CHAPTER II

REVIEW OF LITERATURE

2.0  INTRODUCTION

The primary objective of this research is to overcome the setbacks of the library catalogue to build a new OPAC with all essential qualities. A meticulous study on the research activities in the field of library cataloguing is the prerequisite to pursue the research successfully, which comes under Review of literature. Review of literature is one of the core chapters in the research thesis. Any research study without review of literature cannot justify the pursuing research. The Review of literature section supports the researcher to carry the research in the right path and is the integral part of the thesis. This chapter presents the related researches in this field of study. This section also states the previous researches in this field under the following titles:

- Evolution of Bibliographic Records Format
- Anglo American Cataloguing Rules
- Classified Catalogue Code
- Machine Readable Catalogue
- Online Public Access Catalogue
- Functional Requirement for Bibliographic Records
- Resource Description and Access (RDA) and
- Challenges in OPACs
2.1 EVOLUTION OF BIBLIOGRAPHIC RECORDS FORMATS

Literature searches have been carried out to know the evolution of cataloguing principles from time to time and also to find the aptness of bibliographic records formats in the current scenario. The literature searches exemplify many interesting factors and remarkable changes that have taken place in the bibliographic formats.

Bibliographic records are ever present in the history of libraries to provide information about their collections to the library users. In the Sumerian and Babylonian times, the libraries were collections of stone tablets, and even they had catalogues. As history went along there were many different kinds of catalogues, some were very good and others just inventory lists (William Denton, 2007). Catalogues went through many radical changes mainly in two ways. Physical forms such as bound register form, book form, sheaf or loose leaf form, card form; microform and machine readable form is one way of change. The next one is cataloguing methods, for example Dictionary Catalogue, Classified Catalogue and Divided Catalogue (Bidyut Mal, 2006). All libraries have catalogues in some forms, which is mandatory to find materials in the libraries. Libraries used subjects and subject headings to organize their information resources. They have been further subdivided by author, title and some other features. In the initial stage of library cataloguing, two editions of the same book, different spelling of names and titles, bound copies of different books and series were not properly handled because there were no standard methods. These problems stressed the necessities of standard cataloguing methods. Earlier the developments had taken place mainly in the forms of catalogues, not in cataloguing standards. In the beginning, catalogues were written by
hand. Catalogues were printed in the 1600s. The book form of catalogues was common in the 1900s. Though it met the purpose, it became quickly outdated and cannot be updated. The Card catalogue had been introduced in the late 1900s to resolve these problems and had many advantages over other forms. The Card catalogue was so popular until the dawn of the Online Catalogue (William Denton, 2007).

Cataloguing research took place in big libraries to organize their materials in a systematic way. The British Museum was one of them and played a major role in the development of new cataloguing rules. At the British Museum, this kind of activity was started after the appointment of Pannizzi in 1831. Panizzi created the new famous 91 rules, Rules for the Compilation of The Catalogue to organize books in a systematic way. His rule explained entering of author names, titles, anonymous works and so on. There was a strong contention for Panizzi’s approach, but Panizzi encountered all these issues successfully and proved his approach was a logical one. Panizzi’s catalogues treated a book as an edition of a particular work that is intimately related to the other editions and translations of the work that the library may have, and thought that it should therefore be integrated with them. His cataloguing rule was an important landmark in the history of cataloguing (William Denton, 2007).

C.A.Cutter’s contribution in the development bibliographic records format was a significant one and is still influencing the cataloguing world. Cutter first published ‘Rules for a Dictionary Catalogue’ in 1876. Subsequently it had been revised. The Fourth edition was published in 1904. Cutter’s Dictionary catalogue was a new concept. Many changes were envisioned in his new cataloguing rules. Instead
of just listing items by author, it listed them by author, title, and subject, all together in one alphabetically sorted list. His rules helped to show what a library has by a given author on a given subject in a given kind of literature. It included the edition statements to assist the users to select on their own choice. In the card catalogue system, this meant all of the cards would be filed in the same set of drawers, in which confusion among different editions can be avoided. Cutter’s catalogue rules clearly explained the purpose of the catalogue and how it should work. His rules proved the efficiency of the catalogue in assisting users to obtain the needed books (Gwen Kushiyama, 2010) (Bidyut Mal, 2006)

Various initiatives were taken in various parts of the world to incorporate essential bibliographic records in the catalogue for its enhancement. Prussian Instructions (PI) was one of such endeavors. It is a German cataloguing code. Before the release of the Prussian Instruction, the Royal Library in Berlin began the cataloguing distribution service in 1892 to all the university libraries in Prussian. As the number of titles increased, it became necessary to replace the Royal Library’s brief instructions with new detailed rules. As a result of this, the Prussian Instructions was created. Fritz Milkau was deeply involved in the creation of the Prussian Instructions. An expanded second edition was released in 1908. PI followed grammatical order for arranging titles. PI did not accept the corporate authorship and treated corporate publication as anonymous publication. These are two differences of PI compared to Anglo American Cataloguing Rule. By the 1930s, most of the important libraries in Germany and Austria adopted PI for cataloguing their documents. PI was followed there until the appearance of Rules of Descriptive

In 1927, the Vatican Library, Rome decided to prepare a new catalogue for printed books. As a result of it, the Vatican Rule emerged as another cataloguing standard. Next to Cutter’s rule, this was considered as a complete and comprehensive code, which covered all aspects of cataloguing. The code had rules for titles, authors, description, subject headings and filing. Seymour Lubetzky was one of the famous cataloguers in the twentieth century. His work was key to the 1949 Rules for Descriptive Cataloguing in the Library of Congress. ‘Cataloguing rules and principles’ was Seymour Lubetzky’s seminal work, which was subtitled as a critic of the ALA rules for entry. During his period, the catalogue rules were cumbersome. He strived hard to simplify the cataloguing rules, and raised questions about the consistency of the complex nature of cataloguing rules and their proper relationship with other rules. These questions underpinned to draft a code that was as coherent as the 1949 rules were sprawling and incoherent. Lubetzky’s work was instrumental for the “Paris Principles” at the International Conference on Cataloguing Principles in 1961 (Michael Gorman, 2000). Seymour Lubetzky also said that “the catalogue has to tell you more than what you asked for.” Lubetzky meant that it is not enough to simply confirm whether a known item is held by the library, but that the user needs to be shown the item in the context of the catalogue and be presented with opportunities not initially imagined that, once seen, are recognized as relevant. If a user starts a search with one idea in mind and is presented with additional options, the user may prefer an alternative resource that he or she did not know existed and, therefore, would not have asked for directly (Pat Riva, 2007).
2.2 ANGLO AMERICAN CATALOGUING RULES

The Anglo American Cataloguing Rules (AACR) is an important milestone in the history of library cataloguing. After the World War II, there was an unprecedented growth in the publication field. Libraries encountered difficulties in cataloguing their materials due to the proliferation of resources. The Library of Congress (LC) also published its catalogue to share it with other libraries to reduce their burden. These situations created great awareness among the library professionals about the need of the catalogue standard. The International Federation of Library Associations (IFLA) organized a meeting in 1961 in Paris to share bibliographic information among libraries from different countries. The 1967 edition of AACR was released at the meeting, which mainly dealt with access points. The 1967 version of AACR has quite a number of weaknesses and was not widely accepted. In 1974, this had undergone a revision process to rectify these flaws. Integration of International Standard Bibliographic Description (ISBD) with AACR was also decided. Many new changes had been incorporated to improve the bibliographic records in AACR to catalogue different types of information resources. AACR2, the second edition of AACR was released owing to these steps. It was jointly prepared by the American Library Association, the British Library, the Canadian Committee on cataloguing, the Library Association and the Library of Congress, and had been published in the year 1978 (Helena Coetzee, 2004). Michael Gorman and Paul W. Winker edited the revised edition. Amidst many debates in the cataloguing world about AACR2, it has been accepted by a number of countries because of the continuous update taken place in it. By the time the 1988 revision was published, AACR2 had been accepted in most English-speaking countries. Ultimately, Melvil Dewey’s view of cooperation among
United Kingdom and United States of America had become reality in producing the AACR with a view to create uniformity throughout the English speaking race (Ralph W Manning, 1999). In the preliminary stage, options were limited to include all forms of library resources. Now almost all forms of information resources are included in AACR2 for example cartographic materials, music, sound recordings, motion pictures and video recordings, graphic materials, electronic resources, three dimensional artifacts and microforms. The current edition of AACR2 is 2002, but many revisions have successively been made in 2003, 2004 and 2005 (Anglo American Cataloguing Rules 2002 revision).

Steps are being constantly taken to develop the AACR2 under the direction of the Joint Steering Committee (JSC) of AACR. The print version of the 2002 edition of AACR2 is a breakthrough in the publication of AACR2. The JSC has embarked on an ambitious program to reform the AACR2 with the International Conference on the Principles and Future Development of AACR, held in Toronto in 1997, due to the impact of the Internet on users’ behaviour and their expectations. After several meetings numerous changes were introduced with the help of members of JSC, members of constituents bodies and certain individuals. Chapter 3 (Cartographic materials), Chapter 9 (Electronic Resources) and Chapter 12 (Continuing resources) had undergone significant changes. These changes were incorporated in the 2002 revised edition.

Additional rules or additions to existing rules for the description of cartographic materials in electronic form, miscellaneous changes to existing rules to bring them into line with current practice and editorial changes have been made in
Chapter 3. Chapter 12 is now called “Continuing Resources” instead of “Serials”. It has been expanded to include resources that have either not been covered in the rules or not adequately covered. Now it includes successively issued resources (i.e. serials), on-going integrating resources (e.g. updating loose-leaves, updating websites) and some categories of finite resources. The rules have been expanded to include separate provisions for serials and integrating resources or in some cases other subcategories of continuing resources such as printed resources, electronic resources and updating loose-leaves. Chapter 9 is now called “Electronic Resources”. Changes to align with the International Standard Bibliographic Description for Electronic Resources (ISBD(ER)) and changes to accommodate the particular nature of electronic resources are the two categories of changes in Chapter 9. Changes falling into the first category include: the clarification of the scope of chapter (and the provision of a distinction between direct access and remote access electronic resources; the addition of an instruction at new rule 9.4B2 to consider all remote access electronic resources as published; and, changing the name of the file characteristics area (9.3) to “Type and extent of resource area”. Changes in the second category include: the changing of the chief source of information from the title screen to the resource itself and the removal of the preference given to internal sources; the addition of an option at rule 9.5B1 to allow for the use of conventional terminology to describe a physical carrier, e.g. “1 CD-ROM” instead of “1 computer optical disc”; and the addition of the rule 9.7B22 (Item described) to instruct the cataloguer to always give the date viewed when describing remote access electronic resources. In addition, more current examples of electronic resources have been included and the glossary has been updated with new and revised definitions. The general material designation in list 1 and list 2 of rule
1.1C1 has been changed from “computer file” to “electronic resources” (Anglo American Cataloguing Rules 2002 revision). The Joint Steering Committee for Revision is playing a crucial role in making these revisions.

2.3 CLASSIFIED CATALOGUE CODE (CCC)

Dr S R Ranganathan (SRR) played a pivotal role in India in the field of library science including cataloguing and developed a new cataloguing code called the with Additional Rules for Dictionary Catalogue - CCC. According to SRR, a classified catalogue is one which has two parts – one containing number entries and the other containing word entries called classified part and alphabetical part respectively. The classified part contains main entries and cross reference entries are arranged according to a scheme of classification. The alphabetical part contains added entries (book index entry, class index entry and cross reference index entry) arranged alphabetically. The first edition was published in 1934 and thereafter much effort was taken by him to further develop the CCC. As a result of hard work, chain procedure for subject cataloguing, alphabetization correlating, added rules for compiling union catalogues of periodical publication, supplementary rules for national bibliography, rules for determination of authorship, choice of heading and rendering the heading, law of parsimony, physical form, centralized cataloguing, homonyms in class index entries and feature headings, and non-conventional documents were included in the subsequent editions. All these developments took place stage by stage up to its fifth edition, which was released in 1964 assisted by Prof. Neelameghan.

CCC was an attempt to cover all aspects of cataloguing procedure after Cutter’s Rule and the Vatican Code, and was the first and still only catalogue code in
India. CCC is a comprehensive and well laid code. The first nine chapters cover many basic issues, more importantly, canons and normative principles; parts and physical forms of catalogue, centralised cataloguing; recording, style, language and script, arrangement of entries; conflict of authorship and resolution (determination of authorship); name of person, (i.e., structure, element, etc.) are dealt with. The next 11 chapters (K to N, P to V) constitute the substantial part, i.e., rules for rendering names (persons, corporate bodies, geographical entities); preparation of class index entries; main and book index entries for different categories of books and periodicals; additional rules for compilation of union catalogues of books and periodical publications; National bibliography; indexing periodical; abstracting periodical; and cataloguing of incunabula and non-book materials. The last part (W) constitutes end matter (glossary of terms, bibliographic references and index). The empirical approach and application of normative principles in drafting and arranging the rules have made CCC a model code. It does not cover the entire range of the various types of materials, which makes it a less comprehensive code. No code can be perfect in all details. CCC is no exception. It needs revision and rethinking so as to capture and respond to the many changes that have come about after its publication in 1964 (Krishan Kumar, 1993) and (Manisha Dawra, 2004).

2.4 MACHINE READABLE CATALOGUE (MARC)

A giant step had been taken in the cataloguing history in 1966 by 16 American libraries to create an electronic version of the card catalogue. In 1968, about 50,000 records were created and sent to the participating libraries as a pilot project. In the 1970s the Machine Readable Catalogue emerged and most of the libraries began to
use MARC and its revised version MARC II. MARC is not a cataloguing rule, but a
carrier of bibliographic data in electronic format” (ALA Catalogue Rules and the
International Meeting of Cataloguing Experts). Catalogues had begun to move online
because of the emergence of computers. Cataloguing descriptions followed in the
physical forms of the catalogue, for example AACR2 could not be entered into the
online catalogues. The MARC format was used by American libraries initially for
entering bibliographic information into a computer record. Afterwards it became very
popular among other libraries too. The official documentation, MARC21 concise
1999 states that this “MARC format is a carrier for bibliographic information, and a
standard for the representation and exchange of bibliographic data in machine-
readable form.” Two separate sets of rules are available for bibliographic information:
one for describing library materials (AACR2) and one for representing these
descriptions in online catalogues (MARC). LC realized that MARC can perform well
and will be suitable in online environment only by updating it constantly. LC
maintains the MARC forum to facilitate discussion among all interested parties. In
addition to that open sessions are arranged at the semi-annual meetings of two special
MARC committees called “Machine Readable Bibliographic Information Committee”
(MARBI) in the United States and “Canadian Committee on MARC” (CCM) in
Canada. Experts are expressing their views at these meetings and others also
contributed their views by email. The LC and the National Library of Canada are
taking a final decision to make the recommended changes with the help of the MARC
forum. There are different versions of MARC. CANMARC is the Canadian version of
MARC, which was started in 1970s and UKMARC is the British version. Later both
CANMARC and UKMARC were harmonized with the MARC21 format, which is the
latest version of MARC (Deborah A.Fritz and Richard J.Fritz, 2009). Traditional library catalogues pinpointed the users towards the information resources, but in the current circumstances, it should be able to deliver information as well. Increasing digital information has made a great impact on library users. Roy Tennant mentioned in his talk on “Life beyond MARC: The case for revolutionary Change in Library Systems and service” that “Libraries must switch their focus and resources toward the more efficient use of technology in their processes to remain relevant in the technological age”.

2.5 ONLINE PUBLIC ACCESS CATALOGUE (OPAC)

When the library used only card catalogues, they mainly followed any one of the cataloguing rules such as AACR2, Regeln für die alphabetische Katalogisierung, abbreviated RAK in German and the Classified Cataloguing Code. These cataloguing standards fulfilled the need of the library patrons in finding required physical resources available in the particular library because they were available in the library itself. When multidimensional formats of resources emerged, the attempt had been made to modify the cataloguing rules. The situation compelled making changes to adopt new forms of knowledge resources. Computer and communication technology are the reasons for the changing nature of resources as well as new forms of cataloguing. The Online Public Access Catalogue (OPAC) has emerged as new forms of the catalogue and made a profound impact in the cataloguing world. OPACs dawned in 1970s and 1980s after the massive retrospective conversion to transform data from card catalogues to machine readable format. OPACs were used as a replacement of card catalogues. They used the same bibliographic records of print
Initially OPAC followed the existing standards and also represented only the conventional documents. Subsequently many steps have been taken to improve the functionality of OPAC to overcome the challenges faced by OPAC due to the electronic resources as well as the expectations of library patrons. Enrichment of bibliographic records in OPAC has become unavoidable.

Most of the academic libraries in India are also moving to OPACs. The University Grants Commission (UGC) in India, with the help of Information and Library Network (INFLIBNET) plays a central role in developing OPACs. As a part of this endeavour, INFLIBNET has also developed its own software package SOUL for library automation. As per the study carried out by Kanta, Kapoor and Goyal OP, most of the OPACs in academic libraries of India provide basic search facilities required by the users. OPACs are searchable by using the fields Author, Title and Control Number. Both basic and advanced search options are available in most OPACs. The display format cannot be customised by the users. At the time of their studies, relevance ranking option was also not present, which forces the users to scroll the entire list. Users should decide their need because of non-availability of more information such as abstract on OPACs. Their findings clearly showed that library users generally prefer search engines rather than library catalogues (Kanta Kapoor and Goyal OP, 2007).

The Library of Congress contribution was very much significant to improve the functionalities of OPAC. The ‘Bibliographic Enrichment Advisory Team’ (BEAT) was formed by the Library of Congress in 1992 to accomplish this task. BEAT found
after many studies that the inclusion of ‘Table of Contents’ (TOC) drastically improved the efficiency of information retrieval and improved the user’s catalogue experience in several ways. Research conducted in 1980s and 1990s proved that the users found titles more relevant with the help of TOCs. The words in TOCs helped to find the titles pertinent to users’ queries and to overcome the traditional limitations of subject searching. Indeed, an eleven-year longitudinal study determined that “subject searching is being replaced by keyword searching,” a point directly relevant to TOCs, since they are entirely composed of keywords. The TOC in Library of Congress is a huge success. The usage of catalogues has increased because of this option (John D. Byrum, Jr, 2005).

Andrew Large and Jamshid Beheshti analysed the OPAC studies between 1991 and 1997. They proposed three major areas i.e. bibliographic records, enhancement of search capabilities and improvement of interface to redesign OPAC. As per their study, the amount of subject information in OPAC records is inadequate to provide the required information. According to Knutson “insufficient subject access in standard cataloguing has become almost a truism in the critical literature.” In his study of social science titles, he found that only 2.6 Library of Congress Subject Headings (LCSHs) on average, were allocated per record. As per his suggestion, many books are rarely issued because of meager subject access in catalogues. “Part of the challenge facing research libraries is to find ways to modify current subject cataloguing practices so that materials are more accessible to users”. He also admitted that the relationship between more controlled subject headings and higher circulation were inconclusive. Shirley Cousins found that the addition of table of contents and back-of-book indexes combined with automatic truncation provides an increase in
recall over bare MARC records. She also pointed out that such enhancement not only increases the recall but also helps the searchers to judge the relevancy rather than having to find the documents themselves. Enhancement of the bibliographic record is highly recommended and also to add some kind of ranking to increase the precision by many researchers (Andrew Large and Jamshid Beheshti, 1997). Post-coordinated retrieval is possible in the online environment, which further adds momentum in getting more relevant results. Post-coordinated retrieval permits the patrons to define their requirements precisely, which was not doable in the card catalogue through standardised headings and a built-in cross reference structure (Aruna A, 1998).

The research study conducted by Christopher Osaretin Ukpebor at University of Benin has also ascertained the fact that users are not comfortable with OPAC to find the information of their interest because of their experience on the Internet. They accustomed well with the Internet. Its flexibility and easy to use nature make the information searching process easier. The library users want to search the OPAC with many search options similar to Google. Inflexible search options make library catalogues difficult to use. Finally the inadequacy of today’s OPAC system is currently being understood as a problem (Christopher Osaretin Ukpebor, Apr 2012).

The patrons bemoaned with OPAC and don’t rely on it because OPAC is still unable to provide information directly. Everyone currently needs information from OPAC, which is due to their experience on the Internet. It is one of the main reasons that the library users are moving away from the library catalogue. This problem is to be resolved to attract the library users towards the library for their information needs. It has been observed from many studies that OPAC should include the bibliographic
record fields to facilitate users to access electronic resources directly. Karen Calhoun voiced the same in his report prepared for the Library of Congress on the changing nature of catalogues. He further mentioned in his report “Initiatives like Google Book Search, Open WorldCat, and RedLightGreen hold promise, but so far finding and obtaining items from library collections on the open Web is not a practical alternative for students and scholars. Nevertheless there is an expectation that such initiatives will eventually make research library collections more visible to a worldwide audience. Some influential library and information science professionals are beginning to suggest relying more on state-wide, national or global aggregations of catalogue data for discovery, and using library ILSes as a middle “switching” layer to enable delivery. The huge opportunity of integrating catalogues with open Web discovery tools is the long tail—surfacing research libraries’ rich collections in ways that will substantially enhance scholarly productivity worldwide” (Karen Calhoun, 2006).

The availability of digital information has dramatically altered the behaviour of researchers. In the past, scholars approached the library to do their investigations. This phenomenon is not taking place nowadays. They can search information wherever they are located with the help of network connections. This accessibility is distoling the researchers from libraries. Personal contact services have begun to diminish. Their impressions are formed by the website and services available through web, without contacting the library staff members in person. Statistics from the University of Nebraska-Lincoln Libraries (UNL) showed a rising trend in this direction. In 2007-2008 most searches (81 percent) were conducted outside of a library facility, as contrasted with 57 percent in 2002-2003. How libraries respond to
these expectations will influence opinions about the library, and whether libraries are seen as dynamic information gateways or as book depositories. This is the primary reason why libraries are turning more attention to their websites (DeeAnn Allison, 2010). A research study conducted by Jillian R. Griffiths and Peter Brophy raised a number of important and interesting issues. As per this research study, students choose the search engine as their first choice to locate information and are using the academic resources less. They find the academic resources difficult to locate information. Students either have little awareness of alternative ways of finding information to the search engine route or have tried other methods and still prefer to use Google (Jillian R. Griffiths and Peter Brophy, 2005).

The following studies illustrate the changes that have taken place from different researches and projects: Yu and Young advocated other features frequently offered by search engines and online bookstores that need to be incorporated into the next generation OPACs, because they can provide a new experience to information seekers. “RedLightGreen” from the Mellon Foundation aimed “to offer rich, reliable library information that is unique in the Web environment and to deliver that information in ways that meet the expectations of Web-savvy users.” RedLightGreen was developed to meet the needs of college undergraduates. According to Richard Parker from the University of Warwick (UK) “it's easy to get results, it's easy to refine your results, and there's a lot you can do with your results.” As Roy Tennant bluntly stated in a recent Library Journal column: We need to focus more energy on important systematic changes rather than cosmetic ones (John D. Byrum, Jr., 2005). Though users anticipate information when they access OPAC, the libraries cannot ignore
physical resources available in the libraries as long as they deal with them. OPAC should encompass both physical forms as well as electronic forms of resources.

By and large academic and research libraries in the information prone society are investing a huge amount for online resources, but most of these resources are not linked to the library catalogue. It is one of the main snags of OPAC. This study also highlights that many information seekers prefer search engines or organisational websites for their information need because of this reason.

A research study also proves that most of the researches take place on modernising OPAC for easy to use, to provide more search options, to make more attractive by including icons instead of text and other features, but not on bibliographic records. This is due to the influence of the Internet. It has been found that users’ satisfaction is very important to maximise the usage of OPAC. Many researches focus on users’ interaction with OPAC interfaces and also mainly on OPAC’s search engine capabilities, which substantially increase the precision rather than recall. Elahe Kani-Zabihi, Gheorghita Ghinea and Sherry Y. Che expressed in their survey report the need to make necessary modifications in OPAC and further mentioned that the users are expecting many options in OPAC, for example filtering option, display of relevant materials, download option, basket provision to store searched results for future reference, content of the books to be included in searching, consistent format for all materials, visual-based interface, more icons, readability in search results, ability to include pictures, music clips and videos and links to other OPACs. This study undoubtedly proves that the users expectations are very high and
integration of many advanced level features become mandatory in OPAC to meet the
demand of users (Elahe Kani-Zabihi, Gheorghita Ghinea and Sherry Y. Chen, 2008).

Developments in OPAC have taken place in many stages. When OPAC came
into existence in the 1980s, only the format was changed, but it had the characteristic
of the card catalogue. It used the same bibliographic information and access points of
card catalogues. Most of the features presently available were not imaginable in its
early stage. Search could be made in the beginning with the exact titles, author names
and subjects. OPACs were not proficient to find minor errors in queries. Therefore,
users faced a lot of problems in obtaining relevant information. The search term
should be accurate. OPACs had pre-coordinated information principles for
information searching with limited access points and were called as first generation
OPACs. Revolution in the computer field in late 1980s has brought much
advancement in OPACs. Extraordinary growth in database technology and
information retrieval technology has added more impetus to OPACs. Many features
such as keyword searching, Boolean operators, proximity searches and stemming of
words have been added in OPAC, which increase the information searching
efficiency. Basic and advanced level options also ease the process of information
searching. Users can refine their search. Exact words or phrase are not required for
searching. Bibliographic records can be viewed and printed in different forms. All
bibliographic records can be as Access Points. These are all advantages of second
generation OPAC (Rashid Husain and Mehtab Alam Ansari, 2006). In the 1990s
OPACs have begun to use graphical user interfaces and hypertext linking. The
command driven option has been replaced by a menu driven option to simplify the
information searching process. As a result of many ongoing researches in web
technology, new concepts are emerging constantly. Web 2.0 is one of such concepts and new technology. “With the advent of Web 2.0, the relationship between the library and users has greatly changed. The capabilities of Web 2.0 enable users to engage the library in two-way communication and knowledge exchanges. Instead of users physically coming to the library, the library delivers services to users via the university library Web site. Users are also participating in activities that were once the sole purview of the library, such as cataloguing via folksonomy, or providing comments on books via blogging. The integration and the utilization of Web 2.0 technology into library services is referred to as Library 2.0” (Yong-Mi Kim and June Abbas, 2010). Many libraries have tried to incorporate this concept in their OPACs to enhance their functionalities. Application of Web 2.0 technology in OPAC enables OPAC to harness more bibliographic MARC and also to incorporate data from other resources. Web 2.0 is a social networking. Similarly it provides the same experience to OPAC users. Users can personalise and review their search. It also offers improved searching experiences through configurable relevance ranking, subject tag maps, clustering or faceting for filtering and expanding search results, suggestions for additional searching based on authority headings, indexing of data from several sources such as circulation data to identify most popular items, other catalogues, databases, spelling corrections and community users reviewing or tagging. Users can also refine their searches. The North Carolina State Universities Library, Queens Library in Queensborough, New York, LibraryLabs The State Universities of Florida libraries and The National Library of Australia are some of the libraries use this technology in their OPACs and provide rich discovery experiences to their users (Katie Wilson, 2007). Currently OPACs have not fully embraced these kinds of
services. Tam Winnie, Cox Andrew M and Bussey A performed a research study on the features of next generation OPACs, which shows that the development of next-generation OPACs in UK academic libraries is very much in its infancy. Only one university has embedded a next-generation catalogue — Encore by Innovative Interfaces. More than sixty percent of the OPACs do not have any of the new features such as faceted browser, simple search box, comments and ratings, RSS feeds and tag cloud. Relevance ranking, book jackets and tables of content are the features that libraries have implemented the most. These findings may also seem to indicate that librarians have given higher priority to features that bolster search functionality and enrich content than features with Web 2.0 technologies (Tam, Winnie, Cox, Andrew M. and Bussey A, 2009). “Web 2.0 could be seen as comprising equal parts of evolution and revolution. On the one hand it extends much of what we have been doing for years through the use of standards such as HTML, URIs and HTTP and the ubiquitous Web browser. On the other it challenges outdated attitudes towards the rights of the user, customer choice and empowerment. Web 2.0 is participative. That participation is often seen to be on the part of end-users such as bloggers, and this is certainly true. For libraries and associated organisations, though, there is equal scope for participation. We need to work together to take the leap (Paul Miller, 2005). From the technical point of view as well as observation of many research studies in the review literature, accentuation on OPAC restructuring has become mandatory to serve in a better way to the library patrons for an exuberant experience in information searching processes.

Some of the research studies have also been conducted in India to find the problematic areas of OPAC. One of the recent research studies also proves that
OPACs are still primarily having bibliographic information of books, not other resources. The positive trend is that OPACs provide a facility to reserve materials, personalised SDI service and overdue information, which further explicit the incompetence of OPAC compared to Amazon and search engines (Senthur Velmurugan V and Amudha G, 2011). Ramesh Babu B and Tamizhchelvan M conducted a survey in 2002 to analyse the subject access features in OPACs in Tamil Nadu, India. Libraries in Tamil Nadu had switched over to OPAC during that period. This research finding explicitly described the status of OPAC in Tamil Nadu as well as the lack of subject access facility, which is considered as an onerous task. The survey was taken in the state-of-art libraries in Tamil Nadu (Ramesh Babu B and Tamizhchelvan M, 2003). OPAC could also be indexed by search engines, which is another idea to popularise it among library users and to reach them. Some OPACs use their own search engines based on technologies like Lucene, Solr and also some commercially developed search engines such as Endeca and Primo. Though their performance is fine, they are not up to the expectations of the users (Vinit Kumar, November 2012). The University of California study on the library catalogue concluded that bibliographic systems cannot cope up with the changing environment of information access. It also delineated that the current catalogue is poorly designed to meet needs of immediate results and simplicity in the searching process. The research study made 34 specific recommendations. 18 recommendations focused on improving searching efficiency and the remaining 16 recommendations were related to the catalogue process. It also included centralisation of many functions, elimination of local variations to the possible extension, simplification of metadata and importing more data from vendors to achieve these recommendations (Robert T. Ivey, 2009).
2.6 FUNCTIONAL REQUIREMENT FOR BIBLIOGRAPHIC RECORDS (FRBR)

A series of steps have been taken globally to upgrade the library catalogue and to make it as a potential tool. As a part of it, the International Federation of Library Institutions and Associations (IFLA) formed a group in 1991 to study the cataloguing issues. The IFLA study group published a report on Functional Requirement for Bibliographic Records (FRBR) in 1998. Allyson Carlyle said “FRBR is a conceptual model with the primary purpose of improving cataloguing records (a product), a cataloguing (a process) and catalogues (a technology)”. This conceptual model is based on an entity-attribute-relationship model (Arlene G. Taylor, 2007). The current library catalogue is unsuccessful in distinguishing all version of an intellectual work. FRBR attempts to overcome this setback. The creation of library catalogue by incorporating FRBRization hierarchy of works, expressions, manifestations and items can recognise the difference between a particular work, diverse expressions of that work, different versions of the same work, and particular items. The FRBR catalogue would include separate record for all its entities, for example all information about a work would be centralised in one record. Records for subsequent expressions of that work would add only the information specific to each expression. This approach has certain inherent advantages for collections with many versions of the same works. New publications can be catalogued more quickly and records can be stored and updated more efficiently (David Mimno, Gregory Crane and Alison Jones, 2005). Attempts have been initiated to implement the FRBR concept in library cataloguing since the introduction of FRBR. Bibliographic utility operating organizations and cataloguing system vendors have developed algorithms and browsing for the FRBR
structure. The OCLC has also developed xISBN web service, which uses FRBRization. This technology helps to apply FRBR concepts into OPACs (Jane Cho, 2006). Today FRBR creates an opening to re-examine our cataloguing rules and principles. The Joint Steering Committee for Revision of the Anglo American Cataloguing Rules is using FRBR not only to update terminology, but also to re-examine and hopefully improve the traditional linking devices of uniform titles in light of FRBR. FRBR becomes an international phenomenon. The IFLA’s first International Meeting of Experts on an International Cataloguing Code, July 28-30, 2003 in Frankfurt, Germany also provided an opportunity for re-examining the 1961 Paris Principles in light of FRBR and today’s online environment (Barbara Tillet, 2003).

2.6.1 MARC21 and FRBR

The MARC21 is a widely used format by libraries to create bibliographic information in the online environment. Records created by MARC21 do not have any explicit distinction between work, expression and manifestation. As the introduction of FRBR gives a new dimension to create the next generation library catalogue and aims to fulfill the information seeking behaviour of the users in identifying exact resource irrespective of its form or nature, MARC is in a position to adopt the FRBR model to meet this demand. The Machine Readable Bibliographic Information (MARBI) committee is reviewing the potential implications of FRBR for the exchange of MARC records (Joint Steering Committee for the Revision of AACR, Format Variation Working Group, 2002). Some tools have been recently developed for this conversion. A tool jointly developed by The Norwegian University of Science
and Technology, The Norwegian Bibliographic Database BIBSYS and the National Library of Norway is one of the examples. Conversion is perfect, if the MARC records contain consistent and sufficient information. Otherwise it produces erroneous results. Also the lack of standardised format for FRBR is the problem for the complete conversion, which has to be addressed (Trond Aalberg, Frank Berg Haugen and Ole Husby, 2006). The Library of Congress is keen on updating the MARC21. Even though steps taken by LOC are the proof for the ongoing research activities in MARC to make it as a suitable tool for cataloguing the information resources in online environment, its suitability is still a questionable one when compared with other information searching tools such as Amazon and Google products.

2.7 RESOURCE DESCRIPTION AND ACCESS (RDA)

Revision had been continuously made in AACR2 since 1978 to suit the current nature of resources. The regular revision in AACR2 rules made it more complex in nature. After making the necessary changes in AACR2 to fulfill the need of new formats of resources especially electronic resources, there are still issues to be resolved which demands out of the box thinking. This view is culminated in the International Conference on the Principles and Future Development of AACR held in Toronto in 1997. The Joint Steering Committee (JSC) took initiatives to meet the current demands and as a result of it, Resource Description and Access has emerged as a successor of AACR2. AACR2 was emerged mainly for card catalogues in the pre-computer era. In those periods, the resources were available in print form, and not in digital form. AACR2 has emphasized on description of the carrier of information,
which suited the print formats, and not electronic resources. RDA aims to address this issue and the complex nature of AACR2 (Rebecca Kemp, 2007).

The June 2006 RDA draft wanted to introduce new terminologies to move from the card catalogues. The terminology “the heading” used in AACR2 for card catalogues was replaced by “access point”. Similarly “primary access point” and “additional access point” have also been proposed as replacements for “main entry” and “added entry” respectively (Lynne C. Howarth and Jena Weihs, 2008).

“Different types of materials such as sound recordings, cartographic materials, motion pictures and video recordings can be catalogued by AACR2, but some of them fall into more than one of AACR2’s categories, where actual problems arise for cataloguing. Some categories are based on content, for example cartographic materials, graphic materials and three-dimensional artifacts, while others are based on carrier, that is physical medium in which data are stored, for example sound recordings, motion pictures, video recordings, computer files and microforms. If a map is issued electronically, how it should be catalogued i.e. under cartographic materials or under electronic resources. A new approach is mandatory to catalogue this kind of resources. The Joint Steering Committee of AACR2 organised a meeting in 2004 to revise AACR2. The committee received comments from a constituency review of an early draft and understood the need of a completely different approach. The committee renamed the revised version of AACR2 as RDA” (Liz Miller, 2011). As a result of JSC’s initiatives a new cataloguing standard has emerged as a successor of AACR2 and is built on the strength of AACR2.
2.7.1 RDA, FRBR and FRAD

The RDA goal is to “provide a consistent, flexible and extensible framework for both technical and content description of all types of resources and all types of content” and also to cater to both print and electronic resources, within and beyond the library. The limitations of AACR2 were carefully analyzed to create a new approach for technical and content description. Functional Requirements for Bibliographic Records (FRBR) and Functional Requirements for Authority Data (FRAD) have influenced much in the development of RDA. RDA takes both FRBR and FRAD conceptual models as the basis to build the guidelines and to structure the organization of the guidelines. (Chris Oliver, 2009).

RDA uses FRBR terminology wherever it is possible and is structured to match the order of FRBR entities, attributes and sub-attributes. Furthermore FRBR tasks of finding, identifying, selecting and obtaining are used by RDA to find the required information. This approach is constructed on FRBR concepts of work, realization of those works (expressions), embodiments of those realisations (manifestations) and a single exemplar of manifestation (items). It helps to identify the particular works’ different editions, translations and formats. The end-users will be benefitted and can find the required items. This kind of approach is required in the current circumstances. While searching, a hierarchical navigation environment should be created, for example the results of a title search can be Work-level metadata which can then be expanded to include specific Expressions, then Manifestations, and finally Items. This methodology also removes the large amount of duplicate metadata that is often displayed after a search, leading to cluttered displays which are difficult to
interpret. For example, many large library catalogues currently display multiple brief records with the same title when the collection contains multiple expressions and manifestations of the same work, leading in some circumstances to search results consisting of pages of indistinguishable metadata. The RDA approach can eliminate this chaos (Gordon Dunsire, 2007).

### 2.7.2 MARC21 and RDA

As a result of new developments in the cataloguing standard, MARC21 has to be tweaked to align with RDA. The RDA/MARC Working Group was set up under the auspices of the British Library, the Library and Archives Canada and the Library of Congress in 2008 to identify the required changes in MARC21 to make it compatible with RDA and ensure effective data exchange into the future. Many issues are under discussion for aligning MARC21 with RDA. Significant changes made in MARC21 have been approved with respect to content and carrier categories. As per this new recommendation, there will be three new tags for media type, content type and carrier type, which replaces general material designation (GMD) defined in AACR2 1.1C currently recorded in field 245 (Title statement), subfield $h (Medium)” (Gordon Dunsire, 2009). These new fields are 336 for content type, 337 media type and 338 carrier type. The 336 content type field describes the form of communication through which the work is expressed, for example recording of a musical group’s performance would have content recorded as 336 $a, 337 $a will be audio and 338 $a will be audio disc (Elaine Sanchez, 2011). Mapping of MARC21 and RDA has been dealt by Appendix D in RDA. The draft copy of this was published in Nov 2008. Variable fields and subfields defined in the MARC21 format for bibliographic data
are mapped to the corresponding elements in RDA. Control fields (00X) and control subfields ($0-$8) have been excluded in the mapping (Deirdre Kiorgaard, November 2008). These phenomena show that the steps are being taken to make RDA as a compatible tool.

As per the Library of Congress plan, RDA will be implemented in March 2013 after completing RDA training programmes. U.S.: National Agricultural Library and National Library of Medicine; British Library, Library & Archives Canada, and the National Library of Australia have also similar plans for implementation. Deutsche Nationalbibliothek (DNB) plans to implement the first quarter of 2013 (Library of Congress, Resource Description and Access). The actual potential of RDA can be judged after its full implementation.

2.8 CHALLENGES IN OPACS

In 2000 the LC Cataloguing Directorate sponsored the Bicentennial Conference on Bibliographic Control for the New Millennium to address the challenges of improved access to web resources through library catalogue and applications of metadata. LC formed a working group on the future of bibliographic control in 2006. The working group submitted its final report with 114 specific recommendations under five general categories. They are 1.Increase the efficiency of bibliographic production, 2.Enhance Access to Rare and Unique Materials, 3.Position Library technology for the future, 4.Position the Library Community for the future and 5.Strengthen the Library and Information Science Profession. The category 2 recommends providing access to all materials instead of providing detailed access to some resources and excluding other materials completely. The committee also made
some challenging recommendations. In category 3, it recommended to abandon MARC records because it is a 40 year old technique and no one outside the libraries used it. Moreover bibliographic applications are being developed outside the libraries, which may not be compatible with MARC. As one step ahead, it recommends suspending the work on RDA. In category 4, the report recommended “to transform the LCSH into a tool that provides a more flexible means to create and modify subject authority data”. The recommendation also suggested to make a series of modifications in LCSH to use in conjunction with other systems including Dewey Decimal Classification (Robert T. Ivey, 2009).

It has been observed from different studies that the library users are different in nature. There are novice users, advanced level users and most importantly the Internet users. Their needs and approach to use the library catalogue are also not identical. Bibliographic information can satisfy some of them and only full text information can satisfy others. The second type of users is steadily on the rise. They want to find information quickly and as simply as possible. Therefore, it enforces different types of bibliographic treatment for different materials in the library catalogue. It is very much obvious that printed books and journals are major resources in academic institutes though electronic information begins to predominate in the library collection. It again compels that OPAC should include all kinds of resources. The current cataloguing standards are very much suitable for conventional resources. OPAC has to be revamped to deal with electronic resources and to increase the content.
Providing access to the library print resources through OPAC and to other electronic resources through the library website is the current status of most of the libraries. This may be convenient for librarians, but not for the library users. Users have to look into different resources to find the required information. Most of the time, this kind of facility has put them in jeopardy. They don’t know the difference between OPAC and databases. All information sources are to be linked in any way to ease the information searching process for the benefit of the library users (Karin de Jager, 2007). “Our cataloguing practices have also been focused completely on the physical item, rather than the intellectual one”. “Our needs today will not be our needs tomorrow; therefore, we need an infrastructure that will allow for extension to be developed and applied without breaking the whole” (Roy Tennant, 2004). Cataloguers and cataloguing have begun to change as a consequence of changes in information resources from paper format to digital format. Electronic journals, electronic books, websites and repositories are rapidly increasing the amount of resources. Everyone has the opportunity to use these resources just by clicking the mouse and are not restricted to use a particular library or does not depend on the library catalogue. It is evident that the need for cataloguers is growing. The current information age is useless if the users are not able to retrieve the required information. Cataloguers are the link in the chain that helps to get the information where it needs to be in the academic library environment (Cerbo, Michael A, 2011).

Bates mentioned in the catalogue research report that “the most problematic aspect of OPAC searching is generally subject searching and that there is a lot of evidence that catalogue users would like additional subject information provided in the cataloguing record, specifically, a summary or abstract of the item”. A catalogue
research study showed that academic libraries are slow in responding to the users' requirements and also the users want additional metadata information in the catalogue. It also advocated the enhancement of bibliographic records with more content. The users can decide on the selection of the required items with the help of content fortification. ‘Save the time of the users’ and ‘every reader has his/her own books’ can be accomplished by content enrichment. To reach this objective, many academic libraries in USA have now augmented bibliographic records with a link to LC’s BEAT program and to an external resource link to cover images, summaries, publishers’ descriptions or excerpts of the book purchased from vendors. Settel and Cochrane found that enhanced records retrieved more relevant items compared to MARC records. Although a larger retrieval set may concern some users, precision can be achieved by adding more search terms post-search or by utilizing faceted results in next generation catalogues. Jina Choi Wakimoto opined the benefit of including relevant items in the retrieved list (Jina Choi Wakimoto, 2009). “In this networked information age, there is little patience for separation between information, about information and the information itself. In this sense, library catalogues no longer meet their users' needs because they typically contain only MARC records, metadata and information about the book. On the other hand, the Google Book project offers searchers the actual information, the actual book, the actual text: not just the meta, but the data. The actual information is offered in other information arenas as well. Amazon.com, for example, now offers the Search Inside feature, which allows users to search on the content of the book's pages and even to read selected pages. Users have grown accustomed to such features. Anecdotally, librarians often hear questions and comments from patrons such as: Why are there no reviews attached to this book?
I'd really like to glance at this section of the book to see if this is what I'm looking for. I can do these things on Amazon.com, so why can't I do them here? Enhancing the traditional catalogue is a necessary next step (Angi Faiks, Amy Radermacher and Amy Sheehan, 2007). Karen Markey strongly believed that the online catalogue can regain its glory by redesigning it with post-Boolean probabilistic searching, searching facility with full texts of digitized books, journal articles, encyclopaedias, conference papers; subject cataloguing and to enable users to customise retrievals for their convenience (Karen Markey, 2007).

All these studies ascertain that the scope of the library catalogue should be expanded to include all resources. This expansion can be accomplished with the help of the current technology. But the transformation takes place in a slow pace to include all resources in OPAC compared to the rate of growth of the Internet and its allied technologies, which actually vitiated OPAC. Many OPACs are not having their e-resources, an inevitable element in the Google era. E-resources are separately listed in the library website. Inclusion of e-journals and e-books will substantially reduce the burden of the library patrons in getting the relevant information, and will increase the dependency on OPAC for information.

Another drawback in OPAC is that digital repositories are also not included in OPAC. They are outside the OPAC. This problem has also to be addressed. OPAC cannot handle non-MARC metadata associated with digital repositories. Other implications such as inclusion of open sources in OPAC as well as harvesting metadata form Open Archives Initiative from freely available web resources are to be pondered to empower OPACs. Jina Choi Wakimoto expressed in his paper that
today’s catalogues are incompetent to handle all types of metadata and unable to display their results in an appropriate way, for example at the work and expression level. Besides, the current cataloguing rules don’t have options to include journals at article level, which is the anticipation of the advanced level users. The LC working Group “envisions a future for bibliographic control that will be collaborative, decentralised, international in scope and web based”. Improved indexing and display can be effective if the catalogues enrich the content. The ALA policy is worth mentioning “All information resources that are provided directly or indirectly by the library, regardless of technology, format, or met methods of delivery, should be readily, equally, and equitably accessible to all library users” (Jina Choi Wakimoto, 2009).

Karen Coyle stressed in his paper that the library catalogue should focus on end users. The focus of the library catalogue was the library and the goal of the catalogue was to define the library’s holdings. In the future, the successful library catalogue will be user-centric, and its organizing principle will be the user’s information needs. Karen Coyle also set some goals for the future library catalogue. As per his views, the library catalogue will not contain only bibliographic records. It should have reviews, cover art, citations within works, searchable text and even commentary by users. Relevance ranking should be present, which should be based on what is most popular, what is used in current courses or what items have been chosen as preferred by other users. The catalogue will be interactive, participatory and heterogeneous; it will be able to have more than one kind of data. Karen Coyle’s views are promising and add more thrust to future cataloguing, which is yet to take place (Karen Coyle, 2007). One of the recent research studies in the universities of Sri
Lanka has confirmed that the trend of moving towards the Internet for information needs is continuing. Also the students don’t prefer to use OPAC. This study further ascertains that the users want to search information from electronic resources and to use technology to communicate with the library staff (Mashroofa MM, 2012). It justifies the need of change in our approach in delivering library services.

Other sophisticated mediation tools such as search engines and online media stores are now competing with library catalogues in information dissemination. User friendliness, good interface and rich description of publications present in these tools are fascinating everyone towards them, which is very much lacking in the library catalogue (Danskin, Alan, 2007). The library catalogue mainly deals with text-based resources and its potential has not been fully realised. The commercial bibliographical database meets the current demands. The library catalogues must move in this direction to be an excellent tool (Heaton, Carole, 2003). Natural-language entry, automated mapping to controlled vocabulary, spell-checking, similar pages, relevance ranking, popularity tracking and browsing are revolutionizing search engines and online bookstores in information searching. Search inside the book is another significant feature of Amazon. Some of these advanced features are now visible in a few OPACs. The possibilities should be explored to incorporate most of these elements. Library catalogues should undergo major changes to compete with these mediation tools as well as to satisfy their customers (Holly Yu and Margo Young, 2004).
2.9 INFERENCES

This review literature exemplifies the advancements as well as identifies challenging areas to carry the further research in this direction for the constructive developments of OPAC. The following inferences have been obtained from this review literature:

- Various transformation processes are periodically taking place to make the necessary changes in the library catalogue, but in a slow pace.

- Changes in the physical forms as well as emergence of new cataloguing standards are the proof of these periodical transformations, which has been taken place because of continuous researches in the field of cataloguing.

- Many remarkable developments such as card catalogue, online catalogue, inclusion of table of contents and new search features have fortified the efficiency of library catalogues continuously.

- Constant revisions have been made in AACR2 for cataloguing all kind of resources, for example the introduction of new rules in Chapter 3, Chapter 9 and Chapter 12 in its 2002 revised edition.

- MARC is a breakthrough in library cataloguing and also the base for moving the catalogue into an online environment, but its suitability is still questionable when compared with other information searching tools.

- FRBR has been introduced to improve cataloguing records especially to distinguish all versions of an intellectual work.
• RDA has emerged as successor of AACR2 and is the new paradigm shift in the cataloguing field, which focuses on cataloguing electronic resources with a new approach and also to distinguish different types of the same work.

• Mapping of MARC21 and RDA has been dealt by Appendix D in RDA. Variable fields and subfields defined in the MARC21 format for bibliographic data are mapped to the corresponding elements in RDA which is another important change. MARC21 will be compatible with RDA because of these mappings.

• Some research studies say that catalogues are still unable to provide information directly. It further reveals that library users are moving away from the library catalogue because of this reason.

• One research study proves that the users’ expectation is very high and compels the integration of many advanced level features.

• Revolution in the field of computers has brought much advancement in the entire areas of OPACs, but the rate of speed is slow compared to other mediation tools, which have taken over the OPACs.

• The current catalogue has defects in its design to meet needs of immediate results and simplicity in searching as per the present researches.
- Content enrichment is one of the areas to improve the performance of the catalogues. Academic libraries are slow in responding to the users’ requirements.

- Digital repositories and open sources are also not the part of OPACs. All information should be readily, equally and equitably accessible.

- The library catalogue must be user friendly, and should contain reviews, cover images, searchable texts and even users’ views. The catalogue should be interactive, participatory and heterogeneous.

- Lack of standardised format for FRBR is the problem for the complete conversion, which has to be addressed.

- No standard tools are available to adopt FRBR in MARC21 format.

- AACR2 has become more complex because of the continuous revisions made in it.

- Many issues are still unsolved in AACR2 because it was developed mainly for card catalogues.

- AACR2 has emphasized on description of the carrier of information, which suited the print formats and not electronic resources.

- Potential and other issues of RDA can be assessed after its full implementation.
• Inclusion of electronic resources and modifications in bibliographic information are not the only areas to meet the demands, but also some more actions are diligently to be taken to meet the demands in this Google era.

• The current developmental activities have not addressed other issues such as handling of periodicals in the article level, searching beyond its limit, user-friendliness in the catalogue and inclusion of other services.

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