

Information: Its quality contents and use

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ABSTRACT

- One of the major goals of the public supported research studies and publication must be to meet the current demands of our society .The globalization has resulted in paradigm shift in all fields. Today, the research publication must serve as a learning document for all user communities It must also instill and stimulate developmental activities of current running society and also help in advancement of fundamental knowledge. The impact of new information on society and its relation with various factors should be studied. In this short paper its quality, relevance, direct relation and impact on various factors are analyzed. Quality of the contents should be measured based on the practical application of information. Information technology also changed quality learning of current scenario in this field.
- Findings of Marine information centers of Cochin area witnessed a series of experiments - putting information into practical fields. Technological advancements made it easy to take research findings to needy society, even at grass root level beyond all barriers of scientific communication in research findings.
- Models of quality communication system and Findings of information experts like Cole, S; Tapaswi, M. P; Prathap, G are also reviewed here.

INTRODUCTION

- Science is an information production system. Research is a activity and method producing new information.
- The products of this system are research publications. Scientific research is a human activity which produces more original scientific information by consuming other information in this field
- . Hence scientific research operates with information as input and produces information as output.
- Input information is in part already disclosed and in part it originates from the researchers themselves who conduct the respective research work.
- Our information is however novel and reorganized knowledge which is disclosed in the form of new publications.
- The basic research potentially leads to a variety of economic benefits to our society.
- The Knowledge is empowering the growth of knowledge society is becoming pivoted for the creation of resilient economy.
- Information communication technology has been a driving force to our society.

Evaluation of research activity of researchers through their publications

- **Peer review**

- It can be performed namely by formal, official or organizational level and informal non-official method also helps, depending upon direct and indirect participation of the evaluated person.

- **Scientometric assessment**

- It will help to evaluate various characteristics of a publication.

- To meet the goals of respective assessment practical Scientometric parts to be accessed.
- The main problem are caused by the factors as follows:
 - Scientometric features, publication and its characteristics.
 - Size, research capacity, number of staff strength.
 - Fields and sub fields and type of activity(means basic activity applied research activity and development research

Indicators of comparative assessments in Scientometric assessment of various organization- forming a system

- Three important features should be taken into account
 - Completeness
 - Thematic
 - Homogeneity
 - Research capacity

Objections raised against citation counts and impact factors:

- Publication performance, ie the number of publications and publication practice depend strongly on research fields.
- Citations of individual papers and of periodicals highly depend on research fields and subfields.
- There are numerous periodicals which are not covered by science citation index, journal citation reports, journal ranking package.
- Papers published in English are preferred for citations.
- "circulation" of information is much faster through information channels in highly developed countries, which may be explained by faster research and shorter publication time . Impact factors of periodicals published in these countries may ,therefore have a better chance to become higher than others.
- It may often happen that articles are not cited, though their information content is used by researchers. This means the article has not reached the "citation threshold".

Some of the frequently used Scientometric indicators for evaluation

- Scientometric indicators:

(No of paper/no researcher \times number of years)

- citedness of research papers

(Numbers of citations/number of papers)

● PUBLICATION STRATEGY INDICATOR(S)

- Publication strategy indicator compares the total sum of impact factors of periodicals per paper published to the average impact factor(\bar{I}) of a given subfield .Its formulae is

$$S = (\sum I) / \bar{I}$$

- The s indicator may show whether appropriate publication channels were used by researchers.

- Journal impact factor (JCF), represents a quantified quality measure which enjoys wide acceptability. (Garfield. E., JAMA, 29, 90-93)

Performance indexes:

- *Output of Research papers(P-index)*
- Peter Vinkler reported on the assessment methods applied within an institute for teams working on the same field but on the different subfields (Organic, physical , bio organic and polymer chemistry) and for Institute working on different fields (chemistry, physics,, mathematics, engineering sciences, geo-sciences and computer sciences)
- We must consider quality for the work and papers.

- Gangan Prathap and Nishy describes p- index is a composite indicator which can effectively combine size and quality assessment and publication performances.
- They stress the need to devise a rational strategy to ranking (Authors, groups, institutions / countries) taking into account of performance of productivity (Number of paper P) and quality (Impact defined as the ratio of citations to papers , $i = C/P$)

- Corrected Quality ratio $CQ = C/P.(C.P)^{1/2}$
- Prathap suggested this formulae is not based right reasoning and noting h and p have the same dimensions, ie. $h=p$ Then total citations received is C which sums over P has the dimension of area h^2

- **Information processes in scientific research assume information emitters and absorbers, the pieces and channels of information.**

LEVEL OF VISION

- Organisation

PERSON >>>>>>>>> TEAM >>>> Departments

- Thematic

Project >>>>>>> Research >>>>>>>>> subject wise (Subfield wise)

- Publication

Single author paper> group author papers> Data wise (report etc)

Energy of ideas approach to Bibliographic research (Application of Ohm's law of Scientometrics) Developed by Gangan Prathap and Nishy

	ELECTRICAL THEORY	SCIENTOMETRICS
RESISTANCE/PAPERS	R	P
CURRENT/IMPACT	i	i
VOLTAGE/CITATIONS	$V=iR$	$C=iP$
POWER	$W=iV=I^2R=V^2/R$	$E=iC=I^2P=C^2/P$

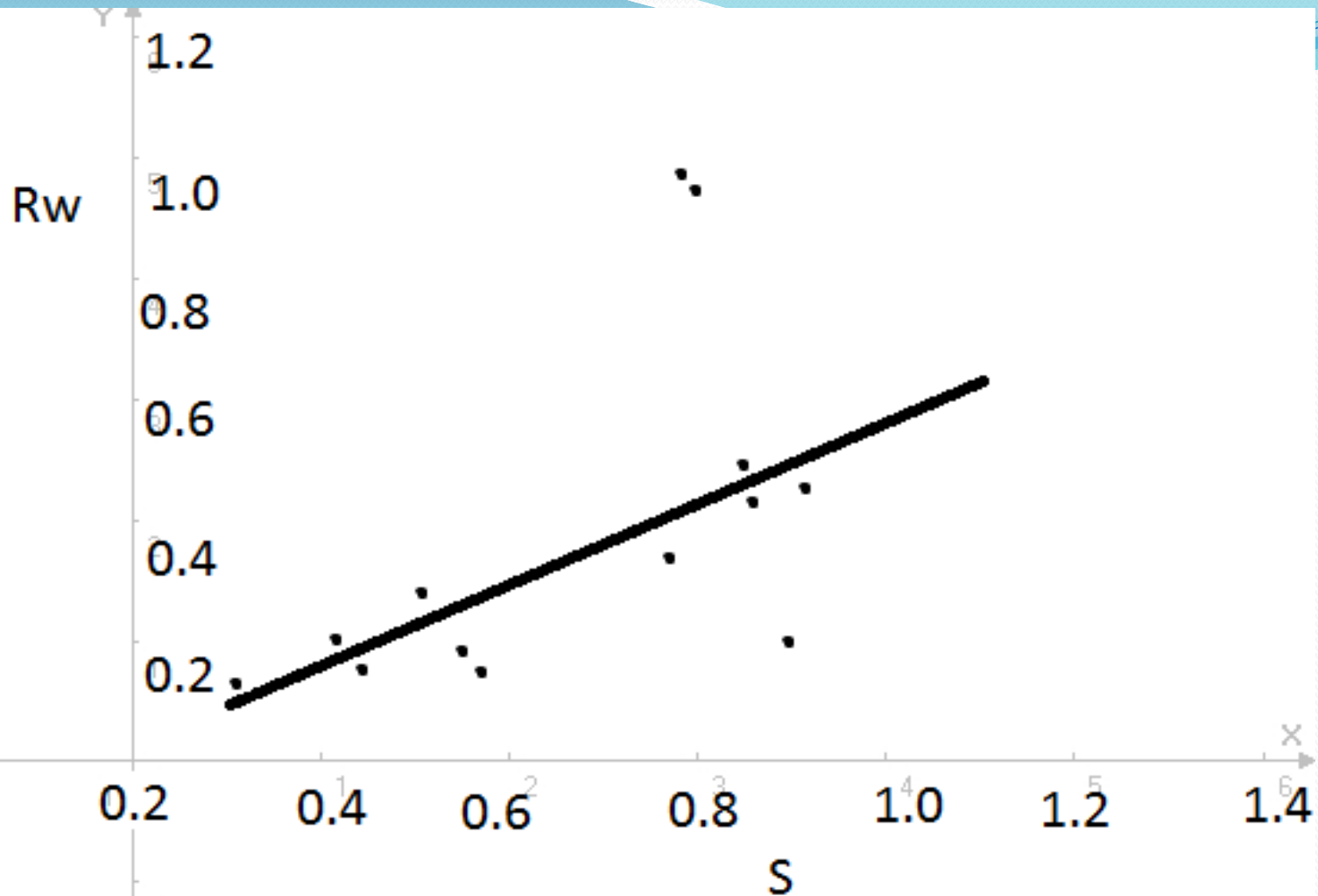
- Connecting h-Index with no. of papers and mean citations rate per paper the composite indicator in this case will be $(C^2/p)^{1/3}$
- This is seen immediately to have the dimension of h
- When we applied to research performance of countries in all fields, the relationship will come as $h = 0.932 (c^2/p)^{1/3}$ obtained with $R^2 = 0.9388$.
- Thus $(c^2/p)^{1/3} = (c.c/p)^{1/3}$ is an indicator and that senses both size and quality

PUBLICATION STRATEGY INDICATOR(S)

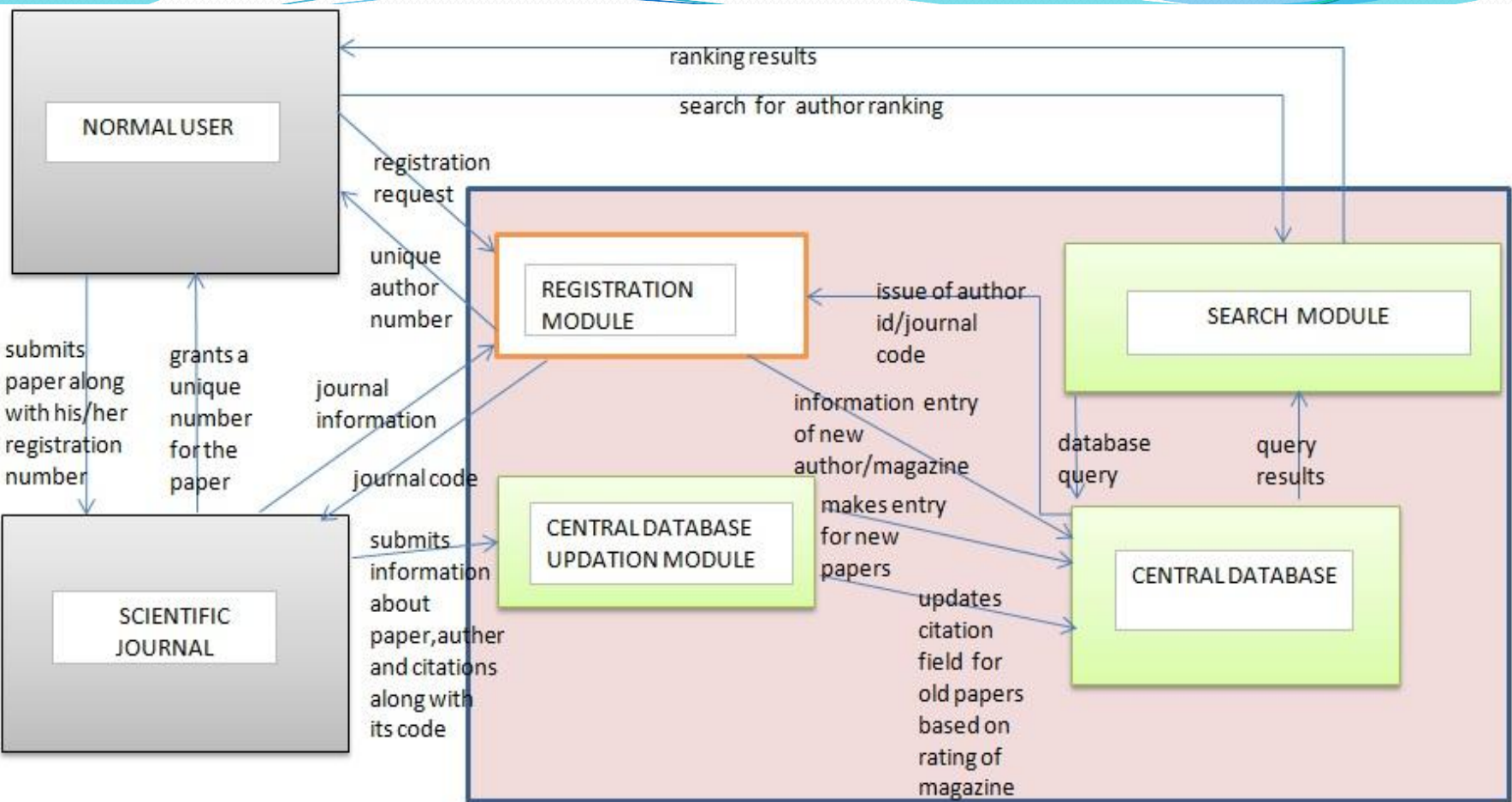
- Publication strategy indicator compares the total sum of impact factors of periodicals per paper published to the average impact factor(\bar{h}) of a given subfield .Its formulae is
- $S = (\sum n) / \bar{h}$ (h bar)
- The s indicator may show whether appropriate publication channels were used by researchers

Relative subfield citedness

- The ratio of the number of actually received citations (I) and the required citations (I_r) of a paper may represent the scientific impact of a given set of papers in comparison to research subfield in question.
- $R_w = I/0.85.n.H$
- This ratio is termed as relative subfield citedness. This index can characterize the relative citedness of papers published by a research team, department or institute in the subfield concerned.
- R_w value of 1 implies the citedness of paper in question is approximately same as the subfield. R_w value greater than 1 implies the citedness of paper in question is higher than any paper in the subfield. R_w value lesser than 1 implies the citedness of paper in question is lesser than any paper in the subfield.



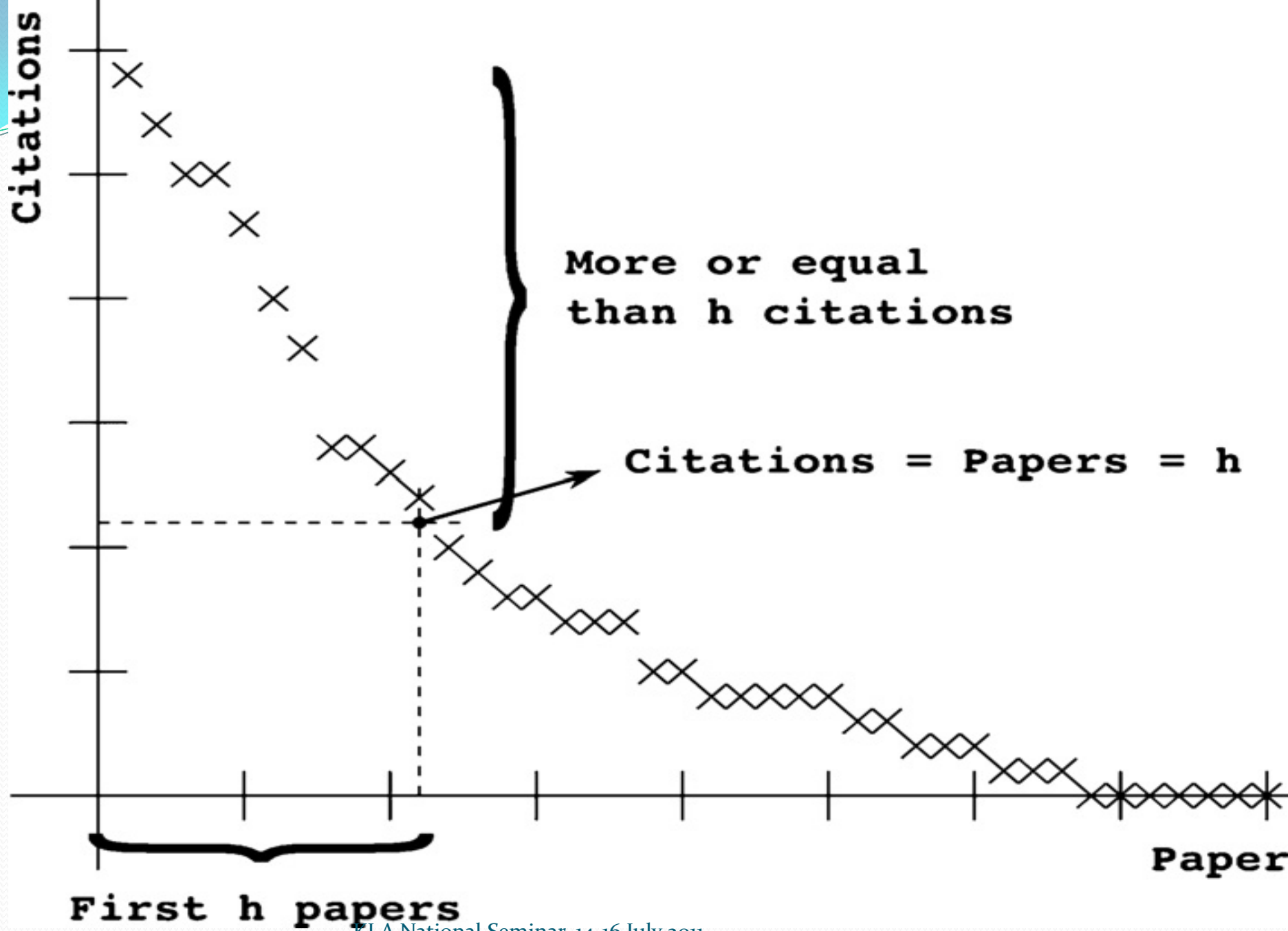
RELATION BETWEEN STRATEGY INDICATOR(S)
AND RELATIVE SUBFIELD CITEDNESS(Rw)



Measurement of quantity and quality of scientific research output

➤ h INDEX(HIRSCH,2005)

- A scientist has index h if h of his or her N_p papers have at least h citations each and the other $(N_p - h)$ papers have $\leq h$ citations each



Advantages of h-index

1. It is easy to compute (computation can be easily done using data available in online databases like ISI Web of Science)
2. This single indicator characterizes both the quantity as well as impact of a researcher's scientific output.
3. It is an objective index and hence can be used for decision making regarding promotions etc.
4. Its performance as compared to other single number criteria (impact factor, number of documents etc) are much better.
5. It is insensitive to lowly cited papers, data available about which are error prone.

Disadvantages of h index

1. The index cannot be used to compare scientists working in different fields as it does not take into account the inter field-differences.
2. It suffers from technical limitations while calculating the h-index of scientists with common name.
3. It cannot be used to compare scientists at different stages of their career as the index depends on the duration of a scientist's career (a scientist in later stages of his career often have higher h indexes than those at early stages).
4. The index did not consider the number of citations received by highly cited papers.
5. The 'Mathew effect', as a result of which works of well established

Some improvements over h index

- g INDEX
- hg INDEX
- h_{α} INDEX
- A INDEX
- R INDEX
- m INDEX

Ranking of Indian engineering and technological institutes for their

Research performance during 1999–2008

(Gangan Prathap and B. M. Gupta)

- Among the major countries, India has one of the largest infrastructures of engineering and technological institutes (over 2000).
- It also produces the largest number of engineering and technology graduates (over 300,000) every year.
- Some of these institutes are very prestigious and even make it to the list of top universities in the world .
- Only a handful of institutes (IISc and some IITs) among the major Indian engineering and technological institutes, however, account for most of the research output of the country. Majority of the others, however have very meagre research output, which is also reflected in the poor out-turn of Ph Ds (less than a thousand each year) of all the Indian engineering and from these institutions.
- So far, no ranking of technology institutes for their research performance have been undertaken. In this regard, it is to be noted that most of the international ranking schemes are complex.

Ranking of Universities

	P	C	C/P	ICP	% OF ICP	h	<i>p(Performance index)</i>
1 University of Hyderabad	2371	10968	4.6	49	37.0	591	24.9
2 Delhi University	4784	12962	2.7	45	32.7	1082	22.6
3 Punjab University	2603	9528	3.7	44	32.7	773	29.7
4 Jadavpur University	4807	11565	2.4	43	30.3	872	18.1
5 Banaras Hindu University	4870	10097	2.1	42	27.6	718	14.7
6 University of Madras	3060	7813	2.6	34	27.1	604	19.7
7 Sanjay Gandhi PGIMS	2207	6068	2.8	32	25.6	202	9.2
8 Jawaharlal Nehru University	2044	5547	2.7	35	24.7	411	20.1
9 Pune University	1758	5113	2.9	35	24.6	420	23.9
10 Anna University	3687	7381	2.0	35	24.5	691	18.7
11 Annamalai University	2384	5878	2.5	32	24.4	232	9.7
12 University of Rajasthan	1909	4958	2.6	27	23.4	307	16.1

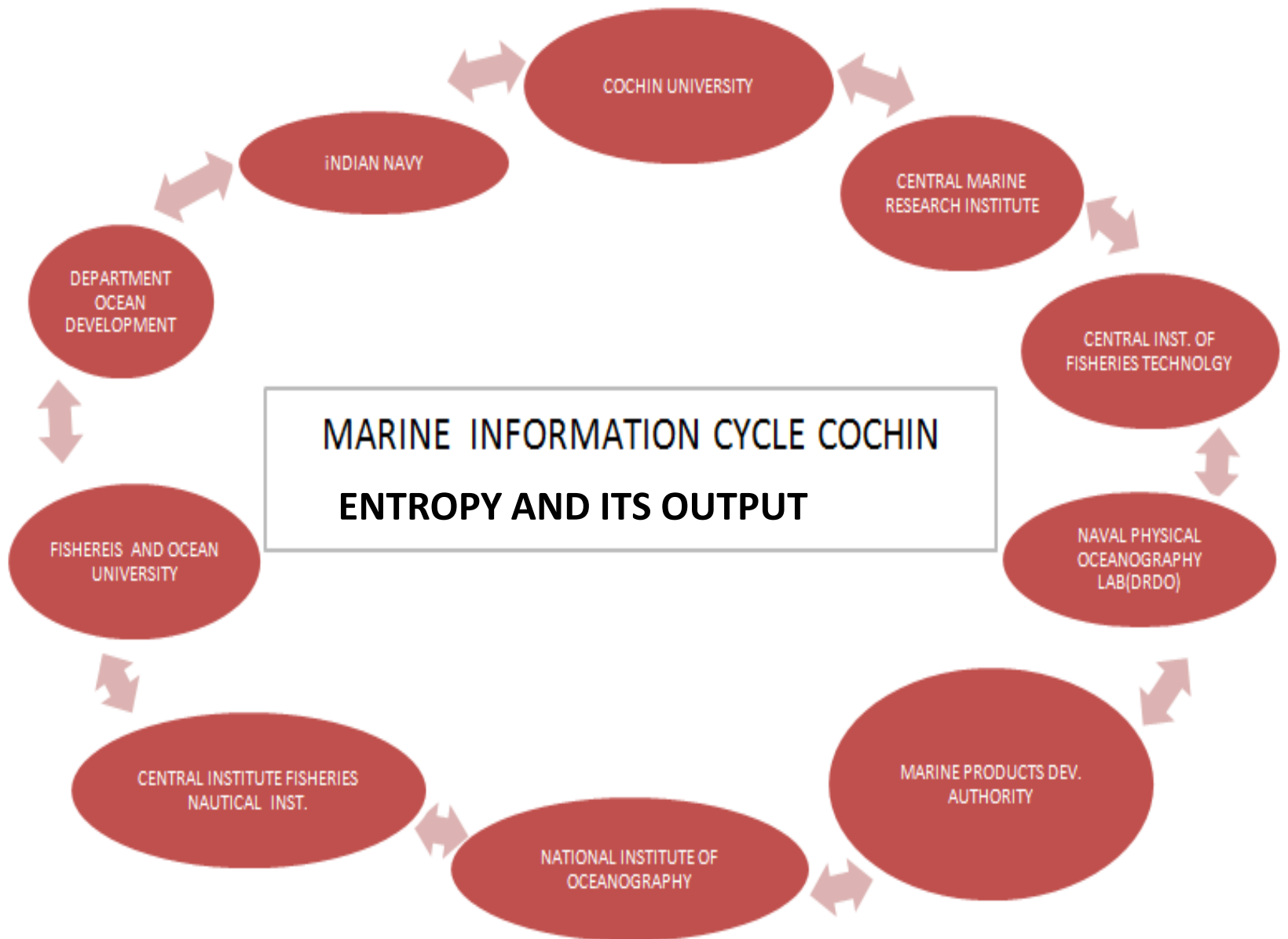
13 Guru Nanak Dev University	1555	4089	2.6	27	22.1	293	18.8
14 CMC Vellore	2244	4860	2.2	34	21.9	367	16.4
15 University of Calcutta	2381	4630	1.9	32	20.8	380	16.0
16 Aligarh Muslim University	2522	4693	1.9	32	20.6	370	14.7
17 University of Mumbai	1835	4002	2.2	32	20.6	182	9.9
18 Madurai Kamaraj University	1246	2974	2.4	25	19.2	142	11.4
19 Shri Venkateswara University	1465	3131	2.1	27	18.8	182	12.4
20 Cochin University of S&T	1625	3252	2.0	26	18.7	218	13.4
21 University of Mysore	1912	3480	1.8	23	18.5	431	22.5
22 Osmania University	1547	2391	1.6	24	15.5	188	12.2
23 Andhra University	1630	2443	1.5	24	15.4	259	15.9
24 CCS Haryana Agricultural University	1554	1616	1.0	24	11.9	190	12.2
25 Punjab Agricultural University	1685	1633	1.0	22	11.7	202	12.0

MARINE INFORMATION SYSTEM OF COCHIN: ITS CONTRIBUTION: PUTTING INFORMATION INTO PRACTICE

Cochin is an important city .Historically Cochin was an important trade centre for marine products with a rich cultural heritage. Cochin is known as the queen of Arabian Sea. The marine information system of Cochin area with a chain of 14 marine organizations plays a vital role for dissemination of information to its users all over the world. When India participated in the International Indian Ocean Expedition (1960-65),Cochin was selected as the main centre of Oceanographic studies. During this expedition potential fisheries resources has been mapped and recorded in publications of IIOE handbooks and atlases. Role of fisheries development in Cochin area in the national economy is well known .The growth in marine export is primarily due to the overall improvement due to overall increase in fish production .

FISHING AS AN IMPORTANT SOCIO – ECONOMIC ACTIVITY:FUTURE CHALLENGE

- Fishing is provides income for millions of our people .Our fishery trade is very prominent at the global level. Our foreign currency earning, a significant part of which comes from fisheries sector, is vital to our national economy.
- Achieving optimal use of marine information and resources
- Evaluation of existing information on marine living resources correlating it with influence of physico chemical parameters on the biota, identifying the gaps and formulating future strategies for successful exploitation of marine living resources.



Marine science department of CUSAT

- Research out put
- The Department is engaged in research right from its inception in 1938 and 93 students have taken their Ph.Ds in different areas of Marine Biology, Microbiology and Biochemistry. Around 600 research papers have been published. A team of talented teachers, trained in different areas of Marine Biology, Microbiology and Biochemistry in India and abroad constitute the faculty. The Department has all the essential infrastructure for teaching, training and research in the basic and applied frontiers of these disciplines. The facilities include a well-maintained museum, aquarium, laboratories and highly sophisticated analytical equipments such as Transmission Electron Microscope, Fluorescence Spectrophotometer, Freeze drier, Microanalyzer etc. The Department of Ocean Development has established an OSTC (Ocean Science and Technology Cell) in the Department to monitor research on Marine Benthos

Central Marine Fisheries Research Institute : Cochin

- Central Marine Fisheries Research Institute :
- **Designated National Repository**' by Government of India, in consultation with the National Biodiversity Authority, under the Biological Diversity Act, 2002.
- CMFRI has so far published over 6000 research papers in Indian and Foreign journals apart from books, special publications and newsletters. In addition, the CMFRI Newsletter, Marine Fisheries Information Service and the Indian Journal of Fisheries are published quarterly to keep everyone informed about the recent research and developments.

PadmaBhushan M S Swaminathan

- A Designated National Repository (DNR) is an Institution recognized by Government of India to keep in safe custody specimens of different categories of biological material. It is an essential part of the infrastructure for biodiversity conservation under Section 39 of the Biological Diversity Act, 2002.
- India is a signatory to the Convention of Biological Diversity (CBD) which makes it mandatory for all the signatory nations to strengthen their capacity by designating National Reference Centres for all the organisms, including microbes.
- Padma Vibhushan Prof. M.S. Swaminathan, Chairman, National Commission on Farmers, Government of India inaugurated the modern museum at CMFRI Headquarters, Kochi on 4th February 2006.
- Currently the museum houses 838 specimen of fin fish species, 117 crustaceans, 249 molluscs, 45 echinoderms, 170 corals, 35 sponges, 20 ascidians and 82 seaweeds, besides a dolphin and 3 Antarctic birds.

Naval Physical Oceanographic lab Cochin(DRDO)

- Naval Physical and Oceanographic Laboratory (NPOL) , Kochi is one of the major R&D laboratories of Defence Research and Development Organisation (DRDO). It was setup in 1952 as an in-house laboratory of the Indian Navy, then called as Indian Naval Physical Laboratory (INPL), for providing scientific support to the armed services. Later it got re-christened as NPOL after the formation of Defence Research and Development Organisation (DRDO) under Ministry of Defence in 1958. Today NPOL stands out with great pride for its outstanding achievements and contributions in the areas of SONAR research and development for Navy.

Marine Products development Authority(MPEDA), Cochin

- Playing vital role in our national economy earning 27 billion dollar in 2011 through export of fish
 - Development of fisheries, training of aquaculture processing marine resources
 - Support Artificial method of shrimp production
- Research and development
- Research publications for fish farmers and industries
- Supporting farmers by providing financial loan and subsidy

Some future challenges:

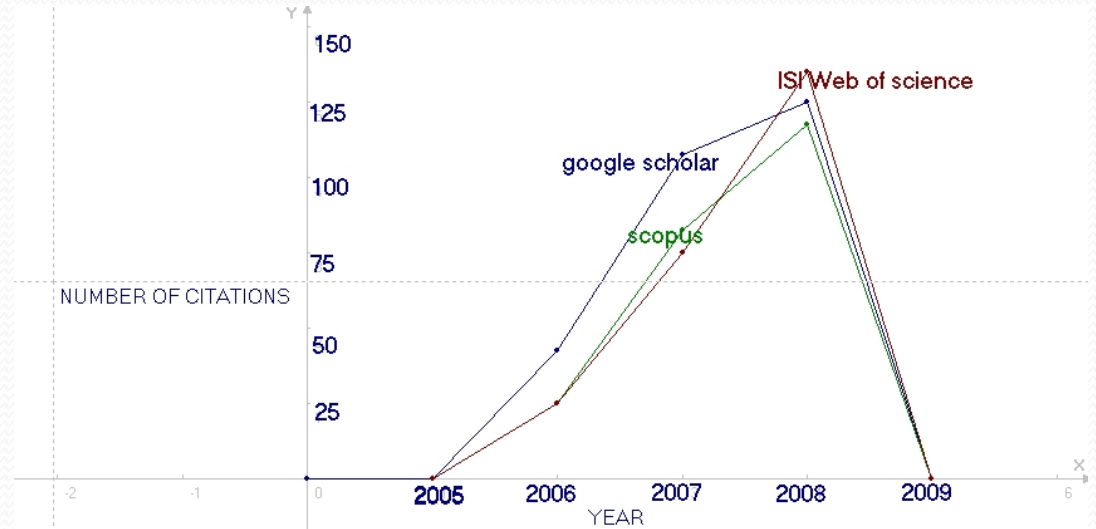
- There are only few comparable bibliometric data concerning various research teams working in the same field. Comparison and assessment of scientific impact (quality, level) of research teams is very difficult, but it appears to be an urgent need for science policy makers and, which is a new feature, also for researchers themselves.

Some suggestions:

- Evaluation can be performed by comparison.
- Comparison can be made between organizational, thematic and publicational types at micro, meso and macro levels.
- This means that a *characteristic piece of data*(indicator) can be related *several data*.
- This method is applied e.g. when specific publication or citation indicators determined in the same way for several research teams, institutes, countries, etc., are compared to one another .
- Importance of quantitative indicators in science policy and research management, that is one reason why the investigation of validity and reliability of these figures can not be overemphasized.

- The Study Global Research reported , India 's current rise is an impressive economic surge of recent years and clearly immense potential to home of world class research. In last decade India has seen vast growth of many quality papers. 16,500 papers in 1998 to 31, 000 papers in 2007, increase , an 82% . Recently our status is almost equal to Japan ,Germany and European countries.
- This is based on study using the database by ISI Web of Science. ISI Web of Knowledge R world largest platform of citation's for quality scholarly literature. It will help our India to design our future scientific strategy and to focus engaging with developmental area.

h-index
According
Google scholar,
web of science
Scopus



Citation numbers by h-index paper according to 3 citation databases upto 2009



- Thank you