Highlights of Library Automation related documents in the *INSPEC*

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Abstracts

The paper has attempted to analyse the Library Automation related records in the *INSPEC (*1969 to July 2004). The growth of Library Automation related literature, country of input, scattering of literature in different publication types, core journals publishing Library Automation related publications, language-wise proportion of the literature, content analysis through keywords/descriptors, availability of URLs (Universal Resource Locator) for full text articles as alternative locations were the main focus of the study. After the year 1984, the literature grows approximately linearly with a growth rate of about 600 items per year. The USA is the predominant publishing country of Library Automation related literature. Journals are the most preferred publication media, followed by Conference/Proceedings-Papers, Book-Chapters, and Reports publications. Most productive journals are: *Library Hi Tech*, followed by *Computers in Libraries*, *VINE*, *Information Technology and Libraries*, and *Program*. English articles constitute 91.83% of the total literature. That means the non-English articles constitute only 8.17%. The keyword analysis indicates that the key areas of Library Automation were cataloguing; academic-libraries; information-retrieval; Internet; and information-services. The most occurred URL was http://www.dlib.org/ as alternative locations in the availability notes of Library Automation related records.

Keywords: Bibliographic Databases; Core Journals; Country-wise Publication Outputs; *INSPEC*; Keyword Frequencies; Library Automation; Literature Growth; Publication Languages; Publication Mapping; Publication Productivity; Publication Types; Quantitative Assessment

Introduction

The library environment is currently undergoing rapid and dynamic changes. There was an increasing demand for processing of data and retrieval of information in the quickest possible time. The application of information systems and services is perhaps the only way to cope with the information needs with speed and relative accuracy and reliability. Computer applications in libraries can in fact be categorised mainly into three types: For supporting clerical functions associated with technical processing and circulation work (Library automation); For information storage, retrieval and dissemination; For supporting "Management Information Services" for librarians, especially analysing library statistics.

The most commonly known house-keeping operations are: acquisition control, serials control, cataloguing and circulation control, web cataloguing, and metadata linking [INSDOC 2000]. Library Automation is the key element for information industry. Research and development of Library Automation has grown very rapidly in recent decades and become increasingly important for the economic growth of librarianship of a developing or developed country. As a reflection, Library Automation literature has also grown rapidly, though diversified as well. CD-ROM and online databases were used as source for R & D mapping [Kalyane and Kadam 1998; Tsay et al. 2000; Parmar 2004].

INSPEC, produced by the Institution of Electrical Engineers, UK, is one of the largest-established and best-known bibliographic database for engineering information. *INSPEC* database covers physics, electronics, electrical engineering, computer sciences, and library and information technology. It is available both online and on CD-ROM. *INSPEC* database has coverage of more than 40,000 records on library and information science.

In practice, any given historical account must be limited by its choice of coverage, technique of analysis and objectives. Effective use of already available knowledge is as valuable as creation of new knowledge [Kalyane et. al. 2003, Kalyane et. al. 2004]. Hence, present effort is to highlight it. The work has focused the literature available in the *INSPEC* database on Library automation. The objectives of the work were:

- to depict the growth of literature;

- to analyse the literature based on country of input;
- to find the scattering of literature based on publication types;
- to identify core journals publishing Library Automation related publications;
- to present language-wise proportion of the literature;
- to analyse the contents of the papers through keywords/descriptors; and
- to quantify the availability of URLs (Universal Resource Locator) for full text articles

History of Library Automation

The prospects for development after 1960 were foreseen [Pekelis 1984] as follows (The Year-Forecasting): 1970 - Translating machines; 2000 - Artificial intelligence, Global library; 2020 - Logical languages; 2030 - Robots, Contacts with extraterrestrials; 2050 - Memory playback; 2060 - Mechanical educator; 2080 - Machine intelligence exceed man's; and 2090 - World brain.

1950: The Library of Congress (LC) used the unit record machines for the production of catalogues for the first time in 1950. Since then many libraries in USA have used unit record machines for automating several of their activities. Use of punched cards, data processing equipment (like unit record machines e.g., tabulators, collators, sorters, etc.) and early computers were prevalent that period.

1960: This period witnessed the use of general-purpose digital computers for the purpose of automating some of the library functions (such as circulation control, acquisitions, serial control, and cataloguing) and for the design and development of information retrieval systems. Feasibility studies on on-line interactive systems and some advanced micro-image searching systems were on during the late 1960s.

1970: Design of on-line systems and conversion of batch systems to the on-line mode were developed.

1980: Library Automation entered into another era in the 1980s with the introduction of microprocessors for use in library activities. Intensive use of on-line systems and use of mini/micro computers, especially the microprocessors were common.

After 1990: Digital Library can handle multimedia data, which can present information more effectively than print media and can be accessed easily and

understood even by those who are illiterate. The following points illustrate the potential differences between traditional and digital libraries [Borgman 1999; Kilker and Gay 1998):

- Traditional libraries are based upon centralised control and relatively few access locations; digital libraries can be distributed and ubiquitous;
- Traditional libraries support one-way, loosely coupled (slow) interaction; digital libraries support two-way communication with tight fast interaction;
- Traditional libraries are based upon a model of one-way search: a consumer looking for an object; digital libraries support symmetric search: consumer looking for an object and the producer of the object looking for a consumer;
- In traditional libraries structured text queries (and some browsing) are used to aid intellectual access; in digital libraries complex interactions of query, navigation/ browsing, and social filtering can be used; and
- Only a librarian may add to the collection of conventional library, because of the discipline essential to create a quality catalogue. In a digital library, cataloguing discipline and search restrictions to authorized data can be automatically enforced.

Gaur analyzed the present status of digitisation of Indian Management Libraries through a survey. The issues such as library automation, development of digital libraries, he found that 45% of libraries have not yet started automation; out of 55% of libraries that have started library automation, only 16% have been fully computerised. Thus, in Indian libraries the digital gap is widening day-by-day. Now is the time when management libraries must make computerisation their number one priority [Gaur 2003].

World Wide Web open archive initiative first started by Paul Ginsparg, a physicist at http://xxx.lanl.gov/ the Los Alamos National Laboratory (LANL), developed the first E-print archive in August 1991. Many subject disciplines such as astronomy, chemistry, computer science, mathematics, and physics have taken the lead in eprint distribution. Perhaps because scientists and researchers in these fields possessed the first high-level computers, e-print servers became available and then prevalent in these disciplines. Fields in the humanities and social sciences have recently begun following the trend, but still lag significantly behind in terms of server repositories and papers [Prakasan et al 2003].

Survey of the status of E-LIS, live archives in the field of Library and Information Science [Kumar and Kalyane 2004] highlights include: Conference papers (34%); highest approval, June 2004 (28%); published archives (76%); not refereed (52%); not in public domain (60%); highest self-archiving-author (De Robbio, Antonella). The number of EPrints having single JITA domain specifications were: Theoretical and general aspects of libraries and information (27); Information use and sociology of information (80); Users, literacy and reading (13); Libraries as physical collections (30); Publishing and legal issues (57); Management (13); Industry, profession and education (36); Information sources, supports, channels (113); Information treatment for information services, Information functions and techniques (101); Technical services libraries, archives and museums (25); Housing technologies (1); Information technology and library technology (92); and Inter-domainary (395) i.e. having specifications of two or more than two JITA classes.

Materials and Methods

Library Automation literature scattered in the *INSPEC* bibliographic database during 1969 to July 2004 is explored. Normal subject keyword search is adopted to retrieve literature related to Library automation. The search resulted a total of 12,322 records related to Library automation. The search queries were as follows:

INSPEC till July, 2004

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#3 #1 or #2 (12322 records)
   #2 (librar* automat*) in TI (573 records)
   #1 (librar* automat*) in DE,ID,SU (12287 records)
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The phrase 'Modern librametrics' was used for the fist time in the context for statistical analysis of digital metadata [Kumar 2004]. That is simple statistical methods of digital metadata counting to evaluate and quantify the growth of a subject. The same techniques have been employed to analyse the bibliographic records in present study.

Normal count procedure (Kalyane and Vidyasagar Rao 1995] is used throughout the analysis of data.

3. Results and Discussion

3.1. Growth of literature

The most famous 'Ideal Logistic Growth Model' of literature in a field has been well discussed in early 1990s [Garg and Kari 1992], [Braun et al 2000], and [Garg and Padhi 2002]. Logistic growth assumes that the growth rate is proportional to the product of present size and future growth. The escalating growth after maturation implies that old topics of research are no longer relevant and new directions in research, new discoveries, and new opportunities keep growing. According to Gompertz, the logistic growth of any field of knowledge ideally takes an extended S-shape [Sharma et al 2002]. Figure 1 depicts year-wise and cumulative number of R&D publications related to Library Automation since year 1969.

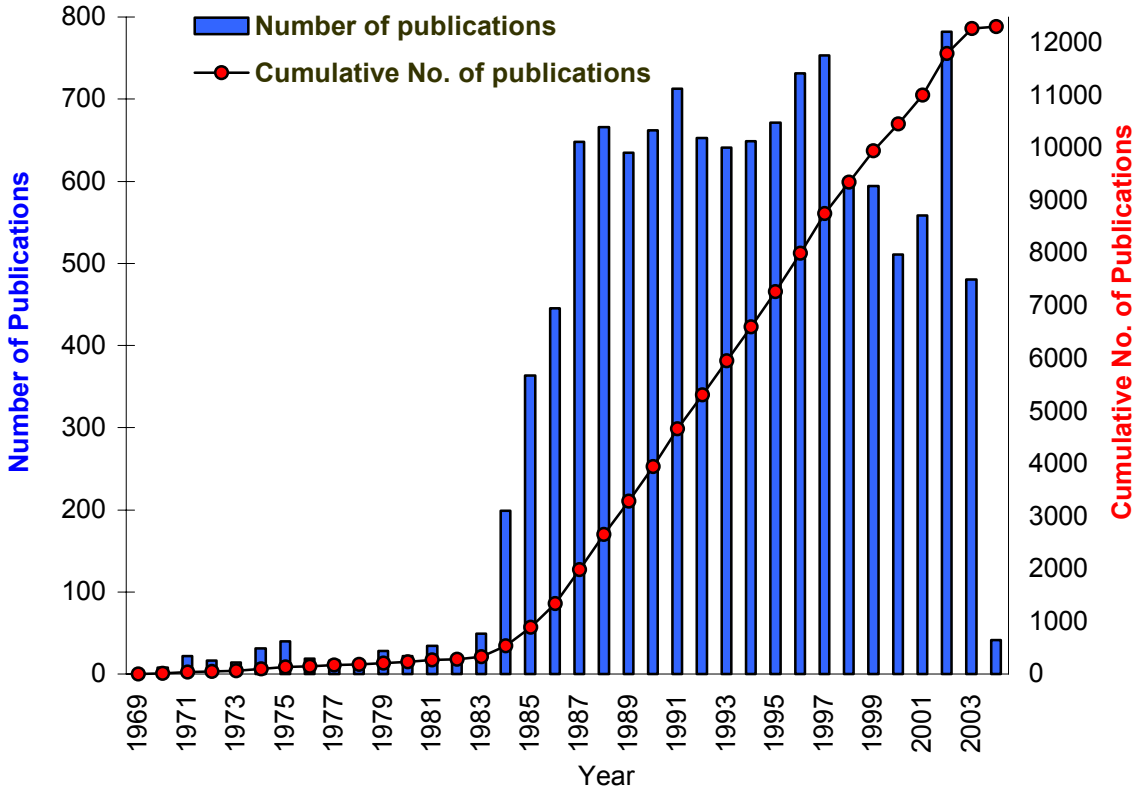

Figure 1: Library Automation related R&D publications as per *INSPEC* (1969-July 2004)

3.2 Country-wise Input

There are a total of 43 countries, which have contributed to the input of Library Automation literature to the *INSPEC* database. Country-wise input of publications is given in Table 1. USA is at the top position with 6,677 publications followed by UK (2,913), Germany (545), The Netherlands (383), Australia (217), and India (201). The total literature output of these top 6 countries on Library Automation related research amounted to about 88.75 per cent.

3.3 Types of Publication Media

As per *INSPEC*, out of the 12,322 publications, 9,973 (80.9%) are scattered in Journal-papers followed by 2,237 (18.15%) in Conference/Proceedings-Papers, 72 (0.58%) in Book-Chapters, 25 (0.20%) in Books, and 15 (0.12%) in Technical Reports. Comparison of growth in literature of Library Automation related research in terms of their publication media are presented in Figure 2. The proportion of Non-Conventional Literature (NCL), which includes technical reports; conference/symposia/seminar papers etc., is 19 %.

Table 1: Input-wise list of countries contributing to the Library Automation related literature as per *INSPEC* (1969-July 2004)

Rank	Country	Number of Publications	Rank	Country	Number of Publications
1	USA	6677	20	Malaysia	12
2	UK	2913	20	Poland	12
3	Germany	545	21	Ireland	11
4	The Netherlands	383	22	Brazil	9
5	Australia	217	23	Costa Rica	8
6	India	201	24	Czech Republic	6
7	Hungary	167	24	Norway	6
8	Canada	146	24	Romania	6
9	Japan	141	25	Russia	5
9	West Germany	141	25	Slovakia	5
10	Denmark	128	25	Yugoslavia	5
10	Sweden	128	26	Switzerland	4
11	Czechoslovakia	87	27	Croatia	3
12	France	82	27	Nigeria	3
13	South Africa	43	27	Slovenia	3
14	USSR	42	27	South Korea	3
15	Spain	39	28	Austria	2
16	China	36	28	Bulgaria	2
17	Israel	30	28	Singapore	2
18	East Germany	23	29	Belgium	1
18	Italy	23	29	Saudi Arabia	1
19	Cuba	21	**Total**		**12322**

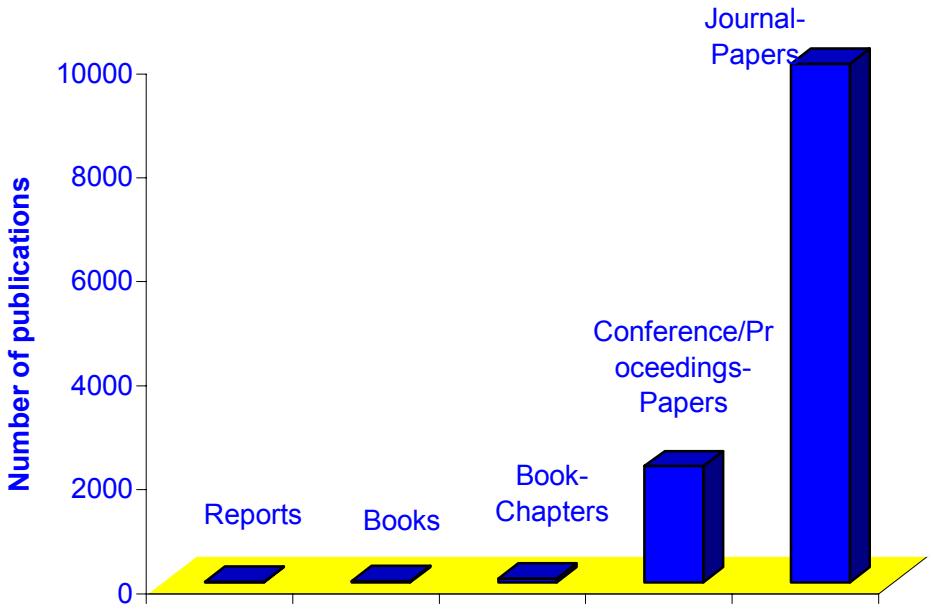

Figure 2: Publication media–wise number of publications related to Library Automation as per *INSPEC* (1969-July 2004)

3.4 Highly contributing journals

The total number of 9,973 journal articles related to Library Automation are scattered in 536 distinct journals. The most contributed five journals are *Library Hi Tech* contributed 478 (4.79%) articles followed by *Computers in Libraries* with 430 (4.31%) articles, *VINE* with 381 (3.82%) articles, *Information Technology and Libraries* with 348 (3.49%) articles, and *Program* with 297 (2.98%) articles.

Productivity of other journals in descending order of number of publications: *Electronic Library* (295); *Library Software Review* (285); *Cataloging & Classification Quarterly* (227); *Journal of Library Administration* (224); *Library Trends* (188); *Technical Services Quarterly* (184); *Reference Librarian* (178); *Tudomanyos es Muszaki Tajekoztatas* (163); *Bulletin of the Medical Library Association* (160); *Library Resources & Technical Services* (152); *Medical Reference Services Quarterly* (134); *IATUL Proceedings, New Series* (132); *INSPEL. International Journal of Special Libraries* (128); *Online* (126); *ABI Technik* (118);

OCLC Micro (115); *LASIE* (109); *OCLC Systems & Services* (104); *Resource Sharing and Information Networks* (103); *Library Acquisitions: Practice and Theory* (100); *Small Computers in Libraries* (99); *Microcomputers for Information Management* (94); *Special Libraries* (92); *Internet Reference Services Quarterly* (85); *Acquisitions Librarian* (84); *Science & Technology Libraries* (76); *D Lib Magazine* (72); *Tidskrift for Dokumentation* (68); *Interlending & Document Supply* (67); *Journal of Interlibrary Loan, Document Delivery & Information Supply* (65); *Library Micromation News* (64); *Law Librarian* (61); *Information Development* (61); *Journal of the American Society for Information Science* (60); *Information Services & Use* (60); *Community & Junior College Libraries* (56); *ASLIB Proceedings* (56); *Canadian Library Journal* (55); *Serials Librarian* (54); *Database* (53); *CD ROM Professional* (51); *Library Science with a Slant to Documentation* (47); *Journal of Librarianship and Information Science* (47); *Library Computing* (46); *College & Undergraduate Libraries* (46); *Technicka Knihovna* (44); *Library Collections, Acquisitions, & Technical Services* (43); *Journal of Internet Cataloging* (42); *New Review of Information Networking* (40); *Journal of Interlibrary Loan & Information Supply* (40); *Alexandria* (40); *Journal of Information Processing and Management* (38); *Joho Kanri* (36); *Issues in Science & Technology Librarianship* (36); *Documentaliste Sciences de l'Information* (36); *South African Journal of Library and Information Science* (35); *Reference & User Services Quarterly* (35); *Legal Reference Services Quarterly* (35); *IATUL Quarterly* (35); *Documentation et Bibliotheques* (35); *RQ* (34); *Information Outlook* (34); *IASLIC Bulletin* (34); *Slavic & East European Information Resources* (32); *CD Rom Librarian* (32); *Quarterly Bulletin of the International Association of Agricultural Librarians and Documentalists* (31); *Laserdisk Professional* (31); *Australian Library Review* (31); *Journal of Documentation* (30); *Bulletin of the American Society for Information Science* (30); *Journal of Academic Librarianship* (29); *Journal of Information Science* (28); *Journal of Hospital Librarianship* (28); *DESIDOC Bulletin of Information Technology* (28); *Kniznice a Vedecke Informacie* (27); *Journal of Agricultural & Food Information* (27); *Education for Information* (27); *Revista Espanola de Documentacion Cientifica* (25); *Library Review* (25); *Journal of the China Society for Scientific and Technical Information* (25); *Australian and New Zealand Journal of Serials Librarianship* (25); *Ariadne* (25); *Microform & Imaging Review* (24); *Law Library Journal* (24); *Information Processing & Management* (24); *Online Information Review* (23);

Information & Librarianship (23); *SRELS Journal of Information Management* (22); *Serials* (22); *Public Library Journal* (22); *Microform Review* (22); *Learned Publishing* (22); *Journal of the Medical Library Association* (22); *Journal of Education for Library and Information Science* (22); *International Information, Communication and Education* (22); *SIGOIS Bulletin* (21); *Journal of Information Science, Principles & Practice* (21); *Journal of Government Information* (20); *Informatik* (20); *Government Information Quarterly* (20); *EDUCOM Review* (20); *Behavioral & Social Sciences Librarian* (20); *Nachrichten fur Dokumentation* (19); *Government Publications Review* (19); *First Monday* (19); *Aslib Proceedings New Information Perspectives* (19); *Library and Information Science* (18); *LASIE Bulletin of LASIE Australia Company Limited* (18); *Libri* (17); *Library & Information Science Research* (17); *Journal of Library Automation* (17); *Communications of the ACM* (17); *Reference Services Review* (16); *Business Information Review* (16); *New Review of Information and Library Research* (15); *Media and Methods* (15); *Information Bulletin of the Library Automated Systems Information Exchange* (15); *IATUL Proceedings* (15); *Canadian Journal of Information Science* (14); *Proceedings of the SPIE The International Society for Optical Engineering* (13); *NFD Information Wissenschaft und Praxis* (13); *Nauchno Tekhnicheskaya Informatsiya, Seriya 1* (13); *Library Technology* (13); *Internet Research: Electronic Networking Applications and Policy* (13); *International Forum on Information and Documentation* (13); *Indicizzazione* (13); *Christian Librarian* (13); *Archives and Museum Informatics* (13); *Library Management* (12); *Library Hi Tech News* (12); *Journal of Business & Finance Librarianship* (12); *Journal of Access Services* (12); *Campus Wide Information Systems* (12); *Public Services Quarterly* (11); *Online Review* (11); *Online & CD ROM Review* (11); *New Library World* (11); *Malaysian Journal of Library & Information Science* (11); *LIBER Quarterly* (11); *IFLA Journal* (11); *Herald of Library Science* (11); *Computer* (11); *Actualidades de la Informacion Cientifica y Tecnica* (11); *Searcher* (10); *Quarterly Bulletin of the International Association of Agricultural Information Specialists* (10); *PC Consultant* (10); *Journal of the American Society for Information Science and Technology* (10); *Journal of Information Networking* (10); *Indexer* (10); *IEEE Annals of the History of Computing* (10); *El Profesional de la Informacion* (10); *EContent* (10); *Computer Networks and ISDN Systems* (10); *Ciencias de la Informacion* (10); *Optical Information Systems* (9); *Journal of Librarianship* (9); *Information Retrieval & Library Automation* (9);

Informatie (9); *EDUCOM Bulletin* (9); *C&L Applications* (9); *Australasian Public Libraries and Information Services* (9); *World Patent Information* (8); *Revista AIBDA* (8); *Library and Information Research News* (8); *Documentaliste* (8); *Computers & Libraries* (8); *Collection Building* (8); *Ciencia da Informacao* (8); *Rural Libraries* (7); *Outlook on Research Libraries* (7); *New Review of Children's Literature and Librarianship* (7); *New Review of Academic Librarianship* (7); *Literary & Linguistic Computing* (7); *Joho Shori* (7); *Computers and the Humanities* (7); *Against the Grain* (7); *Texas Library Journal* (6); *Nauchno Tekhnicheskaya Informatsiya, Seriya 2* (6); *Mechanizace Automatizace Administrativy* (6); *Legal Information Management* (6); *Larc Reports* (6); *Journal of Religious & Theological Information* (6); *Internet Research* (6); *Information Today* (6); *Information Technology and Disabilities* (6); *Database Searcher* (6); *Ceskoslovenska Informatika, Teorie a Praxe* (6); *CD ROM World* (6); *Canadian Journal of Information and Library Science* (6); *Bulletin Israel Society of Special Libraries and Information Centres* (6); and *Aktualne Problemy Informacji i Dokumentacji* (6).

The journals contributed five articles (23 journals) are: *Studii si Cercetari de Documentare*; *SIGMOD Record*; *SIGIR Forum*; *Scientific and Technical Information Processing*; *Riverina Library Review*; *Performance Measurement and Metrics*; *Occasional Papers, University of Illinois Graduate School of Library and Information Science*; *Network. International Communications in Library Automation*; *Managing Information*; *Library Quarterly*; *Knowledge Organization*; *Kniznice a Informacie*; *Journal of Network and Computer Applications*; *Journal of Global Information Management*; *Journal of Educational Technology Systems*; *International Journal of Information Management*; *Informatologia Yugoslavica*; *Health Care on the Internet*; *Educational Technology*; *Computer Equipment Review*; *Colorado Libraries*; *Axis*; and *Automatic Documentation and Mathematical Linguistics*

The journals contributed four articles (18 journals) are: *Zeitschrift fur Bibliothekswesen und Bibliographie*; *Trends in Law Library Management and Technology*; *Transactions of the Information Processing Society of Japan*; *Space Communication and Broadcasting*; *South African Journal for Librarianship and Information Science*; *Social Science Computer Review*; *Multimedia Schools*; *Library Technology News*; *Library Computer Systems and Equipment Review*; *Journal of*

Computing in Higher Education; *International Journal of Medical Informatics*; *Inform* ; *INFOCUS* ; *IBM Journal of Research and Development*; *Health Information and Libraries Journal*; *Fujitsu* ; *Electronic Networking: Research, Applications and Policy*; and *Art Reference Services Quarterly*.

The journals contributed three articles (26 journals) are: *TASK Quarterly*; *SIGUCCS Newsletter*; *Open* ; *New Review of Hypermedia and Multimedia, Applications and Research*; *Mikrodok* ; *Journal of the American Society for Information Sciences*; *Journal of Library & Information Services in Distance Learning*; *Journal of Information and Image Management*; *Journal of Document and Text Management*; *JoDI Journal of Digital Information*; *International Cataloguing and Bibliographic Control*; *Interacting with Computers*; *Information World Review*; *Information Technology for Development*; *Information Studies*; *Information Society*; *Information Media & Technology*; *Electronic Publishing and Bookselling*; *CWIS Campus Wide Information Services*; *Computer Methods and Programs in Biomedicine*; *Computer Economics Report International Edition*; *Cape Librarian*; *BYTE*; *Behaviour and Information Technology*; and *Archivar* .

The journals contributed two articles (68 journals) are: *Wissenschaftliche Zeitschrift der Technischen Hochschule Otto von Guericke Magdeburg*; *Vyber Informaci z Organizacni a Vypocetni Techniky*; *Trudy Vsesouyznogo Nauchno Issledovatel'skogo Instituta Gidrometeorologicheskoi Informatsii Mirovogo Tsentra Dannykh*; *Storage Management*; *Software Practice and Experience*; *Software Engineering Notes*; *Software Engineering Journal*; *Scientific Computing World*; *Rutgers Computer & Technology Law Journal*; *Rivista di Informatica*; *Qingbao Kexue Jishu*; *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wroclawskiej, Seria: Konferencje*; *Netlink* ; *NEC Technical Journal*; *MUG Quarterly*; *Methods of Information in Medicine*; *Mekhanizatsiya i Avtomatizatsiya Proizvodstva*; *Matsushita Technical Journal*; *Mathematical and Computer Modelling*; *Library Issues*; *Library & Archival Security*; *Journal of the Library Science in China*; *Journal of the Institute of Electronics, Information and Communication Engineers*; *Journal of Software*; *Journal of Information Processing*; *Journal of Electronic Publishing*; *Journal of Computing in Small Colleges*; *Journal of Chemical Information and Computer Sciences*; *International Journal of Micrographics and Optical Technology*; *International*

Journal of Bio Medical Computing; *International Classification*; *Interface*; *Informing Science*; *Informatologia* ; *Information Technology & Public Policy*; *Information Research*; *Infomediary* ; *IFIP Transactions A Computer Science and Technology*; *IEEE Multimedia*; *IEEE Internet Computing*; *IBM Technical Disclosure Bulletin*; *IBM System User*; *IBM Nachrichten*; *Expert Systems for Information Management*; *European Journal of Operational Research*; *Electronic Learning*; *EDUCAUSE Review*; *EDUCAUSE Quarterly*; *Document Delivery World*; *DLA Bulletin*; *Database End User*; *CSIRONET News*; *ConneXions* ; *Computing Teacher*; *Computers, Environment and Urban Systems*; *Computers in Genealogy*; *Computers & Geosciences*; *College & University Media Review*; *CIPS Review*; *Bibliotheca Medica Canadiana*; *Automated Activities in Health Sciences Libraries*; *Astrophysics and Space Science*; *APL Quote Quad*; *Annals of Cases on Information Technology Applications and Management in Organizations*; *African Journal of Library, Archives & Information Science*; *ACM Transactions on Office Information Systems*; *ACM Transactions on Information Systems*.

The journals contributed only one article (207 journals) are: *Work Process Improvement Today*; *Wirtschaftsinformatik* ; *Vistas in Astronomy*; *Visible Language*; *Virtual Reality World*; *Virtual Reality*; *Videodisc and Optical Disk*; *URISA Journal*; *Unix & NT News*; *University Computing*; *Unisphere* ; *Transactions of the Institute of Electronics, Information and Communication Engineers D II*; *Transactions of the Institute of Electrical Engineers of Japan, Part C*; *The Office*; *Telonde* ; *Telesis* ; *Technology Reports of the Seikei University*; *T.I.P Applications*; *Systems for Information Management*; *Systems and Computers in Japan*; *Sperry Rand Engineering Review*; *Software World*; *SMPTE Journal*; *Sistemi & Impresa*; *SIGSMALL/PC Notes*; *SIGGROUP Bulletin*; *SIGCUE Outlook*; *SIGCHI Bulletin*; *SIGBIO Newsletter*; *Robot* ; *Remittance and Document Processing Today*; *Regelungstechnik* ; *Records Management Journal*; *Records Management Bulletin*; *Rechentechnik Datenverarbeitung*; *Publications of the Earth Physics Branch Department of Energy, Mines and Resources*; *Przeglad Elektrotechniczny*; *Programming and Computer Software*; *Problemy na Tekhnicheskata Kibernetika i Robotikata*; *Printed Circuit Design & Manufacture*; *Printed Circuit Design*; *Premises Facilities Management*; *Perspectives in Computing*; *Perspectivas em Ciencia da Informacao*; *Performance Evaluation Review*; *Pattern Recognition*; *Organizacija* ;

Online User; *Office Systems and Technology*; *Office Management*; *Office Administration and Automation*; *Object Magazine*; *Neural Network World*; *Network World*; *NEC Research and Development*; *Navigation* ; *Nauchnye i Tekhnicheskie Biblioteki SSSR*; *National Technical Report*; *National Academy Science Letters*; *Multimedia Information & Technology*; *Modern Office Technology*; *Modelling, Measurement & Control D Manufacturing, Management, Human & Socio Economic Problems*; *Mitsubishi Denki Giho*; *Mini Micro Systems*; *Microdoc* ; *Memoirs of the Faculty of Engineering, Fukui University*; *Mathematical and Computer Modelling of Dynamical Systems*; *Managing Office Technology*; *M.D. Computing*; *LOGOS* ; *Linux Journal*; *Library Computer Equipment Review*; *L'Antenna* ; *Journal of Wuhan University of Technology Information & Management Engineering*; *Journal of the Japan Society of Precision Engineering*; *Journal of the Institute of Electronics Engineers of Korea C*; *Journal of Systems Management*; *Journal of Systems and Software*; *Journal of Strategic Information Systems*; *Journal of Scholarly Publishing*; *Journal of Research of the National Institute of Standards and Technology*; *Journal of Management Information Systems*; *Journal of KISSC Computing Practices*; *Journal of KISS: Software and Applications*; *Journal of Instructional Development*; *Journal of Information Technology*; *Journal of Information Ethics*; *Journal of Information & Optimization Sciences*; *Journal of Functional Programming*; *Journal of Educational Multimedia and Hypermedia*; *Journal of Economic Behavior and Organization*; *Journal of Computer Security*; *Journal of Computer Aided Design & Computer Graphics*; *Journal of Clinical Computing*; *Journal of Artificial Intelligence in Education*; *Journal of Archival Organization*; *Johns Hopkins APL Technical Digest*; *ITG Fachberichte* ; *Irish Computer*; *Internet and Higher Education*; *International Journal on Software Tools for Technology Transfer*; *International Journal on Document Analysis and Recognition*; *International Journal of Software Engineering and Knowledge Engineering*; *International Journal of Quantum Chemistry*; *International Journal of Modern Physics C Physics and Computers*; *International Journal of Micrographics & Video Technology*; *International Journal of Mass Spectrometry and Ion Processes*; *International Journal of Man Machine Studies*; *International Journal of Human Computer Studies*; *International Journal of Geographical Information Systems*; *Intelligent Tutoring Media*; *Integrated System Design*; *InformationWEEK* ; *Information Resources Management Journal*; *Information Processing Society of Japan*; *Information Part 1. News Sources Profiles*;

Information Management & Computer Security; *Information Economics and Policy*; *Information and Referral: Journal of the Alliance of Information Referral Systems*; *Informatica* ; *Informacio Elektronika*; *Industrial Robot*; *Industrial Engineering and Management*; *IMIS Journal*; *IMC Journal*; *Image Technology*; *IM Information Management*; *IFIP Transactions C Communication Systems*; *IEICE Transactions on Information and Systems*; *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*; *IEEE Transactions on Pattern Analysis and Machine Intelligence*; *IEEE Transactions on Knowledge and Data Engineering*; *IEEE Transactions on Electron Devices*; *IEEE Transactions on Communications*; *IEEE Spectrum*; *IEEE Expert*; *IEEE Distributed Systems Online*; *IEEE Computer Graphics and Applications*; *IEEE Computer Applications in Power*; *IEE Proceedings Software Engineering*; *ID Systems European Edition*; *ICA Information*; *IBM Systems Journal*; *Expert Systems with Applications*; *Ethics and Information Technology*; *Ericsson Review*; *Ergonomics in Design*; *Elektrotechnische Zeitschrift ETZ B*; *Elektronik Industrie*; *Electronics and Power. Journal of the Institution of Electrical Engineers*; *Electronic Publishing Review*; *Electronic Notes in Theoretical Computer Science*; *Electronic Journal on Information Systems in Developing Countries*; *Electronic Documents*; *Electronic and Optical Publishing Review*; *Education Libraries Journal*; *EDPACS* ; *EDI Law Review*; *EDI Forum*; *Document Manager*; *DEC Professional*; *Data Processing*; *Data Management*; *Data Communications*; *Data Communication and Processing*; *Data & Knowledge Engineering*; *CSI Communications*; *Critique* ; *Computing, The Magazine*; *Computers in Human Behaviour*; *Computers and Law*; *Computerized Circulation Systems Series*; *Computer Systems Europe*; *Computer Supported Cooperative Work: The Journal of Collaborative Computing*; *Computer Physics Communications*; *Computer Networks*; *Computer Law & Practice*; *Computer Journal*; *Computer Decisions*; *Computer Data*; *Compute. Journal for Progressive Computing*; *Communications News*; *Communications Networks*; *Collegiate Microcomputer*; *Capacity Management Review*; *Canadian Datasystems*; *Business Equipment Digest*; *Bulletin of the University of Electro Communications*; *Bulletin of the American Society for Information Science and Technology*; *Bulletin Association Canadienne des Bibliothecaires de Langue Francaise*; *BJHC&IM British Journal of Healthcare Computing & Information Management*; *AV Magazine for Business Communications*; *Australian Computer Journal*; *ASU Newsletter*; *Astronomy & Astrophysics Supplement Series*; *Association Canadienne des Bibliothecaires de*

Langue Francaise. Bulletin; *ARMA Records Management Quarterly*; *Applied Artificial Intelligence*; *Annals of Cases on Information Technology*; *Angewandte Informatik*; *Analytical Chemistry*; *America's Network*; *AISB Quarterly*; *AIP Conference Proceedings*; *AI Expert*; *ACM Computing Surveys*; *and ABB Review*.

3.5 Language-wise publications

Another interesting observation is the growing number of languages in which Library Automation literature is being communicated. Table 2 is the list of languages in which the Library Automation related papers are published.

Table 2: Language-wise distribution of Library Automation related papers as per *INSPEC* (1969-July 2004)

Language	Frequency	Cumulative %	Language	Frequency	Cumulative %
English	11315	91.83	Polish	9	99.56
German	203	93.48	Afrikaans	8	99.63
Hungarian	164	94.81	Danish	8	99.69
Japanese	124	95.81	Slovenian	6	99.74
French	98	96.61	English; French	5	99.78
Spanish	62	97.11	German; English; French; Arabic	5	99.82
Czech	44	97.47	Romanian	5	99.86
Slovak	40	97.79	Norwegian	4	99.89
Dutch	36	98.08	Croatian	3	99.92
Swedish	36	98.38	English; Spanish	3	99.94
Chinese	35	98.66	Korean	3	99.97
Hebrew	28	98.89	Bulgarian; English	1	99.98
Russian	24	99.08	Croatian; Slovenian; English	1	99.98
Italian	23	99.27	English; French; Spanish	1	99.99
English; German	17	99.41	French; Spanish	1	100.00
Portuguese	10	99.49	**Total**	**12322**	

Consistent with the countries of publication, English is the predominant language of articles on Library automation. English language articles constitute 91.83% of the total. There are only 8.17% non-English-language articles. This may be due to the fact that the USA and the UK are the predominant countries of publication and the *INSPEC* is a British-based database. Moreover, English is the official language for most international conferences (Ming et al. 2000).

3.6 Keywords/Descriptors

Keywords of publications convey precisely the thought contents of the papers. The total number of keywords/descriptors appeared in the 12,322 Library Automation

related records in the *INSPEC* database were 49,837. The following is the list of keywords in the order of their number of occurrences in the records: library-automation (11,812); cataloguing (2,077); academic-libraries (1,707); information-retrieval (1,466); Internet (1,463); information-services (1,434); bibliographic-systems (1,324); microcomputer-applications (973); information-retrieval-systems (832); electronic-publishing (724); information-resources (723); CD-ROMs (691); software-packages (568); personnel (521); public-libraries (482); DP-management (401); research-libraries (396); computer-networks (395); user-interfaces (386); human-factors (374); training (369); digital-libraries (367); document-delivery (360); professional-aspects (335); special-libraries (334); indexing (287); library-mechanisation (283); database-management-systems (277); local-area-networks (267); full-text-databases (251); information-dissemination (249); information-networks (244); information-needs (235); electronic-mail (232); standards (230); social-aspects-of-automation (223); education (222); information-centres (221); technological-forecasting (221); computer-aided-instruction (219); libraries (217); hypermedia (209); information-technology (209); information-science (201); government-policies (200); classification (199); educational-computing (193); online-front-ends (191); relational-databases (190); history (187); teaching (187); document-image-processing (186); government-data-processing (172); software-selection (161); copyright (156); management-of-change (153); information-use (144); medical-information-systems (142); medical-computing (138); legislation (130); word-processing (128); expert-systems (126); information-storage (125); meta-data (123); IBM-computers (122); Web-sites (121); information-retrieval-system-evaluation (120); law-administration (118); technology-transfer (117); public-information-systems (116); Apple-computers (115); health-care (108); client-server-systems (107); multimedia-systems (105); open-systems (105); computer-literacy (103); costing (103); medical-administrative-data-processing (103); educational-administrative-data-processing (101); handicapped-aids (100); distance-learning (99); educational-courses (98); multimedia-computing (98); wide-area-networks (95); optical-disc-storage (90); management (89); security-of-data (89); computer-science-education (87); economics (87); document-handling (86); educational-technology (86); electronic-data-interchange (85); protocols (85); systems-analysis (83); visual-databases (83); vocabulary (80); agriculture (79);

interactive-systems (79); records-management (79); workstations (76); humanities (75); information-systems (74); reviews (74); search-engines (74); graphical-user-interfaces (72); internetworking (69); planning (69); microforms (66); computer-communications-software (64); computer-installation (61); research-initiatives (61); spreadsheet-programs (60); distributed-databases (59); software-reviews (59); strategic-planning (59); information-analysis (58); operating-systems-computers (56); office-automation (55); industrial-property (53); technical-support-services (53); thesauri (53); project-management (52); socio-economic-effects (52); geographic-information-systems (51); page-description-languages (51); public-domain-software (51); facsimile (50); hypermedia-markup-languages (50); information-industry (48); management-information-systems (48); publishing (48); scientific-information-systems (48); business-data-processing (47); cartography (47); optical-publishing (47); data-communication-systems (46); standardisation (46); DP-industry (45); microcomputers (45); knowledge-based-systems (44); natural-languages (44); contracts (43); literature (43); politics (43); interlibrary-loan (42); intranets (42); optical-character-recognition (42); computer-based-training (41); computer-graphics (41); virtual-reality (41); groupware (40); administrative-data-processing (39); marketing (39); software-engineering (39); continuing-education (38); integrated-software (38); video-and-audio-discs (38); computer-facilities (37); decision-support-systems (37); statistics (37); character-sets (36); query-formulation (36); statistical-analysis (36); art (35); human-resource-management (35); query-processing (35); teleconferencing (35); desktop-publishing (34); employment (34); portals (34); programming (34); public-administration (34); bar-codes (33); biomedical-education (33); file-servers (33); linguistics (33); performance-evaluation (33); budgeting (32); data-structures (32); equipment-selection-computers (32); IBM-compatible-machines (32); personal-computing (32); computer-selection (31); quality-control (31); software-agents (31); data-privacy (30); authorisation (29); distributed-processing (29); economic-and-sociologic-effects (29); ergonomics (29); Unix (29); cost-benefit-analysis (28); medicine (28); research-and-development-management (28); systems-re-engineering (28); bibliographies (27); buyer's-guides (27); commerce (27); electronic-messaging (27); humanities-data-processing (27); purchasing (27); data-handling (26); file-organisation (26); financial-data-processing (26); real-time-systems (26); social-sciences-computing (26); software-standards (26);

courseware (25); online-operation (25); resource-allocation (25); network-servers (24); software-tools (24); factographic-databases (23); music (23); computer-centres (22); software-performance-evaluation (22); telecommunication-networks (22); viewdata (22); abstracting (21); accounts-data-processing (21); artificial-intelligence (21); image-scanners (21); utility-programs (21); biology-computing (20); data-visualisation (20); hobby-computing (20); object-oriented-databases (20); object-oriented-programming (20); professional-communication (20); query-languages (20); message-authentication (19); multimedia-databases (19); network-operating-systems (19); image-processing (18); macros (18); natural-language-interfaces (18); content-management (17); finance (17); outsourcing (17); program-testing (17); psychology (17); telecommunication (17); user-centred-design (17); authoring-systems (16); executive-workstations (16); formal-specification (16); ISDN (16); ISO-standards (16); relevance-feedback (16); report-generators (16); societies (16); storage-management (16); user-modelling (16); wireless-LAN (16); citation-analysis (15); magnetic-tape-storage (15); multi-access-systems (15); natural-sciences-computing (15); SQL (15); telecommunications-computing (15); Web-design (15); computer-evaluation (14); consultancies (14); data-integrity (14); interactive-terminals (14); knowledge-management (14); social-sciences (14); very-large-databases (14); business-graphics (13); chemistry-computing (13); computer-purchase (13); electronic-commerce (13); equipment-evaluation-computers (13); facsimile-equipment (13); knowledge-acquisition (13); knowledge-engineering (13); language-translation (13); military-computing (13); printing (13); project-engineering (13); speech-recognition (13); text-analysis (13); user-manuals (13); architecture (12); computer-interfaces (12); data-compression (12); data-mining (12); encoding (12); gender-issues (12); interactive-video (12); investment (12); learning-artificial-intelligence (12); patents (12); speech-synthesis (12); system-documentation (12); transport-protocols (12); batch-processing-computers (11); computer-maintenance (11); computer-network-management (11); cryptography (11); digital-storage (11); environmental-science-computing (11); high-level-languages (11); multimedia-communication (11); notebook-computers (11); software-portability (11); storage-media (11); system-recovery (11); teacher-training (11); technical-presentation (11); text-editing (11); transaction-processing (11); analogue-digital-conversion (10); ANSI-standards (10); budgeting-data-processing (10); business-communication (10); computerised-picture-

processing (10); engineering-computing (10); mark-scanning-equipment (10); metropolitan-area-networks (10); mobile-computing (10); neural-nets (10); object-oriented-methods (10); optical-storage (10); packet-switching (10); philosophical-aspects (10); reproduction-copying (10); scheduling (10); sorting (10); stock-control-data-processing (10); subroutines (10); copy-protection (9); demography (9); educational-aids (9); knowledge-representation (9); mathematics-computing (9); multiprogramming (9); nomenclature (9); operations-research (9); optimisation (9); portable-computers (9); smart-cards (9); software-libraries (9); software-maintenance (9); software-prototyping (9); specification-languages (9); application-program-interfaces (8); computer-crime (8); cooperative-systems (8); DEC-computers (8); geography (8); geophysics-computing (8); glossaries (8); grammars (8); image-recognition (8); inference-mechanisms (8); laser-printers (8); mainframes (8); medical-image-processing (8); physics-computing (8); printers (8); telecommunication-services (8); audio-visual-systems (7); back-up-procedures (7); BASIC-listings (7); complete-computer-programs (7); computer-output-to-microfilm (7); computer-peripheral-equipment (7); computer-testing (7); data-analysis (7); database-indexing (7); data-conversion (7); decision-theory (7); digital-simulation (7); engineering-information-systems (7); environmental-engineering (7); home-computing (7); image-segmentation (7); inter-computer-links (7); object-oriented-languages (7); Perl (7); photocopying (7); programming-environments (7); queueing-theory (7); retail-data-processing (7); risk-management (7); safety (7); software-management (7); software-reliability (7); software-reusability (7); aerospace-computing (6); application-generators (6); behavioural-sciences (6); botany (6); cellular-radio (6); computer-animation (6); computer-software (6); computer-viruses (6); educational-institutions (6); health-hazards (6); invoicing (6); maintenance-engineering (6); marketing-data-processing (6); office-environment (6); personal-information-systems (6); pharmaceutical-industry (6); prejudicial-factors (6); robots (6); semantic-networks (6); software-quality (6); and speech-analysis-and-processing (6).

The keywords occurred five times (40 keywords) are: access-protocols; add-on-boards; auditing; authoring-languages; bank-data-processing; Boolean-functions; certification; circuit-layout-CAD; code-standards; data-acquisition; database-theory; deductive-databases; disasters; entity-relationship-modelling; equipment-selection;

exhibitions; formal-logic; hard-discs; help-systems; image-retrieval; intelligent-tutoring-systems; laboratories; management-science; manufacturing-data-processing; microphotography; mobile-robots; modems; patient-care; performance-index; quality-management; random-access-storage; read-only-storage; security; telecommunication-security; telecommunication-standards; teletext; teleworking; video-recording; workflow-management-software; and XML.

The keywords occurred four times (47 keywords) are: audio-recording; automobile-industry; biology; building-wiring; cache-storage; cognitive-systems; computational-complexity; computational-linguistics; computer-aided-software-engineering; computer-science; data-models; data-warehouses; decision-making; direct-broadcasting-by-satellite; distributive-data-processing; entertainment; genetics; identification-technology; information-management; installation; Java; keyboards; languages; learning-systems; linear-programming; logic-CAD; logic-programming; magnetic-storage; management-education; minicomputers; network-computers; PACS; parallel-processing; pattern-recognition; probability; problem-solving; product-development; Radio-Shack-computers; salaries-and-wages; satellite-relay-systems; software-development-management; speech-based-user-interfaces; storage-allocation; systems-engineering; terminal-emulation; travel-industry; and tree-data-structures.

The keywords occurred three times (66 keywords) are: ACT-computers; aerospace-industry; astronomy; automatic-programming; banking; building; CAD; call-centres; chemical-engineering-computing; chemistry; cinematography; circuit-simulation; computational-geometry; computer-applications; computer-games; computer-graphic-equipment; computerised-control; computer-selection-and-evaluation; dictionaries; ecology; encyclopaedias; equipment-evaluation; errors; feature-extraction; feedback; flowcharting; fuzzy-logic; fuzzy-set-theory; geology; geophysics; geriatrics; Hewlett-Packard-computers; home-working; identification; IEEE-standards; image-coding; image-matching; interactive-television; Internet-telephony; job-control-language-listings; LAN-interconnection; laptop-computers; lighting; magnetic-disc-storage; magnetic-tape-equipment; materials-handling; materials-science; medical-diagnostic-computing; natural-sciences; NCR-computers; network-interfaces; object-recognition; optical-communication; parallel-programming; photography; physics; salaries;

satellite-communication; service-industries; spelling-aids; telephony; television-applications; town-and-country-planning; video-databases; video-discs; and zoology

The keywords occurred two times (135 keywords) are: abstract-data-types; accounting; active-databases; advertising; anthropology; aquaculture; archaeology; astronomy-computing; asynchronous-transfer-mode; audio-systems; automata-theory; BASIC; behavioural-sciences-computing; biomedical-communication; biomedical-NMR; biometrics-access-control; Boolean-algebra; building-management-systems; cable-television; case-based-reasoning; character-recognition; character-recognition-equipment; chemical-industry; circuit-CAD; C-language; colour-graphics; computer-controlled-typesetting; computer-displays; computerised-monitoring; computer-operating-procedures; computer-vision; conformance-testing; construction-industry; content-based-retrieval; credit-transactions; customer-relationship-management; data-communication-equipment; data-description; diagrams; digital-audio-tape; digital-communication-systems; digital-signal-processing-chips; distributed-object-management; Earth; engineering; environmental-factors; expert-system-shells; face-recognition; farming; fault-tolerant-computing; floppy-discs; food-processing-industry; forestry; formal-languages; frame-relay; fraud; generalisation-artificial-intelligence; handwriting-recognition; heat-systems; high-energy-physics-instrumentation-computing; image-processing-equipment; image-restoration; image-texture; industrial-robots; ink-jet-printers; input-output-programs; inspection; insurance-data-processing; integrated-circuit-design; integrated-circuit-layout; intelligent-control; interactive-devices; job-control-languages; laser-beam-applications; linear-algebra; list-processing; man-machine-systems; Markov-processes; medical-information-processing; merging; message-passing; microprocessor-chips; military-systems; monitoring; mouse-controllers-computers; natural-resources; neurophysiology; oceanography; optical-fibre-LAN; optical-fibre-networks; organisational-aspects; parallel-architectures; parallel-machines; Pascal-listings; pattern-clustering; payroll-data-processing; peripheral-interfaces; PERT; procurement; program-compilers; program-verification; PROLOG; recording; recurrent-neural-nets; reliability; retailing; robot-vision; satellite-computers; self-organising-feature-maps; software-cost-estimation; software-metrics; spatial-data-structures; special-purpose-computers; spectroscopy-computing; statistical-databases; storage-units; string-matching; structured-programming; technology-

management; telecommunication-computing; telecommunication-links; telecommunication-network-management; telerobotics; television; time-series; time-sharing-systems; transportation; tree-searching; trees-mathematics; type-theory; virtual-storage; visual-programming; voice-communication; voice-mail; and warehouse-automation.

The keywords which are occurring once are: access-control; accidents; accreditation; acoustic-signal-processing; Ada; adaptive-systems; aircraft-instrumentation; algebraic-specification; Amstrad-computers; APL; application-specific-integrated-circuits; architectural-CAD; arithmetic; ART-neural-nets; assembling; astronomical-catalogues; audio-coding; audio-discs; audio-equipment; augmented-reality; automatic-control; automatic-telephone-systems; automatic-testing; automatic-test-software; automobiles; backpropagation; bandwidth-allocation; batch-processing; Bayes-methods; beam-handling-techniques; biographies; biological-effects-of-fields; block-codes; broadband-networks; buffer-storage; business-forms; CAD/CAM; capacity-management-computers; cathode-ray-tube-displays; cellular-arrays; chaos; cheque-processing; chromatography; circuit-analysis-computing; Citibank; civil-engineering; CMOS-digital-integrated-circuits; CMOS-integrated-circuits; COBOL; codes; combinational-circuits; command-and-control-systems; commissioning; Commodore-computers; communicating-sequential-processes; communication-complexity; communications-computing; community-antenna-television; Compaq-computers; competitive-intelligence; computer-aided-analysis; computer-architecture; computer-integrated-manufacturing; computerised-instrumentation; computerised-materials-handling; computerised-tomography; computer-stationery; computer-telephony-integration; configuration-management; constraint-handling; content-addressable-storage; context-free-grammars; control-engineering-computing; correlation-methods; critical-path-analysis; crosstalk; customer-satisfaction; customer-services; data-communication; data-encapsulation; data-gloves; data-preparation; data-recording; debit-transactions; decision-tables; decoding; demonstrations; digital-communication; digital-systems; digital-versatile-discs; disc-drives; discrete-event-simulation; discrete-Fourier-transforms; display-devices; distributed-programming; distributive-administrative-data-processing; DRAM-chips; drugs; EFTS; electricity-supply-industry; electromagnetic-interference; electronic-engineering-computing; electronic-money; electronic-music; electronics-industry;

electronic-trading; embedded-systems; energy-resources; engineering-graphics; enterprise-resource-planning; entropy; environmental-degradation; error-analysis; error-correction; error-detection; explanation; FDDI; fibre-optics; fifth-generation-systems; fires; floating-point-arithmetic; Ford; forecasting-theory; formal-verification; fractals; functional-programming; furniture; further-education; fuzzy-neural-nets; games-of-skill; geophysical-signal-processing; government; graph-grammars; graphs; graph-theory; Gray-codes; group-decision-support-systems; handwritten-character-recognition; haptic-interfaces; hardware-description-languages; heating; Hebbian-learning; high-level-synthesis; holographic-storage; home-shopping; Hopfield-neural-nets; human-computer-interaction; ICI; ICL-computers; IEC-standards; image-classification; image-colour-analysis; image-reconstruction; image-resolution; imaging; induction-heating; industrial-computer-control; industrial-control; information-filters; information-theory; inheritance; innovation-management; insurance; integrated-circuit-technology; interactive-programming; international-trade; interrupts; invasive-software; IP-networks; iterative-methods; job-specification; knowledge-verification; laboratory-techniques; lambda-calculus; leisure-industry; lifts; logic-arrays; logistics-data-processing; magnetic-field-effects; magnetic-tapes; mailing-systems; manipulator-kinematics; market-opportunities; mass-spectroscopic-chemical-analysis; mass-spectroscopy; mathematics; matrix-algebra; mechatronics; medical-expert-systems; memory-protocols; message-switching; metacomputing; metallurgical-industries; meteorology; microwave-links; middleware; Midland-Bank; minimisation; mining; mixed-analogue-digital-integrated-circuits; mobile-communication-systems; mobile-radio; modelling; motion-estimation; multiplexing; multiplexing-equipment; multiprocessing-systems; multi-threading; naming-services; National-Westminster-Bank; naval-engineering-computing; NEC-computers; network-topology; neural-net-architecture; nonmonotonic-reasoning; numerical-analysis; object-detection; optical-fibres; optical-information-processing; optical-interconnections; optical-projectors; overvoltage-protection; oxidation; paging-communication; Peat-Marwick; persistent-objects; Petri-nets; petroleum-industry; phase-shifting-masks; planning-artificial-intelligence; postal-services; power-cables; power-control; power-engineering-computing; power-integrated-circuits; power-supplies-to-apparatus; pricing; principal-component-analysis; printed-circuit-design; printed-circuit-layout; private-telephone-exchanges; process-computer-control; production-control; production-engineering-computing; program-debugging;

program-diagnostics; program-interpreters; programming-languages; program-processors; PROLOG-listings; protection; proteins; proton-proton-interactions; public-utilities; punched-card-equipment; punched-tape-equipment; quality-of-service; radio-applications; radio-broadcasting; radio-links; radiology; radio-networks; radio-stations; radio-systems; radiotelephony; railways; realistic-images; reduced-instruction-set-computing; redundancy; relaxation; remote-consoles; rendering-computer-graphics; replicated-databases; reverse-engineering; road-vehicles; satellite-links; search-problems; semantic-Web; sensory-aids; ships; simulation; simulation-languages; Sinclair-computers; software-architecture; software-houses; sound-reproduction; space-heating; spectral-analysis; sport; SRAM-chips; state-space-methods; statistical-testing; stereo-image-processing; stochastic-systems; stock-control; storage-area-networks; student-experiments; supervisory-programs; supply-chain-management; surface-mount-technology; surgery; surveillance; switches; switching; synchronisation; system-monitoring; system-theory; tape-recorders; tariffs; task-analysis; team-working; telecommunication-channels; telecommunication-control; telecommunication-systems; telecontrol; telegraphy; telemedicine; telephone-sets; television-broadcasting; television-networks; television-systems; temporal-databases; temporal-logic; testing; theorem-proving; time-sharing-programs; timing; total-quality-management; touch-sensitive-screens; tracking; transputers; trees-mathematical; vectors; vehicles; ventilation; veterinary-medicine; videotelephony; virtual-machines; virtual-reality-languages; visual-communication; visual-languages; Wang-computers; wood-processing; and workstation-clusters.

The most occurred keywords are library-automation; cataloguing; academic-libraries; information-retrieval; Internet; information-services.

3.7 URLs (Universal Resource Locators) as alternative locations

The LANL Research Library has been building systems with elements of reference linking since the mid 1990s. The early systems, which linked from locally loaded Databases (such as *INSPEC*® and BIOSIS®) to full-text journal articles stored both manually and at remote websites, employed were called as “static” linking system [van de Sompel & Hochstenbach 1999]. The present systems rely heavily on

metadata for linking and standardisation may lead toward more useful systems. Several new mechanisms, such as the OpenURL and the DOI, are becoming available and will lessen the impact of metadata inconsistencies on linking systems. In the new paradigms of the digital library, metadata becomes more than a descriptive resources; it becomes a tool in and of itself [Balke & Knudson 2002]. Alternative locations are available and growing over the E-Print Archive websites of Library and Information Science [Kumar 2004].

Providing alternative locations in the *INSPEC* database is a very useful feature of the database. Among the 12,322 records studied only a meager number of articles (198) have the URLs as alternative locations. The URLs given in records as alternative locations with their number of occurrences include: http://www.dlib.org/ (69 times) followed by http://educate.lib.chalmers.se/ (33 times); http://www.ariadne.ac.uk/ (25 times); http://www.library.ncsb.edu/ (24 times); http://www.firstmonday.dk/issues/ (16 times); http://www.istl.org/ (10 times); http://www.isc.rit.edu/easi/ (5 times); http://jodi.ecs.soton.ac.uk/Articles/ (3 times); http://www.emeraldinsight.com/ (2 times); and http://www.press.umich.edu/ (2 times). The URLs occurred only once are http://dsonline.computer.org/; http://fgdc.er.usgs.gov/metadata/; http://informationr.net/; http://informationr.net/I; http://ProjectEuclid.org; http://ww/library.ucsb.edu/; http://www.ejisdc.org; http://www.library.drexel.edu/facts/; and http://www.rit.edu/.

Conclusions

The *INSPEC* has more than 40,000 research articles related to Library and Information Science. This study explored the growth of 12,322 publications related to "Library Automation" based on the *INSPEC* database, and examined the various characteristics as follows:

1. After the year 1984, the literature grows approximately linearly with a growth rate of about 600 items per year.

2. The USA is the predominant (about 54%) publishing country of Library Automation related literature.

3. Type of Publication Media publishing Library Automation related articles may be identified as Journal-papers (80.9%) followed by Conference/Proceedings-Papers (0.58%), Book-Chapters (0.20%), and Reports publications (0.12%).

4. The top 50 journals publishing Library Automation related articles covered about 68 % of the total literature. Indicates that: about 50% of literature is concentrated in first 23 journals only, the remaining 50% is scattered within 513 journals. Most productive journal was *Library Hi Tech*, followed by *Computers in Libraries*, *VINE*, *Information Technology and Libraries*, *Program*, *Electronic Library*, *Library Software Review*, *Cataloging & Classification Quarterly*, *Journal of Library Administration*, and *Library Trends*, etc.

5. The single most prevalent form of publication media is journals, which contributes about 80.9% of the total literature on Library automation.

6. English is the most used language of articles on Library Automation. English articles constitute 91.83% of the total literature.

7. The keyword analysis shows that the prime areas where Library Automation research has much concentrated are cataloguing; academic-libraries; information-retrieval; Internet; and information-services.

8. The identified 19 distinct URLs as alternative locations in the availability notes occurred in 198 Library Automation related records and the most occurred website was http://www.dlib.org/.

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