

PUBLISHED OUTPUT OF NETAJI SUBHAS INSTITUTE OF TECHNOLOGY, DELHI (1996-2015): A SCIENTOMETRIC STUDY

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Delhi is the National Capital Territory of India. Indian constitution has included 'Education' in concurrence list so the better education & research is the responsibility of State Government as well as Government of India. Netaji Subhas Institute of Technology was started in 1983 with one division, namely Electronics and Communication Engineering. At present it has six engineering divisions. Accordingly research publications have increased during the last twenty years. This paper is a scientometric study of publications authored by staff / students of Netaji Subhas Institute of Technology, Delhi during twenty years (1996 - 2015) and indexed in SCOPUS database.

Keywords: Scientometrics; Research output; NetajiSubhas Institute of Technology; Delhi

INTRODUCTION

Delhi has many Government engineering institutions. The oldest engineering institute which is not a university and has autonomy under the Government of the National Capital Territory of Delhi (GNCT) is Netaji Subhas Institute of Technology, popularly known as NSIT, New Delhi.

NSIT was established in 1983 and was known as Delhi Institute of Technology. In the year 1997 name was changed to present name and the institute was shifted in 1998 to its present 145 acre campus at Dwarka, New Delhi. It is an autonomous body and is fully funded by GNCT. The institute is affiliated to the University of Delhi. Its academic departments/divisions are: (1) Electronics and Communications Engineering (ECE), (2) Computer Engineering (COE), (3) Instrumentation and Control Engineering (ICE), (4) Manufacturing Processes and Automation Engineering (MPAE), (5) Information Technology (IT), (6) Bio-Technology (BT), (7) Management, (8) Humanities and Social Science, (9) Mathematics, (10) Physics and (11) Chemistry. One more Mechanical Engineering (ME) Division is going to start from the academic year 2016-17.

ICTE-INDEST Consortium

Indian National Digital Library in Engineering Sciences and Technology (INDEST) was set up in 2003 by the Ministry of Human Resource Development (MHRD), Government of India on the recommendation of an Expert Group. Later it became the AICTE-INDEST Consortium. NSIT is a member of this consortia and subscribes to many e-resources [1].

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Scientometrics

Scientometric was first defined by Nalimov [2] as 'the quantitative methods of the research on the development of science as an informational process'. Some of the main themes include - ways of measuring research quality and impact, understanding the process of citations, mapping specific fields and the use of indicators in research policy and management. Traditionally this field has concentrated on the observable or measurable aspects of communications. The basic unit of analysis is a collection of papers and the number of citations they have received over a certain period of time.

Scientometric measures have come to be accepted by many governments and official bodies to monitor, record, and evaluate research performance. This occurs at multiple levels – individuals, departments and research groups, institutions and of course, journals- and has significant consequences in terms of jobs and promotions, research funding, etc.

Bibliographic database SCOPUS

Scopus database of Elsevier covers the following subject areas [3]

S. No.	Subject Area (as on 29-1-2016)
1.	Medicine
2.	Biochemistry, Genetics and Molecular Biology
3.	Engineering
4.	Physics and Astronomy
5.	Agricultural and Biological Science
6.	Material Science
7.	Chemistry
8.	Computer Science
9.	Pharmacology, Toxicology and Pharmaceutics
10.	Immunology and Microbiology
11.	Environmental Science
12.	Chemical Engineering
13.	Mathematics
14.	Earth and Planetary Science
15.	Energy
16.	Multidisciplinary
17.	Neuroscience
18.	Health Profession

19.	Veterinary
20.	Decision Science
21.	Dentistry
22.	Nursing
23.	Arts & Humanities
24.	Business Management and Account
25.	Economics, Econometrics and Finances
26.	Social Science
27.	Psychology
28.	Undefined

Scopus provides search options namely (i) Document Search, (ii) Author Search, (iii) Affiliation Search, and (iv) Advanced Search.

BACKGROUND

Gupta [4] (2011) has analyzed the performance of research as reflected in publication during 1996 to 2010. As per the data mentioned in different tables the productivity of India and the top country are-

Productivity in term of research publication of India and USA				
Block Year → Country ↓	1996 to 2000	2001 to 2005	2006 to 2010	1996 to 2010
USA	1586567	1643852	2061016	5291435
India	110454	151475	276680	538609

Ranking (world shares) of India and USA in publications				
Block Year → Country ↓	1996 to 2000	2001 to 2005	2006 to 2010	1996 to 2010
USA	1 (27.2)	1 (22.07)	1 (20.7)	1 (22.77)
India	13 (1.89)	12 (2.03)	10 (2.78)	10 (2.32)

Gupta (2011) has also classified the states of India into three categories on the basis of number of publications. Delhi figures among the more productive states alongwith Maharashtra, Karnataka, Tamil Nadu and West Bengal. The publications output for Delhi during the years are:

Research output and percentage output of Delhi are				
Block Year → Country ↓	1996 to 2000	2001 to 2005	2006 to 2010	1996 to 2010
Publication	14532	20879	34103	76273
Publication output (%)	13.16	13.78	12.33	12.91

OBJECTIVES

The objectives of the present study are to:

- Identify the dominant subject areas of research and growth in publications in these areas at NSIT.
- To find the growth in publications in Delhi in the same subject areas during the period under study.
- find the Share and growth of publications of individual Departments/Divisions of NSIT during the period
- find the citations received by the publication from NSIT

METHODOLOGY

The ‘Affiliation Search’ option of Scopus database has been used to identify the publications originating from NSIT. The documents from the result were selected in batches and some fields were selected to export the documents in excel format. After formatting the excel worksheets again the records were merged for analysis purposes. Documents beyond 1996 to 2015 as also documents in the subject areas (i) Social Science, (ii) Business Management, and (iii) Others were excluded the results were analyzed.

Query-1:

(AF-ID (“Netaji Subhas Institute of Technology” 60010633)) AND (EXCLUDE (PUBYEAR, 2016) OR EXCLUDE (PUBYEAR, 1995) OR EXCLUDE (PUBYEAR, 1994) OR EXCLUDE (PUBYEAR, 1993) OR EXCLUDE (PUBYEAR, 1992) OR EXCLUDE (PUBYEAR, 1991) OR EXCLUDE (PUBYEAR, 1990) OR EXCLUDE (PUBYEAR, 1989) OR EXCLUDE (PUBYEAR, 1988)) AND (EXCLUDE (SUBJAREA, “SOC”) OR EXCLUDE

(SUBJAREA, “BUSI”) OR EXCLUDE (SUBJAREA, “PHAR”) OR EXCLUDE (SUBJAREA, “CENG”) OR EXCLUDE (SUBJAREA, “MEDI”) OR EXCLUDE (SUBJAREA, “CHEM”) OR EXCLUDE (SUBJAREA, “ENVI”) OR EXCLUDE (SUBJAREA, “MULT”) OR EXCLUDE (SUBJAREA, “EART”) OR EXCLUDE (SUBJAREA, “AGRI”) OR EXCLUDE (SUBJAREA, “IMMU”) OR EXCLUDE (SUBJAREA, “NEUR”) OR EXCLUDE (SUBJAREA, “PSYC”))

The ‘Advanced Search’ option was used to identify the publications by authors with ‘Affiliation City’ as ‘Delhi’ and after the year 1995. The documents of year 2016 were excluded. Also in the subject areas namely (1) Chemical Engineering, (2) Pharmacology, Toxicology and Pharmaceutics, (3) Medicine, (4) Chemistry, (5) Environmental Science, (6) Multidisciplinary, (7) Earth and Planetary Science, (8) Agricultural and Biological Science, (9) Immunology and Microbiology, (10) Neuroscience, and (11) Psychology, (12) Social Science, (13) Business Management, (14) Nursing, (15) Economics, Econometrics and Finances, (16) Veterinary, (17) Health Profession, (18) Arts & Humanities, (19) Dentistry, and (20) Undefined were excluded. This search was results to ‘Query 2’. The results were analyzed in the window of five years.

Query 2:

AFFILCITY (Delhi) AND PUBYEAR > 1995 AND (EXCLUDE (PUBYEAR, 2016)) AND (EXCLUDE (SUBJAREA, “MEDI”) OR EXCLUDE (SUBJAREA, “AGRI”) OR EXCLUDE (SUBJAREA, “CHEM”) OR EXCLUDE (SUBJAREA, “SOC”) OR EXCLUDE (SUBJAREA, “PHAR”) OR EXCLUDE (SUBJAREA, “ENVI”) OR EXCLUDE (SUBJAREA, “IMMU”) OR EXCLUDE (SUBJAREA, “CENG”) OR EXCLUDE (SUBJAREA, “EART”) OR EXCLUDE (SUBJAREA, “ECON”) OR EXCLUDE (SUBJAREA, “MULT”) OR EXCLUDE (SUBJAREA, “BUSI”) OR EXCLUDE (SUBJAREA, “NEUR”) OR EXCLUDE (SUBJAREA, “ARTS”) OR EXCLUDE (SUBJAREA, “HEAL”) OR EXCLUDE

(SUBJAREA,	"VETE")	OR	EXCLUDE
(SUBJAREA,	"NURS")	OR	EXCLUDE
(SUBJAREA,	"PSUC")	OR	EXCLUDE
(SUBJAREA,	"DENT")	OR	EXCLUDE
(SUBJAREA,	"Undefined")		

ANALYSIS

Dominant Subject-areas of research at NSIT

The major subject areas and their share were: Engineering (50.8%), Computer Science (43.6%), Mathematics (21.5%), Physics and Astronomy (937%), Material Science (8.6%), Social Science (4.3%), Energy (4%), Decision Science (2.1%), Biochemistry; Genetics and Molecular Biology (1.8%), Business Management (1.6%), and Others (7.0%). Here 'Others' included the subject areas namely (1) Chemical Engineering, (2) Pharmacology, Toxicology and Pharmaceutics, (3) Medicine, (4) Chemistry, (5) Environmental Science, (6) Multidisciplinary, (7) Earth and Planetary Science, (8) Agricultural and Biological Science, (9) Immunology and Microbiology, (10) Neuroscience, and (11) Psychology.

At NSIT no undergraduate degree is awarded in Social Science, Business Management and Other areas; however a few publications have been found hence to identify the dominated subject areas of research these were excluded from the List. Thus NSIT's dominant areas of research in terms of subject areas listed in Scopus database are: (I) Engineering, (II) Computer Science, (III) Mathematics, (IV) Physics and Astronomy, (V) Material Science, (VI) Energy, (VII) Decision Science, and (VIII) Biochemistry; Genetics and Molecular Biology. Also the UG degree programmes of NSIT namely ECE, ICE, MPAA, COE, IT and BT are related to these subject areas.

Publications growth in subject-areas dominated at Netaji Subhas Institute of Technology

The yearly growth of publications in the above mentioned subject areas is reflected in Figure1.

The publication count during 1996-2000 was below 50 which crossed 100 during 2001 to 2005. After 2005 the publications have increased substantially and crossed 300 during 2006 to 2010 and 500 during 2011 to 2015.

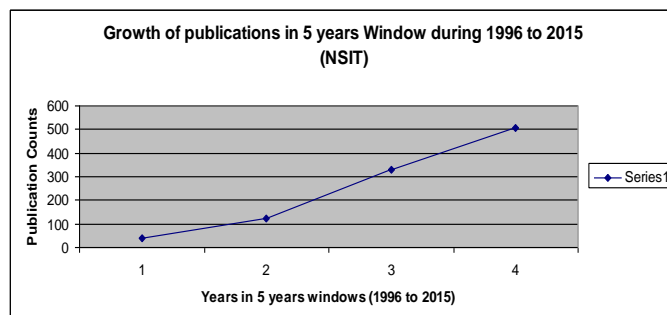


Figure 1

The publication count during 1996-2000 was below 50 which crossed 100 during 2001 to 2005. After 2005 the publications have increased substantially and crossed 300 during 2006 to 2010 and 500 during 2011 to 2015.

Publications growth in Delhi in subject-areas dominated at NSIT

The publications originating from Delhi in the eight subject areas for the period of 1996 to 2015 is shown in Figure 2.

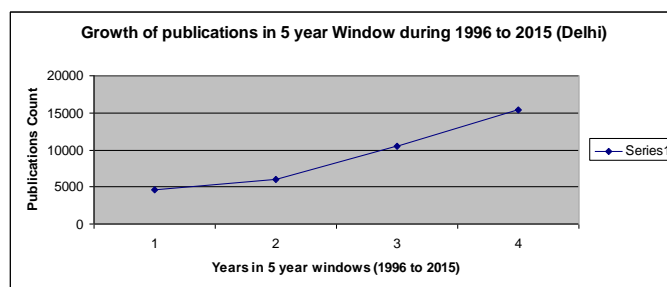


Figure 2

The publications count for the period 1996 to 2000 by authors in 'Delhi' was just below five thousand in selected eight subject areas. During the period 2006 to 2010 the number crossed ten thousand and in 2011 to 2015 it crossed the number of fifteen thousand.

Growth in share of NSIT

Share of NSIT was computed using the windows of five years for the period 1996 to 201 for eight subject areas. It is reflected in Figure3 below:

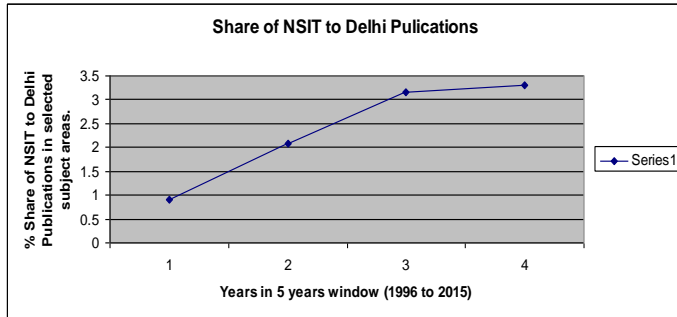


Figure3

The share of NSIT and indexed in Scopus database was below 1% and increased to above 2% during 2001 to 2005. It further increased to about 3% during 2006 to 2010. The growth in share during 2011 to 2015 is very marginal to 3.29%.

Share and growth of publication of Departments/Divisions of NSIT

Share of publications in selected subject areas from the Institute during 1996 to 2015 and indexed in Scopus database is represented in Figure 4 below:-

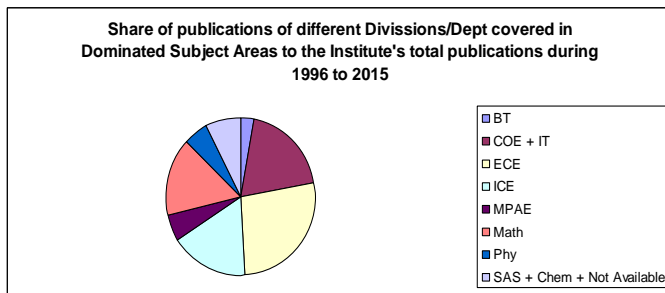


Figure4

More than 75% of the contributions during the period have been made by four Departments/Divisions namely (1) Electronics and Communication Engineering (ECE), (2) Computer Engineering Division with Information Technology Division, (3) Instrumentation and Control Engineering Division and (4) Mathematics Department. The remaining divisions/departments of the Institute have contributed less than 25% of publications during the period. Electronic Communication Engineering division is on top followed by Computer + IT divisions. Also the contribution by Mathematics department is more than many of the divisions.

The average per year publications for the period 1996 to 2015 for different department/division of the Institute are shown in Figure 5.

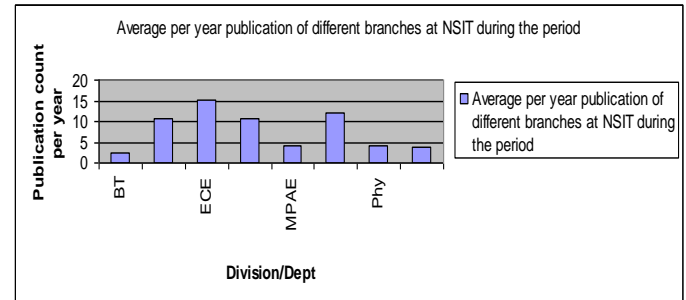


Figure 5

Many of the Departments/Divisions had no publications in 1996 and started publishing only in later years. The year when first publication of the division/department appeared was considered for calculating the average. The departments/divisions with ten or more than ten publications per year are COE/IT, ECE, ICE and Math.

The growth in publications from different departments/divisions of the institute have been represented differently (1) for those where the total publications during 1996 to 2015 are above one hundred and (2) for those where the total publication during the period is below one hundred. In the first category the departments/ divisions included are COE+IT, ECE, ICE and Mathematics Figure 6

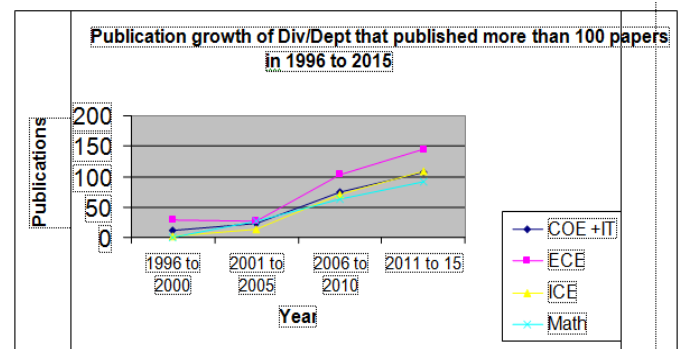


Figure6

The growth from block years 1996-2000 to that 2001-2005 was flat. An upward trend is seen after this. The ECE division appears to stand apart.

In the second category the departments/divisions included are BT, MPAE, Physics, and Chemistry, & Others. The growth for these have been represented in Figure 7 below:

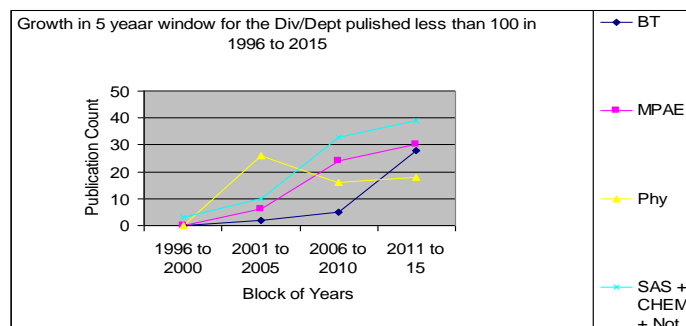


Figure 7

The growth in publication for division of BT was initially very distinct from that for MPAE during the block years 2001-2005 & 2006-10 but in 2011-15 the two have come very close. The growth for BT has superseded that for Physics in 2011-2015.

Also the number of publications without indication of the name of division/ department is increasing year after year.

Citation received by the publication from Departments/Divisions of NSIT during the period

The citation count of the publication is one of the parameters that indicates the impact of publication on future research. For different departments of the Institute during the period the average number of citations is shown in Figure 8 below

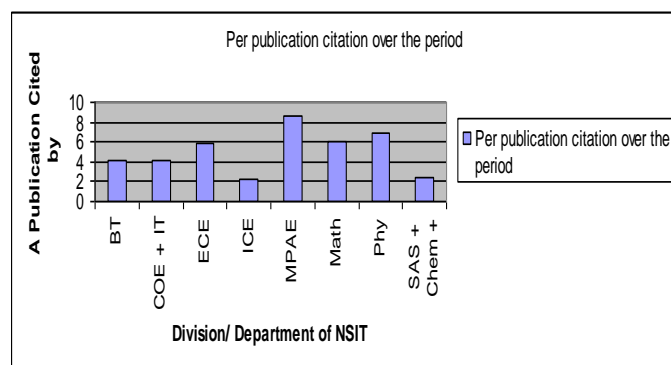


Figure 8

It is seen that ECE, MPAE, Mathematics and Physic Department/ Divisions have

received on an average more than 5 citations per publication.

Authorship pattern at NSIT

The authorship of publications from different departments/divisions (1. BT, 2. COE+IT, 3.ECE, 4.ICE, 5.MPAE, 6.Math & 7.Physics) have been shown in Figure 9 below

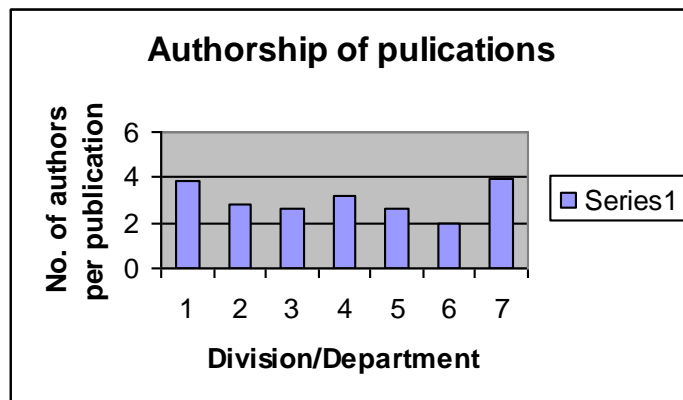


Figure 9

On an average the authorship pattern of publication for different engineering divisions is less than four authors per publication. For Physics Department it is just below four and is around 2 authors for Mathematics Department.

CONCLUSION

It appears that INDEST-AICTE consortium did not help significantly in increasing the growth of publications from Delhi during 2001-2005 in dominant subject-areas. But it helped significantly in increasing the growth of publications from Delhi in block years 2006-2010 & 2011-2015 in NSIT dominant subject-areas.

An Institute should frame a policy for its employees for clearly indicating affiliation.

Growth in publications from NSIT from block year 2006-2011 to 2011-15 has gone up from about 300 publications to about 500 publications. But the share of the institute has just gone up from 3.1% to 3.3% (when publication output from Delhi is considered).

NSIT has the potential to increase its share in publications from Delhi.

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