



# INTERNSHIP IN THE GERMAN NATIONAL LIBRARY FRANKFURT November 2010

## REPORT

### **Acknowledgement**

This is a report of my Internship in the German National Library in Frankfurt on November 2010.

First of all, I want to acknowledge the administrators of German National Library (DNB) and the office of Bibliothek & Information International (BI-I) and my DILL professors for making my internship in Germany possible.

I will always be grateful to German National Library (DNB) Director General Elisabeth Niggemann, Director Ute Schwens, and Mr. Frank Brinkmann for allowing me to have my internship in their library and for giving me this wonderful opportunity to gain enough knowledge in the areas of Digital Preservation and Online Services. I am also indebted to all my internship mentors – important, busy individuals who so kindly shared to me their professional knowledge, expertise and experiences in different DNB activities and projects. I am truly impressed by the library's high-priority projects, activities and collaborations being done in national and international level.

I will always be thankful also to BI-I and to Mr. Benjamin Blinten for sponsoring my internship. It was one month of productive internship in the German National Library in Frankfurt, and I also had the chance to visit their beautiful office in Leipzig and other libraries and museums and was able to travel different beautiful places in Germany.

### **Germany**

Germany is a beautiful country with rich history and culture. It is officially known as the Federal Republic of Germany, a country located in Central Europe, with a territory area of 357.111.91 km<sup>2</sup>. It is a federal parliamentary representative democratic republic. Berlin is its capital and largest city.

It was first documented in 100AD by a term Germania. In the 10th century, its territories formed a central part of the Holy Roman Empire. During the Franco-Prussian War in 1871, it was unified as a nation or state. Then it was divided into East Germany and West Germany after World War II in 1949. The two have different political system. The West Germany was under France, United Kingdom, and United States. They were merged on 23 May 1949 to establish the Federal Republic of Germany. While on 7 October 1949, under the rule of the Soviet Union, East Germany became the German Democratic Republic. Germany was reunified in 1990. The present Germany is composed of 16 states, which are further subdivided into 439 districts and cities.

## **The Library System in Germany**

Germany's own unique history of past government and political system had a great impact on its library system. Today, Ministry of Culture, which supports libraries are part of the decentralized responsibility of the 16 federal states. Therefore, the 10,900 public, special and academic libraries have different classification system, collections and library methods. This also explains the establishment on three locations of the National Library of Germany (in Frankfurt am Main, Leipzig and Berlin) (Although as the moment of writing, the transfer of collections from Berlin to Leipzig had started already).

## **DNB**

Soon after the Reunification of East and West Germany in 1990, the Deutsche Bücherei Leipzig and Deutsche Bibliothek Frankfurt am Main merged into one institution – the Die Deutsche Bibliothek or the German Library.

In June 2006, a new law gave them the title the Deutsche Nationalbibliothek (DNB or German National Library). The law also expanded their mandate to collect, catalogue, and store offline to online publications, as part of the cultural heritage of Germany.

The DNB is the national archival library and bibliographic centre of the whole country. Its mission is to systematically acquire, manage, archive and record bibliographically all German and German-language publications and printed and recorded music from 1913 on and to make them accessible to the public.

Publishers have to submit two deposit copies of each new publication to DNB. These publications are collected to be classified bibliographically, archived and held in store for use. Since DNB is located in two cities: Leipzig and Frankfurt am Main, processing of the publications submitted to them is shared. Publishers of printed music and music recordings should also submit two deposit copies of each new publication to the Deutsches Musikarchiv in Leipzig, but after it is processed, the second copy will be delivered to Frankfurt for storage.

DNB also plays a significant role in the development and maintenance of international and national library rules and standards, and they do this by maintaining an active collaboration with libraries, museums, archives, universities, and publishers within the whole 16 states of Germany and in international level.

DNB holds a total of around 25.4 million media units at the end of 2009.

## **Internship Report**

The growing number of electronic publications and of computing technology is so fast that it has developed serious challenges of how to preserve access to digital objects produced on obsolete machines. Libraries and librarians are concerned to the threat of losing data resulting from technical obsolescence. And for this reason DNB's website (<http://www.d-nb.de/eng/index.htm>) has sparked my interest. They have made significant progress in responding to the changing world of digital dissemination of information through their different digital library projects and activities; specifically I was attracted in their digitization and long-term preservation programs and online services.

## 1<sup>st</sup> WEEK

1 November 2010

- ❖ 9:00: On my first day, Mrs. Barbara Grimm welcomed me in the Reception area and brought me to the office where I was assigned to stay for the days of my internship in the IT Department.
- ❖ 9:30-10:30: Mrs. Elke Jost-Zell gave me and my co-intern a guided in-house tour of the German National Library. She brought us to different sections of the library, showed us different collections, introduced us to some of her colleagues and gave us a brief history of the library.
- ❖ 11:00-12:00: Mrs. Barbara Grimm and Mrs. Margot Niemietz welcomed us again, and introduced us to the outline of the internship plan and guided us on how to use some of the equipments in the office.
- ❖ 12:00-13:00: Mr. Robert Stoldt explained the DIGITIZATION activities of DNB. He mentioned general principles they use in planning and management of this process and described some archival issues, imaging and conversion work. He cited some sample of digitization projects of the DNB.
- ❖ 14:15-15:15: Mr. Kirubel Legasion talked about eConnect or Europeana Connect. It is a big co-operative project that aims to deliver key infrastructure components and value added services essential to Europeana to fully provide interoperable, multilingual and user-oriented services towards its users. The project also aims to create Europeana licensing framework, enable and integrate services for Europeana, implement an audio-enabling infrastructure and provide huge amount of audio content and create stronger and wider collaborative networking for Europeana. But he stressed that DNB's main tasks in the project is to develop the user interface and the semantic search requirements to meet the needs of users and to develop a service for the delivery of persistent identifiers. Persistent Identifiers will enable digital objects to have a stable access point over the Internet.
- ❖ 15:15-16:15: Dr. Lars Svensson discussed about the activities of DNB in its effort of providing technologies and resources for semantic enrichment of vast amounts of digital content inside and outside the library. I really appreciate that after sharing his ideas about Semantic Web and DNB, he also tackled some interesting topics for my thesis.

2 November 2010

- ❖ 9:00-10:00: I really appreciate that in the midst of his busy schedule, Mr. Reinhard Altenhöner, head of IT Department of DNB, met and welcomed us in his office.
- ❖ 10:00-11:00: Mr. Alexander Haffner talked about Competence Center for Interoperable Metadata (KIM) Project. He explained about RDA, Semantic web, and FRBR using the book of Dan Brown, Angels and Demons as sample. He explained the necessity of interoperability of the library systems and internalization of cataloguing tools helps connect catalogues and all together promotes semantic web.

- ❖ 11:00–12:00: Mr. Marcus Dindorf tackled about Keeping Emulation Environments Portable (KEEP) Project. This is an EU Research project. The overall aim of the project develop work plans and activities that promotes long term preservation and access to wide range of digital collection even those stored on obsolete carriers. The three major tasks of KEEP is to develop: a Transfer Tool Framework (TTF) for preservation of all kinds of data carriers; a “Virtual Machine” (VM) for emulators; and an Emulation Framework (EF) for access of digital objects.
- ❖ 13:00-14:00: Mr. Tobias Steinke described about the initial drive for long-term archiving (LZA) and preservation of digital documents in Germany. DNB, through its group of experts, initiated creation of nationwide collaboration and communication network, extensive discussion of policy issues and coordinated activities for cooperative task management to create long-term archiving and preservation solutions. He mentioned KOPAL (Cooperative development of a long-term digital information archive) as a sample of earlier LZA initiative in Germany.
- ❖ 14:00-15:00: Mrs. Virginia Werb shared with me information about LOCKSS and KOPAL Infrastructure and Interoperability (LuKII) Project. Designed according to the OAIS reference model, this project aims to use the interoperability of the distributed archive system LOCKSS (Lots of Copies Keep Stuff Safe) and the BMBF project KOPAL resulting archive system. Since LOCKSS and KOPAL are both open-source software, the system is a good combination of low-cost storage and tools for migration. Many libraries with digital content can benefit from it. I requested another session with Mrs. Werb to learn the practical steps and activities involved in the operation and I am glad she grant me my request.
- ❖ 15:00–16:00: Mr. Karlheinz Schmitt and Mr. Stefan Hein patiently explained to me what they are trying to achieve in the Digital Preservation for Libraries (DP4LIB). This is a direct follow-up project of KOPAL and it aims to achieve technical and professional advancement of the KOPAL system to an integrated service at the DNB and provide this service to external institutions. After the talk, I agree that there is a big need to do a comprehensive research on establishing a business model and cost model for long-term preservation.

### 3 November 2010

- ❖ 9:30–12:00: Dr. Volker Henze and Mrs. Schmidt talked about the activities, collections and services in the DNB Reader Services Department. And I am so glad that they gave me this talk because if I just focus on the technical activities only, I would not going to have a complete overview of the digital preservation and archiving activities and experiences of DNB. They gave me insights, feedback and the present issues they are experiencing as end-user of digital collections and digital initiative projects.
- ❖ 13:00-14:00: Mr. Attila Zabus shared to me some information about Sustaining Heritage Access Through Multivalent Archiving (SHAMAN) Project. This is a research project among business, science and memory institutions and is sponsored by EU. The project stressed that understanding and preservation of the context of the digital objects through analysis of its lifecycle is very important because that knowledge is necessary to reuse those

objects in the future. Its overall goal is to develop a more advance digital preservation framework that will include tools for analysing, ingesting, managing, accessing and reusing information objects and data across libraries and other deployment scenarios.

- ❖ 14:00–15:30: Mr. Andreas Heß explained to me the idea, the workflow involved in the CONTENTUS project. I even saw the Esser Test Chart used in the project; he showed me the interface and demonstrated how CONTENTUS works and I just fall in love with it. Maybe it was the design of the interface or the icons they used or the variety of the materials made available, or maybe it is the ideal digital library I have in mind. CONTENTUS aims to be the next generation multimedia library, to develop technologies that will do automatic process and semantic interlinking of huge quantities of data stored in different formats and still preserve it for use of next generations. It will allow users to read ebooks, view images, watch films, listen to sound recordings, see online resources and access millions of other cultural heritage materials in one portal. A comprehensive set of metadata and the link to various digital knowledge records on the Internet and to integrate user-generated content are the challenges faced in fulfilling this project.
- ❖ 15:30–16:30 Mrs. Claudia Grote explained to me the design, different features and performance of DNB Search Engine and how the user can further group the search result for more ease of use. DNB is using Pica Plus Library System by OCLC, and Solr 1.4. The portal features a high level of functionality is very well structured. It offers basic and more advanced search features which will suit the expertise of different users. I admire the usefulness of making the text from a scanned Table of Contents (TOC) searchable by the use of OCR (Optical Character Recognition) software. I even asked Mrs. Grote to show me how to do the conversion and indexing of a pdf file. According to their statistics, the library customers use this feature frequently.

4 November 2010

- ❖ 9:30-10:30: Mr. Reinhold Heuvelmann shared with me the work the DNB and the Standardization Committee experienced to facilitate the switch from the use of German Data Exchange Format (MAB) to international formats and standards – MARC 21 and AACR2 in DNB and all German libraries. Funded by different institution, DNB organised MARC-21 workshops for German and Austrian experts, established networking between American and German experts, produced concordance of MAB2 to MARC 21 and conducted feasibility study for a web-based edition system.
- ❖ 11:00-12:00: Mrs. Aenne Löhden presented the CONTENTUS Ontology. I really appreciate that she prepared clear samples of ontology, then explained how it is embedded in CONTENTUS and how it will improve data exploitation and presentation. She made a clear point on its importance for semantic web technology.
- ❖ 13:00-14:00: Dr. Jan Hannemann gave background information on what is Linked Data and how it developed. He clearly pointed out the usefulness of Linked Data by comparing the difference of an online interface for data related to people without Linked Data and then with Linked Data. The one without the Linked Data will just going to provide a single institution's data alone, while the one with Linked Data will provide data in different

format from other online sources, example Wikipedia, Geonames, other authority files and other bibliographic data sources. He mentioned DNB's Linked Data services and plan for future work. He explained the considerable potential of Linked data for libraries and the reason why library data can become a 'backbone of trust' for the semantic web.

- ❖ 14:30–15:30 Mr. K. Karaca Koçer explained what a Uniform Resource Name (URN) is and cited the advantages of using it to digital objects. A URN is a unique and persistent identifier given to a digital object. It is like the ISBN for digital objects. Overall, the citation of URN guarantees durable access to a digital object. He mentioned that DNB leases and manages URNs, through the namespace "urn: nbn: de", not only for Germany, but also for Austria and Switzerland stakeholders.

5 November 2010:

- ❖ 9:00-12:00: Mrs. Renate Behrens-Neumann explained the importance and variety of works of Arbeitsstelle für Standardisierung (Office for Library Standards, AfS). It is a unit of the DNB that manages and coordinates the different local and international work in the different areas of standardisation like the development and use of descriptive and subject cataloguing rules, rules for cataloguing of electronic resources, authority files, data formats and communication interfaces, and archiving and long-term preservation of digital publications. More than 10,000 libraries benefit with the standardisation work they do. Some of the projects they mentioned includes translating Resource Description and Access (RDA) to German, organizing training programmes for the use of new cataloguing code, translating some parts of MARC 21, preparing the ground for a Gemeinsame Normdatei (GND - authority file of the German speaking countries) and many other activities associated with metadata.
- ❖ 14:00-15:00: Mrs. Barbara Pfeifer talked about the different kinds of authority files: Corporate Body Authority File (GKD), the Personal Name Authority File (PND) and the Subject Headings Authority File (SWD).

#### **Observations/Concerns: 1st week**

- Maintaining collaboration with local and international institutions, developing projects, supporting research and development is a tough job and an expensive one but it makes the role and great responsibility of securing long-term preservation and accessibility of cultural and scientific heritage in digital format achievable.
- Legal and sustainability issues, technical infrastructure and staffing models restricts the progress of digital preservation initiatives even that of developed countries.
- Setting technical standards, and observing systems and processes sustains digital preservation initiative.
- Open communication and active partnership among IT personnel, librarians, managers and stakeholders is inevitable in a successful digital project strategy.
- Implementing digital preservation project, especially among consortium partners is complicated and often laborious process but once you agreed and started working, things will slowly fall into place.

## 2<sup>nd</sup> WEEK

8 November 2010:

- ❖ 10:00-11:00: Mrs. Natasha Schumann shared about the Network of Expertise in Digital Preservation (NESTOR) Project. Funded by the German Federal Ministry for Education and Research, NESTOR is a cooperation network with partners from different field. It brings together the experiences learned and the competencies with regard to digital preservation in Germany. It aims to promote standardisation, training and networking in the field of digital preservation. People interested in digital preservation should really check their website because of the rich information or links they provided there, only, most of them are written in German, but of course librarians knows how to use electronic translator tools, so the materials can still be useful.
  
- ❖ 11:00–12:00: Mrs. Maren Brodersen demonstrated how the submission of online publications can be done on the DNB website. First the user needs to register to the system and then request to deliver. The user will get an email to inform them when their request was approved. There are two ways you can submit online publications, first through the use of web forms, which can be use when submitting smaller quantities or individual titles and second, through interfaces for automated delivery or OAI harvesting, which is use for larger quantities. We also discussed about the file format and other technical notes for data structures and syntax for network publications.
  
- ❖ 14:00–17:00: Mrs. Natasha Schrimpf and Mrs. Sabine Schumann gave me an assignment research about the digital preservation initiative in Asia and status of legal deposit for digital objects within EU countries

9 November 2010:

- ❖ The whole day I did my research assignment and found out that there isn't much research about digital preservation in Asia. There were many digitization projects but not digital preservation. Most of the paper presentation or web pages thought that these two things are the same but they are not. My stay here in DNB made it clearer to me now, that digitization is the process of making digital copies of physical items while digital preservation are the activities you do to maintain the digital objects, and to make it accessible over a long period of time. Digitization activities then will produce digital objects that need to be the target of digital preservation project. Until now digitization is being thought as digital preservation activity in most researches made in Asia, and there are very few countries that put attention on this very important issue/activity in spite of growing digitization activities in the region.

### Observations/Concerns: 2nd week

- Concern of digital preservation in DNB doesn't end in activities inside the libraries, they go out, they collaborate with others to create standards, to train people, and to disseminate knowledge; they know digital preservation is a big task, and they take it seriously and want to work it out with others.
- One of the best way to make sure that a particular digital content will still viable and

accessible for a long term period is to make many copies of it in different storage which can be in different locations; copyright and interoperability can be an issue but proper agreements, and contracts can be made about it; it can be done through the use of LOCKSS and KOPAL infrastructure and interoperability.

### **3<sup>rd</sup> WEEK**

15 November 2010:

- ❖ 10:00-12:00 Mrs. Kristina Knull-Schlomann welcomed me to the new room where I will stay for the next two weeks. She also shared information about the National bibliographic services and catalogue enrichment, and also, the German National Bibliography, the Data Services and the New Release Service. Most of the services I heard are very new to me, they are very unique and useful, other libraries should do them too. She also showed some publications of DNB.
- ❖ 13:00-14.30 Mrs. Kathrin Ansorge talked about the principles, practice and issues concerning content and digitization projects of DNB.

16 November 2010

- ❖ 10:00-12:00 Mrs. Stephanie Glagla-Dietz introduction me into the online catalogue and services. I realized that online catalogue and services of DNB differs a lot from other national or other library because it have different kind of holdings, and they cater services to a broad set of stakeholders – this includes not only the individual citizens, but many librarians, libraries, publishers and many others. We talked about the layout, ease of use, functionality, terminology, design and navigational tools of the catalogue. Director General Elisabeth Niggemann kindly met me in her office that morning.
- ❖ 13:00-17:00 Mrs. Stephanie Glagla-Dietz taught me how to use Selenium web application testing system to test the online catalogue and I made some test and recorded it. My mentor said she will use the recording to test latest version of the catalogue.

17 November 2010

- ❖ 9:00-12:00 Mrs. Hannelore Effelsberg taught me how to use the Content Management System of DNB, which at that moment was – Nodevision. We tried how to add, edit, and delete text, how to add, edit and delete pdf and images and how to put or delete a link. She told me a brief history of DNB's CMS, told me some concerns she have for CMS work, and gave advice on how to be expert on it.
- ❖ 13:00-17:00 Special tests concerning the CMS

18 November 2010

- ❖ 10:00-12:00 Mrs. Martina Tumulla introduced the projects "Impact" and "Deutsche Digitale Bibliothek". IMPACT is an EC-sponsored project. It aims to push innovation of OCR technology and language technology to improve the access to historical text and to

overcome the barriers that hinders mass digitisation of European cultural heritage. IMPACT consortium target to reach that goal in four years, and they have to follow a work plan which is structured into four Sub-projects: Operational Context (SP OC), Text Recognition (SP TR), Enhancement & Enrichment (SP EE), Capacity Building (SP CB). Deutsche Digitale Bibliothek (DDB) aims to make the rich cultural heritage of German archives, libraries and museums, AV and Science institutions available to everyone, anywhere, 24/7 – the ‘Center of Excellence’. This project has six working groups: Content, Metadata, Technical bard, Web representation or Web design, Registration and Marketing.

- ❖ 13:00-16:00 Use of Selenium web application testing system to test the online catalogue
- ❖ 16:00-17:00 Mrs. Anke Meyer talked about the features of the DNB Portal system. She said that individuals, libraries and publishers can upload electronic publication using one same interface. She demonstrated how to register to the system and how to upload files. After registering to the system you can use the Data shop, borrow books and request for photocopies to be send to the user’s place.

19 November 2010

- ❖ 10:00-12:00 Mrs. Ines Kolbe and Mr. Thomas Jaeger talked about the Accessible Registries of Rights Information and Orphan Works (ARROW) project. ARROW is consortium project of European national libraries, publishers and collective management organisations, and writers. It a project funded by the European Commission. It aims to find solutions on how to provide information on the rights of orphaned works and out of print materials, so they can be used for scanning and inclusion in Digital Libraries.
- ❖ 13:00-17:00 Private study of the ARROW-papers

#### **Observations/Concerns: 3rd week**

- Management of authority files for personal name, corporate body names and subject headings together with persistent identifier, promotes Linked data which is essential in having a semantic web.
- In doing CMS you have to be very careful in what you’re doing, since mistake is inevitable, and be sure to check everything because what you will do will be available on the web; you have to know by hear the folders (Hard drives) where you will gather the content and the each pages of your site so it will be easy for you to add, edit or delete content.
- To make the texts from scanned Table of Contents (TOC) searchable is really useful for both the library and the users; it is really cheap to do this since there are open source software available but you have to invest on scanning the TOCs.
- I asked them why they don’t include indexes at the end of the books to be scanned and be processed by OCR then be searchable also in search engines, they said maybe because not all materials have indexes; I still think there should be a project to include them if a particular material have index, it will be really useful too.
- Consistent and rich metadata is not only useful in making the materials searchable, but also essential in digital preservation.
- Creating search indexes is not limited; it is based on your description metadata and type of

materials; and should be created considering the needs of the users.

- Web testing should be done regularly and using a system like selenium makes the work less complex.
- My research work about the digital legal deposit shows that not every EU countries have one existing law regarding this; the task showed me how complicated the work of digital legal deposit and how it is essential for the national libraries at the moment.

#### 4<sup>th</sup> WEEK

22 November 2010

- ❖ 9:00-11:00 Mrs. Christa Schöning-Walter talked about the PETRUS Project. Since a new law in 2006 gave DNB a new responsibility to collect, catalog, index and archive online publications, DNB wants to be ready to the huge amount of the items to be collected in the future and therefore, it aims to establish an automatic cataloguing workflow for e-publications, and that is what PETRUS will do. Four departments are involved in this project: Bibliographic Description, Subject Cataloguing, Digital Services, IT. The project will going to address the works needed through four sub-projects: Automatic Classification, Automatic Subject Cataloguing, Match and Merge of Authority Data and Match and Merge of bibliographic records. She also shared some of the challenges they are facing now while in the middle of the project, but I think this is one of the brilliant and most advanced project now in the library world.
- ❖ 13:00-15:00 Research and analysis of PETRUS
- ❖ 15:00-17:00 Personal research time for the presentation on the 24th November

23 November 2010

- ❖ 9:00-10:00 Today I have another session with Mrs. Hannelore Effelsberg. She taught me how to add, edit, and delete address and contacts, and putting links on them. Then she showed me the CMS interface for administrators, and it shows that it pays to know XML.
- ❖ 10:00-17:00 Research and analysis on PETRUS

24 November 2010

- ❖ 10:00-12.30 Mrs. Nicole von der Hude talked about the SRU-Interface. The DNB SRU service (search/retrieve via URL) provides a method to automate basic query, it uses a standard syntax to represent queries, and a standard protocol (XML) for the results of the search. This is a bit abstract for me, but she helped me understand it more by explaining its history, standards, functions, formats and practical examples and how it is being use in DNB. She also explained how it is connected with Linked Data.
- ❖ 13.30-15:00 I was asked to give a short presentation about the National Library of the Philippines and feedback about the internship. I also gave a brief presentation about the Philippine eLibrary, which is a consortium project of five government agencies. Its Project Management Office is the National Library of the Philippines.

- ❖ 16:00-17:00 I really appreciate the help of Director Ute Schwens, Mr. Frank Brinkmann and Mrs. Kristina Knull-Schlomann in arranging my trip to German National Library in Leipzig.

25 November 2010

- ❖ Tour to the German National Library in Leipzig and other libraries and tourist spot in the area. The front side of the building shows the great European architecture -- very classic and elegant. The different reading rooms, collections and the history of the place is just amazing. I am grateful I had the chance to visit the place.

26 November 2010

- ❖ I requested another talk related to URN so Mrs. Uta Ackermann met me to share other things related to it. She explained how URN is being managed, how it is being assigned. She also showed me some links of electronic publication related to URN. She explained the parts of URN. It is consist of several components like namespace (NID), subname spaces (SNID), and the namespace specific string (NISS).

27 November 2010

- ❖ Tour of City of Mainz, the Gutenberg Museum Mainz (<http://www.gutenberg-museum.de/index.php?id=29&L=1>), and the Mainz Christmas Market. Beautiful experience.

28 November 2010

- ❖ Frankfurt City Tour. I really enjoyed the sight-seeing. The people are very kind and nice, even those who you just meet in the streets or on the coffee shops. And the food was great. I will truly going to miss this place and I will try to go back here.

#### **Observations/Concerns: 4th week**

- I remember support vector machine (SVM) was mentioned in solving ranking problems so it was used in learning retrieval functions in search engines, now I know, it could also be use as classification technique in automatic cataloguing.
- CMS editors should be excellent communicators, always informed of the new things and projects in the institution and should be analytical and familiar with XHTML and CSS.
- When we were checking the data sample for URN, there are some URN which is assigned for one title/publication, some for one whole issue and the dialogue partner said that there are even URN issued for each page of one whole publication, so I asked if they have a policy and she said they are still in the process of discussing about it.
- Long term preservation and access of digital materials is achievable when done with interconnected activities and project which are existing already in the library (ex. enriching metadata, cataloguing and classification, maintaining authority files) and new activities which can be created for this purpose (ex. checking of digital material's status, and migration)



Through this internship, I have grown to understand that the factors influencing the management of long-term preservation of digital objects and/or storage materials include: Technical Infrastructure (Software, hardware and protocols used by the network); Standards (Ontologies, metadata, subject heading, persistent identifier, digital signature, etc. that will facilitate compatibility, interoperability and long-term access); Training of personnel; Collaboration (among different stakeholders: individuals and institutions; Local and International connections; Among librarians and IT specialist); Continuous research and development projects; Budget; Law/Legality.

Overall, I had a great experience in the German National Library and in Germany. This Internship bridged the gap between theory and application. My mentors gave me a comprehensive overview of the important factors and activities concerning digital preservation and online services. I gained a perspective of the actual situation of how to manage projects. I learned new good ideas for future projects when I go back to my country and ideas for future research with contacts for future research work.

Once again, I want to thank the German National Library Family and the Bibliothek & Information International who gave me the opportunity to see and enjoy the beautiful Germany and to be significantly introduced to your advanced digital library projects and colorful culture.