



**TECHNOLOGICAL DEVELOPMENT AND INFORMATION  
SCIENCE-FROM EARLY AGE TO CONTEMPORARY  
PERIOD: TAKE A RELOOK**

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**Abstract:**

Information Science is one of the important knowledge clusters responsible for Information activities ranging from information collection, selection, organization, processing and management. Though, ultimately Information Science is responsible for information dissemination. Information Science initially treated as information field but the advancement of tools and technologies changes the entire arena of Information Science. Today rather than information field it is treated as Applied Science domain with Social Science touch. Information Science is today responsible for Information-Technology-People interaction. Information Science changes its dimension with the advancement of knowledge cluster and IT. The paper talks about Information Science including its need and role and generation wise characteristics and development. Paper highlighted changing dimension, tools and technologies related with Information Science.

**Key Words:** Information, Information Science, Technology, Computing, Development, IST, Information Science and Technology, Trend Report, Progress, Electronics, IT, Engineering & Documentation

**Introduction:**

Information Science is an important domain responsible for Information Infrastructure building. Information Science is actually a big field responsible for Digital and Manual Information Processing and Management. Information Science is incorporated with so many subjects as so many tools and techniques are gradually changing the arena of Information Science. Incorporating subjects are Computer Science, Information Technology, Management Science, Operation Research, Information Studies, Cognitive Science and so on. Actually, Information Science incorporates such subjects which have connection of knowledge management and information processing. The changes of Information Science we may find out since fifteenth century when even, the term 'Information Science' was not used. In 1665 the Royal Society, London first published *Philosophical Transaction* and treated as first Information Science material as Journal. The same type of attempt we found in 1736 when *Academic de Chirurgia, Paris* published first Medical Journal in the world. Gradually, from Information and Documentation Context, Information Science moved to Technological field; due to advancement of IT and computing in 19<sup>th</sup> century and onwards.

**Hypothesis:**

The main aim and objective of this study includes, but not limited to:-

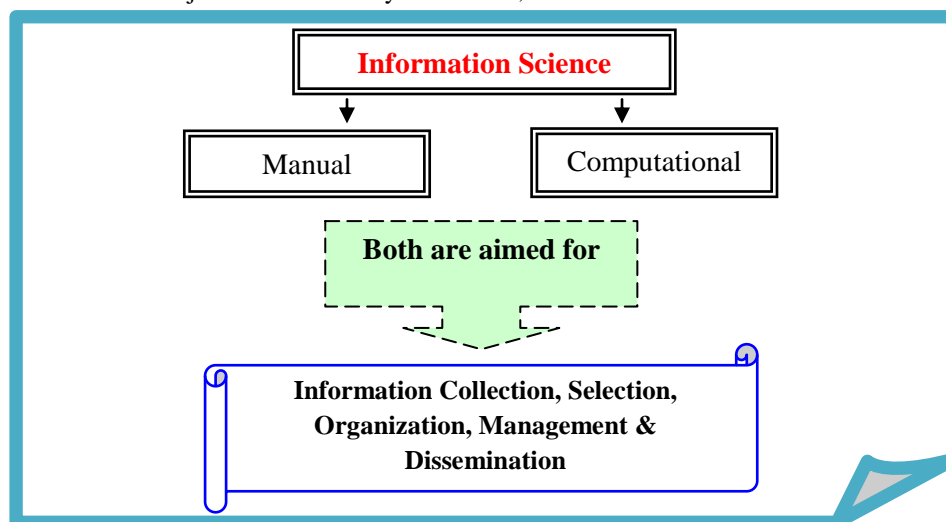


Figure 1: Information Science & two foci

✓ To learn basic about Information Science; including its characteristics and features;

- ✓ To find out changing dimension and domain of Information Science towards an Applied Science domain;
- ✓ To find out main changes of tools and Technologies in the field of Information Science;
- ✓ To learn century wise differences in Development of Information Science;
- ✓ To learn the changing nomenclature of Information Science and related at a glance.

**Professional, Technical and Technological Development: Up to 1800's**

Apart from Philosophical Transaction and Medical Journal, First Chemical Journal was also launched in Eighteenth Century i.e. 1778 *Chemisches Journal*, Similarly in 1787 William Curtis published first *Botanical Journal*. The Technological Development happened in 1801 when Joseph Marie Jacquard invents a *Punched Card*. This was treated as one of the advance tool for Modern Information Science as it was used for memory storage. In 1822 another thing happened in Electronic Information Science when Charles Babbage design his '*Difference Engine*'; the first step towards modern computer. Later on 1834, Babbage Design '*Analytical Engine*' for advance storage based Computing. On other side of Information Science, in 1841 the Chemical Society of London was established and in 1854, The Foundation of Boolean Algebra established; which was responsible for today's sophisticated Search Engine development. In 1876 Alexander Graham Bell invents Telephone, other hand in manual information world significance happened in 1876 when ALA was established in Philadelphia in US. In 1877 Thomson Edison invents Phonograph.

**Technology, Information and Development: Up To 1900's**

Information Science today works with so many tools and techniques such as Cloud Computing, Green Computing, Usability Engineering, and HCI and so on. But these development of twentieth century was established some of the big event of 18<sup>th</sup> century. WS Burrough in 1885 invents first workable adding and listing calculator. In same year George Eastman develops a practical photographic film. In 1896 Hollerith established Tabulating Machine Company for holding all his patents and manufactures the tabulating machine. In 1950 National Science Foundation was established in USA for Advance Science and Technological development for humanity. Further this foundation is also responsible for modernization of Information Science field. In the same year Hans Peter Luhn develops Prototype of the Luhn scanner for IBM. The CRT based information and Photograph also started same time.

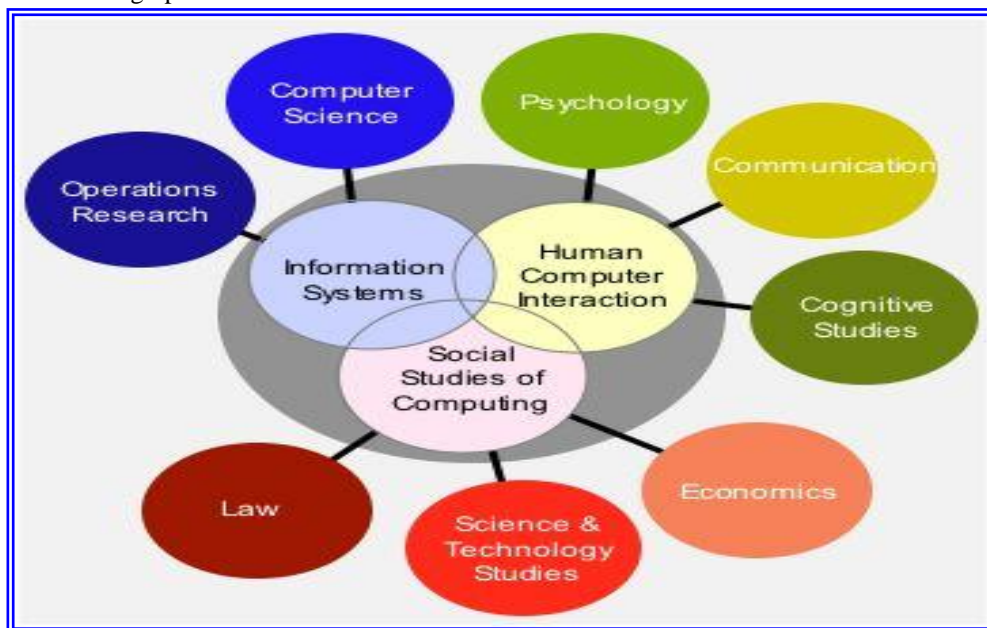


Figure 2: Shows the Interdisciplinary broader connection of Information Science [CIS: Cornell]

- ✓ On other side of Information Science, in 1896 was remarkable for the establishment of International Institute of Bibliography [IIB] and in US, American Documentation Institute [ADI] was established in 1950. In same year, Adams develops the concept of a Clinical Librarian which advocates personalized service to user of Medical Information. The landmark of modern IT depended Information Science was, Electronic Statistical Machine, Type 101 in the year 1950 which is used in a wild variety of indexing and Information Retrieval projects over the next few years. In 1951, first commercially available Computer was UNIVAC-I introduced by Mauchley and Eckert; similarly in same year Eugene Garfield develops methods for Compiling Current list of Medical Literature. In Britain, same year, first computing abstracting based Information Service was started by Derwant Publication Ltd. This was based on Punch card.

- ✓ In 1955, All Soviet Institute for Scientific and Technical Institute [VINITI] was also an important name in Information Science. Same year, Automated and Punch Card based Classification Systems are used in the field of Chemistry and Biology. In 1953 first IBM Electronic Digital Computer i.e. IBM 701 was used. After that, ASITA Reference Test was conducted comparing coordinate indexing and subject heading. In 1954, UNIVAC comes in market rather than its private uses; which was a landmark in Information Science practice. Later that year, optical scanner was also introduced. On other hand, Chemical Abstract Service [CAS] established research and development unit and Garfield publishes the first issue of Management's Document preview; though title changed in 1956 as Current Content of Management and Social Science. In 1957 NCR-304, the first solid state business computer was emerged. Later on, Taube's Uniterm Systems evolves from single word usage to role and links to 'concept coordinate indexing'. Next year, 1958 a computer launched using Solid State Circuitry, started programs and user oriented programming language is called Second Generation Computer was came. This year, Uniterm Indexing was introduced using IBM-704 computer with several facilities including Boolean Searches. Another most significant task and event this year was ARPA or Advance Research Project Agency which may be treated as father of modern Communication Network or even Information Networks. In 1959 ASM offers Machine Readable Bibliographic record for others to search using their Computing Machinery. Same year, CAS publishes first five monthly samples of Chemical Titles [CT].
- ✓ In 1959 COBAL, CODASYL and some other business computer programming language was developed. On same time, Mooers founds the Rockford Research Institute which was dedicated to Information Science research and develop TRAC Computer language. This year, University of Pittsburgh introduced first demonstration of computer searching of full text information. The SATIRE was also developed by SACCS. On other hand of Information Science, in 1961 American Institute of Chemical Engineering publishes Chemical Engineering Thesaurus. In 1962, Harry L Margan develops an algorithm to translate two dimensional structural diagram in to a tabular form which is able in manipulated and searched via computer. This is still fundamental in CAS Chemical Registry Systems. Year 1961 treated as important due to happening of 'Science Information Specialist' conference. This conference was helpful to launch some Information Science academic development. After that, Information Science started at Drexel University, at Lehigh University and so on. In 1962, ARPA established IPTO for advance Information Processing. Similarly Luhn implements his proposed SDI Systems at IBM Lab.

Period/Age/Year	Events/Origin/Development	Information Field
1835	International Institute of Bibliography (IIB)	Documentation
1854	George Boole	Documentation
1902	International Catalogue of Scientific Papers	Documentation
1875	practical calculating machine	Documentation
1920 & 1930	Produce formalized methods for Reasoning.	Information Sc.
1950	Electronic stored programme Computer commercial reality.	Information Sc.
1955	Language Translation	Information Sc.
1950's (late)	General problem solver	Information Sc.
1968	MACSYMA by MIT	Information Sc.
In 1982, the	Internet Protocol Suite	Information Sc.
1980's	Emerging Cloud & Green Computing Concept	IST
1990s	Voice over Internet Protocol (VoIP) "phone calls"	Information Sc.
1990s	Fifth Generation Computing	IST
2010's	Social Networking gain popularity.	IST
2011	Nanoscale superconductors	IST

Figure 3: Changing characteristics of Information Field and time to tome Nomenclature changes at a glance

- ✓ Same year, Command Retrieval Information Systems introduced called CRIS. In 1963, PG course in Information Science was first introduced by University of Sheffield; same time, first MEDLARS products are issued. In same year MEDLARS product was launched. In 1964 MIT develops Technical Information Project; which is treated as important event for Information Science practice. Later on it stored 25,000 records and able in online communication too.
- ✓ In 1966 NLM set up Toxicological Information Centre. The International Council of Scientific Union establishes CODATA to modernize the Quality and accessibility of scientific and bibliographic data collected globally. In July XEROX launches DATRIX; which consist of doctoral dissertation. In 1969 Japanese Information Centre for Science and Technology started online service of its database. Same time, Syracuse University first launches online searching strategy in Instruction in Classroom. In 1973 launches first Fully Functional personal Computer called ALTO. 1975 first IBM Personal Computer

was introduced i.e. IBM 5100. In 1976 first highly marketable Computer Apple-II was introduced to the common people. In 1981, first successfully Marketed IBM Personal Computer was launched called IBM-PC. In 1984 CAS is stored into SNT later on in 1986 NSFNET is established for high speed communication Networks. In 1989, March Tim Berners Lee, CERN write a paper entitled ‘Information Management: A proposal’. In the same year, November First web page was developed and appears in CERN Web server. In 1991 WAIS invented by Kable. And in July, 1992 www client software was related by CERN. 1995, CAS began internet coverage of Chemical Science resources on the Internet that are only available in Electronic form. In 1996, Bneusler Kable, co-found the Internet Archive. During the late of 1900’s several other happening made in the field of Information Science.

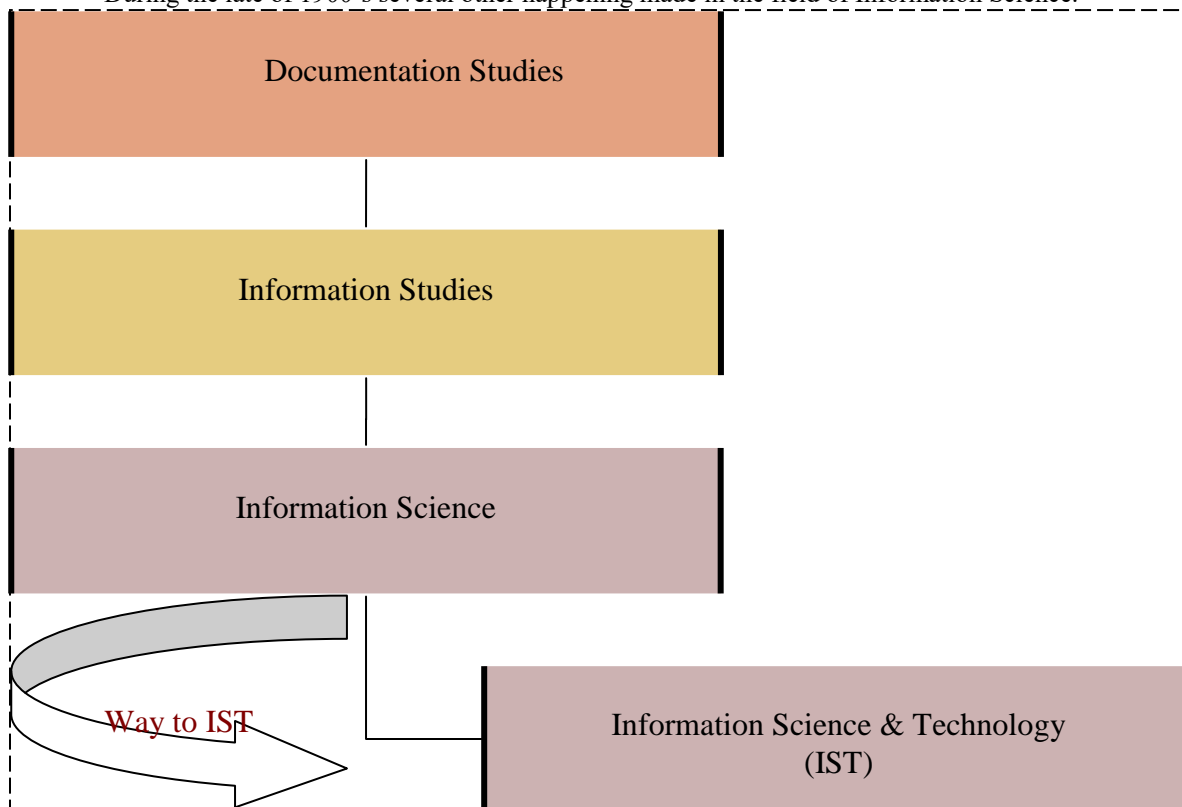


Figure 4: Emerging academic changes in Information Science

<i>Technological Job or Post</i>	<i>Other Job or Post</i>
Information Scientist	Teacher/Lecturer of Computing
MIS Professionals	Teacher/Lecturer of LIS
Database Managers	R & D Activities
Network Security Expert	Public Relation Officer
Multimedia	Media Person
System Analyst	Archivist
Knowledge Engineer	Documentation officer
Knowledge Broker	Educationalist
Web Administrator	Consultant
Programmer	Information System Developer & Designer.

Figure 5: Depicted Changing Job nature of skilled Information Science; based on manual and technological curriculum

Above mentioned Technological and professional changes are most important for Information Science development. Recently some more tools and Technologies change the entire arena of Information Science and make Information Science as an advance field of Applied Science. Today several new tools and technologies are affecting Information Science and thus a new nomenclature originated i.e. Information Science and Technology [IST]. Several associations, departments and course was introduced with such name. recently Cloud Computing, Green Computing, Usability Engineering, HCI changes overall look of Information Science.

**Findings:**

- ✓ Information Science, earlier treated as field of Information; but later on it integrated with Technology and shoed as Applied Science Domain;

- ✓ Information Science now a days also treated as Information Science and Engineering [ISE], Information Science and Computing [ISC], Information Science and Technology [IST], due to advancement in interdisciplinary research and technological integration;
- ✓ Computers, Technologies and other hand information, book are two different side of 'Information Science';
- ✓ Information Science is popular course in the academics especially in the I-Schools.

**Conclusion:**

Information is power and knowledge is super power. Practically, both Information and Knowledge both are supplied and modernized by Information Science domain. Advance Technologies changes entire arena of Information Science; the academics around the world moving towards integration of IT and IS in meaningful way. Cloud Computing, Virtualization and other are recent development in the field of Information Science. In future Information Science would be much more Information-Technology-People interacting field no doubt with humanity touch.

**References:**

1. Cohen, E. B. (2004). Applying the Informing Science Framework to Higher Education: Knowledge Development, Management, and Dissemination. Konferencja Pozyskiwanie wiedzy i zarządzanie wiedzą (Proceedings of the Knowledge Acquisition and Management Conference) May 13-15, 2004 Kule, Poland.
2. Cohen, Eli B. and Nycz Malgorzata (2006). Learning Objects and E-Learning: an Informing Science Perspective. *Interdisciplinary Journal of Knowledge and Learning Objects* Volume 2, 2006.
3. Martin, S.B. (1998). Information technology, employment, and the information sector: Trends in information employment 1970–1995. *Journal of the American Society for Information Science*, 49(12), 1053–1069.
4. Michael Buckland and Ziming liu (1995).History of information science. *Annual Review of Information Science and Technology*, vol. 30: 385-416.
5. Paul, P. K. (2012). Information Scientist: Roles and Values with special Reference to their Appropriate Academic Programme and its availability in India. *International Journal of Information Dissemination and Technology*, Vol. 2, No. 4, October-December-2012, Page-245-248,
6. Paul,P.K., D Chaterjee,R Bhatnagar, Uma Pricilda (2012). Information Scientist: Contemporary innovative techno management roles with special reference to Information Scientist Vs Information Technologist: A Study, *Indian Journal of Information Science and Applications [IJISA]*, Vol. 2. No. 1, Jan-Jun-2012, Academic Research Publication, New Delhi, Page-47-50.
7. Paul, P. K., Ashok Kumar, Dipak Chaterjee (2012). Health Informatics and its Practice: Emerging Domain of Information Science-Indian Scenario. *Current Trends in Biotechnology and Chemical Research*, Vol. 2 No. 2, Page- 83-87,
8. Prantosh Kr. Paul, K L Dangwal and Dipak Chaterjee, (2012). Information Technology and Advance Computing and their interaction for healthy Education, Techning, and learning: The IKM Approach. *Asian Journal of Natural and Applied Sciences*, V-1, No. 4, Page- 70-77.
9. Paul,P.K. , R Rajesh, D Chatterjee, M K Ghose (2013). Information Scientist: Technological and Managerial Skill requirement in 21<sup>st</sup> century. *Information Studies* Vol. 19, No. 1, Page-29-36.
10. Paul, P.K., (2013). MSc-Information Science [Geo Informatics]: Overview emphasizing twoproposed curriculum for sophisticated Geo Spatial development. *International Journal of Pharmaceutical and Biological Research (IJPBR)*, Vol 4 Issue 5 Page 218-227.
11. Pau1, P.K., K L Dangwal, A Kumar (2013). Information Infrastructure and Academic and Education World: The Role and Opportunities in Contemporary Perspective. *International Journal of Education for Peace and Development: Vol. 1 No. 1* Page-31-36.
12. Reichman, F. (1961). Notched Cards. In R. Shaw (Ed.), *The state of the library art04(01)*, pp. 11–55). New Brunswick, NJ: Rutgers, The State University, Graduate School of Library Service.
13. Saracevic, T. (1996). Relevance reconsidered. *Information science: Integration in perspectives*. In *Proceedings of the Second Conference on Conceptions of Library and Information Science* (pp. 201–218), Copenhagen, Denmark: Royal School of Library and Information Science.
14. Saracevic, T. (1975). Relevance: A review of and a framework for the thinking on the notion in information science. *Journal of the American Society of Information Science*, 26(6), 321–343.
15. Saracevic, T. (1979a). An essay on the past and future of information science education. I. Historical overview. *Information Processing & Management*, 15(1), 1–15.
16. Saracevic, T. (1979b). An essay on the past and future of information science education. II. Unresolved problems of 'extemalities' of education *Information Processing & Management*, 15(4), 291–301.
17. Vakkari, S.P. (1996). Library and information science: Content and scope. In J. Olaisen, E. Munch-Petersen, & P. Wilson (Eds.), *Information science: From development of the discipline to social interaction*. Oslo, Norway: Scandinavian University Press.

18. Vickery, B.C., & Vickery, A. (1987). Information science in theory and practice. London: Butterworths.
19. Wersig, G., & Neveling, U. (1975). The phenomena of interest to information science. *Information Scientist*, 9, 127–140.
20. White, H.D., & McCain, K.W. (1997). Visualization of literatures. *Annual Review of Information Science and Technology*, 32, 99–168.
21. Information Science (2017) availed on 10-09-2017 at [https://en.wikipedia.org/wiki/Information\\_science](https://en.wikipedia.org/wiki/Information_science)
22. iSchools Organization (2017) availed on 10-09-2017 at <http://ischools.org/about/>
23. College of Information & Communication (2017), University of Carolina availed on 10-09-2017 at <http://www.libsci.sc.edu/bob/istchron/iscnet/ischron.html>
24. <https://en.wikipedia.org/wiki/Science> (availed on 10-09-2017)
25. <https://en.wikipedia.org/wiki/Technology> (availed on 10-09-2017)