Impact of Outsourcing to Cloud Computing on Academic Libraries: An Exploratory Study

A study submitted in partial fulfilment of the requirements for the degree of MSc Digital Library Management

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by

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Abstract

**Background:** In recent years cloud computing has become an integral part of the academic libraries. University libraries in the Yorkshire region so far have transferred a number of selected services to cloud computing. Libraries today are generally attracted to the benefits of cloud computing, however, there are still many issues concerning the use of this service. Lastly, libraries which have implemented the cloud based services have not publicised their involvement in these cloud projects.

**Aims:** The aim of this research is to understand and explore the impact of cloud computing in academic libraries within the Yorkshire region. There were areas related to cloud computing that the previous literatures had not covered such as library staffing and new skill sets, ownership of library data and return of investment.

**Methods:** A series of seven semi-structured interviews were conducted. The participants chosen were from various library systems, departments and e-resources. The interviews were recorded and then analysed using thematic analysis.

**Results:** The result of this study revealed that the understanding of cloud computing varies according to the services they use. The IT department has an important role in involvement in decisions of libraries to move to cloud based services. Libraries possess sole ownership of their data (except the purchased licensed data) stored on the cloud. Cloud based services are convenient and all the libraries in the Yorkshire region have benefited from the services they have implemented. This research found
that these libraries save staff time and cost using cloud based services. Security and privacy issues, however, still remain major concerns.

**Conclusion:** Cloud computing is becoming a trend in academic libraries. Libraries plan to transfer more services to the cloud in the future. The libraries should accept cloud based services by balancing their needs and the potential risk factors involved.
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1 Chapter 1: Introduction

We are witnessing an evolutionary conversion in the existing library technologies and the implementation of new systems and services in libraries. This dissertation aims to explore the impact of cloud-based services in seven academic libraries in the Yorkshire region, United Kingdom (UK). This study provides a unique insight into why these libraries ought to move to cloud based services when they face a number of risk factors. This chapter describes the research problems and tries to justify the study as well as the research questions and objectives. Finally, the structure of dissertation is described,

1.1 Background of the Research

In the 1960’s, Ross Perot established the Electronic Data Services (EDS) company. It recognized that the computing needs of many organizations were lesser than the actual capability of the hardware they had purchased. This steered to the introduction of Cloud computing in several systems and services by the Electronic Data Services (EDS) (Varnum, 2014). According to Arutyunov (2012) the creator of Cloud computing was in fact, John McCarthy, who advocated in the 1960’s that public services would be used in the future for computing. Furthermore, Arutyunov adds that the term “cloud computing”, was first used in 2008 by Eric Schmidt the then CEO of Google at a thematic Internet Conference. Before libraries introduced new library technology services to customers, they were already using Cloud (Common Location Independent, Online Utility on Demand) (Cervone, 2010). The services at that time included Gmail, Google docs and Google forms, Facebook, WhatsApp and
YouTube. In order to attract users back to the libraries and provide equivalent Google experiences, libraries had to face a number of challenges (Levy, 2013). Cloud shares a wide range of services such as simple data sharing to complex Library Management Systems, discovery services, e-Resources, publishing, self-servicing services, citation management, mobile apps, and acquisition and cataloguing services through shared infrastructure. In this study, the browser centric cloud based services in the academic libraries and on librarianship is explored.

1.2 Significance of the study

Over the last few years a large number of academic libraries in the Yorkshire region have started using cloud-based services from various cloud service providers. The main concept of cloud computing is data outsourcing (Sood, 2012; Wang, Yi, Bertino, & Sun, 2016). However, the demand for large resources has made it difficult for academia to investigate the crucial issues of security, dependability and interoperability (Bessani, et al., 2012).

There are studies on how and why cloud computing has gained popularity in academic libraries. Hence, it has been widely concerned with establishing a definition of the term, and exploring the benefits of cloud computing in academic libraries and in general, more common issues associated with cloud computing. However, there is a lack of thorough and systematic analysis on ownership of library data, return of investment, contractual safeguards, impact of cloud services on library staff, the different interesting concepts on cloud computing and cloud based services. In addition, a number of university libraries do not publicize their cloud projects. If they publicize their project details such as reasons for cloud adoption, benefits and
challenges of cloud services, it would be helpful for other academic institutions not only in the UK but also in globally.

This research explores in depth the adoption of cloud based services by different libraries and the impact of these services on academic libraries.

1.3 Research Aims and Objectives

1.3.1 Research aims

This study aims to explore in detail the influence of Cloud Computing and the major issues concerned with its use by academic libraries in the Yorkshire region.

1.4 Research Questions

- What are the actual impacts of cloud computing in academic libraries?
- How do libraries deal with proprietary data held by cloud service provider?
- What are the resolutions libraries have taken so far to overcome the cloud issues?
- Will the library’s data be returned if the library decides to leave a cloud based service, the cloud service provider faces receivership or the cloud service is acquired?

1.4.1 Objectives

- To identify and explore the factors that influences the university libraries in the Yorkshire region to adopt cloud computing.
- To explore how information professionals manage complex cloud services and mitigate potential challenges.
- To investigate the details about ownership of library data and data retrieval
- To examine the strategies to measure return on investment.
• To identify whether university libraries in the Yorkshire region foresee a future closely connected to cloud computing.

1.5 Organisation of Dissertation

The dissertation is divided into seven chapters, a bibliography and a set of appendices.

Chapter 1 (Introduction)

This chapter illustrates the relevance of cloud computing and background of the study followed by a brief description of research aim, research questions and research objectives. Additionally, this chapter also concisely describes the layout of the dissertation and the contents of each chapter.

Chapter 2 (Literature Review)

This chapter describes cloud computing in detail. A review of the literature regarding cloud computing in the library services and its effects on librarianship will be discussed in this chapter.

Chapter 3 (Methodology)

This chapter discusses the research methods used in this study. It demonstrates and explains the qualitative approach that is used in the study, the data collection methods, the data analysis methods. It also tries to give an overview of the limitations of this study.

Chapter 4 (Results)

This chapter explores the results of the research conducted through interviews.
Chapter 5 (Discussion)

This chapter consists of the key findings of the study and tries to answer research questions by comparing it with existing literature on this area of study.

Chapter 6 (Conclusion)

This chapter summarises the key points, research contributions, research limitations and recommendations. This chapter also includes suggestions for further research.

Bibliography

This includes an alphabetical order of the sources used in the research study such as books and academic journals.
2 Chapter 2: Literature Review

2.1 Introduction

This chapter provides a general overview of definition of cloud computing, the key concepts and issues with regard to the implication of cloud computing in libraries.

2.2 Definition of Cloud Computing

In a recent study conducted by Yuvaraj (2015) and Bushhouse n (2011) explain that the definition of cloud computing is still in progress as people interpret it differently in each time and this leads from one question to more questions.

However, one of the most used definitions from National Institute of Standards and Technology (NIST) by Mell and Grance (2011) “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service-provider interaction” (p.2). According to Scale (2009) “cloud computing can be defined as simply the sharing and use of applications and resources of a network environment to get work done without concern about ownership and management of the network’s resources and applications” (p.10). Arutyunov (2012) explains that cloud computing is a data processing technology, using internet to offer system resources and capacity to the users. However, Yuvaraj (2015) emphasises that it is difficult to interpret the meaning of cloud as difficult as one tries to catch actual cloud by hand.
In a study by Wu, Ping, Ge, Wang, and Fu (2010) explain that cloud stores data on multiple virtual servers and gives an impression that data stored in a particular location. The truth is that the location does not exist. The word Cloud is a pseudonym uses to address the virtual space. The data stores in multiple computers to create a cloud and the location keep on changes. (Wu, Ping, Ge, Wang, & Fu, 2010)

2.3 Implementation

Libraries may consider various options such as cost factor when they plan to implement cloud based services (Breeding, 2012). In a case study by National Archives UK, expresses fear of one of the elite institutions on paying ten years cost in advance before implementation (The National Archives, 2015).

2.4 Reasons for cloud adoption

Libraries may be fascinated in cloud computing by recognizing the cost saving in staff (Corrado & Moulasison, 2011). Stukalova and Guskov (2016) highlight the fact that due to limited budgets libraries are unable to purchase expensive hardware and equipment. Furthermore, it is often necessary to appoint specialized staff to perform complex library-related tasks and services. This is another reason for libraries to embrace cloud-based services.

2.5 Dependability issues

Cloud Computing is not free from any challenging issues such as design faults, unforeseen failures such as unavailability of service and discontinuity of business, unexpected operating conditions such as power outages, network degradation, or
hardware failure, and adversarial attacks such as hijacking and phishing (Correia & Mittal, 2013).

2.5.1 Network issues

The application of old and new technologies in the library may create a lack of connectivity in the future (Levy, 2013). One of the main wrangle about cloud computing is without internet connection it would not be possible to carry out any of the functions (Arutyunov, 2012). In addition, it would be difficult for libraries to use cloud services if their internet access is not speedy or reliable (Leavitt, 2009). Cervone (2011) describes that limited option on customisation may cause difficult to the cloud based system to integrate with local system.

2.5.2 Software issues

Cloud based services are updated and upgraded by cloud service providers that is less customizable (Iles & Erturk, 2015). In a study by Arutyunov (2012) states that cloud software packages are cheaper to use than purchasing it. However, the users could not customise the software according to their requirements.

2.5.3 Privacy and Security

In a study by Stukalova and Guskov (2016) states that the largest and serious concerns on using cloud based services are the privacy and security. Corrado and Moulaison (2012) specify that libraries have concerns on the security and privacy of their patron data. Aniello, Bonomi, Breno, and Baldoni (2013) specifically argue that more importance should be given to developing new technology based services than control and security based issues. Cloud computing is working on the traditional architecture that is running on a web browser using web applications made it more vulnerable to security dangers and data breach (Khan, 2016; Ramachandran & Chang,
2016). Moreover, Levy (2013) expresses his concern over how ‘Wikileaks’ published much confidential and sensitive data within short span of time and made it available to public in the age of encryption. He also recognizes that some libraries often choose different cloud service providers to avoid any future risk. Sood (2012) highlights the architectural security issues and the main concerns in this area, such as external attacks and the violation of security and privacy by the cloud service provider. Security and privacy breach will have serious repercussions to the cloud provider, to the client and to the entire cloud service sector (Ramachandran & Chang, 2016). Naghavi (2012) explains that if an attacker sends enormous amount of illicit service appeal creates slow running of the system and it also affects the overall performance. Arutyunov (2012) argues that though, cost and speed are the main attractions of cloud computing, a large number of organizations do not consider storing their confidential data on cloud. Hari Krishna, Kiran, Murali, and Reddy (2016) argue that customers outsource their data on cloud, however, they do not trust providers as a whole.

2.5.4 Legal and compliance issues

Sultan (2013) states that despite the financial and flexible features of cloud computing, numerous government rules and regulations prevent the transference of personal data outside the country. Leavitt (2009) identifies that customers can access the data stored in the cloud from any part of the world and it became a serious concern for governments to implement data storage laws such as the European Union’s (EU) data privacy regulations as an example. Laws to access and disclosure of data by certain countries like USA cause possible legal issues (Erl, Mahmood, & Puttini, 2014). Stukalova and Guskov (2016) highlight the involvement of Federal
Bureau of Investigation (FBI) in 2009 to close a data center for storing an article on ‘Liquid Rocket Engines’ which led to the stoppage of cloud services temporarily.

### 2.6 Ownership of Data

Corrado and Moulaison (2011) suggest a Service Level Agreement (SLA) can help librarians to address various concerns libraries have such as uptime, performance and security before the implementation of cloud. Service Level Agreement (SLA) is crucial to explain exact agreements among customers and cloud service providers with regard of various services (Chang, Walters, & Wills, 2013). Scale (2010) describes that cloud computing enabling libraries to change the responsibility of ownership and maintenance of resources to library cloud service providers who controlled the access of information. Truitt (2009) expresses his concern on ownership of data with the incident Amazon’s Orwellian Kindle deleted copies of ‘1984’ and ‘Animal Farm’ from subscriber’s e book readers without their knowledge or consent. On the other hand, Yuvaraj (2015) points out that there can be issues of proprietary data owned by cloud service providers. Breeding (2012) identifies the risk of losing data on cloud storage services and suggested to keep numerous copies of files as backup.

### 2.7 Return on Investment

Cloud computing can save time, money and simplify workflows (Goldner, 2011). However, Corrado and Moulaison (2011) argue that it is important to evaluate all the expenses involved when migrating to cloud library. They add that the migration cost to cloud computing may not always be the cheaper option. In another case study Corrado and Moulaison (2011) highlighted the experience of a University library which successfully migrated to Amazon’s EC2 service has similar expense as any of
the local computing implementation. According to Corrado and Moulaison (2011) however, this can minimize the operational expenses. In his study, Han (2011) identified that Amazon Web Services (AWS) offers technical advantages and effective cost savings when compared to a local storage and server. Romero and Nuria (2012) point out that there are cloud providers who offer very competitive prices at the beginning but unexpectedly later increase their prices.

2.8 Staffing

Goldner (2011) demonstrates the rapid change in the library collection affects the traditional job roles in the library. He adds that the Acquisition librarian has to handle license for electronic resources as well as purchasing library materials in different formats. Mavodza (2013) emphasizes the implication of cloud includes training of staff and managers. Yuvaraj (2015) comments on a misunderstanding that the implementation of cloud in the library may put an end to library IT staff as the cloud provider supports all the technical work. In contrast, Corrado and Moulaison (2011) report that local staff may lose control over the library technologies, users computing platforms and have restrictions on what they can do the way cloud based services work. The library professionals are expected to broaden their professional skills and think open-mindedly to manage the new wider range of services so that these developments do not affect their professional domain (Mavodza, 2013; Yuvaraj, 2015).

Marston, Li, Bandyopadhyay, Zhang, and Ghalsasib (2011) fear that the in-house IT department may view cloud computing as a threat to their profession. Another major issue related to cloud based services are the rejection of these technologies by the
staff concerned over the change, initial anxiety and fruitless change management from the management (Stukalova & Guskov, 2016).

2.9 Current Development

Discovery service such as Primo Central, EBSCO Discovery Service, Summon can provide access to libraries special institutional repository (Hoy, 2012). In addition, cloud based services such as Aleph, Alma, WorldShare, Intota 2, Sierra, Koha, and BLUEcloud LSP can host library products outside the library (Iles & Erturk, 2015). Open source library management system KOHA could be used on the cloud based services provided by ByWater solutions (Hoy, 2012). Bibliographic management is one of the widely accepted cloud based services (Hoy, 2012). Citation management software such as Mendeley can be used to share the contents and connect the research community (Hoy, 2012). Mobile apps can also add more value to the innovative cloud based services (Iles & Erturk, 2015). Yuvaraj (2015) describes the advent of StackMap shef mapping software which allows users to see the map of a physical book and track its location. OCLC’s World Cat Mobile Site enables the users to locate the nearest library holding a particular book (Yuvaraj 2015). Cloud based cataloguing can enhance the storing, sharing and cataloguing of books (Yuvaraj 2015). In a recent press release, Bibliotheca announces the cloud library e-book and audio book solutions to the UK public libraries following its success in the Canada and the US (Bibliotheca, 2016). Cloud based services permeate the resources discovery and library management systems in the academic libraries (Breeding, 2012).
2.10 Cloud Service Provider issues

Sultan (2013) emphasizes that issues like bankruptcy, outages and lack of interoperability will affect the cloud based services badly. Moreover, he adds that customers may consider well established large companies like Google, Amazon, Microsoft and IBM to store their data. However, Stukalova and Guskov (2016) argue that unprofessional or improper backup may lead to loss of data stored in the cloud. Correia and Mittal (2013) point out to the several cloud outages in popular cloud services which lasted few minutes to several days. The authors share three cases of disruption happened on cloud services:

1. A social Book Marking service lost the client data that they were unable to recover.

2. A popular mobile data service lost their client data and took seven days to retrieve it.

3. An employee of a cloud provider read personal emails of their client.

One of the latest in this list was the leak of highly confidential (11million) Panamanian documents from a Panamanian law firm (Head, 2016). Corrado and Moulaison (2012) discuss a case study where the librarian implemented a free cloud based library service after spending a lot of time and effort. Later the free cloud based service was sold to another company and the service was discontinued. Cervone (2011) emphasises that cloud service provider may not disclose their security infrastructure with customers.

2.11 Advantages and Disadvantages of Cloud computing

When a library shifts to cloud it eliminates the expense of hardware, software installation, maintenance cost and manpower cost (Hoy, 2012). Software as a service
has reduced the local IT services to a minimum in the libraries (Iles & Erturk, 2015). Cloud based services enable users to access documents within seconds and to share it in real time (Sorensen & Glassman, 2011). However, Sorensen and Glassman (2011) describe the ‘access’ cloud offers are a unique selling point. The much praised advantages of cloud computing are its efficiency and the capability of running different programmes simultaneously (Corrado & Moulaison, 2012). A Cloud service provider (vendor) supported cloud solutions could solve the issue of ‘lack of technical knowledge’ that small organizations often face (Corrado & Moulaison, 2012). Sorensen and Glassman (2011) observe the training sessions on web based services offered by cloud application to increase the visibility and presence of library. 

In a study by Mavodza (2013) explains that the control over various cloud models varies in terms of the infrastructure, storage, and applications. Users may have restricted control over Software as a Service (SaaS) applications, however, they do not have control over the hosting environment, cloud storage, operating system, networks and operating system (Mavodza, 2013).
3 Chapter 3: Methodology

This chapter presents the research approach and methods used in this study.

3.1 Research Approach

This study aims to discover the influence of cloud computing in the academic libraries of the Yorkshire region. In view of the exploratory nature of this study and human participation, a qualitative approach has been adopted in order to achieve the aims and objectives of this study over a quantitative approach (Connaway & Powell, 2010). The influence of the dynamic context and individual participation of library professionals was made clear through the employment of a qualitative method (Pickard, 2007). The result of this research study would be based on the opinions and personal interactions of participants from seven academic libraries (Pickard, 2007). The research study is more social in nature, dynamic and also, this study focuses more on individual experience and opinions (Wildemuth, 2009; Pickard, 2007).

3.2 Research Design: Case Study

A case study design is a specific qualitative research method (Connaway & Powell, 2010; Walliman, 2006). Qualitative analysis is basically case oriented where data collection and analysis is focused on cases (Bazeley, 2013). Case study is an attempt to understand and uncover the high-octane cloud based service context through the detailed analysis of a particular instance or few instances which are used as samples (Wildemuth, 2009). It involves deep understanding of a specific phenomenon which
closely explores the experience and perceptions of individual participants (Alasuutari, Bickman, & Brannen, 2008). This study was conducted in seven university libraries located in the Yorkshire region. Case study research is of great use to gather less discussed or never discussed information from a small sample group (Pickard, 2007). Case study design is flexible for exploratory research and it is possible to use both qualitative and quantitative research methods in a case study (Walliman, 2006). In addition, it will be helpful to investigate and explore various functions and performance of organizations through a case study (Connaway & Powell, 2010). However, the success of case study research method is largely dependent on trustworthiness (Pickard, 2007). Each participant will be provided a study outline to give them an idea of the structure of the study in which they are participating (Pickard, 2007).

It is appropriate to gather extensive and comprehensive data on a single research phenomenon (Busha & Harter, 1980). The objects commonly used in case study methods are one or more elements such as libraries, librarians or users, and information systems (Busha & Harter, 1980). This method has also been previously used by many as an exploratory undertaking to uncover and expound the problem of enquiry. Multiple cases help to compare and contrast a particular context (Saldaa, 2011). However, it is time consuming and exorbitant (Busha & Harter, 1980).

3.3 Sampling

Practically, it is not possible to select a large population for this study. Sampling will help the researcher to select few participants from a large number of populations to conduct the research (Pickard, 2007). An intensity sampling will be used to identify samples for this research. Intensity study helps to identify relevant participants
whose experience gives us an insight about the impact of cloud computing in the library (Powell & Connaway, 2004). There is no specific sample size for a qualitative study (Powell and Connaway, 2004). Wildemuth, (2009) explains that the purpose of sampling is to choose specific participants for the research. The sample used in this study was comparatively small, seven experienced library staff from university libraries located in the Yorkshire region (Table 1). One of the advantages of this small sampling was increased data range and researcher’s possibility to explore more in the context (Pickard, 2007). The interviewees were chosen based on their experience in the implementation and experience with the cloud services. A priori purposive sampling helped the neophyte researcher who had limited time to apply a structure to sampling, to adjust the questions as study progressed and to identify new discoveries (Pickard, 2007).

Table 1: The Interviewees Sampled for the Research.

<table>
<thead>
<tr>
<th>Participants</th>
<th>University</th>
<th>Gender</th>
<th>Job role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>University A</td>
<td>Female</td>
<td>Systems Specialist</td>
</tr>
<tr>
<td>Participant 2</td>
<td>University B</td>
<td>Male</td>
<td>E-resources librarian</td>
</tr>
<tr>
<td>Participant 3</td>
<td>University C</td>
<td>Male</td>
<td>Head of Digital services</td>
</tr>
<tr>
<td>Participant 4</td>
<td>University D</td>
<td>Female</td>
<td>Technology Development Manager: Collection service</td>
</tr>
<tr>
<td>Participant 5</td>
<td>University E</td>
<td>Male</td>
<td>Library Systems Team Leader</td>
</tr>
<tr>
<td>Participant 6</td>
<td>University F</td>
<td>Male</td>
<td>Digital Programmes Manager</td>
</tr>
<tr>
<td>Participant 7</td>
<td>University G</td>
<td>Female</td>
<td>Journal and Electronics</td>
</tr>
</tbody>
</table>
3.4 Pilot Test

Pilot test helps to check the feasibility of the research project at hand (Robson, 2011). In other words, it helps to refine the data collection plan and adjust the questions according to the situations Pickard (2007) and it is a feature of qualitative research (Silverman, 2013). First pilot test was done on a fellow student who had previous work experience in the research topic. It was helpful to organize the questions in advance based on the participant’s answers to the questions and move the interview forward. It also helped to check the audio recorder before the actual interview took place. Second pilot test was carried out on a lecturer, who also had previous experience with cloud based services. This helped to reorganize the interview questions and improve the interview skills.

3.5 Data Collection Technique

An interview is a widely used, valuable data collection method, and extensively used in the Library and Information Science research (Connaway & Powell, 2010; Busha & Harter, 1980; Pickard, 2007). A structured interview helped the researcher to frame appropriate questions to find what she wants to find out. (Connaway & Powell, 2010). The advantage of structured interview is to keep the interview on track. However, the disadvantage of this type of interview is the disability of the interviewer to be part of the conversation (Pickard, 2007). Moreover, Pickard (2007) indicates that the interviewer has full control over the interview which eventually decreases the chance of poor response rate. Pickard (2007) adds that interview technique is appropriate for anyone, even those who are new to it.
The researcher used semi-structured interview format as a collection tool, and interviews were conducted in a ‘free-flowing and open ended’ manner (Silverman, 2013). This research study used face to face interviews, telephonic interview, emails, and finally virtual interviews Flick (2006) using ‘Skype’ to collect data from the focus group. Majority of the face to face interviews were conducted at the participant’s workplaces. The interviews had length ranging between 45 minutes to 1 hour 30 minutes. During the interview participants shared their knowledge and expertise in depth and this allowed the researcher to collect very rich data. See (Appendix 1) for the full list of interview questions.

3.6 **Recording and Transcribing**

The interviews were recorded by using improved technologies such as voice recorder and mobile recorder; and the researcher checked the equipment’s before using them (Pickard, 2007). The data collected from the interviewees were rich in nature and was of immense use to this research study (Powell & Connaway, 2004). As suggested by Pickard (2007) note taking was also carried out to note down important points.

Wildemuth (2009) justifies that audio recording would ensure the full recording of everything which was said during the interview and the recording could be easily converted to readable formats in a computer. The technology used to do the transcription was ‘Express Scribe Transcription Software’. Pickard (2007) suggests transcribing the interview as soon as it finishes. It helped the researcher to learn from one interview before moving on to another one. It also helped the single researcher to transcribe the records without much time and effort. However, transcriptions were done for six interviews and it took a vast amount of researcher’s time.
3.7 Qualitative Data Analysis

The data was extracted from seven semi-structured interviews and was analysed and deduced using thematic analysis (Braun & Clarke, 2006). The focus was given to the data collected through interviews, which later led to the development of codes and themes. In qualitative analysis coding plays a vital role (Robson, 2011). Huberman and Miles (2002) suggest the researchers to familiarize themselves with the data to generate initial code, identify a theme and review the theme in order to complete the analysis.

In this stage the qualitative analysis of the data was done through the thematic coding approach (Robson, 2011). To analyse the interview data all the audio recorded interviews were transcribed into Microsoft word. It was a time consuming process as some of the interviews lasted approximately 1. 30 hours. Researcher familiarised herself with the data by listening to the recordings and by understanding the transcripts along with adding memos at required places. In thematic coding approach, all parts of the data which represents a specific interest is coded and a theme is formed later based on the same codes group (Robson, 2011). This study followed this format while undertaking thematic coding. The codes were later extracted from interview transcripts to identify any repeated ideas or responses using Microsoft excel. These codes were refined numerous times and a thematic map of codes was developed using the UML diagram. In this research, theme was taken as anything that captures the attention of the research question or any new piece of information. See (Appendices 2 and 3) for the UML diagram and example of coding.
3.8 Ethics Approval

This research study was assessed by the Information School’s Research Ethics team and classified as “low-risk”. The research study involves human participants but does not involve any vulnerable participants and do not deal with any sensitive issues. Following the assessment of the research ethics application, the research was approved by the University of Sheffield Information School’s Ethics Administrator. The research ethics application form and the approved letter can be found in (Appendices 4 and 5).

3.8.1 Information Sheet and Consent Form

The participant information sheet and consent form was given to all the participants during the interview to inform them of the nature of the research and its details (Appendices 6). The consent form clearly informed the participants that their involvement is voluntary and they could withdraw from the interview at any time.

3.8.2 Data Anonymization and Storage

The research involved senior library staff and it was possible to identify them or their institutions very easily from the data they shared. Therefore, it was necessary to provide confidentiality and it became a key ethical issue for the researcher. The researcher tried her best to protect the participant’s anonymity by giving them individual codes throughout the research. The data was stored securely using Information School’s secured space.

3.9 Limitations and Problems

The main aim of the study was to explore the impact of cloud computing in academic libraries and librarianship in the Yorkshire region. The use of additional research
methods such as questionnaire would have augmented the findings and provided a detailed picture of the use of cloud based services by academic libraries and staff.

Therefore, the limitations to this research are:

3.9.1 **Short Span of Time**

The main constraint for the research study was the short span of time available to conduct the research and the difficulty to get suitable interview appointments with participants because of the busy end of term programmes. For instance, one participant cancelled the interview as she was only free towards the end of August. Due to these inconveniences interviews started quite later than the originally scheduled time. The researcher was forced to finish all the interviews by the end of July. Therefore, it affected and delayed the data analysis and writing findings.

3.9.2 **Sample Size**

The focus group of this research study was comparatively small. Due to the busy schedule of library staff it was possible to interview on seven library staff from different universities. Hence, the research is not exhaustive. However, researcher tried to provide an in depth outlook of the phenomenon within these constraints.

3.9.3 **Technical Limitations**

A smart phone was used for the virtual interview to connect the participant on Skype. This method saved time and travelling expense as it was planned well in advance, however, the low internet speed interrupted the connection and interview at several times. In addition, the telephonic interview recording was not of good quality and it took surprisingly long time to transcribe.
3.9.4 Researchers Inexperience

The main limitation of the research was the inexperience of the researcher. It would have been better if the researcher used mixed research methods such as qualitative and quantitative using a questionnaire to gather data from all the library staff from the sample. This would have provided a more thorough and concrete data related to the research and also it would have improved the quality of research.

3.10 Summary

This chapter was discussed the qualitative research method and it’s appropriateness to this research. This study was based on seven case studies. The data was gathered via semi-structured interviews. The interview data were transcribed and analysed by thematic analysis. Finally, this chapter discussed the ethical aspects and the limitations of the research.
4 Chapter 4: Results

4.1 Introduction

This research aims to explore the impact of cloud-based services in academic libraries and library profession. This chapter presents a detailed structure of themes got from the data collected from the interviews such as participant’s perceptions, reasons to adopt cloud services, implementation process, ownership of data and better practices.

4.2 Perceptions of Cloud Computing

All the participants shared their individual knowledge on cloud, whether they were using cloud based services or not. There were interesting definitions and meanings derived during the interview. Majority of the participants commented that it is a service using a virtual server for storage and which is accessible through internet. In addition, participants mentioned that the services, which are not hosted locally, are also a cloud service.

Participant 3 explained the cloud computing as:

“Basically the server or services or something that is somewhere else you reached across the network. For me that is the essence of cloud computing.”

Participant 5 described cloud as:
“A service that is based, accessed through the internet. But it's not specifically based at the university itself but the service will be elsewhere”.

However, he expressed his concern over the qualification of few hosted services by cloud service providers, which are hosted in a specific location as clouds.

Participant 6 discussed cloud as “hosted by the cloud service provider and provide the application and they support the application at our environment”.

Participant 7 given the meaning of cloud as:

“Is not locally hosted basically. We don’t host it”.

The perspective of cloud computing received from participants helped to understand the way library professionals look into the cloud computing. There was a clear difference in the way participants perceived the cloud based services. However, all the participants thought it as a service not hosted in the university but by the cloud service provider.

4.3 Reasons for using cloud computing

Participants discussed various reasons to go with the cloud services. For instance, one library whose library management system provider was Ex Libris explained that Ex Libris was initially their local service provider and thus, the library was one of the early implementers of their cloud service. They, therefore, benefited financially from their Early Adapters Scheme.

Four libraries were supported by the university policy to implement cloud services and their IT department was strongly in favour of this. The IT department also advised the library on how to go about safe contractual agreement for this purpose.
Furthermore, Participants 1 and 3 indicated that the pressure in staffing and managing local infrastructure as another reason to move to cloud.

“Obviously, we had to do lots of work with backups and upgrades. We all had to manually organised, quite a work required by ourselves and colleagues in the IT” (Participant 1).

“The pressure in system staffing was the biggest really critical. The library basically wanted to able to spend its time in developing services from a library point of view and not from an IT infrastructure point of view” (Participant 3).

Participant 4 remembered that Alma was the only cloud based library management service which was available at the time. Also, they were benefited from the early adapters of cloud services. The university library wanted to improve their services by using inexpensive new services which was based on cloud.

Participant 5 identified the university policy to reduce the expense on infrastructure and hence the decision was taken by the university to provide better services to students.

However, Participant 2 specified a different viewpoint that the cost involved in implementing the cloud services and the lack of support from the IT team were the reasons for not implementing the cloud service in their library. The limited budget was one of the reasons that pressurised libraries to expand their services. The justifications of implementing the cloud-based services were also to increase their efficiency and provide efficient access to their collections and services.

Participants 3, 5 and 6 added that their libraries could not provide round the clock support to their users. They identified that their libraries could not afford staff
working 24/7 in the library. In addition, it was impossible for libraries to run a weekend midnight system upgrade. Furthermore, the better support level that was 24/7 provided by the cloud service provider was also a reason for six of the participant libraries to move to cloud.

Participants 4 and 6 recognized the need of a timely change and the trend.

“It was a trend that was happening already. Some of the services are available only on cloud, for example; Alma- no choice. ...Support side-24/7 support. Reduced dependency of local infrastructure. We recognized that university started to try to reduce the pressure of local infrastructure. Upgrade cycle as well” (Participant 6).

“We didn’t want to stay like in the olden days. We recognized it is the way a lot of things moving” (Participant 4).

It was found that all the participating libraries were using various cloud based services ranging from Office 365 to discovery services in order to provide efficient services.

The widely used cloud services in the academic libraries in Yorkshire Region are currently Library Management System Alma, discovery service Primo by Ex Libris, EBSCO discovery service by EBSCO, Summon by Innovative, reading lists Aspire by Talis, Rebus by PTFS, content management system Libguides by Springshare, Mobile apps: CampusM, and the research data system Figshare.
4.4 Implementation Process

Majority of the participants recollected that they were engaged in planning and discussion before implementing the cloud based services. Participants explained the various organisational processes they had gone through during pre-implementation.

4.4.1 Organizational process

Participant 3 stated that their library discussed with institutional IT team and made sure the involvement of IT team from the very beginning of cloud discussion. Participant was advised to use ‘necessary contractual safeguards’ and negotiations for the services with the cloud service provider before moving into the cloud.

Participant 5 implemented cloud services as a process of functional requirement which later led to the tender process. After a thorough analysis of all the options which was available in the market they have gone for the best options.

Furthermore, Participant 6 discussed the aspects of cloud such as its cost effective and efficient, inexpensive services and fulltime cloud service provider support were considered during the pre-implementation. In addition, he added that security was also considered as a key requirement during the process.

4.4.2 Cloud service provider Selection Criteria

It was highlighted that participants follow some practices to select a cloud service provider for their cloud services. Participant 3 highlighted that his library investigated on various ISO standards regarding the ways cloud service provider manages data, data centres and evidence on the cloud service provider was comply with data protection legislation. Participants 5 and 6 emphasised that their library
checked the financial stability as well as the client list for credibility of the cloud service provider to avoid any potential risks.

4.4.3 Role of the IT department

Responses from the Participants 1, 2, 3 and 4 showed that the role of the IT department was imperative in decision taking in the implementation of cloud based services.

Participant 1 found that “It depends very much on the relationship you have locally with your IT staff. It enabled us to be free or independent on our local IT systems”. Also recollected answering several questions asked regarding security by institutional IT department before moving to the cloud.

Participants 3 and 4 stressed the importance of getting an approval from the IT department.

“Whether your IT department is considered when moving things to cloud……
If your IT department is threat against the cloud you are into problems at that point because they gonna say we are not going to approve this. That makes life very difficult. And some institutions are like that” (Participant 3).

“In terms of university, Director of IT is very keen on cloud services. University drive to adopt cloud. … She is very in favour of using the cloud for anything” (Participant 4).

“Central IT team’s whole policy is try to move to cloud. They encouraged us to go to cloud” (Participant 6).
4.5 Staffing

All the participants agreed that there were no posts or job losses after the implementation of cloud based services in their libraries.

“Definitely there have not new people appointed for the cloud based services”

(Participant 1).

Participants 3 and 4 highlighted the less need of technical staff in the library.

“The ability to manage machines by the technical staff is really reduced”

(Participant 3).

All the librarians who used cloud based services emphasised that they were used to do a lot of manual works under pressure before implementing the cloud services. Many of these tasks have completely eliminated from the libraries day to day activities.

The participants who are using 2 to 4 cloud based services found that after the implementation of these services, libraries were able to include more staff. This was especially the case in the configuration and system managing than before without heavy technical skills.

Participant 3 talked specifically about few staff who was about to retire had negative feelings toward the new system. However, Participant 6 found that it was difficult for a senior staff to match his skills with the new system requirements. Overall, he found that library staffs were positive and quite happy about their new job roles. Participant 5 stated that he would not reduce the staffing in his team as he required more application support.
However, Participant 4 shared few concerns over future job roles.

“Over time more services go to cloud, we may reduce the number of people in development” (Participant 4)

4.5.1 Job roles

Participant 1 who has 23 years of experience in the library systems explained that there were a change in job roles in the library but the changes were not related to cloud but it was a part of library restructuring. Participant 1 also explained that few traditional library activities such as running backups, uploading data manually were few of the traditional library works completely eliminated after implementing the cloud services.

In addition, Participant 3, with 18 years of experience, shared similar thoughts on job role as he thinks it as a ‘certain levels of re-organisation change’ happened in the library. Participants 3 and 5 further added that staff from the systems tends to spend more time on negotiating with the cloud service providers and suppliers rather than trying to configure the system and the libraries spend less time on supporting the service than before.

However, participant 4 shared that:

“There is a potential thing if more services go to cloud, we could have to make less our staff actually”.

Participant 6 expressed the similar view points as Participant 4, though their IT team encouraged the library to move to cloud however, there were concerns over reduced work from their IT colleagues ‘on future and roles and where things are going’.
“We have an in house web developer, he would have involved in the past, but now with this cloud system it is not required” (Participant 7).

4.5.2 New Skill Sets

Participants agreed that new skillsets are needed in order to effectively manage cloud service. Participant 1 thought that staff should “be Cooperative and work as a community around things. It definitely brings together more working with these groups; and has to get changes implemented”. Participant 3 identified negotiation skills and thinks it is vital. In addition, he added that good librarian skills and IT skills are still needed to manage cloud services. However, Participant 4 recognized the need for deep technical skills such as ‘analytics’ and thinks that cloud services “open the door of some light weight technical skills”. Participant 6 expressed his thoughts on new skill sets as “better communication skills, they would be able to use API. They would be able to produce better looking front end system”. Furthermore, Participant 7 believed that there was no need of any special skills to manage cloud services. “We don’t do anything in the cloud based service. We get supported by supplier... we don’t do anything with the cloud service, we just access it”.

4.6 Cloud service provider support and cloud service provider relationship

Cloud service provider support was one of the themes that were widely used by the participants. Participants had different experiences and views on the support received from their cloud service provider. Round the clock support from the cloud service provider was referenced as a key benefit of cloud based services by 6 participants. Participant 1 explained that the quick cloud service provider support depends on the type of library problem. Cloud service provider responses quickly if it is an urgent
issue and other times it takes approximately 24 hours to get a reply from them. Participant 3 was clear that library cannot move to cloud without the proper support. Participant added that, however, “Sometimes you get the support unless you raise a big query”. Participant 4 used the cloud service provider’s mechanism that was ‘escalate and say system down’, if it was an urgent issue and usually they received the respond within minutes. Moreover, she added that her cloud service provider takes time to solve small issues and she justifies it her way as “taken ages that is the nature of working with suppliers”. However, Participants 5 and 6 believed that whenever they had any problem it was very easy to contact the cloud service provider. Participant 5 shared that they had quarterly visits from his cloud service provider that allowed the library to seek support from the cloud service provider face to face and through online help desk support. In addition, one of his colleagues had been invited in the cloud service providers cloud service advisory board. Participant 6 agreed that it was possible for their library to contact the cloud service provider through online help desk and set the priority of the issue. Furthermore, the cloud service provider support extended to a monthly support call with the cloud service provider. Participant 7 often sends email to his cloud service provider whenever he had any issues. The cloud service provider replies the same day or the day after and normally very quickly.

Cloud service provider relationship was another key theme which was repeated by Participants 3 and 7.

“It is always important to have a good relationship with the supplier; doesn’t matter they supply books or systems or whatever. If the relationship goes bad, that’s not a good thing to happen. In a cloud system it is absolutely crucial because they are the ones got your data and systems. And if you go wrong, you
are in a big hole. It’s crucial you have a good relationship with them”

(Participant 3).

Participant 7 told that:

“Obviously we should keep good customer relationship. But we are actually paying for their service. Therefore, have to maintain a fraction”.

4.7 Investment and cost

A number of participants expressed positive outlooks in regard to cloud investments and the return of costs. One participant, however, specified expenses as a reason for not implementing cloud services or concerns over the expensive services.

Participant 1 was very sure that her library pays an annual fee. And her library had saved money and thought that the services are cost effective.

“We saved quite a lot of money. It is cheaper for us even without taking into account, the amount of IT staff time spent. The actual cost of the service is less than the previous service” (Participant 1).

Participant 2 was not happy about the expensive service provided by the cloud service provider and concluded that “When we did a cost benefit analysis, the cost was high and the benefit was less” (Participant 2).

Participant 3 stated that “in a not-for-profit organization like libraries, we have to ensure that we don’t lose money”. He emphasised the pressure on the library budget and was confident that “we don’t have more money, we don’t have more staff and yet we do lots of new things”. He experienced that the new systems were not expensive, less time to manage it and saved some money by not doing the older services.
Furthermore, he admitted that “I can’t say we save actual money, I don’t see that in the budget. We haven’t got huge investment of money either staffing, resources to pay for. And yeah, we are managing more systems with resources that we have”.

Participant 4 shared her experience that one of her cloud services are very cheap and considered it as cost-effective. Participants 3, 4, 5, 6 and 7 had the same number of staff after implementing the cloud service. Participant 4 added that cloud services allowed her library to do interesting works - “So we built an application where you can do the virtual bookshelf. We build some custom forms. We can push some data to Alma through API’s. So it gives more flexibility to do things like that. Otherwise we may not have the capacity to do”.

Participant 6 identified that cloud services generated savings by not using or not purchasing university infrastructure. Participant 7 reported that cloud services are value for money as she could see the better usage of library resources.

### 4.8 Ownership of library data

Participants had differing opinions about the ownership of library data in the cloud and discontinuity of service if the cloud service provider goes out of business or disappear. However, all the participants felt that contractual agreement has a pivotal role in securing the ownership of data in the cloud. Participants held contracts with the cloud service providers regarding their ownership of data. Participant 1 stated that her contract clearly specified ‘all material which a Customer posts within a Program will continue to be owned by the Customer’.

Participants 3, 4, 5 and 6 were sure about their libraries ownership of data in the cloud.
“We do care. We read the contracts. We go and state that the data is ours” (Participant 3).

“We do own the data. It’s our data. I am sure that it’s written in our contract” (Participant 4).

“As far as we would be concerned any data we allow the cloud service provider to host still would be our data” (Participant 5).

However, Participant 7 was not sure about the ownership of her library’s data in the cloud. She concluded that it (the ownership) would be an issue for her library. Furthermore, Participants 3 and 6 emphasised that all the data in the cloud may not belong to libraries as they have only licences to use the records. They pinpointed that if the data was entitled to use only for the library then the data was not allowed to share with other customers.

Only Participants 4 and 6 shared of a business continuity plan or emergency plan or back-up plan if something happens to their library services. Participant 6 explained that his library would do works according to the emergency plan, which might be manual or just writing things down or using the ESCROW or using an alternate system. He commented that his library would do various things at this time only for a short term position.

Moreover, none of the participants ever had any previous experience on getting the data out from a third party organisation. And participants 3, 4 and 6 expressed that they do not know how or how long this agreement is going to work in a practical situation.
“That’s the theory. Whether this happens in practice, we don’t know” (Participant 3).

“In practice how easily that would be to do, how long that would take, I don’t know. Would be a little while” (Participant 6).

4.9 Retrieving library data

Participants were asked about receiving back the data from the cloud provider and the data format if they wish to discontinue the cloud service. It was interesting that participants had different viewpoints on this theme.

Participant 1 checked the contractual agreement and shared her library’s power on this matter. According to the contract the cloud service provider should make available the data to download on customer’s request for the sixty days. Participants 3, 4, 5 and 6 strongly agreed with Participant 1 in that the contractual agreement states the responsibility of the cloud service provider to provide the data back to the library.

However, Participant 3 emphasised that the cloud service provider may return the data into a format suitable for the cloud service provider. Participant 5 argued that it is the cloud service provider’s responsibility to provide the data in a format that suits the library and it can also help to upload the library data into the new system. Hence, three participants highlighted receiving the data back from the cloud service provider in MARC records.

Only Participant 6 pin pointed that the library could take the data from any of the systems at any time and anyway by choosing a format such as MARC records, XML and Dublin core to export the data.
“So we can choose the format we export that data. So in practice, we would do it by ourselves using the existing tools provided by the application and take in a format that would work for us all the time” (Participant 6).

4.10 Implications of EU Referendum

One of the questions asked to five of the participants were the implications of recently held EU (European Union) Referendum on cloud based services. Participant 3 and 5 shared their thoughts that the EU has strong data protection and privacy laws which protects the data if the United Kingdom remains in EU.

Participant 4 added that:

“If Britain is outside Europe, Britain’s data protection legislation, I suspect, is not going to be stronger than the EU”.

Participant 4, 5 and 6 considered it as a concern. And Participant 4 expected that the EU Referendum would not be in effect and knew the fact that they have to wait for 2 to 3 years. She also thought that it is a concern and expected that the large number of customers her cloud provider Ex Libris has in the UK may led to a UK data centre.

“Don’t know the legal implications are. Crazy situations. I guess Lawyers will be looking at it. I think it would be more restricted what kind of services are we are signed up to” (Participant 5).

Participant 6 knew that the cloud providers have a large number of customers from the UK.

“So the companies have to provide a solution that works for UK clients, I think. So it’s going to be on them to monitor what happens around UK governments
approach and to provide service accordingly to meet our needs. If in case data has to be hold in the UK, then suddenly a lot of demand for UK data centres and these companies would have to, would commercially have to make a change only governments approach has going to be”.

However, Participant 7 was not much concerned about the EU Referendum as her cloud provider was an American company and they did not keep any sensitive data in the cloud.

4.11 Trend in library market

Participant 1, 3 and 5 identified a ‘new trend’ or ‘a problem’ which is in the library market where the companies take over by another company. They also noticed that the new companies tend to maintain or support the existing services.

“(Cloud companies) they are taken over by another company. And then particular product they are offering doesn’t get developed anymore and replaced by another one probably by the company is doing the buying. I don’t think we ever get away from that. One thing we found recent years is that they tend to maintain services even if the company is taken over. They tend to support the service” (Participant 5).

4.12 Outsourcing to cloud issues

All the participants experienced at least one issue with their cloud experience ranging from internet slow down to discontinuity of a network. Another problem all the libraries had experienced was the service disruption of JANET- a network for the UK research and education community.
4.12.1 Privacy and security

Participants had different viewpoints on this theme. All the participants considered issues related to privacy and security as a major issue and would remain as such. Issues associated with this theme were:

Participants 1 and 3 discussed an initial security issue where the external cloud system could not communicate well with the internal system. Participant 3 experienced that his library could not run the jobs on the system whenever his library wanted because if all the customers run the jobs at the same time may affect the performance of the system. He expressed his concerns over the location of the second data centre which would be in operation if the main data centre failed.

“Where is that second data centre, is that data centre in the EU or somewhere else” (Participant 3).

Only Participant 4 specified a delay of three months to fix the security issues by the cloud service provider. Libraries are concerned over the privacy and confidentiality of their patron data. However, it found that Participants 5 and 7 were not collecting patron data.

“It would be an issue for us if patron data was held outside EU” (Participant 5).

Participant 6 strongly demanded security standards and the security of data related evidence from the cloud service provider. His library always removes data when no longer required and uses management techniques as a safeguard.
4.12.2 Lack of Control

Participants were asked to talk about the disadvantages of cloud computing. Responses showed that six participants agreed that they did not have any control over the systems, upgrade and changes, and could not customise the interface.

“You cannot necessarily influence a big system” (Participant 1).

“You have to take what the cloud service provider gives you” (Participant 6).

4.12.3 Unwelcomed service

Out of all the participants, only Participant 5 reported that his cloud service provider introduced one new service during a weekend without any prior information. This new service called ‘Flow’ which required certain amount of student data. His library was quite unhappy and uncomfortable of this new service which they had to act quickly to deactivate it.

4.12.4 Additional Charges for Additional Services

Participants 4, 5 and 6 found that cloud service providers charge additional cost for providing additional services. For instance, cloud service providers may try to keep the storage space to a minimum level that may lead to purchasing an additional storage with additional cost. They also added that in order to obtain an additional service such as new self- issue unit and different language support, libraries have to pay an additional amount which is significantly more expensive. Participant 6 added that initially cloud service provider says no to the request for changes and if they are offered some money cloud service provider agrees to do the request which again proves that system changes are expensive.
4.12.5 Monthly Upgrade

Participant 1 felt that though the monthly upgrade, which takes place at midnight, is a benefit of cloud service. However, it could be a problem for the 24 hour working library. She continued that when her library’s self-checking machines stopped working they had to depend on security staff to turn the self-checking machine on and off.

However, Participant 6 specified that upgrading process adds pressure on his library. If the upgrade goes wrong his library gets only a week time to solve it before it goes live.

It was found from the discussion that, by default test system is very important for testing the monthly releases or changes before moving to the prediction service. The cloud provider may sometimes not provide it to customers.

4.12.6 Frustrated Library Staff

Participant 1, however, felt that it was difficult and frustrating for her library to get the kind of changes library wants even it was a small change. Another issue that Participant 4 was frustrated about was the prolonged delay to address and solve specific problems.

4.13 Contractual Safeguard

Although, participants were not asked directly about the Service Level Agreement or Escrow agreement, Participants 3, 4 and 6 brought it up as part of their discussion.
4.13.1 SLA (Service Level Agreement)

Participant 4 and 6 commented that it is important to know the SLA as it helps to know the level of support and access provided by the cloud service provider. In addition, SLA’s helped the libraries to set the priorities.

4.13.2 ESCROW Agreement

When asked about the discontinuity of cloud service which usually happens if the cloud service provider goes out of business or bankrupt, participants 3, 4 and 6 shared similar view points. They mentioned about a common agreement in the IT context called ‘ESCROW agreement’. The agreement says that if a customer purchases an application which the cloud service provider hosts should also get a copy of it. If the cloud service provider just disappears customer can go to a ‘third party organisation in operation’ that has a copy of the customer data or this third party organisation takes care of the operation of the system.

Only Participants 4 and 6 shared of a business continuity plan or emergency plan or back-up plan if something happens to their library services. Participant 6 explained that his library would do works according to the emergency plan, which might be manual or just writing things down or using the ESCROW or using an alternate system. He commented that his library would do various things at this time only for a short term position.

Moreover, none of the participants ever had any previous experience on getting the data out from a third party organisation. And participants 3, 4 and 6 expressed that they do not know how or how long this agreement is going to work in a practical situation.
“That’s the theory. Whether this happens in practice, we don’t know” (Participant 3).

“In practice how easily that would be to do, how long that would take, I don’t know. Would be a little while” (Participant 6).

Participants 3, 4 and 6 specified that the ESCROW agreement helps their libraries to access the library data via a third party company which has a copy of their data.

4.14 Benefits of Cloud Computing

Participant 5 emphasised that his library was getting an enhanced service better searching interface and less time required for upgrades. He added that his library received a feedback that library users liked the services and staff relieved as there was no longer any workload for them.

Participants 3 and 4 reported that the cloud services had flexibility, usability and scalability. Participant 4 discussed that the scalability of cloud enables to ‘crunch’ the large mass of data. Participant 6 highlighted that his library reduced the dependency in the universities infrastructure that generated savings. He added that his cloud service provided the opportunity to share data and resources among different institutions. He pinpointed that monthly upgrades were better as his library could easily manage small monthly changes than wait for a year.

Participant 7 recognised that after moving to cloud her library were enabled to uncover a large number of e-journals that they never realised they had. Furthermore, she realised that this new service manages the data better and lead to better usage of the resources. Participants 1 and 7 specified that cloud services saved a lot of their
staff time. All the participants were benefited from the full time support offered by the cloud service provider.

4.15 Future of Cloud Based Services

Participant 1 reported that the proxy service called EZ PROXY which her library uses is currently hosted locally and may move to cloud in the future. Participant 3 added that his library is on a process to move the discovery service Primo to cloud. He also specified that the research data system Figshare could not provide storage as it was a platform for managing data may move from cloud hosting to locally hosting. His library identified that there were some security issues as well as limitations to transfer the large size of research data in to cloud. Participant 6 identified that his university is generally moving university products and services to cloud. Participant 5 shared that his library is planning to move the library management system Sierra from locally hosted to cloud hosted.
5 Chapter 5: Discussion

5.1 Introduction

This chapter elaborates more on the findings of this research and the relevant literature in order to highlight the aim of the research. The findings from this research have shown the impact of cloud based services in the day to day activities and in staffing of university libraries.

5.2 Summary of the research

As established in Chapter 4, academic libraries in the Yorkshire region have diverse experience in cloud computing and it was reflected in their understanding of the term cloud computing. As the findings detail, the crucial reasons to move to a cloud based service includes, saving money and staff time, ease of usability and convenience, providing efficient services and above all, to receive round the clock support from a cloud service provider. Libraries have moved only a selected library services from a locally hosted computing service to a cloud hosting environment, with a follow up plan to adopt more services in future. The Library management system and the Discovery system are presently the most widely used cloud services in contemporary university libraries. It was interesting to observe the role of an IT department in academic libraries, especially in making decisions and approving the move to cloud based services. Each academic library that participated in the research found to have adopted a distinct conception from planning the cloud services to protecting the valuable patron and institutional data to choosing data centre location. The recent
held EU Referendum and the legal complexities may affect the library cloud services. Safeguards such as contracts, negotiations and service agreements and investigating cloud services providers’ credibility and profitability were also taken to reduce possible risks.

Furthermore, the library staff also gained benefits in the form of additional skills such as communication, negotiation, cooperation and low level technical skills to manage and configure the cloud system. Understandably, all these benefits and services increase the demand for cloud services among academic libraries. This may be due to that fact with this new system libraries could focus on and provide more user centred services than focusing on library systems.

Cloud based services have greatly affected the job roles, by replacing traditional library jobs with new library jobs. It also reduced the technical skill needed for library jobs. A large number of traditional jobs have been eliminated completely from the academic libraries after the induction of cloud based services. There is a possibility that in the near future more library staff would fear for the loss of their jobs with the increase in the number of libraries adopting cloud based services. Libraries strongly depend on contractual agreement and Service Level Agreement to minimise any potential risks, however, only three participant libraries were aware of the importance of backup and emergency plans. It proves that the strategy for protecting the data is also dependent on the libraries. One of the participants revealed that because of a technical problem soon after upgrading the system at midnight, the security staffs are having to turns on and off the self-checking machines to ensure its full functionality.
Surprisingly, it is found that library has the sole ownership of its data except for the data it has purchased the licence only to use. Libraries could retrieve data from the systems at any time by any format using the application provided by the cloud service provider. This finding is quite contrary to the findings in existing literature. The most likely cause of this adjustment might be the changing practices of library data ownership by the academic libraries. Six participants agreed that they could add more efficient user centred services within the same budget and without recruiting new staff. Libraries save financial costs by managing the services with existing staff, by not making extra investment in infrastructure, by saving staff time, and by adopting cheaper cloud services.

However, participants are aware of the extra charges for the additional services provided by the cloud service provider. There was one participant who revealed that the cloud services are quite expensive for their library. The main cloud related issues found in the participants’ libraries were related to network, communication, privacy and security, new services, monthly upgrade, lack of customisation and control over the system. Participants maintain a good relationship with the cloud service provider in a way to get better service. Participants observed that there is tendency to purchase a cloud service company by another company.

5.3 Impact of Cloud Computing on Academic Libraries

5.3.1 Understanding of Cloud Computing by Library Staff

The results of this study indicate that participants assume different meanings to the term cloud computing. This diversity in participants’ perception was discussed in the literature by Bushhousen (2011) and Yuvaraj (2015) who explained that people define the term cloud computing differently. In addition, it was found that some of
the answers provided a feeling that even participants were confused about different aspects of cloud hosting. The possible reason for this confusion might be related to their job roles and cloud services they manage. Further, one of the participants expressed his concern over the qualification of a service to become cloud service by referring a datacentre location of his library’s potential cloud based service. Metz (2011) specifies that the software applications hosted from the vendor’s datacentres may not be cloud based. Cloud or cloud like services available in the market are still undergoing different innovations and transformations, therefore, it would be difficult to clarify the participants concern. Cloud data centre location does not exist as cloud stores data in numerous virtual servers (Breeding, 2012; Wu, Ping, Ge, Wang, & Fu, 2010).

5.3.2 Organisational Process of Implementing of Cloud Based Services

The result of my study demonstrates various practices followed by libraries to implement the cloud service. The most interesting finding of this study is the pivotal role of IT department and their decision making power in the process of moving to cloud. There are a number of institutions who could not implement cloud services as their IT department holds a view which is against this service. The possible explanation for the rejection of cloud services may be the fear of an external system connecting to the internal system. However, it is interesting to note that researchers neglected to mention this aspect. One of the participant libraries involved their IT department from the beginning in the discussions and further processes for clear guidance and support.
5.3.3 Choosing Cloud Service Provider

Academic libraries have taken several measures to investigate the cloud service provider’s profitability and credibility by checking their financial status and client list in order to reduce any potential risks (Bayramusta & Naisr, 2016). Some of the libraries discuss the induction of these services with their IT department to avoid any security issues and negotiation problems. This result of the study supports the previous study on trust management evaluations and precautions with regards to cloud service provider selection for ensuring quality, reliability and security (Supriya, Sangeeta, & Patra, 2016). It is noticeable that academic libraries do not practice any formal guidelines or standard policies in choosing a cloud service provider. The possible explanation for this might be that the purpose of cloud services to meet the library requirements varies among universities.

5.3.4 Legal Compliances

The result of this study proves that libraries are aware and have taken serious measures to handle data protection imposed by various countries. The security legislation such as USA PATRIOT Act and the Homeland Security Act enables the government of United States of America to access the electronic information (Jaeger & Grimes, 2008). The European countries cannot store personal as well as research data outside the European Union. In other words, European Union has the strongest data protection legislation than any other countries. This finding supports the previous research that libraries shifted the data centres from countries like United States of America to Europe in order to protect their data (Erl, Mahmood, & Puttini, 2014; Breeding, 2012). Another surprising finding is that there are three datacentres in total and most of the libraries are not aware of the location of their second and third data centres. This topic is not much discussed and need to be explored further.
5.3.4.1 European Union (EU) Referendum

The impact of European Union (EU) referendum may have serious impact on the cloud data centres. A large number of libraries realised that their datacentre operates outside the United Kingdom specifically in Amsterdam. The European Union has an intention to protect the research as well as patron data of European countries through their stringent data protection legislation. In addition, there is a chance that cloud service providers may offer data centres in the UK within 2 or 3 years. The possible explanation for this is, that the cloud service providers have large number of customers in the UK and they may not want to lose their valuable customers. This is a recent issue and a new topic hence, it is not supported by previous research.

5.3.4.2 Contractual Safeguards

A number of libraries believe that contracts and agreements are the only safeguards to overcome any potential risks related to ownership of data, data protection, receiving the data back from the cloud service provider, and in the event of discontinuity of service and support. Only one participant specified that his library has contingency or emergency plans to face any cloud service failure, by manually adding the data. Thus, this findings are in line with those of previous studies such as the work of Breeding in which he argues that moving to cloud services does not eradicate the libraries’ responsibilities to protect the data by taking security measures (Breeding, 2012). The libraries legally negotiate with contracts and service agreements. Therefore, the legal protection might be the reason for not considering any emergency plan. Services like discovery do not hold any patron data, and therefore, if the service hosted from any country outside the UK or European Union the security issues do not affect the libraries. Stringent governance, rules and regulations and unified security systems would increase the trust and confidence of
academic libraries and will encourage them to move to the cloud and implement cloud services (Ramachandran & Chang, 2016).

5.3.4.3 Agreements

Libraries should negotiate with the cloud service provider for a better Service Level Agreement (SLA) with a detailed description of the service and guarantee provided by the cloud service provider (Corrado & Moulaison, 2012). The advantage of having a SLA is that it will ensure the quality and responsibility of the service provider’s make them provide the cloud services more systematically and efficiently as stipulated in the agreement. Hence, the obligation to follow the rules and regulations are mutual among the cloud service providers and the customers and any violation of this may adverse effects (Yimam & Fernandez, 2016). When libraries use low cost cloud services there may be a chance that cloud service providers may not include all the necessary services and operational parameters in the SLA. When depending on free or low cost cloud solutions information of time the services would be available, the number of users served and benchmarks would not be precisely discoursed (Cervone, 2011). The use of agreements can be justified as it binds the cloud service provider legally to provide efficient and safe services. Escrow agreement facilitates data recovery along with ensuring the smooth operating of the system without any interruption through a third party organization even if there is a discontinuity of the service. However, researchers haven’t paid sufficient attention to the importance of Escrow agreement in academic.

5.4 Adoption of Cloud Based Services

Surprisingly, libraries which have moved to cloud based services have managed to save money by reducing the operational costs (Chang, Walters, & Wills, 2013). One
participant’s library adopted cloud service as part of an introductory scheme with discounts offered by the cloud service provider. It is a surprise that libraries accept this scheme without knowing the actual benefits or drawbacks of cloud services. Introductory schemes come with discounts that financially benefit libraries, so that might be one of the reasons why libraries adopt cloud with great enthusiasm. These sorts of benefits such as discounts have been recognized by Breeding (2012). The other reasons to move to cloud were to reduce pressure on infrastructure by not purchasing and maintaining infrastructure. This result further supports the previous research (Hoy, 2012; Wale, 2011). Another reason for moving to the cloud is to solve the issue of lack of staff in their library, this finding differs from the previous research on this front (Hoy, 2012; Breeding, 2012). The highly used cloud based services in the libraries are SaaS (Software as a Service) based such as library management system and discovery system. The results of the study on these services are similar to those described in the previous researches (Breeding, 2012; Wu, Ping, Ge, Wang, & Fu, 2010). Libraries have chosen cloud based services to save staff time and to develop more user oriented services. It also helps them to save money, reduce the infrastructure dependency on the universities and also to reduce the workload of their staff.

5.5 Staffing and Job Roles

The academic library staffing and job roles have been affected by the implementation of cloud services. Libraries have a similar perspective with regard to staffing and changes in job roles. Some libraries think cloud service enhanced the job roles and a large number of libraries confirmed that they have not appointed staff or no staff lose their jobs. However, the requirements for the technical staff have already reduced in the libraries. If the libraries move to more cloud based services, the role of library
staff is also going to reduce. It is understood from the study that cloud service has started affecting the staffing from technical areas and it is going to affect the housekeeping jobs in library as well. However, the result of this study supports the previous studies on this aspect, that switch from locally hosted system to cloud hosted system would reduce or diminish the job roles (Breeding, 2012; Wale, 2011). Library staff developed skills such communication and negotiation: to communicate and negotiate with the cloud service provider, system configuration and management, cooperative to work with a different groups other than the usual library skills to manage complex cloud services.

5.6 Ownership of Data

Libraries have contractual agreement to prove that the data uploaded into the cloud service provider systems by library is owned by the library. However, libraries have purchased license to use certain resources that are not owned by the library. In addition, libraries have the provision to retrieve the data back from the system at any time, in any format using the applications provided by the cloud service provider. This finding was unexpected and differs from the previous studies by Scale (2010) and Yuvaraj (2015) elaborate the concerns over ownership of library data. This research study shows that concerns over ownership of library data are minimal due to the new set agreements between libraries and cloud service providers. It is also contrary to the research considering ownership is an unanswered issue (Mohammed, 2011).

If the cloud service provider goes bankrupt or acquired, libraries could use the Escrow agreement to get the data back or make sure that the system operates for them from a third party. Cervone (2011) suggests that libraries should ensure their
data should be accessed after the cloud service provider goes out of business or is acquired by another company. In addition, libraries take multiple copies of data or do regular backup to save their data (Breeding, 2012). The involvement of a ‘third party’ through Escrow agreement to retrieve the data is an interesting topic. However, it is not clear how the third parties handle data security or privacy of the university. And the lack of compliance standard will be a problem for libraries in the future.

5.7 Return of Investment in University Libraries

Participants pay an annual fee for the use of cloud based services. This supports the case study by The National Archives (2015) as customers pay yearly fee to use the cloud service. One of the participants could not implement the cloud service when his library realised that the cost of the service is higher than the benefits. The reason behind this is might be the higher subscription fee of cloud service to provide access, hosting and fulltime support. However, cloud computing is much cheaper compared to a dedicated local server, its managing and maintenance (Breeding, 2012). Six participants agreed that their libraries have benefited financially from the cloud service. Cloud service providers were able to provide the services at a cheaper cost. Libraries could not show the actual cash as evidence however, they save money in terms of staff time, by providing more efficient services with the existing staff and without purchasing or using the university infrastructure. Libraries manage to provide more services such as virtual bookshelf, custom forms and upload data into Alma through API’s (Application Programming Interface) without increasing their budget. Libraries cloud focus more on the services than configuring and managing the locally hosted systems. The reduced workload of the library staff also provides a better environment for accessing the library services.
5.8 Cloud Issues

Privacy and security would remain as a big issue. Libraries are aware of the depth and effect of these issues (Stukalova and Guskov, 2016). Libraries concern over the security and privacy issues are depends on the kind of cloud services they use. The other issues libraries face is with respect to communication, networks, lack of control over the system upgrades, additional charges and upgradation to new service without any prior discussion with the customers (Arutyunov, 2012; Moura, 2016). This kind of issue is recognised as the communication issue due to the interoperability issues between various systems. The additional charges are incurred due to the profit making tendencies of the cloud service provider. Monthly upgrades become issues when libraries could not deal with the new changes in the very less time; for instance only one week time is available to resolve any wrong upgrade. It is found that if library staff has no control to make any small changes in the cloud system and it causes severe inconvenience to the library staff (Cervone, 2011). Participants faced overnight upgradation of a new unnecessary service which required patron data. Cloud service providers might have used the existing services to promote their services. Also, libraries involve their security staff at night to restart their machines after upgrades which help them to ensure uninterrupted service.

5.9 New Trend

Libraries were aware of a new trend in the library market that companies acquire other companies as part of expanding their business and improving services. The consolidation may support the progress of library products and services (Breeding, 2016).
5.10 Future of Cloud Computing in the University Libraries

Libraries plan to move further services such as library management system and discovery system to cloud. Libraries ensure to maintain good relationships with the cloud service provider to ensure better services and data protection. This findings support the previous research (Breeding, 2012). Libraries desire to provide efficient service to its users. This is one of the reasons to adopt cloud based services. These services can reduce the hassle of yearly upgradation of manual uploads and lack of support to the users.

5.11 Summary

These findings cannot be extrapolated to all the libraries in the region. Cloud computing is a convenient way of managing library services with the same budget and staff. Nevertheless, the main issues of privacy and security will remain as such.
6 Chapter 6: Conclusion

The aim of the research is to explore the impact of cloud computing in the academic libraries in the Yorkshire region.

6.1 The impact of Cloud Computing in the Academic Libraries

Academic libraries in Yorkshire region have shifted only selected library services to the cloud. The most used cloud based services at present are the Library management system and the Discovery system. As the findings detailed, the major reasons for moving to a cloud based service are, to save money and staff time, to ease of usability and convenience, provide efficient services and above all, to receive round the clock support offered by the cloud service providers. The IT department in academic libraries played an important role in taking decisions and approving the move to cloud services. All academic libraries in the Yorkshire region which participated in the research regarding the use of cloud services stated that they benefited from the services on offer in terms of saving financial costs and staff time. Other benefits included, 24/7 support and monthly or quarterly system upgrade. In summary, with cloud based services libraries were able to focus more on their services and provide more user centred services rather than focus solely on library systems.
6.2 Impact of Cloud Computing on Staffing and Their Job Roles

The library staff also gained additional skills such as communication, negotiation, cooperation and low level technical skills to manage and configure the cloud system. Cloud based services have changed the way libraries previously operated and reconfigured job roles by replacing traditional library activities with newer cloud based technology. The introduction of cloud based services significantly reducing the need for the technical skills required in library jobs caused staff to raise concerns about their jobs. Consequently, as libraries begin to adopt more cloud service systems managed by external cloud service providers and reduce the need for technical skill sets, there is a possibility that a number of librarians may face unemployment in the near future.

6.3 Ownership of Library Data and Data Retrieval

In contrast to the literature review, libraries in fact possess sole ownership of all their data; this however excludes data purchased with a licence to use. Libraries can retrieve data from the cloud systems at any chosen period and format using the application provided by the cloud service provider. Libraries may also retrieve their data through the use of their Escrow agreement.

6.4 Return of Investment

Research findings indicated that cloud based services are cheaper and libraries can add more efficient user centred services with the same budget and staff. In addition to this, staff time can be saved as efforts to update and maintain the cloud system are managed by the cloud service providers.
6.5 Cloud Issues and Safeguards

Issues relating to network, upgrades, privacy and security, communication and lack of customisation control are highlighted in this research. Participants however have contractual agreements, Service Level Agreements and an Escrow agreement to legally protect their data and ensure uninterrupted service. A participant however also discussed other emergency plans to overcome any unforeseen incidents in addition to the previously mentioned agreements.

Participants also mentioned that there are tendencies for Cloud Companies to acquire other Cloud Companies. They also mentioned that there are increased developments occurring in field of cloud computing to provide its users with better services.

6.6 Recommendations for Libraries

- Libraries should be careful not to fall for solely financially driven benefits cloud services offer.
- Libraries should involve their institutional IT teams from the initial point of cloud implementation for expert advice and guidance.
- Consult other libraries currently using cloud services.
- Select the cloud based services based on library requirements, product objectives and strategies.
- Establish a common standard guide required to be followed during the implementation and application of cloud services.
- Identify the location of the data centres to be used by the library to ensure security and privacy.
- Libraries should be clear-sighted about their Service Level Agreements and should possess good negotiation strategies with cloud service providers.
• All the libraries should have in place contingency plans which are frequently tested (least once in every six months) to face any unforeseen challenges.

• Implement the ISO standard services from a credible cloud service provider.

• Train and involve all the library staff in handling and managing cloud services. It is necessary to educate them of the pros and cons of cloud computing.

• Conduct workshops with cloud service providers about latest products and services available in the market.

6.7 Recommendations for Cloud Service Provider

• Ensure better support and security services to acquire trust from the customers

• Not to upgrade any new products or services without customer consent

• Conduct compulsory customer training workshops about current library systems

• Provide complete information about available services during inductions

• Avoid delays in service and responses to libraries and other customers which may reflect badly on the cloud service provider

• Collect customer feedback to improve cloud based services

6.8 Suggestions for Future Research

• This study should be repeated in the future after more libraries may have adopted or cancelled the use of more cloud based services. Additionally, this
will also provide a more comprehensive assessment of the impact of cloud services in the libraries.

- Researchers should perhaps also involve more university libraries in the Yorkshire region in the study to thoroughly assess the impact of cloud computing on academic libraries. Specifically, to know the ‘actual reasons for libraries to adopt cloud based services’, organisational procedures for this purpose, and the impact of the recent outcome of the EU referendum on cloud based services in the UK.

- Further case studies should be conducted at other academic institutions outside the Yorkshire region which use 5 to 10 cloud based services in their library. This would in turn also help explore the broader impact of cloud computing in the library activities and librarianship.

- More interviews should be conducted on a larger number of library staff to achieve more results concerning their outlook on the impact of cloud computing services. Data collection by means of performing questionnaires on library staff from several libraries may perhaps be an effective method to conduct this research.

Word Count: 14969
References


Appendices

Appendix 1: Interview Questions

Introduction
1. What is your role in the university library and how long you have worked here?
2. Can you tell me more about your role in the library, what are you responsible for?

Define Cloud based services
3. What do you think is cloud, how would you define cloud based service?
4. Which all services are in cloud now (SAAS, IAAS & PAAS); could you share your library experience with Cloud based services?
5. What were the organizational processes undergone before moving into cloud.

Current Use
6. Why did this library adopt Cloud based services? How long ago was it?
7. How did it affect the job roles? Participant job role and other staff job role.
   Have you appointed any new staff to manage Cloud based services?
8. Does the library get full vendor support? What all type of support?
9. How have these services affected the user communities and their information search?

Summative Evaluation

Issues
10. What were the challenges associated with moving to cloud. Are you having any issues now?

11. Does library faced any technical issues after the implementation of Cloud based services?

12. Is the library concerned about privacy issues? And security issues?

13. What do you think the implication of EU ref on cloud based services?

**Ownership of Data**

14. ‘Library do not own its valuable data’- What is the experience of this library with the statement?

15. What if, the Cloud provider goes out of business?

16. What if, someone else take over Cloud which the library already implemented?

17. What if library plans to discontinue the Cloud based services: Will the provider returns the data? In which format?

**Return of Investment**

18. Does this library think cloud service is cost effective/ minimise any expense compared to the previous services?

**Advantages / Disadvantages**

19. What are the advantages and Disadvantages if any, of cloud services for this library – which we haven’t mentioned?

**Opinion**

20. What advise do you have to those who are interested in implementing cloud based services?
Appendix 2: Diagram of Coding
### Appendix 3: Example of Coding Using Microsoft Excel

<table>
<thead>
<tr>
<th>3</th>
<th>They can give us the MARC</th>
<th>Add-on cost</th>
<th>Add-on expenses</th>
<th>Extracted</th>
<th>Disadvantage</th>
<th>Disadvantage</th>
<th>Ownership of data</th>
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<td>Less control</td>
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<td>Impact on staffing</td>
<td>Impact on staffing</td>
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<td>The new skill set, deep tech knowledge needed</td>
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<td>Organizational impact</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
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<td>SharePoint products, often at a high expense</td>
<td>Technical skills</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
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<td>May reduce the number of peer reviews in future</td>
<td>Staffing</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
<td>Impact on staffing</td>
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<td>Job roles, there is a potential, job role in future</td>
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<td>Re-implement the process</td>
<td>Pre-implementation process</td>
<td>Implementation strategy</td>
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<td>Implementation strategy</td>
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<td>Goal: meet staff</td>
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<td>EU ref</td>
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<td>Are there any concerns</td>
<td>Are there any concerns</td>
<td>EU ref</td>
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<td>Legal compliance</td>
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Appendix 4: Ethics Application Form

Application 009221

Section A: Applicant details

Created:
Wed 25 May 2016 at 21:32

First name:
Sherin

Last name:
Francis

Email:
sfrancis1@sheffield.ac.uk

Programme name:
MSc Digital Library Management

Module name:
INF 6000 Dissertation
Last updated:
03/06/2016

Department:
Information School

Date application started:
Wed 25 May 2016 at 21:32

Applying as:
Undergraduate / Postgraduate taught

Research project title:
Impact of Outsourcing to Cloud Computing on Academic Libraries and Librarianship: An Exploratory Study

Section B: Basic information

1. Supervisor(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew Cox</td>
<td><a href="mailto:a.m.cox@sheffield.ac.uk">a.m.cox@sheffield.ac.uk</a></td>
</tr>
</tbody>
</table>
1. Aims & Objectives

The aim of this research is to explore the impact of cloud services on libraries and library staff especially on areas such as pre-implementation, post-implementation, the pressure on staff to change the job roles and to acquire new skill sets. Whether outsourcing to cloud computing is worth compared to the challenges and risk libraries face. How has the outsourcing technology changed the traditional library practices and its benefits to the university libraries in the Yorkshire region.

The objectives of the study is to identify and explore the following elements in the university libraries of Yorkshire region: impact of cloud computing in the university libraries of Yorkshire region, how the library staff manage complex cloud services, the ways libraries deal with the ownership of data and return of investment, the aspects which inspire libraries to transfer data to a third party when data security is not safe, and finally the future plans of the libraries in cloud service.

2. Methodology

The research will be approached through qualitative method based on the nature of the study and the involvement of human participation. It will conduct as a case study to explore the individual experience and perceptions of participants in the university libraries in the Yorkshire region. The sample size of this research is approximately nine experienced library staff from the university libraries in the Yorkshire region.

A semi-structured interview method will be using to collect the data along with looking at the available documents to collect more data in depth. The interview will be recorded by using a voice recorder with the permission of the participant or else a note taking will be carried out to collect the data. A thematic analysis approach will be used to analyse the collected data.

3. Personal Safety

Raises personal safety issues? No
Personal safety management
- not entered -

Section D: About the participants

1. Potential Participants

The potential participants for this research will be the experienced Head of digital services or the responsible staff from each library who implemented and manages library cloud services. Whose experience would help the researcher to collect required data to complete the research successfully.

2. Recruiting Potential Participants

After obtaining ethical approval, I will contact the potential participants of my research formally
1. Aims & Objectives

The aim of the research is to explore the impact of cloud services on libraries and library staff especially on areas such as pre-implementation, post-implementation, the pressure on staff to change the job roles and to acquire new skill sets. Whether outsourcing to cloud computing is worth compared to the challenges and risk libraries face. How has the outsourcing technology changed the traditional library practices and its benefits to the university libraries in the Yorkshire region.

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Rises personal safety issues? No

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- not entered -

Section D: About the participants

1. Potential Participants

The potential participants for this research will be the experienced Head of digital services or the responsible staff from each library who implemented and manages library cloud services. Whose experience would help the researcher to collect required data to complete the research successfully.

2. Recruiting Potential Participants

After obtaining ethical approval, I will contact the potential participants of my research formally.
through an email requesting permission to conduct 35-40 minutes interview. And will try to explain them how important it will be for me as a researcher to conduct my research in their libraries based on my research topic. Once I receive their willingness to participate in my interview, I will contact them again to fix a date and time for the interview and will ensure the confidentiality of their participation.

2.1 Advertising methods

Will the study be advertised using the volunteer lists for staff or students maintained by CICS? No
- not entered -

3. Consent

Will informed consent be obtained from the participants? (i.e. the proposed process) Yes

The potential participants will be informed about the project when they contacted initially by email. The purpose of the mail will be to obtain their permission to participate in an interview conducted by the researcher. Further details of the research will be explained to the potential participants in detail by providing an information sheet before the interview begins. The researcher will be asked to sign to confirm this. The participants will be assured about their anonymity throughout the research and their right to withdraw from the interview at any time.

4. Payment

Will financial/ in kind payments be offered to participants? No
- not entered -

5. Potential Harm to Participants

What is the potential for physical and/or psychological harm/distress to the participants?

There is no potential for physical, psychological harm or distress to the participants. The research will be carried out to identify the impact of cloud service on academic libraries and librarianship. The 35-40 minutes interview will be carried out to collect data based on the objectives of the research and not to collect information about individual participants of this project. Therefore, the likelihood for harm or disaster should not be more than that experienced in their daily lives.

How will this be managed to ensure appropriate protection and well-being of the participants?

The potential participants will be informed that they have the right to withdraw from the interview whenever they want. And they will be anonymous throughout the research.

Section E: About the data

1. Data Confidentiality Measures

The researcher will make sure that the personal details of participants would not be added in the records and a code for each participant such as participant 1 or participant 2 will be given to ensure the confidentiality. All data will be destroyed on completion of the research.
2. Data Storage

The data will be stored on the University's Google Drive. Before the interview, a consent form will be presented to, signed and collected from the potential participants. A voice recorder will be used to record the interview and the data collected will be only used by this project and finally, the data will be destroyed after the project completion.

Section F: Supporting documentation

Information & Consent

Participant information sheets relevant to project?
Yes

Participant Information Sheets
- Information_Sheet.pdf (Document 022500)
- Information_Sheet.pdf (Document 022502)

Consent forms relevant to project?
Yes

Consent Forms
- Consent_Form.pdf (Document 022501)

Additional Documentation
None

External Documentation
- not entered -

Official notes
- not entered -

Section G: Declaration
Appendix 5: Research Ethics Approval Letter

Sherin Francis  
Registration number: 150113474  
Information School  
Programme: MSc Digital Library Management

Dear Sherin,

**PROJECT TITLE:** Impact of Outsourcing to Cloud Computing on Academic Libraries and Librarianship: An Exploratory Study  
**APPLICATION:** Reference Number 009221

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 03/06/2016 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 009221 (dated 02/06/2016).
- Participant information sheet 1018834 version 5 (02/06/2016).
- Participant consent form 1018833 version 5 (02/06/2016).

If during the course of the project you need to **deviate significantly from the above-approved documentation** please inform me since written approval will be required.

Yours sincerely,

Matt Jones  
Ethics Administrator  
Information School
Appendix 6: Combined Information Sheet and Consent Form

|------------------------------------------------|------------------------------------------------------------------------------------------------|

- **Researchers**
  My name is Sherin Francis and I am conducting this research as part of the requirements for the MSc in Digital Library Management. I can be contacted at sfrancis1@sheffield.ac.uk. The supervisor for this research is Dr. Andrew M Cox and contacted at a.m.cox@sheffield.ac.uk.

- **Purpose of the research**
  The purpose of the research is to explore the benefits and challenges of certain aspects of cloud computing such as pre-implementation, post-implementation, the pressure on staff to change their job roles and to acquire new sets of skills. It will also identify the impact of outsourcing technology on traditional library practices and its benefits to the university library.

- **Who will be participating?**
  The participants of this research are experienced Digital Library Service professionals or staff who are responsible for digital services in the university libraries. Their insights, views and experience of implementing and managing this new technology will help to inform my research.

- **What will you be asked to do?**
  The researcher will conduct a face to face interview with the participants which will last approximately 35 -40 minutes. The questions will be based on the decisions to implement cloud service, the challenges faced during pre-implementation and post-implementation of cloud services, the benefits, and staff skill sets needed. Researcher would seek the opportunity to examine any documents related to cloud services as evidence.

- **What are the potential risks of participating?**
  The risks of participating are the same as those experienced in everyday life. The interview questions are based purely on cloud services and will not ask any personal or sensitive questions.

- **What data will we collect?**
  The data will be recorded to produce transcripts and will not be used for any other purpose. Transcripts will use codes to recognize participants which will be analyzed. Partial or direct quotes will be used if the participant's response is valuable and notable.

- **What will we do with the data?**
  The data will be accessible to the researcher and to the supervisor of this research. The transcripts will be coded to ensure their anonymity. Data will be stored safely on the password protected storage space provided by the university. All the data collected for this research will be deleted from the voice recorder and from the storage space, except for the partial or direct quotes used in the dissertation. Data in all formats will be retained until the dissertation is awarded a mark. All data will then be destroyed. This excludes partial transcripts and quotations used in the dissertation.
Will my participation be confidential?
Yes, the individual participation will be confidential. The participants will not be named and the responses will be anonymized. All the identifying information mentioned during the interview will be removed from the transcripts to ensure confidentiality.

What will happen to the results of the research project?
The response will be analyzed and included in my MSc dissertation, to be completed in September 2016. This may be rewritten or submitted for publication in journal or used as the basis for a conference paper or presentation. The dissertation may be available online and the researcher can be contacted if you want to obtain a summary of the research or a copy of the research.

I confirm that I have read and understand the description of the research project, and that I have had an opportunity to ask questions about the project.

I understand that my participation is voluntary and that I am free to withdraw at any time without any negative consequences.

I understand that I may decline to answer any particular question or questions, or to do any of the activities. If I stop participating at all time, all of my data will be purged.

I understand that my responses will be kept strictly confidential, that my name or identity will not be linked to any research materials, and that I will not be identified or identifiable in any report or reports that result from the research.

I give permission for the research team members to have access to my anonymised responses.

I agree to take part in the research project as described above.

________________________________________  ________________________________
Participant Name (Please print)                  Participant Signature

________________________________________  ________________________________
Researcher Name (Please print)                   Researcher Signature

________________________
Date

Note: If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, please contact Dr Jo Bates, Research Ethics Coordinator, Information School, The University of Sheffield (school_ethics@sheffield.ac.uk), or to the University Registrar and Secretary.
Access to Dissertation

A Dissertation submitted to the University may be held by the Department (or School) within which the Dissertation was undertaken and made available for borrowing or consultation in accordance with University Regulations.

Requests for the loan of dissertations may be received from libraries in the UK and overseas. The Department may also receive requests from other organisations, as well as individuals. The conservation of the original dissertation is better assured if the Department and/or Library can fulfill such requests by sending a copy. The Department may also make your dissertation available via its web pages.

In certain cases where confidentiality of information is concerned, if either the author or the supervisor so requests, the Department will withhold the dissertation from loan or consultation for the period specified below. Where no such restriction is in force, the Department may also deposit the Dissertation in the University of Sheffield Library.

To be completed by the Author – Select (a) or (b) by placing a tick in the appropriate box

If you are willing to give permission for the Information School to make your dissertation available in these ways, please complete the following:

(a) Subject to the General Regulation on Intellectual Property, I, the author, agree to this dissertation being made immediately available through the Department and/or University Library for consultation, and for the Department and/or Library to reproduce this dissertation in whole or part in order to supply single copies for the purpose of research or private study.

(b) Subject to the General Regulation on Intellectual Property, I, the author, request that this dissertation be withheld from loan, consultation or reproduction for a period of [_____] years from the date of its submission. Subsequent to this period, I agree to this dissertation being made available through the Department and/or University Library for consultation, and for the Department and/or Library to reproduce this dissertation in whole or part in order to supply single copies for the purpose of research or private study.

Name: SHERIN FRANCIS
Department: INFORMATION SCHOOL
Signed: S. Francis
Date: 31/08/16

To be completed by the Supervisor – Select (a) or (b) by placing a tick in the appropriate box

(a) I, the supervisor, agree to this dissertation being made immediately available through the Department and/or University Library for loan or consultation, subject to any special restrictions (*) agreed with external organisations as part of a collaborative project.

*Special restrictions

(b) I, the supervisor, request that this dissertation be withheld from loan, consultation or reproduction for a period of [_____] years from the date of its submission. Subsequent to this period, I agree to this dissertation being made available through the Department and/or University Library for loan or consultation, subject to any special restrictions (*) agreed with external organisations as part of a collaborative project.

Name:
Department:
Signed:
Date:

THIS SHEET MUST BE SUBMITTED WITH DISSERTATIONS BY DEPARTMENTAL REQUIREMENTS.