Leadership is the activity of influencing people to strive willingly for group objectives." There are three types of people in present times; the first category make the change happen. They take up leadership and become a source of inspiration

for others also. The second are the ones who follow whatever is happening. And third are the ones who do not realize what is happening and by the end of the day they ask, “what happened today”? They hardly realize that the world around them has completely changed. A leader stands in front and pulls the people along with him. The manager administers and maintains while a leader innovates and develops. A leader relies on people and counts on their trust. He does the right things through inspiration. Hence the organizational world demands leaders not just managers. Who is a true leader? Somebody has beautifully defined a leader as “one who never reacts, but observes, understands, analyses and then acts decisively”. “Good leaders are made, not born. If you have the desire and willpower, you can become an effective leader. Good leaders develop through never ending process of self-study, education, training, and experience”(Jago, 1982). “Leaders become great, not because of their power, but because of their ability to empower others” (John Maxwell). Leader would not react immediately on small things because he has some powerful, charismatic qualities. A leader is a cool and calm person. He would not lose his temper instantly. He possesses a clear vision that is a clear understanding of what is he doing and why and how he is going to do it. This enables him to be confident and therefore he has a high level of commitment and while performing he becomes a source of inspiration. Leader is someone who knows the way, goes the way and shows the way. Leadership is an art of motivating a group of people to act towards achieving a common goal. Leadership includes being able to motivate and direct others, setting objectives, organizing taking initiatives and positive attitudes to frustration and failure, accepting responsibility, and being flexible.

2.1 Situational Leadership

Situational leadership is based on interplay among (a) the amount of guidance and direction (task behavior) a leader gives, (2) the amount of socio-emotional support (relationship behavior) a leader provides, and

(3) the readiness level that followers exhibit in performing a specific task, function or objective. This concept was developed to help people attempting leadership, regardless of their role, to be more effective in their daily interaction with others. Situational leadership is a model, not a theory. Its concepts, procedures, actions, and outcomes are based on tested methodologies that are practical and easy to apply.

2.2 Leadership Style

Researchers such as Blake, Mouton and McCauley and McGregor have argued that there is ‘One Best’ style of leadership “a style that maximizes productivity and satisfaction, growth and development in all situations” but further research in the last several decades has clearly supported the contention that there is no one best leadership style. The primary reason why there is no one best way of leadership is because leadership is situational or contingent. According to situational leadership there is no way to influence people. Which leadership style a person should use with individuals or groups depends on the readiness level of the people the leader is attempting to influence. Leadership style is the leader as perceived by the followers. The ways that classifying leader behaviors developed including the identification of task and relationship behavior. Task behavior is defined as the extent to which the leader engages in spelling out the duties and responsibilities of an individual or group. These behaviors include telling people what to do, how to do, when to do, where to do, and who is to do it. Relationship behavior is defined as the extent to which the leader engages in two-way or multi-way communication. It includes listening, facilitating, and supportive behaviors. No one style is effective in all situations. Each style is appropriate and effective depending on the situation. The following descriptions apply to the four styles:

- **Style 1 (S1, Telling):** This leadership style is characterized by above-average amounts of task behavior and below-average amounts of relationship behavior. This style includes telling

the followers what to do, where to do and how to do it. This style is appropriate when an individual or group is low in ability and willingness and needs direction.

- **Style 2 (S2, Selling):** This leadership style is characterized by above-average amounts of both task and relationship behavior. In this style a leader is not only providing the guidance but also providing the opportunity for dialog and for clarification in order to help the person.
- **Style 3 (S3, Participating):** This style is characterized by above-average amounts of relationship behavior and below-average amounts of task behavior. This style includes a person or group that's able but has developed ability and has not an opportunity to gain confidence in doing it on its own.
- **Style 4 (S4, Delegating):** This style is characterized by below-average amounts of both relationship behavior and task behavior. In this style individual or group is both able or willing and able or confident. They have enough opportunity to practice and they feel comfortable without the leader providing direction.

2.3 Principles of Leadership

- Know yourself and seek self-improvement
- Be technically proficient
- Seek responsibility and take responsibility for your actions
- Make sound and timely decisions
- Set the example
- Know your people and look out for their well-being
- Keep your workers informed
- Develop a sense of responsibility in your workers
- Ensure that tasks are understood, supervised and accomplished
- Train as a team

- Use the full capabilities of your organization shared leadership

2.4 The Five P's of Leadership

- Pay attention to what is important
- Praise what you want to continue
- Punish what you want to stop
- Pay for the results you want
- Promote the people who delivered results

3. EIGHT LEADERSHIP QUALITIES

A leader is effective and efficient due to certain attitudes and inherent abilities he has, which enables him to carry on his activities. There are eight main attitudes or inner powers that he exercises at the appropriate time and right place.

- (a) **Power to listen (Patience):** The first ability or power that a leader needs to have is the listening ability or the power to withdraw. For correct decisions leaders are very much dependent on the information they receive. The ability to listen means a very effective and permanent survey and assessment of the situation. In order to enhance the listening ability, one needs to have patience when someone is sharing something with him. If a leader is impatient, he loses relevant information and can hardly successful without complete information.
- (b) **Availability (Humility):** Leaders have mental ability and power to pack up. The responsibility of a leader is to be present whenever he is needed. The listening ability and availability are very deeply connected. Whenever he is called upon, he needs to pack up all other thoughts, and pull out from whichever engagement his mind needs to be available to those for whom he is responsible. Availability does not mean physical availability; a leader has to be mentally available to his people. Availability means to be always ready, so that you are able to start anything at

any time. It means ability to decision making and to have clear objectives. Leader needs humility to be available all his associates to gain the trust of his people.

- (c) **Tolerance (Love):** All the uncertainties, complexities and contradictions require a lot of tolerance. A leader has to have a high level of tolerance. Tolerance means strength or inner power. Tolerance is the ability to work in very demanding situations, when there is a lot of turbulence and high pressure. A leader has to handle many different situations simultaneously and to accept considerable feedback. He has to take major decisions and take the responsibility for those decisions. He has to be able to take criticism without reacting or even feeling it as a burden. As soon as a leader loses his tolerance power, his goodwill is lost. Others will not want to follow him. Tolerance means to give one's best up to the very end. Tolerance is to accept both praise and defamation with equanimity of mind. It can develop through love. Though Love, leader empowers people and the people in return, are available to him when he needs them.
- (d) **Adaptability (Maturity):** A leader has the ability to adapt or the power to adjust. Flexibility and the ability to adapt is the strength that helps the leader to reach his goals. Flexibility in a leader is the ability to adjust to many different personalities and situations he or she faces in the process of reaching his goal. He needs maturity to give way to others, to bend and to tolerate. Adaptability means to have integrity. Adaptability is to encourage job-rotation and to be able to change place and task. Nowadays, effective people are multi-skilled and therefore better equipped for change. A leader needs to have the maturity or understanding, and then he becomes like the boiled frog and fails in his mission.
- (e) **Discrimination (Knowledge):** A leader has a very powerful ability to discern or discriminate

right from wrong, truth from falsehood, reality from illusion and benefit from harm. This ability is absolutely crucial for a leader who is taking decision for so many others to follow. If he lacks discrimination power and chooses the wrong path, the consequences may be hard hit. Again it requires a very powerful management Information system, in terms of selecting, analyzing, synthesizing, prioritizing, assessing, appraising, and evaluating. Discrimination power means that you build up a very good assessment system. Knowledge and wisdom enables one to have accurate discrimination.

- (f) **Decision Making (Clarity of Mind):** One of the major tasks of a leader is to take decisions. He is constantly in situations where he has to judge, where to go next. The power of decision is not only to discriminate between right and wrong but to judge best choice. The ability to decide is rests on the ability to anticipate the right course of action and to take it. Decisions often have to be made on the spot and therefore his power to judge needs great clarity. Discrimination for correct decisions is like correct investigate, analyze, synthesize and understand first, and only then take decision after considering all pros and cons of the matter. Not to take decisions first and then understand, he needs to have a great clarity of mind to take bold decisions.
- (g) **Ability to Respond (Courage):** The leader has to have power to face as he carries the main responsibility. The implication of decision making is his responsibility. This ability is similar to courage. He needs courage to face the effects of his own decisions, they have to become responsible. A leader has to face the obstacles arise when he commits to a course. The power to face is the ability to anticipate barriers, problems, and contradictions and face them when he goes wrong. Honesty increases his power to face.

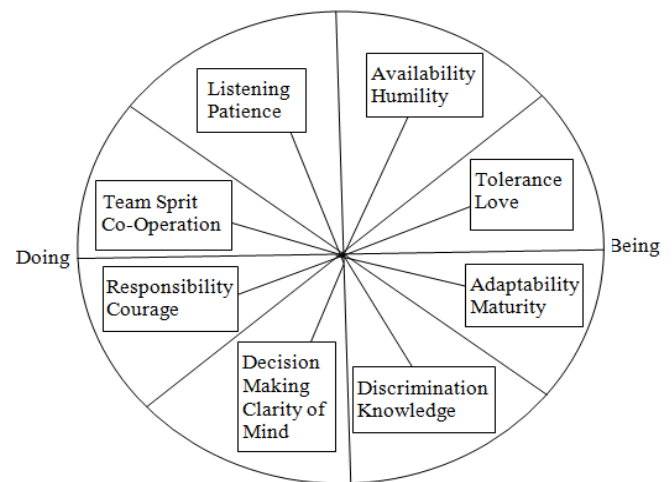
(h) **Team Spirit (Cooperation):** A leader should have the ability to create a team spirit and the power to cooperate. A leader needs to be able to inspire cooperation in others and he can do so only when he himself is able to cooperate well with others. The ability to cooperate with each other is becoming more important, as substantial time, money and energy are involved. Cooperation comes from common purpose and in seeing the specialty of each member of the team, an appreciation of the distinctive contribution that each one can make. Team spirit means that people are strongly connected in the same value system. It is a power which is able to make huge tasks easy and enjoyable as well. Crating a team spirit means to get people committed to take up the responsibility collectively in a team.

3.1 Pro-activity and Interactivity between Abilities:

To listen we need to be available and to be available we need to have interest in listening to others. To be available we need to be strong, which means to have tolerance power. To have tolerance we need the ability to adapt. In order to adapt in an accurate manner we need the discerning ability so as to know what to adapt, when to adapt. The more we analyze and discriminate, the better decisions we take. Taking decisions implies that we shall be responsible for the result of the decisions we have made. Team spirit is based on shared responsibility. It is only possible due to cooperation. A leader in any case should not fluctuate in his state of mind and behavior. Thus there are the qualities that enable the leader to take up leadership and become a source of inspiration for others as well. In fact we all have these abilities but it varies in degree as also the manner in which we work.

Out of these eight abilities the first four abilities is what a leader has to be and the latter four abilities is what he has to or perform. A leader has to be a good listener, he has to be loveable and tolerant,

and he has to be mature to adapt himself. So this is what he has to be to enhance his performing capabilities. He has to be to enhance his performance capabilities. He has to practically discern, to take decisions, to take up responsibility and to create a team spirit. There is a very deep interactivity between being and doing. If a leader cannot be what he is expected to be, he cannot do. When a leader is good listener, he gets clear information to discern or discriminate otherwise his mind will be pre-occupied with his own ideas and assumptions.



4. LEADERSHIP ROLES

Leadership roles can be applied to any situation where you are required to take the lead, professionally, socially, and at home in family setting. Leaders are leaders because they have credibility, and people want to follow them. McMillan (1999) presented a manifesto for the librarian of the virtual library as “we have new roles to fill. While the format of our resources may change, while access to information may change, while styles of service may change, the vision of high quality, service oriented, and information centers still fits the library’s mission. We will serve our user communities best if we incorporate this in to the digital library”. Leadership roles are all around us not just in work environment. Some of the prominent roles are as follows:

- Provide purpose
- Build a star team, not a team of stars
- Establish shared ownership for the results
- Develop team members to fullest potential
- Make the work interesting and engaging
- Develop a self managing team
- Motivate and inspire team members
- Lead and facilitate constructive communication
- Monitor but do not micromanage

4.1 Negative Leadership Traits

- Insensitive to others: abrasive, intimidating, bullying style.
- Cold, aloof arrogant
- Overly ambitious: Always thinking for next job, playing politics
- Untrustworthy
- Having specific performance problems with the business
- Unable to delegate or build a team-over managing
- Unable to staff effectively
- Unable to think strategically
- Unable to adapt to boss with different style.
- Over dependent on mentor

5. NEED FOR LEADERSHIP SKILLS AMONG LIS PROFESSIONALS AND FUTURE LIBRARIANS

“Librarians have been the real heroes of the digital revolution in higher education. They are the ones who have seen the farthest, done the most, accepted the hardest challenges and demonstrated most clearly the benefits of digital information. In the process, they have turned their own field upside down and have revolutionized their professional training. It is testimony to their success that we take their achievement and their information management systems for granted (Breivik and Gee, 2006). Technological innovations

such as digitization, electronic publishing, and web 3.0, Library 3.0, RSS, Blogs, Wikis, SMS, Podcasting, Mashups, Tagging etc, libraries worldwide have been adjusting to the shift from the printed era to the digital era. These changes impact on roles of LIS professionals. Acquiring new skills is the demand of present time due to fast technological changes. The following leadership skills apply to all library professionals.

- Exhibit leadership skills including critical thinking, risk taking, creativity, regardless of position within management structure.
- Demonstrates commitment to working with others to achieve common goal.
- Implement principles of knowledge management.
- Implements changes of Technology.
- Share expertise with users.
- Display excellent communication skills.
- Communicate effectively with publishers and other information providers.
- Actively pursues personal and professional growth though continuing education.
- Commitment to excellent customer services.

Arora (2004) highlighted leadership skills and personal traits that were used successfully for transforming a traditional library into a hybrid library in precarious circumstances and conditions that exist in some of the organizations in India. The management techniques, skills, and personal traits of a leader were used to motivate staff members to computerize the library, to improve library services and to transform a traditional library into a hybrid library. The National Knowledge Commission 2007 recommends the minimum skills required for LIS professionals are

- Library handling skills
- Service orientation
- ICT knowledge skills
- Communication and training skills

- Marketing and presentation skills
- Understanding of cultural diversity
- Knowledge mapping skills

Further librarians need to develop competencies and leadership skills, technical knowledge and personal attributes, that enable individuals to contribute positively to their organizations and the library profession. In order to effectively meet user needs library professionals are continually challenged to keep up to date with new sources of Information, databases, and search engines. There is need for library professionals to maintain strong network within and without their organization to enhance development of skills and knowledge.

6. CONCLUSION

Leaders are agents of change within their organizations and are responsible for helping and guiding other people through proper communication. In Indian we have number of professional associations. These associations should take steps in building and development of leadership and capacity building skills among the LIS professionals. The library schools should assume the role of leadership and responsibility. Leadership skills contribute to the effectiveness, continuity, sustainability, stability, and overall development of an organization and libraries are not an exception to this. Most of us are not aware of the qualities we possess and seek the strength from outside. Accessing and developing these inner qualities is a process we call personal engineering. One may be great map reader, but if he is using a map of Mumbai to find the way to Delhi, then he is simply wasting time. Likewise vast amount of organization's time are wasted through wrong decisions and miss-communication. Having the right

map means to know one's own self and the situation. For better leadership we need to be aware of our own inner potential and develop new skills and powers essentials for effectiveness in the present environment.

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Social Value of Public Libraries: A Case Study of ARS Inamdar Public Library, Pune

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ABSTRACT

Public libraries being social institutions make an impact on the communities they serve and the value of public libraries is assessed by measuring how well they meet the needs of their communities. The benefits that users gain by using library services can be assessed in terms of knowledge gained, higher information literacy, higher academic and professional success, increase in individual well-being and social inclusion. This paper is based on a case study conducted in a century-old ARS Inamdar Public Library, Pune to measure its social value for the community. The data was collected using two different questionnaires from a sample of 160 users and 110 non-users. The result shows that the library is valuable for most of the users as it helped them to keep up to date, to improve their information seeking skills and in their professional development. The library is quite a safe and calm place for studying and most of the users are getting benefits of the same. The non-users group acknowledged that the public library is playing important role in increased quality of life of the community served by it.

Keywords: Social Institution, Public Library, Social Value, Social Impact of Public Libraries, Community Development.

1. INTRODUCTION

A social institution is an integrated pattern of human relationships established by the common will and serving some vital human need (Martin, 1937). The public library is a social institution based on the democratic principal “of the people, by the people and for the people”. In other words, public libraries are locally based service organizations set up to meet the needs of the local communities and to operate within the context of the communities while contributing to the

creation and maintenance of a well-informed and democratic society. Public library is a barometer of democratic functioning of society in contemporary times (Kumar, 1998). In the modern age it has become a community centre for social, recreational and cultural activities, where all classes of people, rich or poor, high or low, congregate and enjoy the functions arranged for the purpose (Trehan, 1982).

American Library Association (ALA) issued a declaration in 2013 for the Right to Libraries which

serves as a strong public statement about the value of libraries for individuals, communities and their nation (ALA, 2013). The Declaration is in the spirit of the United States Declaration of Independence and the Universal Declaration of Human Rights. In the document it is believed that "... libraries are essential to a democratic society. Every day, in countless communities across our nation and the world, millions of children, students and adults use libraries to learn, grow and achieve their dreams. In addition to a vast array of books, computers and other resources, library users benefit from the expert teaching and guidance of librarians and library staff to help their minds and open new worlds" (ALA, 2013). The declaration further advocates for the value of libraries as

- (a) Libraries empower the individual
- (b) Libraries support literacy and lifelong learning
- (c) Libraries strengthen families
- (d) Libraries are the great equalizer
- (e) Libraries build communities
- (f) Libraries protect our right to know
- (g) Libraries strengthen our nation
- (h) Libraries advance research and scholarship
- (i) Libraries help us to better understand each other
- (j) Libraries preserve our nation's cultural heritage

2. SOCIAL VALUE OF PUBLIC LIBRARIES

"Impact" and "outcome" are often used synonymously in the professional literature. "Value" or "benefit" are generally broader terms. Definitions of library outcome generally highlight the effect on individual users or on users collectively. Impact links this with the library's aims and objectives and their relationship with its host institution's goals (Poll and Payne, 2006). The value of public libraries is, in one way, dependent on how well they perform their role, in other words, how well public library services meet the needs of their communities and how they and the impact they make

are valued by the citizens and the communities they serve (Aabo, 2005). The public library can become a responsible institution to a basic social need for information, and a powerful support of social changes when set up by the community as a whole. The collective community action for establishment and development of public libraries can be of direct benefit to a particular community or nation (Satyanarayana, 1997). The terms social value, social benefits, social capital or social impact are being used apparently interchangeably in the literature in a variety of ways (Berryman, 2005). The various approaches to identify the value of a public library can be divided into two broad groups: economic and social (Matthews, 2004).

Of course, the problem of attempting to assess outcome is complicated by the fact that the benefits from the use of the public library may accrue directly to the individual users, indirectly to the community, or both (Matthews, 2004). The users get social benefits as well as economic benefits as a result of using the public library. A researcher can attempt to assess the public library on the basis of either the social benefits or economic benefits. Here in this study our concern is to assess the public library on the basis of social benefits.

In 1987 a research team developed a formalized study of the service roles of public libraries at the behest of the Public Library Association (PLA) and American Library Association (ALA). The result of this effort, *Planning and Role for Public Libraries*, asserted that public libraries have established eight specific roles in communities: activity centre, information centre, education support centre, independent learning centre, popular material access, childhood learning centre, reference materials and support, and research centre. Each role is based on direct social involvement in the community and has clear implications for library planning, management, resources, and advocacy, serving as the nexus of the library's relationship with the community (McClure and Jaeger, 2009).

3. REVIEW OF LITERATURE

Debono (2002) reviewed the research which has been conducted to assess the social impact of public libraries and identified 15 potential social impacts and noted the number of studies that addressed each potential social impact. His study also results in a body of knowledge and tested methodologies on which researchers may draw when measuring the social impact of a public library upon the community it serves. Rooney-Browne (2011) summarizes the findings of a report to produce a comprehensive review of existing quantitative and qualitative evaluation methodologies for demonstrating the value of public libraries in the United Kingdom. On the basis of various review studies he suggested the following positive outcomes:

- (a) Increased quality of life
- (b) Access to culture and the arts
- (c) Equity/free access to resources
- (d) Improved personal development
- (e) Vocational and/or economic effects
- (f) Recreation,
- (g) Community building
- (h) Decreasing social isolation
- (i) Education, Health and general information, and
- (j) Public space

Poll and Payne (2006) also give overview of purposes and methods used in impact research and illustrate this through project experiences. According to them the benefits that users experience by using library services can be assessed in terms of knowledge gained, higher information literacy, higher academic and professional success, social inclusion and increase in individual well-being.

Rosenfeldt (2006) conducted a study to support public library advocates and planners by establishing who uses libraries, why, what services they most value and how they see them developing. On the basis of quantitative and qualitative data collected, he finds that Victorians place significant value in the availability of free library services in their

communities. Public library impacts powerfully on strengthening their communities, especially through information provisions, access to information technology and development of computing skills, lifelong learning and education and expansion of social networks. This is the most comprehensive research of its kind undertaken in Australia.

The report by Wavell, Baxter and Johnson (2002) of a study provides a critical overview on impact evaluation in museums, archives and libraries sector. It consisted largely of a review of the literature published during the last five years retrospective period, with a particular emphasis on impact evaluations conducted within UK. The methodologies used in these evaluation studies are discussed critically within the broad context of social, learning and economic impact. The most compelling evidence from this review indicates that the sector has an impact of personal development.

Considering the various aspects of tested methodologies and potential social impacts in foreign countries this study is an attempt in Indian context to measure the social value of public library.

3.1 Objectives of the Study

This case study was conducted to measure the social value of the ARS Inamdar Public Library (ARSIPL), Pune in the society with the following objectives:

- (a) To examine the Social Impact of ARSIPL
- (b) To examine the impact of Information Technology on ARSIPL
- (c) To provide library staff a clear picture of how their services impact on local communities

3.2 The ARS Inamdar Public Library, Pune

ARS Inamdar Public Library, Pune was established in 1915 with the sound objectives for educational development of Muslim Community particularly following the Aligarh Movement. Presently it is recognized as the category “A” grade public library at district level and receiving grant-in-aid by the

Government of Maharashtra under the provisions of the Maharashtra Public Libraries Act, 1967.

4. METHODOLOGY

Case study is an intensive study of a case which may be an individual, an institution, a system, a community, an organization, an event, or even the entire culture (Ahuja, 2009). It is a way of organizing social data so as to preserve the unitary character of the social object being studied (Goode and Hatt, 2006). To assess the comprehensive social impact of the library based on the various factors of social impact a survey was executed and data was collected through two different questionnaires, one for library members, and the second for non-users covering selected academicians, intellectuals, social workers, NGO officials, local community in the nearby area of ARSIPL. The data collected through questionnaires was supplemented following a short interview in some cases.

The sample size considered for users was determined using an online calculator available at www.surveysystem.com/sscalc.htm. There were 548 members of the library at the time of sampling. To calculate the sample size, the researcher considered only the active members. Active members are those who have borrowed books or other material at least two times in the last year and it was found from the library record that almost 50 percent of the registered users (i.e., 274) are active members. Taking Confidence Level 95 percent and Confidence Interval ± 5 , a sample size of 160 members was determined to represent the population of active members. For non-users survey a sample of 110 non-users was taken which may or may not be statistically valid because of the project limitations.

5. DATA ANALYSIS & INTERPRETATION

5.1 Library Users' Perspective of Social Impact of the Public Library

5.1.1 General

Gender-wise Distribution: There was majority of the male respondents (Table 1), only 25 percent are female among the library users.

Table 1: Gender-wise distribution of library members

Gender	Respondents	Percentage (%)
Female	40	25
Male	120	75
Total	160	100

Age-group Distribution: The age of respondents is well spread, as Table 2 shows most of the users (55 percent) fall under the age group 18-30 years, 6.87 percent are below 18 years but it is observed that none of them is below 15 years. Only few Senior Citizens (3.75 percent) are using the library.

Table 2: Age-wise distribution of library members

Age	Respondents	Percentage (%)
Below 18	11	06.87
18 to 30	88	55.00
31 to 40	31	19.38
41 to 60	24	15.00
61 or above	06	03.75
Total	160	100.00

Occupation/Status: The large portion of the users' community is students (40.63 percent) and servicemen (43.75 percent). Self employed persons are 8.75 percent; the number of retired persons and businessmen is unexpectedly less. House wives and social workers are included in the category of other persons and constitute 2.5 percent (Fig.1).

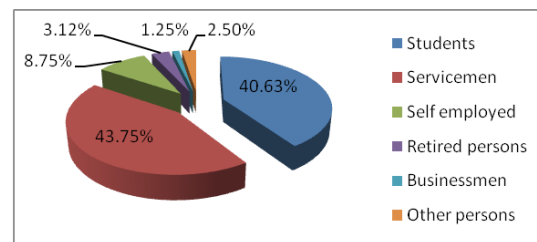


Figure 1: Social status of library members.

5.1.2 Benefits from the Library

The benefits as acknowledged by the user community are shown in Table 3; the respondents were allowed to check more than one option. The library is valuable for most of the users as it helped them to keep up-to-date (40.62 percent), to improve information seeking skills (40 percent), in their professional development (40 percent). 39.37 percent feel that library is safe and quite place for study and reading and 38.75 percent got helpful information for their study in school/college and university.

Among other benefits, 28.75 percent of the users said that the library helped them to save money in different ways, the library is an enjoyable place for 20.62 percent users where they like to spend some of their time, the library is important for 20.62 percent users for the leisure and recreation. Only a minor group of user community is taking benefits of online services like OPAC (20 percent), library website (19.37 percent), which means that there is lack of awareness or they need do not require these services. The library also providing help to users to save time (18.75 percent), to make contact with different kind of people (18.75 percent), to get information for job seeking (15 percent). Though the percentage of users benefitted by the public library in various ways is not much high under various categories of benefits but as most of the users are in the category of Students and Servicemen (fig.-1) and on the basis of data in Table 3, it is acknowledged that more or less the library is valuable for the user community.

Table 3: Benefits from the library

Benefited from library services	Respondents*	Percentage (%)
The library helped me to keep up-to-date	65	40.62
The library helped me to improve my information seeking skills	64	40.00
The library help me in my profession	64	40.00
I experienced the library safe	63	39.37

and quite place for studying and reading		
I received helpful information for school/college/university	62	38.75
The library helped me to save money	46	28.75
I experiences the library as an enjoyable place where I like to spend some of my time	33	20.62
The library was important for my leisure/recreation	33	20.62
Online catalogue is very helpful to search and locate the books	32	20.00
I got useful information on library website	31	19.37
It helped me to save time	30	18.75
I made contact with many different kind of people	30	18.75
I got helpful information f or job seeking	24	15.00
Others	03	01.87

*(Multiple answers were allowed)

As answers to the question “If the next year library would be closed down, could you get the same information/ services elsewhere?” users expressed the importance of library and its resources in users’ life (Table 4). According to 30 percent of the users they will not get the replacement of library services elsewhere, 27.50 percent will get the replacement but with more time and efforts, 18.75 percent will not get everything in other library and 16.25 percent have a replacement of this service. 7.5 percent have no opinion in this regard.

Table 4: Non-replacement of the library services

Getting library services elsewhere	Respondents	Percentage (%)
Yes	26	16.25
Yes, but it would take more time and effort	44	27.50
Yes, but not everything	30	18.75
No	48	30.00
Do not know	12	07.50
Total	160	100.00

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Table 5 depicts that majority of the respondents (59.37 percent) felt they could get the same services or information via the Internet, while 40 percent of them will go to another library and for other means also. So it seems that library and its services have an important place in a user's life.

Table 5: Alternative to library services

Alternative place to get information	Respondents*	Percentage (%)
on Internet	95	59.37
From another library	64	40.00
In purchased books	33	20.62
From colleagues, friends etc.	28	17.50
In the media	26	16.25
Others	11	06.87

*(Multiple answers were allowed)

5.1.3 Role of Public Library in the Society (for Users)

The outcome of the library is not mutually exclusive and as shown in Fig. 2; respondents reported multiple outcomes in the format of yes, no and don't know. Here researcher's anticipation is that the response of users with respect to outcomes reflects their priorities and awareness. Out of 11 outcomes as listed, users assigned higher importance to 6 outcomes and remaining 5 have less importance or do not come in the priorities of the users.

The library is playing important role in increased quality of life as responded by 83.12 percent users and providing information related to career and scholarship to the community as accepted by 70 percent users. The library have important role in personal development of individuals (65.62 percent) and enhancing literacy and lifelong learning (56.87 percent) and providing access to culture through its services and activities to 55 percent users. The library is also playing its role in community building, decreasing social isolation and enhancing computer literacy but it seems that user community is not aware of these impacts as responded by the users.

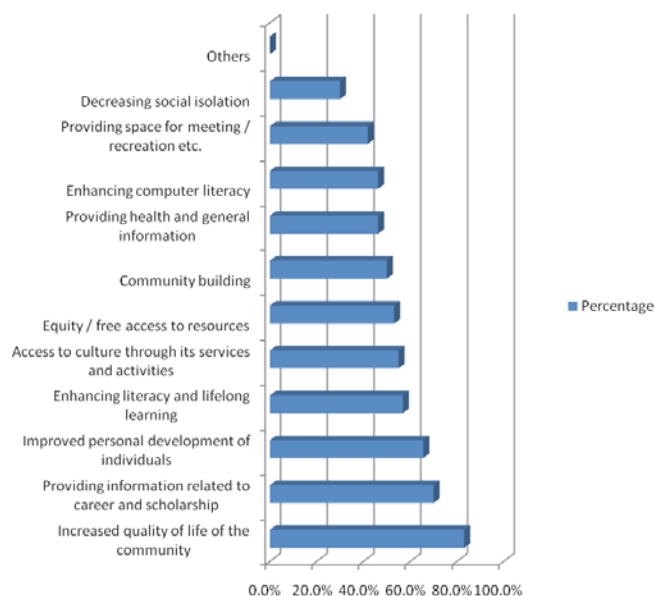


Figure 2: Important roles of the library as perceived by users.

5.2 Non-user's Perspectives on Social Impact of the Public Library

To know the views of non-users about the library and its value in the society a short questionnaire was filled up by 110 individuals.

5.2.1 General

Gender-wise Distribution: There was majority of the male respondents (Table 6), only 25.45 percent were female respondents.

Table 6: Gender-wise distribution of non-library members

Gender	Respondents	Percentage (%)
Female	28	25.45
Male	82	74.55
Total	110	100.00

Age group-wise Distribution: Table 7 shows age group-wise distribution of the non-users.

Table 7: Age-wise distribution of non-library members

Age	Respondents	Percentage (%)
Below 18	0	0.00
18 to 30	36	32.73
31 to 40	35	31.82
41 to 60	28	25.45
61 or above	11	10.00
Total	110	100.00

Occupation/Status: The non-users' community included academician (54.55 percent), retired persons (7.27 percent), social workers (5.46 percent), students (4.54 percent), businessmen (1.82 percent) and homemaker 1.82 percent. 24.54 percent people are engaged in other jobs (Table 8).

Table 8: Social status of non-users

Occupation	Respondents	Percentage (%)
Academician	60	54.55
Businessmen	02	01.82
Students	05	04.54
Retired persons	08	07.27
Homemaker	02	01.82
Social Worker	06	05.46
Other services	27	24.54
Total	110	100.00

5.2.2 Role of Public Library in the Society for Non-users

The responses of non-user community are also important to know the value of the library in society. Figure 3 shows that majority of the non-user community acknowledged the social value of the library.

The non-users were asked questions with respect to the expected benefits provided by the public library through its services to the community. 86.36 percent non-users accepted that the library

is playing an important role in increasing quality of life of the community served by it. The library also supports lifelong learning (82.72 percent) and it is a centre of formal and non-formal education as agreed to by 81.81 percent. A majority of non-users (80.9 percent) feels that public library promotes culture through its activities and services; it is playing an important role in community building as agreed by 79.09 percent. In all the above options, negative response was in the range of 5 to 10 percent.

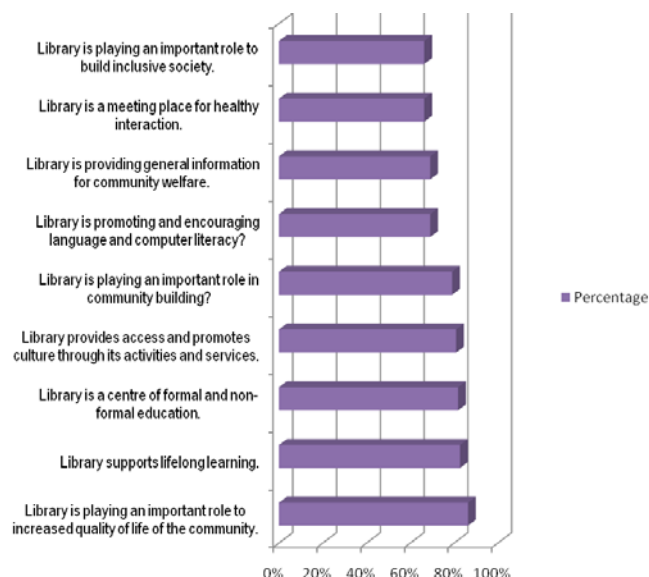


Figure 3: Important roles of the library as perceived by non-users

For other options, as mentioned below, there was “positive” response (66 to 70 percent) and “negative” response (10 to 20 percent):

- Promoting and encouraging language and computer literacy (69.09 percent)
- Providing general information for community welfare (69.09 percent)
- Providing meeting place for healthy interaction (66.36 percent)
- Playing an important role to build inclusive society (66.36 percent)

6. MAJOR FINDINGS OF THE STUDY

The outcome of the study as mentioned here show the value of public library and its services for the community being served. The social value can be measured on the basis of benefits received by the users individually or collectively (Tables 3-5):

- (a) The library is valuable for most of the users as it helped them to keep up-to-date in improving their information seeking skills and in their professional development.
- (b) The library is quite safe and calm place for studying and reading and most of the users are getting benefits of the same.
- (c) Among other benefits, the library is helping the user community to save money in different ways, providing them an enjoyable place where they like to spend some of their time.
- (d) Library is important for some of the users as they get material for their leisure and recreation.
- (e) Few users are taking benefits of library's online services like OPAC, website etc. The library is also providing help to users to save their time and to get information for job seeking.
- (f) For most of the users this library is unique and they will not get same resources and services elsewhere in the city. Some of the users have alternate to this library but others will get the same services with more time and efforts or will not get everything.
- (g) For different users there are different sources of information alternate of this library services like Internet, another library, purchased books, colleagues or friend and the media. It shows that this library and its services have important place for the community.

The library users and non-users have acknowledged the impact of library services on enhancing social values as under

- (a) The library is playing an important role in increased quality of life of the community and also improved personal development of individuals.
- (b) The library also supports lifelong learning and it is a centre of formal and informal education.
- (c) It is providing information related to career and scholarship, equal access to its resources and enhancing literacy, lifelong learning and computer literacy.
- (d) It is playing an important role in community building and access to culture through its services and activities.
- (e) The library is also promoting and encouraging language and computer literacy, providing general information for community welfare, providing meeting place for healthy interaction and playing a significant role to build inclusive society.
- (f) It is providing health and general information, space for meeting and recreation and have link with the decreasing social isolation.

7. CONCLUSION

On the basis of this study it is concluded that the ARSIPL, Pune, a hundred years old social institution, has the potential to deliver its services to the community contributing to quality life of the community, lifelong learning, community building, social inclusion and so on. It is acknowledged that ARS Inamdar Public Library supports confidence building of the community and social networking in different ways. The values of these outcomes may vary from library to library. If we generalize the results, they are also applicable to other public libraries but to know the actual status of outcomes from their services for the society qualitative and quantitative studies are required.

This type of studies are not very common in India. It is expected that the findings of this study

will help to the policy makers, library authorities, library staff, the community which have established the library and the society to judge the social value of public library system with respect to its mission in the changing society. It is recommended to conduct this type of studies at district, taluka and village level public libraries in Maharashtra or at National level.

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Research and Publishing Trends by Agricultural Scientists: A Bibliometric Analysis of Indian Journal of Agricultural Research –2012-2014

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ABSTRACT

The present study contains a bibliometric analysis of Indian Journal of Agricultural research. The study covers three volumes (Volume No. 46 to 48) published between 2012 and 2014. The study includes year-wise, subject-wise distribution of contributions in the field of agricultural sector. Authorship pattern, geographical distribution of contribution, prolific contributors to the journal, state-wise distribution of the contribution within India and as well as county-wise distribution of the contribution across the world etc. are being taken up for this study. In the field of agricultural sector, it is observed that collaborative research is predominated, the degree of collaboration in Indian Journal of Agricultural Research is 0.9638 which clearly indicates its dominance upon individual contribution. Agricultural Universities are conducting more research work to develop the agriculture and its allied areas compared to that of the individual sector specified Research Institutes. The scope of publication of research articles in the Indian Journal of Agricultural Research is going internationally. Majority of the research articles in agriculture sector were contribution from the authors from the States of Haryana, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Punjab. Majority of the articles 42 (19%) have a length of four pages, 42 (19%) have a length of five pages, Maximum number of citations 1401 (40.46 %) produced in 2013 followed by 1255 (36.25%) citations in 2014, and 806 (23.28%) citations in 2012. Agricultural researchers preferred journal articles more frequently for their research work, than any other types of communication channels.

Keywords: Bibliometrics, Bibliography, Authorship pattern, Geographical distribution, Citation Analysis

1. INTRODUCTION

The word “bibliometrics” constitutes one of the major thrust areas of research in the field of library and

information science. It utilizes quantitative analysis and statistics to describe patterns of publications within a given field or body of literature. The term statistical

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bibliography was first employed by E.W. Hulme in 1923, to refer to the application of quantitative techniques to libraries. The word bibliometrics appeared in print in 1969 in Alan Pitchard's article statistical bibliography or bibliometrics in the December issue of the Journal of Documentation. It flourished in early 20th century with the works of Lotka, Bradford and Zipf who observed distribution pattern in word frequency, author and journal productivity. Bibliometric methods have been used in Eastern Europe countries to monitor science and scientists. The field of bibliometrics has produced major information scientists such as B.C. Brookers and H. Egghe.

2. SCOPE AND LIMITATIONS OF THE STUDY

The present study has been undertaken in order to know the nature and contents of articles in the Indian Journal of Agricultural research. The Indian Journal of Agricultural Research is an official publication of Agricultural Research Communication Centre. It publishes original research articles by renowned scientists on all aspects of plant and soil science. The aim of the journal is to provide a forum for the scientific community to publish their research findings and also to open new vistas for further research. It is one of the leading journals being published for the last forty five years and is being scanned in the important indexing and abstracting journals of the world. The major limitations of the present study are - The study is limited to the articles of Vol. 46 to 48 of Indian Journal of Agricultural Research from years 2012 to 2014. It is a quarterly journal, so naturally 16 issues have been analysed.

3. SOURCES OF DATA

In order to analyse the Indian Journal of Agricultural Research, the primary sources used by the investigator are the issues of the journal volume 46 to 48 for the period years 2012-2014. Sixteen issues of the journals are taken as the sources of data. All the issues are minutely scanned to collect the necessary data.

4. VARIABLES CONSIDERED FOR ANALYSIS

The following variables were considered for analysis to draw meaningful conclusion:

- Total number of articles appeared during the period 2012-2014
- Subject-wise breakup articles
- Authorship pattern and collaborative authors
- Geographical distribution of contribution
- Number of pages per article
- The prolific contribution to the journal

5. OBJECTIVES OF THE STUDY

- Year-wise distribution of the contribution
- Subject-wise distribution of contribution
- Authorship pattern
- Geographical distribution of contribution.
- Prolific contributors to the journal
- Average length of the article per volume

6. METHODOLOGY:

Document analysis was the major techniques used by the investigators for the current study. A specially prepared data sheet was used for analysing the 16 issues of the Indian Journal of Agricultural Research manually. Data items for source contributions included authors' name, number of authors, institutional contributions and geographical distribution of the contribution, number of pages, and subject of articles. After collection of all these data, the analysis was done manually.

The method used by the investigators for the analysis of data collected, was purely manual. To draw meaningful conclusions various techniques have to be used for the analysis. They are documental analysis, calculation of percentages and averages, preparation of frequency tables, diagrammatical representation and statistical analysis.

7. DATA ANALYSIS & INTERPRETATION

Research articles contribution to Indian Journal of Agricultural Research

Table 1 – Research articles published in Indian Journal of Agricultural Research

Year	Volume	Issues	Articles
2012	46	4	59 (26.69%)
2013	47	6	84 (38.00%)
2014	48	6	78 (35.29%)
Total	3	16	221 (100%)

Table 1- Analysed that a total of 221 articles were published in Indian Journal of Agricultural Research during the year between 2012 and 2014. Out of the 221 contributions from the selected three years, 38% (84) research articles were published in Volume 47 (1-6) during the year 2013, 35% (78) research articles were published in Volume 48 (1-6) in 2014 and 26% (59) research articles were published in volume 46 (1-4) during the year 2012.

This analysis reveals that more research articles on agriculture sector was published during the year 2013 when compared to the years 2012 and 2014.

Subject Wise Distribution of Articles

Table 2 – Subject wise distribution of articles.

Subject wise distribution of articles		
Subjects	Number of articles	Percentage
Agronomy	23	10.4
Irrigation Genetics	22	9.95
Plant Pathology	21	9.50
Fruits and Horticulture	17	7.69
Plant Breeding	17	7.69
Entomology	16	7.23
Biochemistry	14	6.33
Vegetable science	13	5.88
Agricultural Engineering	12	5.42
Environmental Science	12	5.42
Seed Science and Technology	12	5.42
Post Harvest Technology	10	4.52

Soil Science	9	4.07
Microbiology	8	3.61
Plant Physiology	8	3.61
Floriculture and Landscaping	7	3.16
	221	100

The table 2, analysis shows that majority of the articles contributed which appeared under the subject Agronomy 23 (10.4%) followed by Irrigation Genetics 22 (9.95%), Plant Pathology 21 (9.50%), Fruits & Horticulture is 17 (7.69%), Plant Breeding is 17 (7.69%), Entomology 16 (7.23%), Biochemistry 14 (6.33%), Vegetable Science 13 (5.88%), Agricultural Engineering and Environmental Science 12 (5.42%), Seed Science & Technology 12 (5.42%), Post-Harvest Technology 10 (4.52%), Soil Science 9 (4.52%), Microbiology 8 (3.61%), Plant Physiology 8 (3.61%) and Floriculture & Landscaping 7 (3.16%).

This study reveals that majority of the agricultural scientists are conducting research and publishing their research findings in Agronomy, Irrigation Genetics, Plant Pathology, Fruits and Horticulture & Plant Breeding and Entomology subjects.

Year - wise Authorship pattern of the contribution

Table 3 – Year-wise Authorship pattern of the contribution.

Sl. No.	Year-wise authorship pattern of the contribution	2012	2013	2014	Total	%
1	One Author	1	4	3	8	3.61%
2	Two Author	11	22	21	54	24.43%
3	Three authors	23	25	21	69	31.22%
4	Four Authors	16	19	14	49	22.17%
5	Five Authors	6	7	10	23	10.40%
6	Six Authors	2	4	6	12	5.42%
7	Seven Authors	0	0	2	2	0.90%
8	Eight Authors	0	3	1	4	1.80%
Total		59	84	78	221	100%

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The Table – 3, Analysis of the 221 contributions (articles) reveals that there are 8 contributions (3.61%) by single authors, 54 contributions (24.43%) by two authors, 69 contributions (31.22%) by Three authors, 49 contributions (22.17%) by four authors, 23 contributions (10.40%) by five authors, 12 contributions (5.42%) by six authors, 2 contributions (0.90%) by seven authors and 4 (1.80%) contributions by eight authors.

This analysis reveals that more number of authors desires to write collaboratively and only less number of people likes to produce individual write-up work by less than two authors. i.e. the trend towards multiple authorship or collaborative research predominates in writing of articles in the field of agriculture sector.

Degree of collaboration in the Indian Journal of Agricultural Research

The formula given by K. Subramanyam is useful for determining the degree of collaboration in quantitative terms. The study followed the same formula which is mathematically put as

$$C = \frac{NM}{NM + NS}$$

Where C = Degree of Collaboration

NM= Number of Multi authored papers

NS= Number of Single authored papers in this present study

NM = 213

NS = 8

$$C = \frac{213}{213 + 8} = 0.9638$$

C = 0.9638

Thus the degree of collaboration in Indian Journal of Agricultural Research is 0.9638 which clearly indicates its dominance upon individual contribution.

Agricultural Universities v/s Research Institutes contribution:

Table - 4, Universities v/s Research Institutes contribution

Sl.N	Contribution	2012	2013	2014	Total	%
1	Research Institutes	13	24	15	52	23.52%
2	Universities	46	60	63	169	76.47%
Total		59	84	78	221	100%

The table 4, reveals an analysis of agricultural universities contribution and research institute's contributions to the agricultural research scenario. This study indicates that out of the 221 contributions, 76.47% (169) have been contributed by Agricultural Universities and 23.52% (52) by the Research Institutes. This analysis reveals that the Agricultural Universities are conducting more research work to develop the agriculture and its allied areas compared to that of the individual sector specified Research Institutes.

Geographical Distribution of contribution Country wise contribution

Table 5- Country wise contribution.

Sl. N.	Country	2012	2013	2014	Total	%
1	India	51	75	65	191	86.42%
2	Nigeria	4	1	3	8	3.61%
3	Iran	2	3	2	7	3.16%
4	China	1	2	0	3	1.35%
5	Bangladesh	0	1	1	2	0.90%
6	Turkey	0	0	2	2	0.90%
7	Australia	0	0	1	1	0.45%
8	Algeria	0	1	0	1	0.45%
9	Czech Republic	0	0	1	1	0.45%
10	Ethopia	0	1	0	1	0.45%
11	Japan	1	0	0	1	0.45%
12	Mexico	0	0	1	1	0.45%
13	Pakistan	0	0	1	1	0.45%
14	Taiwan	0	0	1	1	0.45%
Total		59	84	78	221	100%

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The table 5, reveals the geographical distribution of contributions by the authors, which indicates that, out of 221 contributions from 14 countries, 191 (86.42%) contributions are from India alone. Nigeria has contributed 8 (3.61%) contributions, Iran has contributed 7 (3.16%) contributions, China has contributed 3 (1.35%) contributions, Bangladesh has contributed 2 (0.90%) contributions, Turkey has contributed 2 (0.90%) contributions, whereas the countries like Australia, Algeria, Czech Republic, Ethiopia, Japan, Mexico, Pakistan and Taiwan have a single (0.45%) contribution in the Indian Journal of Agricultural Research.

The study reveals that the scope of publication of research articles in the Indian Journal of Agricultural Research is going international. Out of 221 contributions, 30 (13.58%) contributions are from the authors from Nigeria, Iran, China, Bangladesh, Australia, Algeria, Czech Republic, Ethiopia, Japan, Mexico and Pakistan. In bibliometrics, the value of the geographic origin of the author indicates the international standing and acceptability of the journal. This study also reveals that most of the research articles 191 (86.42%) contributions are by Indian researchers.

State wise contribution in India

Table -6, State wise contribution in India

S.N.	States	2012	2013	2014	Total	%
1.	Haryana	5	9	20	34	17.80%
2.	Uttar Pradesh	5	3	17	25	13.08%
3.	Andhra Pradesh	4	7	10	21	10.99%
4.	Tamil Nadu	5	7	4	16	8.37%
5.	Punjab	3	7	6	16	8.37%
6.	Jammu & Kashmir	6	0	6	12	6.28%
7.	Karnataka	2	7	2	11	5.75%
8.	Maharashtra	3	3	5	11	5.75%
9.	Uttarakhand	4	6	0	10	5.23%
10.	Rajasthan	1	4	4	9	4.71%
11.	Gujarat	2	4	1	7	3.66%
12.	Himachal Pradesh	1	5	1	7	3.66%
13.	New Delhi	2	4	1	7	3.66%
14.	Assam	2	2	2	6	3.14%

15.	West Bengal	2	2	1	5	2.61%
16.	Bihar	3	0	1	4	2.09%
17.	Kerala	0	2	2	4	2.09%
18.	Madhya Pradesh	0	0	3	3	1.57%
19.	Meghalaya	0	1	2	3	1.57%
20.	Odisha	1	0	1	2	1.04%
21.	Arunachal Pradesh	0	0	1	1	0.52%
22.	Bhopal	0	0	1	1	0.52%
23.	Chhattisgarh	0	0	1	1	0.52%
24.	Goa	0	0	1	1	0.52%
25.	Jharkhand,	0	0	1	1	0.52%
26.	Nagaland	0	1	0	1	0.52%
27.	Tripura	0	1	0	1	0.52%
	Total	51	75	65	191	100%

Table- 6, depicts an analysis of the geographical distribution of contribution by researchers by in India (state-wise) to Indian Journal of Agricultural research. The study reveals that out of 191 contributions from 27 states, Haryana has contributed 34 (17.80%) contributions, followed by Uttar Pradesh 25 (13.08%) contributions, Andhra Pradesh 21 (10.99%) contributions, Tamil Nadu 16 (8.37%) contributions, Punjab 16 (8.37%) contributions, Jammu Kashmir 12 (6.28%) contributions, Karnataka 11 (5.75%) contributions, Maharashtra 11 (5.75%) contribution, Uttarakhand 10 (5.23%) contributions, Rajasthan 9 (4.71%) contributions, Gujarat 9 (4.71%) contributions, Himachal Pradesh 9 (4.71%) contributions, New Delhi 9 (4.71%) contributions, Assam 6 (3.14%) contribution, West Bengal 5 (2.61%) contributions, Bihar 4 (2.09%) contributions, Kerala 4 (2.09%) contributions, Madhya Pradesh 3 (1.57%) contributions, Meghalaya 3 (1.57%) contributions, Odisha 2 (1.04%) contributions. The rest of the States likes Arunachal Pradesh, Bhopal, Chhattisgarh, Goa, Jharkhand, Nagaland and Tripura have 1 (0.52%) contribution only.

Thus the study reveals that majority of the research articles in agriculture sector were contribution from the authors from the States of Haryana, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Punjab.

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Most Prolific Contributors to Indian Journal of Agricultural Research

A rank list of contributors to Indian Journal of Agricultural Research with more than three articles, during the period 2012 – 2014 has been prepared. Totally 221 articles were contribution from 660 authors (includes single and co-authors).

Table -7, Most Prolific Contributors to Indian Journal of Agricultural Research.

SL No.	Rank	Name of the Authors	No of articles contributed from 2012 to 2014	Percentage
1	1	V.K. Sharma	4	1.80%
2	2	A. Siva Sankar	3	1.35%
3	2	A.K. Singh	3	1.35%
4	2	A.P. Singh	3	1.35%
5	2	Ashok Kumar	3	1.35%
6	2	D.K. Groover	3	1.35%
7	2	G Padmaja	3	1.35%
8	2	G. Satyanarayana Reddy	3	1.35%
9	2	Lakhi Ram	3	1.35%
10	2	P. Chandrasekhar Rao	3	1.35%
11	2	Renu Devi	3	1.35%
12	2	Rupesh Sharma	3	1.35%
13	2	S.K. Sharma	3	1.35%
14	2	S.K. Singhal	3	1.35%
15	2	T. Padmalatha	3	1.35%
Total			46	20.81%

Table -7, reveals that the list contains the names of 15 authors with more than three articles contribution by each to Indian Journal of Agricultural research during the period of 2012-2014. The contributions from all of them when taken together, constitutes 46 (20.81%) contributions out of the total contributed articles (221). The author V.K. Sharma has obtained first rank and he has contributed 4

(1.80%) articles. The rest of the fourteen authors stands second rank and their contribution is 3 (1.35%) articles.

Average page length of the article per volume

Table -8, Page length of the article

Page length	2012	2013	2014	Total	Percentage
Two Pages	3	0	2	5	2.26%
Three Pages	7	13	10	30	13.57%
Four Pages	9	15	18	42	19%
Five Pages	15	22	15	42	19%
Six Pages	13	12	11	36	16.28%
Seven Pages	7	13	12	32	14.47%
Eight Pages	4	4	4	12	5.42%
Nine Pages	0	2	2	4	1.80%
Ten Pages	0	2	3	5	2.26%
Eleven Pages	0	0	1	1	0.45%
Twelve Pages	1	0	0	1	0.45%
Fourteen pages	0	1	0	1	0.45%
Total	59	84	78	221	100

Table -8, reveals that the majority of the articles 42 (19%) have the length of four pages, 42 (19%) have length of five pages, 36 (16.28%) with length of with six pages, 32 (14.47%) articles with seven pages, 30 (13.57%) articles with three pages, 12 (5.42%) articles with eight pages, 5 (2.26%) articles with two pages, 5(2.26%) articles with ten pages, 4 (1.80%) articles with nine pages, 1(0.45%) articles with eleven page, 1 (0.45%) with twelve page, 1 (0.45%) with fourteen page.

CITATION ANALYSIS

Year wise Distribution of Citations

The references provided by the authors at the end of their articles are the basis of citation analysis. Citation traces a connection between two documents, one which cites and the other which is cited. Citation

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analysis is one of the popular methods applied to derive the following benefits

Table 9: Year wise Distribution of Citations

Year	Vol.	issues	Citation
2012	46	4	806 (23.28%)
2013	47	6	1401 (40.46%)
2014	48	6	1255 (36.25%)
Total	3	16	3462 (100%)

The above table 9 showed that maximum number of citations 1401 (40.46 %) produced in 2013 followed by 1255 (36.25%) citations in 2014, and 806 (23.28%) citations in 2012.

Forms of Document Cited

Table10: Forms of Document Cited

Forms of Document Cited	Total Number of Citation	Percentage
Journals	1315	37.98
Seminar / conference proceedings	1010	29.17
Books	507	14.64
Website	205	5.92
Research Reports	138	3.98
Reference Books	87	2.51
Dissertations	64	1.84
Abstract	50	1.44
Annual Reports	48	1.38
News letters	38	1.09
Total	3462	100%

The table, 10 reveals that majority of the contributors preferred journals as the source of information which occupied the top position with the highest number of citations 1315 (37.98%) of the total 3462 citations followed by Seminar / Conference Proceedings with 1010 (29.17%) citations, Books with 507 (14.64%) citations,

Websites with 205 (5.92%) citations, research reports with 138 (3.98%) citations, reference books with 87 (2.51%) citations, dissertations with 64 (1.84%), abstracts with 50 (1.44%) citations, annual reports with 48 (1.38%) citations and newsletters with 38 (1.09%) citations. It is found that the agricultural researchers preferred journal articles more frequently for their research work, than any other types of communication channels.

Major Findings of the Study:

1. Majority of the research articles on agriculture sector was published during the year 2013 when compared to the years 2012 and 2014.
2. Majority of the agricultural scientists are conducting research and publishing their research findings in Agronomy, Irrigation Genetics, Plant Pathology, Fruits and Horticulture & Plant Breeding and Entomology subjects.
3. Multiple authorship or collaborative research predominates in writing of articles in the field of agriculture sector. The degree of collaboration in Indian Journal of Agricultural Research is 0.9638 which clearly indicates its dominance upon individual contribution.
4. Agricultural Universities are conducting more research work to develop the agriculture and its allied areas compared to that of the individual sector specified Research Institutes.
5. The scope of publication of research articles in the Indian Journal of Agricultural Research is going international.
6. Majority of the research articles in agriculture sector were contribution from the authors from the States of Haryana, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Punjab.
7. The author V.K. Sharma has obtained first rank and he has contributed 4 (1.80%) articles.

Madhu K.N.

8. Majority of the articles 42 (19%) have the length of four pages, 42 (19%) have length of five pages,
9. Maximum number of citations 1401 (40.46 %) produced in 2013 followed by 1255 (36.25%) citations in 2014, and 806 (23.28%) citations in 2012.
10. Agricultural researchers preferred journal articles more frequently for their research work, than any other types of communication channels.

RECOMMENDATION:

Based on the research findings from the study, the following recommendations are proffered:

1. The Institute should constitute a Publication and Research Presentation Committee whose responsibility would be to ensure that there is constant publications and tentative research results presentations of all the funded and sponsored agricultural projects.
2. Since funding has not served as yard stick for productivity as revealed by the study, it is therefore recommended that research with effective improvement to agriculture should be recognized through awards and appreciations to deserving scientists, field assistants/technicians and all contributors to the research break through.
3. It is also recommended that similar studies should be undertaken on other publications that are published from ICARs Research Institutes, State Agricultural Universities, to facilitate planning and administration for agricultural improvement, food security, sustainability and sufficiency.

CONCLUSION:

The bibliometric analysis of the articles in the 46 to 48 volumes of the Indian Journal of agricultural research

shows the various characteristics of the published literature in agricultural sector. The publishing trend totally depends on the productivity pattern of the authors. Now a days we can see the team research or collaborative research is visible in all the areas of knowledge, particularly in science and technology and with special reference in agriculture sector. The present study also reveals that the trend collaborative research is increasing in the agricultural science discipline. The study revealed that Maximum number of citations 1401 (40.46%) produced in 2013 followed by 1255 (36.25%) citations in 2014, and 806 (23.28%) citations in 2012. The agricultural researchers preferred journal articles more frequently for their research work, than any other types of communication channels.

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Sir. C.V. Raman's Contribution to Physics Literature: A Study Using SAO/NASA Astrophysics Data System

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ABSTRACT

C.V. Raman has contributed many classic papers in Physical sciences during his years at the Indian Association for the Cultivation of Science, Indian Institute of Science and the Raman Research Institute. In this paper we would like to emphasis on his scientific contributions in Physics domain. In this study NASA\ADS has been used to analyze citation pattern of the research papers published by C.V Raman. Since NASA/ADS covers only Astronomy & Astrophysics, Physics and Geophysics, the present study was restricted to papers published in the field of Physics. The analysis includes year wise distribution of publications; authorship pattern, collaboration; and journal preferences for the publication. In his entire career as a scientist he has collaborated with 27 eminent scientists and students and has published a total of 144 papers during the years 1907–1963.

1. INTRODUCTION

Scientometrics is a study concerned with the quantitative features and characteristics of science and scientific research. It is a technique used for the documenting works of eminent scientists and researchers. In this study an attempt has been made to analyze the communication and collaboration pattern of C.V. Raman in physical sciences domain as reflected through NASA\ADS.

Chandrasekhara Venkata Raman (C. V. Raman) was born at Trichinopoly in Southern India

on November 7th, 1888. His father was a lecturer in mathematics and physics so that from the first he was immersed in an academic atmosphere. He entered Presidency College, Madras, in 1902, and in 1904 passed his B.A. examination, winning the first place and the gold medal in physics; in 1907 he gained his M.A. degree, obtaining the highest distinctions. His earliest researches in optics and acoustics - the two fields of investigation to which he has dedicated his entire career - were carried out while he was a student.

Since at that time a scientific career did not appear to present the best possibilities, Raman joined the Indian Finance Department in 1907; though the duties of his office took most of his time, Raman found opportunities for carrying on experimental research in the laboratory of the Indian Association for the Cultivation of Science at Calcutta (of which he became Honorary Secretary in 1919). In 1917 he was offered the newly endowed Palit Chair of Physics at Calcutta University, and decided to accept it. After 15 years at Calcutta he became Professor at the Indian Institute of Science at Bangalore (1933-1948), and since 1948 he was Director of the Raman Institute of Research at Bangalore, established and endowed by him. He also founded the *Indian Journal of Physics* in 1926, of which he is the Editor. Raman sponsored the establishment of the Indian Academy of Sciences and has served as President since its inception. He also initiated the *Proceedings* of that academy, in which much of his work has been published, and is President of the Current Science Association, Bangalore, which publishes *Current Science (India)*.

In 1922 he published his work on the “Molecular Diffraction of Light”, the first of a series of investigations with his collaborators which ultimately led to his discovery, on the 28th of February, 1928, of the radiation effect which bears his name (“A new radiation”, *Indian J. Phys.*, 2 (1928) 387), and which gained him the 1930 Nobel Prize in Physics. Sir Chandrasekhara Venkata Raman died on November 21, 1970. (Venkataraman, G.)

2. NASA/ASTROPHYSICS DATA SYSTEM

The NASA Astrophysics Data System is a popular citation database widely known as ADS. The NASA Astrophysics Data System Abstract Service resides at the centre of URANIA, the most sophisticated discipline centered bibliographic system ever developed. The typical astronomer, on average, uses

the ADS every day; It offers time-cited data of papers published in journals, conference proceedings, book chapters, etc. This is a comprehensive database in the field of astronomy and astrophysics containing more than 9.6 million bibliographic records. (Meera and Manjunath). ADS provides bibliographic information to the majority of astronomical researchers worldwide. It contains abstracts, full-text scans of journal articles, links to articles and data online at other data centers, and reference/citation information available for free to users all over the world.

This service provides access to three databases: Astronomy and Astrophysics, Physics and Geophysics, and the arXiv.org preprints in Astronomy. Users can use one of the obtainable query forms to submit queries by author, object name, date range, words in the title, and words in the abstract text. ADS has highly customizable query forms (Figure 8), and full-text scans of much of the astronomical literature which can be browsed or searched via their full-text search interface. (Meera and Manjunath)

3. METHODOLOGY

We have used NASA/ADS database to retrieve time-cited data for the papers published by C.V. Raman. A search for the author, “Raman C.V”, may retrieve many articles of the other authors with the same name. We have carefully selected articles published by him by going through each retrieved record. Bibliographic records selected accordingly are posted into a “Private Library” - a facility provided by the system. The private library thus created for C V Raman is given below in Figure 10. (The SAO/NASA Astrophysics Data System)

4. OBJECTIVES

- To know the authorship pattern, collaborative research pattern of Sir. C.V. Raman
- To identify the Core Channels of Communication and distribution of publications

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- To compare the research output, in terms of the number of citation received, and how far his top cited works have importance in present study.

1933	-	1961	-	
1934	-	1962	1	0.69
		Total	144(100%)	

5. DATA ANALYSIS

Based on the ADS private library, an attempt was made to analyze the amount of literature that has been contributed by Sir. C.V. Raman. There were 144 articles indexed in ADS. As shown in Table – 1, in 65 years of publication Sir. C.V. Raman had published on an average of 2-3 articles per year in physics. Highest number of articles have been appeared in the year 1922 (13, 9.2%) followed by 1927 (12, 8.33%) and 1921 (11, 7.63%).

Table - 1: Publication Productivity in Chronological Order

Year	No. of Publications	%	Year	No. of Publications	%
1907	1	0.69	1935	1	0.69
1908	1	0.69	1936	1	0.69
1909	3	2.08	1937	1	0.69
1910	1	0.69	1938	5	3.47
1911	2	1.38	1939	3	2.08
1912	-		1940	5	3.47
1913	-		1941	5	3.47
1914	1	0.69	1942	5	3.47
1915	1	0.69	1943	-	
1916	1	0.69	1944	-	
1917	1	0.69	1945	2	1.38
1918	3	2.08	1946	-	
1919	5	3.47	1947	-	
1920	4	2.77	1948	2	1.38
1921	11	7.63	1949	-	
1922	13	9.02	1950	-	
1923	10	6.94	1951	-	
1924	2	1.38	1952	-	
1925	9	6.25	1953	-	
1926	6	4.16	1954	-	
1927	12	8.33	1955	-	
1928	10	6.94	1956	-	
1929	7	4.86	1957	-	
1930	1	0.69	1958	-	
1931	7	4.86	1959	-	
1932	1	0.69	1960	-	

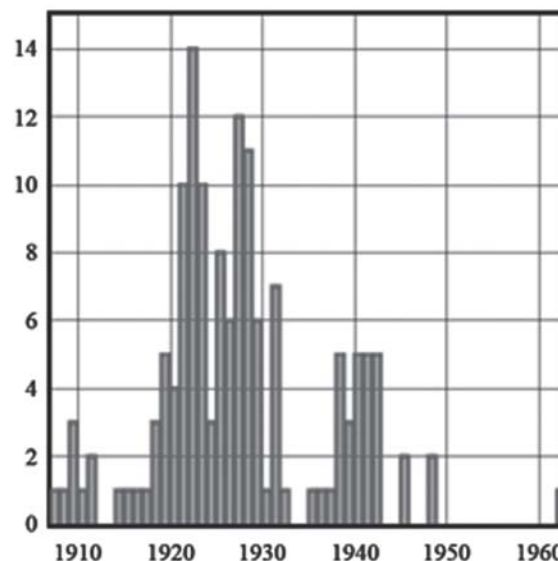


Fig 1: Graphical representation of Table 1

Table – 2: Authorship Pattern

Year	Single and Multi authored Papers			Total
Year	Single	Two	Three	
1907	1	-	-	1
1908	1	-	-	1
1909	3	-	-	3
1910	1	-	-	1
1911	2	-	-	2
1912	-	-	-	-
1913	-	-	-	-
1914	1	-	-	1
1915	1	-	-	1
1916	1	-	-	1
1917	1	-	-	1
1918	2	1	-	3
1919	4	1	-	5
1920	2	2	-	4
1921	8	3	-	11
1922	13	-	-	13
1923	8	2	-	10
1924	1	1	-	2
1925	2	7	-	9
1926	4	2	-	6

1927	4	8	-	12
1928	1	9	-	10
1929	5	2	-	7
1930	1	-	-	1
1931	4	3	-	7
1932	-	1	-	1
1933	-	-	-	-
1934	-	-	-	-
1935	-	1	-	1
1936	-	1	-	1
1937	-	1	-	1
1938	-	5	-	5
1939	-	3	-	3
1940	-	5	-	5
1941	1	2	2	5
1942	4	1	-	5
1943	-	-	-	-
1944	-	-	-	-
1945	2	-	-	2
1946	-	-	-	-
1947	-	-	-	-
1948	2	-	-	2
1949	-	-	-	-
1950	-	-	-	-
1951	-	-	-	-
1952	-	-	-	-
1953	-	-	-	-
1954	-	-	-	-
1955	-	-	-	-
1956	-	-	-	-
1957	-	-	-	-
1958	-	-	-	-
1959	-	-	-	-
1960	-	-	-	-
1961	-	-	-	-
1962	1	-	-	1
1963	-	-	-	-

As shown in Table – 2, out of 144 papers, single authorship papers were 79(54.86%), two authorship papers were 61(42.36%) and three authorship papers were only 2 (1.38%). Raman was more interested to publish his research findings individually rather than collaborate with multiple authors.

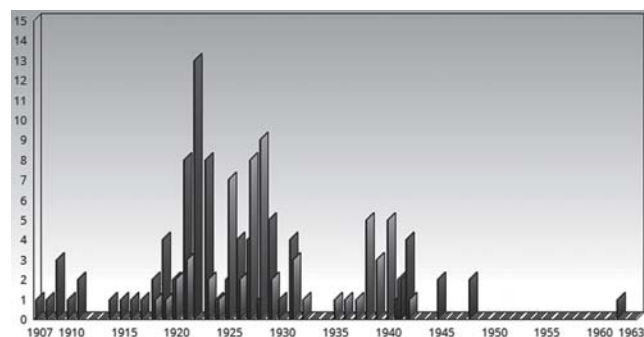


Fig 2: Graphical representation of Authorship Pattern

Table – 3: Authorship credit of Researchers collaborating with C.V.Raman

Collaboration is an intense form of interaction that allows for effective communication as well as the sharing of competence and other resources. Melin [17]. Table – 3 lists the 27 different authors who have contributed with Sir.C.V.Raman in Physics disciplines. Among them Krishnan K.S. (15), Nilakantan P. (7), and Nedungadi T.M.K. (4) are top three collaborators with whom he has published 26 papers.

Co-author Name	Total Co-authored articles (%)	Period of Association		
		From	To	Total Years
Banerji, Bhabonath	1	1920	-	1
Banerji, K.	1	1925	-	1
Bhagavantam, S.	3	1931	1932	2
Chinchalkar, S.W.	1	1931	-	1
Datta, S.K.	1	1925	-	1
Dey, Ashutosh	1	1919	-	1
Ganesan, A.S.	2	1923	1924	2
Ghosh, P.N.	1	1918	-	1
Krishna Datta, Sushil	1	1925	-	1
Krishnamurti, P.	1	1929	-	1
Krishnan, K.S.	15	1925	1929	5
Kumar, Sivakali	1	1920	-	1
Nagendra Nath, N.S.	1	1936	-	1
Nedungadi, T.M.K.	4	1939	1942	4
Nilakantan, P.	7	1940	1941	2
Pisharoty, P. Rama	1	1941	-	1

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Raghavendra Rao, B.V.	3	1935	1938	4
Rajagopalan, V. S.	2	1939	1942	4
Ramakrishna Rao, I.	2	1926	1927	2
Ramanathan, K.R.	1	1923	-	1
Ramdas, L.A.	3	1925	-	1
Ray, Bidhubhusan	1	1921	-	1
Sirkar, S.C.	1	1928	-	1
Sogani, C.M.	3	1927	1928	2
Subbaramaiah, K.	1	1938	-	1
Sutherland, G.A.	2	1921	-	1
Venkateswaran, C. S.	4	1938	1939	2

Channels of Communication

Table. 4 Dissemination of the channels of communication used by Sir. C.V. Raman

Channel of Communication	No. of Publications	%
Applied Optics	1	0.69
Astrophysical Journal	3	2.08
Journal of the Optical Society of America	3	2.08
Nature	101	70.13
Philosophical Magazine	1	0.69
Physical Review	9	6.25
Proceedings of the Physical Society of London A	21	14.58
Scientific American	1	0.69
Transactions of the Optical Society	3	2.08
Zeitschrift für Physik	1	0.69
Total	144(100%)	

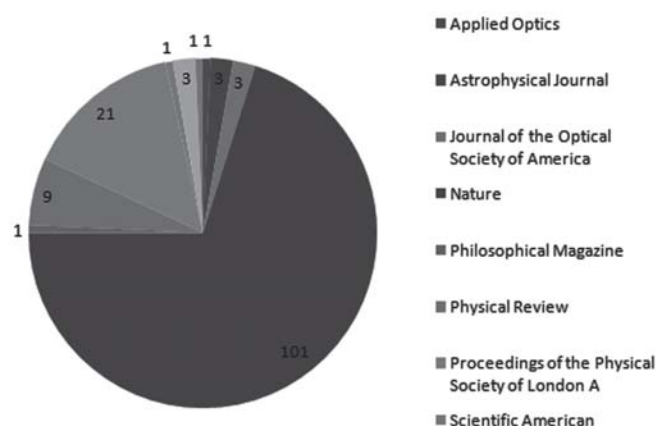


Fig 3: Channels of Communication

On the basis of analysis it is found that Raman had used more than 10 journals to communicate his research findings. Top ranking journals were: *Nature* (101, 70.13%), *Proceedings of the Physical Society of London A* (21, 14.58%) *Astrophysical Journal*, *Journal of the Optical Society of America*, *Transactions of the Optical Society* (3, 2.08%) and *Applied Optics*, *Philosophical Magazine*, *Scientific American* and *Zeitschrift für Physik* (1, 0.69%). Most of his papers were published in Indian journals. He thus created due status to Indian journals at the international science publication activities.

6. CONCLUSION

Scientometrics plays an important role in the dissemination of a particular scientist whose interest lays in the number of important papers he or she has published. One can understand that Raman had taken enormous interest to reach his works to common man's understanding of physics. His discovery of the 'Raman Effect' made a very distinctive contribution to Physics. Even after more than 85 years of this discovery, it is influencing many researchers to study its application in many disciplines.

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