5IK50E

Degree Project in Informatics at Master Level

Master Thesis

Migrating from integrated library systems to library services platforms:

An exploratory qualitative study for the implications on academic libraries’ workflows
Abstract

The present master thesis is an exploratory qualitative study in academic libraries regarding the transition from the integrated library systems to the next generation integrated library systems or library services platforms and the potential implications in their internal workflows. Nowadays, libraries all over the world are facing up with a number of challenges in terms of acquiring, describing and making available to the public all the resources, both printed and electronic, they manage. In particular, the academic libraries have more reasons to wish to fulfill their users’ needs since the majority of them use the library sources more and more for scientific research and educational purposes.

In this study we attempt to explore the phenomenon in the globe using the available literature and to identify the implications in libraries’ workflows and the possible future developments. Moreover, through observation and semi-structured interviews we try to identify the current developments in the Greek context regarding the adoption of next ILS and possible implications in their workflows. Finally, we attempt a comparison between the Greek situation and the international one.

**Keywords:** Library Information Systems, Next Generation Integrated Library Systems, Library Services Platforms, Academic Libraries, Qualitative Study, Workflow, Greece
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To my wife Chrysi
and our sons
Yiorgos and Yiannis
Stratos

To my wife Eleni
and my children
Constantinos and Katerina
Antonis
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## Abbreviations List

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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>ILS</td>
<td>Integrated Library System</td>
</tr>
<tr>
<td>LMS</td>
<td>Library Management System</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning software</td>
</tr>
<tr>
<td>LIS</td>
<td>Library Information System</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>OPAC</td>
<td>Online Public Access Catalogue</td>
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<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
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<tr>
<td>SaaS</td>
<td>Software as a Service</td>
</tr>
<tr>
<td>IATUL</td>
<td>International Association of University Libraries</td>
</tr>
<tr>
<td>WHELF</td>
<td>Wales Higher Education Libraries Forum</td>
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<tr>
<td>ERM</td>
<td>Electronic Resource Management system</td>
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<tr>
<td>API</td>
<td>Application Programming Interface</td>
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<tr>
<td>Abbreviation</td>
<td>Meaning</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
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<tr>
<td>ILL</td>
<td>Inter Library Loan</td>
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<td>HEALLink</td>
<td>Hellenic Academic Library Link</td>
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<tr>
<td>ILSaS</td>
<td>Integrated Library System as a Service</td>
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1 Introduction

Chapter 1 constitutes the introduction to the research study and presents the research setting along with the topic background and the research problem as well. Thereinafter, the purpose, the aims of the research and the research question, are mentioned. The limitations of the study are also discussed, and we conclude with the topic justification and the thesis structure.

1.1 Introduction and Research Setting

An integrated library system (ILS), also known as a library management system (LMS), is actually an enterprise resource planning (ERP) that integrates all library modules such as acquisitions, cataloguing, circulation, serials control, information and reference services into one package for effective management of library processes (Breeding, 2013; Lantovics, 2016, Omeluzor and Oyovwe-Tinuoye, 2016).

In the decades of 80’s and 90’s the Library Information Systems (LIS) rapidly developed and their presence in the libraries of the world was ubiquitous (Wang and Dawes, 2012). After the developments in technology and especially in Information and Communication Technology (ICT) had led the libraries in other more challenging paths, they forced them to adopt more state-of-the-art technologies in order to serve their users (Madhusudhan and Singh, 2016).

Before the Web and the ATMs, public keyboards were put in libraries attached to dumb terminals. These terminals were connected to mainframes, and libraries workflows were supported, either relied on data supplied from a central hub, or created stand-alone systems for local inventory control. Those inventory systems, built upon ordering, acquisition, and circulation of physical materials evolved into the integrated library systems (ILS) with which most libraries are now familiar (Pace, 2009).

In our days libraries face pressures in terms of inadequate funding and increasing demands for their services, technology is a critical success factor for them. Libraries have to deploy the most appropriate technology platforms for resource management and discovery search. University libraries but also research and national ones, experience complexity in managing collections of large scale and diverse formats. They also need systems optimized as much for lending e-books or other digital material in addition to their longstanding print offerings (Breeding, 2016).

Apart from that there are other more practical reasons that libraries have to change their old ILS. One reason is that an old software and hardware system needs to be replaced because it comes to its end and there is no more maintenance (Kelley et.al, 2013). Another reason is the ongoing changes and mergers between the leading vendors in the library systems field that drives to the creation of new products offered by them.

Moreover, the libraries got access in several databases through subscriptions, acquiring new electronic resources paying a great deal of money (Fu and Fitzgerald,
Subsequently, libraries created their own repositories in an attempt to gather the scientific, research and educational work produced by the universities and at the same time, through collaborations and synergies they are creating consortia in order to reduce the cost of subscribing in grand publishers and vendors (Fu and Fitzgerald, 2013).

Finally, apart from these many libraries have access to other less known databases or web sites which are nevertheless necessary for them. In the first decade of the current century the traditional ILS were well established, but the libraries needed new tools for the management of those resources (Breeding, 2015).

The technology developments along with the increasing users' needs and the need of libraries to offer not only traditional services but also new and innovative ones have led the discourse of the libraries' evolution and their role to the emerge of the term library 3.0 which represents the fact the libraries' role has been evolved and has become more challenging and complicated (Chan, 2015). The following graphical representation (figure 1), we believe that depicts the current situation not only for academic but also for all types of libraries:

![Figure 1. Current Situation in Libraries’ Technology Development adopted from Chan (2015)](http://creativecommons.org/licenses/by/4.0/)

These issues have become an object of study among the professional librarians and the system analysts and there is so far a number of studies and case studies that deals with these concerns. Wang and Dawes (2012) mention these issues and the tremendous changes in both resources and services that libraries are provided with. They also mention the fact that the electronic material is surpassing the printed and is becoming a dominant library resource. Furthermore, Breeding (2009) mentions that there is dissatisfaction towards the current ILS products because they have failed to manage the electronic content and their user interfaces do not meet the contemporary expectations.
As the clients of a library are also keen on searching the web using the state of the art search engines such as Google and Yahoo, the inability of Web OPACs to fetch and deliver the required information to clients, increased their dissatisfaction towards the services provided by the libraries (Green, 2014). That made the transition from a traditional LIS to a next generation system a need that had to be implemented in the near future. This happened after ProQuest introduced Summon, a service that implemented a web scale discovery service (ibid).

Green (2014) argues that such “discovery layers” are making use of the Open URL standardized format, allows the clients of the library to extend their search to the library's full range of acquisitions no matter if they are printed or digitized, thus minimizing the time they spent from research to actual possession of the requested information.

It is worth mentioning that in the next-generation ILS there is no Online Public Access Catalog interface (demise of the local catalog Breeding, 2014) but the vendors offer additional discovery products as the discovery-layer interfaces for their next-generation ILSs (Fu and Fitzgerald, 2013; Omeluzor and Oyovwe-Tinuoye, 2016).

Therefore Green (2014) argues that a next generation ILS may adopt the Software as a Service (SaaS) model that allows a single instance of information to be provided in more than one clients following a subscription-based process. This subscription model also helps libraries to reduce their running costs, as they will be able to achieve better prices from the vendors in comparison to buying the books but also there will be a cost reduction due to the lack of hardware maintenance as this is now vendor’s responsibility.

Most academic libraries still rely on integrated library systems and the transition to the next generation ILS is in a relatively early phase despite the fact that procurements of new systems result in the selection of a library services platform, with Ex Libris Alma currently seeing strong popularity (Breeding, 2016). The next generation ILS is still under development (Kelley et.al., 2013) but if the trend continues the number of traditional ILS deployments will decrease over time among large academic libraries (Breeding, 2016, p. 3).

In the beginning of a new cycle of transition, academic libraries are expected to replace their legacy systems with the new platforms during the next decade (Breeding, 2014) and this shift signifies the way that libraries will manage their resources and deliver their services.

“I interpret the progress seen in these recent years as the establishment of a new generation of technologies for libraries. But it’s just a set point in an ongoing series of continuous cycles. This new generation follows several that have come before and others that will unfold in future years. It is important that these technologies continue to advance and be reinvented in ways that break away from the limitations of those previously established” (Breeding, 2013 p. 16)
Marshall Breeding (2013) also mentions that the most successful library automation products are those who manages to retain the classic ILS model and the same time managed to converge and develop fast responding search services to satisfy the arising needs of their clients.

1.2 Purpose Statement and Research Question

Although the integrated library systems offer great opportunities for the libraries worldwide in order to organize and spread their resources to the users and to automate their procedures, the current developments on this field with new systems called “library services platform” (Breeding, 2012, p. 24) or “the next generation integrated library system” (Wang and Dawes, 2012, p. 1) or “web-scale management solution” (Burke, 2012) and “library management service” (Dula et al., 2012) along with the increasing publications and the dramatic transformation in libraries’ collections have created new standards that university libraries need to follow (Breeding, 2014). The aim of this research is to describe what has been done so far and to identify the implications for academic libraries establishing these new systems in its internal workflows.

As already mentioned the libraries’ collections have gradually moved the recent years from printed to electronic resources and nowadays the academic libraries worldwide maintain the biggest part of their collections in e-format and annually subscriptions in e-platforms while their printed material is declined (Yang, 2013 & Breeding, 2014). This shift along with the fact that institutional repositories were created in order to gather the knowledge that is produced in the universities, resulted in a situation where a university library has to manage and organize a heterogeneous material in multiple formats with a number of different communication protocols following them.

Pace (2015) and Romaine & Wang (2017) mentions that the next generation library systems are actually electronic resource management systems (ERM) which were developed as separate systems in order to facilitate libraries in organizing and providing their electronic resources because the traditional ILS failed in this point as they were developed only for managing printed material. This resulted in a situation where the libraries separated their workflows and the staff from traditional workflows.

In the framework of the present thesis, we also examine in brief the current situation in Greek academic libraries comparing with the international one attempting to identify for the Greek context possible implications on their workflows as well.

As there is no study so far concerning the Greek academic libraries overall, but partial ones, we believe that our contribution to the Greek context will be useful and it may provoke further studies on this field.

The research question is:

"What are the implications for the academic libraries regarding the adoption of the next generation ILS in their internal workflows?"
The research was conducted by studying the current literature regarding the ILS and making a comparison with the past and the present situation and looking at the future developments. Also, the qualitative approach was followed along with observation and interpretation and semi-structured interviews. This approach we believe that is suitable for our study because from the one hand we explore the phenomenon in the globe and on the other hand we try to identify possible implications on the libraries' workflows both internationally and nationally. Moreover, the fact that we were able to conduct the observation and the interviews with fellow colleagues and partners that we have been collaborating with for several years was an added motive.

1.3 Topic Justification

It is widely accepted that the increasing users’ needs for instant and accurate information created serious matters for librarians and the librarian community has been striving to find new roads and trustworthy solutions. Moreover, the role of libraries has changed from the traditional services to the proactive or even interactive or integrated library services offering advanced support to their patrons (Kamar & Clair, 2015).

In this framework, libraries and, speaking about research, the academic libraries espoused several procedures in order to deal with these matters. First, as it has already been mentioned, the academic libraries implemented new information systems which actually automated the procedures that were already in use, such as cataloguing, circulation, acquisitions, etc. (Breeding, 2016).

Moreover, in many cases academic libraries are facing funding issues thus, in order to overcome monetary boundaries and keep serving their patrons new consortia have been emerged, like the one of Greek Academic libraries, so to deploy most appropriate platforms and services in the most cost-effective way. Such changes are followed by alternations in libraries’ everyday workflows.

1.4 Scope and Limitations

The scope of this research is twofold: from the one hand to describe and explore the previous and the future situation regarding the integrated library systems (ILS) and its offsprings the library services platforms and the implications on their workflows and on the other hand to describe in brief the aforementioned issues for the university libraries in Greece.

The possible implications for academic libraries by changing their internal workflows covers broader matters such as advanced skills both from librarians and IT professionals, poor technical support from vendors’ side, interoperability issues and staff training seminars. We believe that our study will contribute both the librarians and the IT specialist to identify the most important aspects of the migration from the old system to the new one by focusing on their workflows and how these are changed or amended.
There are several reasons that led us to deal with this subject in our master thesis which we believe that are quite important for academic libraries worldwide. First of all, despite the fact that a big number of university libraries have migrated from ILS to next generation ILS an important percentage of them they have not migrated yet or are planning to migrate in the near future.

So, there is an ongoing public discourse among the librarians for this subject either on public forums and conferences or through publications mainly in scientific journals. Secondly, the vendors offer new applications and search engines to the libraries providing new and advanced services but at the same time limitations are emerged. Third, new libraries synergies and consortia are being created by the academic libraries worldwide in order to cope with the decreasing budget and to negotiate from a better position with the vendors.

Last but not least personal interest for the current developments in Greek context regarding the adoption and implementation of these next generation ILS is an added factor for our decision.

As it is mentioned semi structured interviews were conducted with five academic libraries (three in the region of Attica, one in Patra and one from USA). We decided to explore the current situation in libraries recently moved to new systems adopting next Generation ILS (proprietary and open access) and to one library that has not migrated yet but is planning to do it.

Moreover, we conducted an interview with a former associate Dean in university libraries from a university in USA (St. Louis) in order to have the American perspective. Of course, the sample is small, but we believe that exactly because these libraries have recently migrated to the new systems and are the biggest in Greece and one of the biggest in USA with a big number of employees and different disciplines the findings will be useful for our study.

Furthermore, we conducted a semi structured interview with a vendor representative here in Greece for ILS and next generation ILS in order to have the vendor's perspective on this field and to identify future possible developments regarding the implementation of new applications and tools.

Both researchers are familiar with the information systems and particularly with the LIS as Stratos holds a degree in computer science from the department of informatics from TEI of Thessaloniki and works as a vocational high school teacher on this field and Antonis has a bachelor from TEI of Athens from the department of Librarianship and Information Systems and has been working for over twenty years as a university librarian.
1.5 Thesis Organization

The thesis consisted of six (6) chapters.

Chapter 1 is the introduction where the research setting, the research question and the topic justification are presented.

Chapter 2 provides the literature review on the selected topic along with the findings on the academic libraries workflows and how the implementation of the new systems affected the entire libraries procedures.

Chapter 3 presents the methodology and the methodological tradition. The hermeneutic approach along with the interpretive research was used in order to interpret the phenomenon and the exploratory qualitative approach was followed in order to identify the possible impacts on academic libraries' workflows and to answer to the research question. Two techniques were carried our observation and semi-structured interviews.

Chapter 4 provides the findings from the empirical data along with their analysis and Chapter 5 is a discussion on the findings both from the literature and the empirical data.

Finally, chapter 6 provides the conclusion of the study, our contribution to the research and proposes future research settings. Fig 1 depicts the thesis organization:

![Thesis structure]

*Figure 2. Thesis structure*
Review of the Literature

Chapter 2 constitutes a review of the literature that is used in this exploratory qualitative study. First, a general overview is presented, where is mentioned the gradually transition of the academic libraries from the traditional LIS to the next generation ILS. After that, the implications of the implementation of the new systems on the libraries’ workflows are presented and finally, a summary of the literature is provided where the findings are displayed.

2.1 General Overview

In the international literature there are several published articles in scientific journals concerning exactly what libraries and especially academics have to face up with. Wang and Dawes (2012, p.79) focus on the Service Oriented Architecture (SOA) “for building business applications as a set of loosely coupled distributed components linked together to deliver a well-defined level of service”. These services will be able to communicate each other in terms of data exchange and service collaboration. A very good example of a service in libraries is that of check-in or check-out service.

Furthermore, Peter Green in his suggestion (2014 IATUL conference) and referring to the decision of Curtin University Library in Australia to implement a next generation library system, demonstrates some major concerns for the librarian community. In specific he:

a. investigates why vendors have invested so much in the development of new systems and why libraries are taking them up,
b. examines the pros and cons of moving from a locally hosted service to a cloud based one,
c. considers the impact of a rapid development methodology and
d. reflects on the expected outcome after the end of this long scale procedure. It is understandable that libraries’ attempts to fulfil users’ needs in gathering all the available sources under one umbrella should be a very well-organized procedure in order to have the intended outcomes.

In his paper George Machovec (2014), examines the aforementioned issues in the frame of libraries consortia. The author focuses on issues facing this type of libraries collaboration, including e-resource licensing, ebooks, next generation integrated library systems, shared print archiving, shared digital repositories, governance etc. In this research Machovec attempts a throwback to the LIS and mentions that after a period where libraries developed separated software environments a number of reasons (financial, technology developments, etc) urged them to proceed to synergies in order not only to share their sources but also to reduce the costs having better deals with vendors.

In Gareth Wyn Owen’s paper (2016), a case study of the Wales Higher Education Libraries Forum (WHELF) project is presented. That project aimed to design and implement a library management system (LMS) that would be common and shared
amongst all Universities of Wales, the National Library of Wales and the whole of National Health System Libraries in Wales. In this paper are also presented the methodology approach, the limitations and practical implications as well as the benefits that occurred and an estimation of further future benefits for the Wales library consortia (ibid).

Moreover, Fu and Fitzgerald (2013) in their paper analyze how the traditional integrated library system (ILS) and the next-generation ILS may impact system and technical services staffing models at academic libraries. Through their study they compare two traditional ILS and three next generation ones, by focusing on software architecture and functionality. The result of their analysis was that indeed the next generation library systems could have essential impacts on the existed ones and also to the staff models if the role of the librarians was going to be redesigned and meet the challenges and the opportunities of the new era.

Marshal Breeding (2016), Carla Wale (2011), Sharon Yang and Melissa Hofmann (2010) are also make references to open source ILSs that are implemented worldwide in comparison to proprietary ones. There are many reasons for a library to turn her interest in open source ILS amongst others are the reduction of running costs that comes from proprietary licensing fees and maintenance fees, the ease of customization and the innovation that follows the support that relies on large communities rather one vendor (Wale, 2011) and the centralization of technical infrastructure of multiple libraries within a campus or under one institution (Breeding, 2014).

The last matches to Sierra case in Greek university libraries where 26 academic libraries are under one umbrella and the server of the system is administered by one leading institution, known as ILSaS (Papadatou et al., 2017). The Greek academic libraries have so far developed synergies and consortia such as HEALink established in 1998 which concerns the management of their electronic resources and the negotiation with vendors and the creation of a new consortium which concerns the common cataloguing and interlibrary loan policies under the umbrella of Sierra from Innovative in 2015. The benefits of these procedures are obvious but need to be further investigated.

2.2 Implications on Academic Libraries’ Workflows

These new systems, which actually are electronic resources management systems (ERM) were developed as separate systems, because the traditional ILS were not able to manage the electronic collections (Yang, 2013 & Pace, 2015). This resulted in a situation where the libraries changed their workflows and a number of their personnel had to be designated for managing the new system (Pace, 2015).

The typical workflow and functionality are built on a modular structure which include Systems Administration, Cataloging, Acquisitions, Serials, Circulation, and Statistics and Reports and they are called “client modules” (Fu and Fitzgerald, 2013).
It is almost expected (if not for sure) that when libraries change their systems then they will restructure their internal workflows, reorganize their units and reengineer their staff because of the implementation of the new system (Kelley et.al., 2013; Fu and Fitzgerald, 2013; Breeding, 2015).

It is also expected that some workflows mainly regarding collections and technical services will considerably change before the migration from the old system as an extensive and intensive preparation need to be done in advance in terms of data clean-up and training as well as maintaining core duties (Johnson & Ireland, 2017).

Not only each migration from an old system to a new one but each phase of change brings new operational tasks that benefit from technology (Breeding, 2015). It is a common that large academic libraries have one e-resources librarian (systems librarian or electronic resource librarian), another one as a reference librarian and one or two in the cataloguing and acquisitions department (Pace, 2015 & Stachokas, 2018).

This significant change happened when academic libraries started to establish the next ILS the so called “electronic resource librarian” begun as a public service generalist and it evolved as a technical service specialist or as an expert to the electronic resources management (Stachokas, 2018).

Large academic libraries with an important proportion of their budget spending on acquiring electronic resources not only have an ERL’s position but also, they are led to hire new staff by creating two clusters: one for licensing, acquisitions and collection analysis and one for metadata, discovery, management of knowledge bases, and addressing technical problems (Stachokas, 2018).

Fu and Fitzgerald (2013) in their analysis argued that the implementation of the next generation ILS would have a huge impact on libraries’ staffing and organizational structures as there will be no requirement for local staff to execute traditional works such as server and storage administration, backup and recovery administration, and server-side network administration. Instead this staff could be used for other functions such as learning how to use APIs so that they will be able to support the customization of their institutions’ discovery interfaces and the integration of the ILS with other local enterprise systems, such as financial management systems, learning management systems, and other local applications.

Academic libraries had accepted the fact that traditional ILS covered their basic needs and functions but new emerged e-resources such as web-based content, licensed resources, digital material and the creation of digital repositories changed dramatically their collections and the associated workflows (Pace, 2009).

Furthermore, in subsequent phases, new products and tools are offered by vendors that subsume much of the functionality of these multiple applications, resulting in more streamlined and integrated platforms (Breeding 2015).

Academic libraries and vendors agreed that new tools and systems had to be designed for better management of libraries’ resources and services and for efficiently
workflows (Pace, 2009). Nevertheless, it seems that finally libraries adopted its internal workflows to the limitations of the offered systems (Breeding, 2007).

While the percentage for electronic materials is crossing the 50% of the whole budget (Burke, 2012 & Yang, 2013), much fewer than half the staff were devoted to these separate systems and workflows (Pace, 2015). According to Pace (2015) and Ohler (2013) the major flaw of ERMs is that they were created for the same purpose that an ILS was; just for handling exclusively physical materials, ERMs were similarly suited only to electronic materials and when the libraries had to manage both printed and electronic material they had to have multiple systems in play.

Medeiros (2013, p. 4) in his viewpoint is thrilled with the implementation of the next generation ILS as he believes that these systems “promote collaborations, leveraging records and applications built by others in order to facilitate efficiency”. He also urges that better workflows management functions are delivered. Medeiros (2013) and Wilson (2012) agree that the integration of multiple management points (ILS, ERMS, knowledge base, digital repositories, etc) will help academic libraries to handle a complex data management but at the same time are wondering “how are these systems working in real situations?”

Andrew Pace (2015) challenges up to a point these new systems, as having worked as a librarian decided to become a systems librarian in order to build new and advanced systems for managing, discovering and providing better services for library resources. In his paper argues that of course these new systems allow for advanced internal workflows for librarians in terms of ordering and purchasing material (both printed and electronic) but he stresses that libraries need better management workflows in order to handle complex orders, packages and title lists available on multiple platforms with multiple mechanisms. These separate systems have created obstacles for efficient workflows (Romaine & Wang, 2017)

Here it seems that both differentiate from Breeding’s expectations (2012) who argued that these new systems will offer to libraries flexibility of designing their workflows most suitable to their needs. Breeding argued that in libraries’ modules such as acquisitions (both printed and electronic), cataloguing and serials management the new systems enable libraries to organize their work themselves rather than impose their own rigid workflows (Breeding, 2012). From the other hand Pace (2015) mentions that workflow efficiency remains elusive having multiple systems in play.

Kelley et.al. (2013), in their study about 77 institutions in USA that migrated or are planning to migrate in a new system mention that their expectations apart from changing the internal workflows and structures are for better account management for both library personnel and users, including integration with institution-wide accounts. Moreover, they hope that the new system will have a built-in digital preservation code and the appropriate support.

It is quite demanding to picture the library’s workflows as the current essential products are enough and one integrated system cannot include all of them (Pace, 2009). Andrews (2007) illustrates the most common:
• Open URL Link Resolver
• Federated search tool
• Digital archive, institutional repository, and portfolio products
• Electronic Resource Management (ERM)
• Compact and robotic storage systems for archived print materials
• Next-generation portal and discovery tools (for all the above)
• A management interface (for all the above) to determine usage and user satisfaction and allow for ad hoc reporting and statistical analysis

According to Mackinder (2014) workflows in many cases are considered as processes, yet they are totally different as workflows are the generic set of directives that allow librarians to accomplish their work procedures such as investigating, ordering, licensing, as well as other chunks of processes that exists between them.

Workflows are depending on policy decisions and they depict the big picture of what has to be done in order a normal flux to be established for librarians, while a procedure is more detailed. Meaning, that workflows provide the general guidelines that demarcates the procedures, as procedures are the steps librarians and other library staff have to follow in order to carry out a workflow (Mackinder, 2014).

The Library Services Platforms support roles that are defined by the system administrator and in its turn the system identifies the librarian’s role by his login to a dashboard where all the tasks associated with the role are displayed (Yang, 2013). By this way for instance a librarian in acquisition module who occasionally does cataloguing, or circulation is able to see list of buttons or links for acquisitions and cataloguing tasks (figures 3, 4 & 5).

![Role-based Unified Workflows-Dashboard of Alma](image)

**Figure 3.** Alma dashboard adopted from Yang (2013)
Ohler (2013) makes an interesting reference comparing the workflows that academic libraries developed with the traditional LIS to the workflows that are developed with the new systems. More specifically, in the development of the traditional ILS libraries focused on their local workflows and how they can be developed or amended without searching for commonalities with other libraries and to share experience. This resulted in a situation where in terms of acquisitions and serials modules were different from library to library.
Moreover, the proprietary nature of the traditional LIS hampered the interoperability of these systems something that libraries were needed when migrating from the old system to the new one. The same mistake repeated in the issue of the workflows with the next generations systems where either the system was too specific to match with the local practice (Collins & Grogg, 2011) or it was too general to support local workflows (Wang & Dawes, 2012).

This resulted in a situation where academic libraries had to either reinvent their workflows to match the design of the systems or to find out workarounds to facilitate the gaps in the system and in its turn resulted in duplicating the work between the traditional acquisitions staff and the electronic one (Ohler, 2013).

Unfortunately, in the Greek literature there are not many studies or inquiries so far regarding the above-mentioned issues examining how the Greek academic libraries have finally achieved or not to handle these matters. There are only partial references referring to these issues (Semertzaki, 2009), (Oikonomou & Fragou, 2008), (Katsirikou et.al. 2016) and a fully research study needs to be carried out.

The very last development the consortium of 26 academic libraries under the Innovative interface (Sierra ILS) is running from September of 2015 and the implications of this transition on libraries’ workflows have just recently begun to be investigated (Papadatou, et. al, 2017). It is for sure that soon more studies need to be carried out in order to explore and identify the implications in detail.

2.3 Supported Workflows by Commercial Products

The development of the next generation library systems came to cover the problem of multiple management points and isolated data by creating integrated platforms from the ground up (Wilson, 2012) and to help libraries automate their internal operations (Breeding, 2014). These library services platforms can include the traditional ILS, the ERM, the knowledge base and the existing discovery services (Wilson, 2012; Breeding, 2012; Ohler, 2013; Breeding, 2016) and are dependent on web-based interfaces (Platform as a Service) able to provide shared access to these separated modules enabling unified workflows (Breeding, 2014).

The main difference between the traditional ILS and the next generation ILS is the latter has an open architecture and is more flexible and unified in its workflow and interface (Fu and Fitzgerald, 2013). Each librarian has a certain role and an associated set of rights and permissions to perform certain tasks (Yang, 2013). This change from the one hand allows libraries to streamline and automate their workflows but on the other hand arising issues emerge such as concerns regarding librarians’ jobs, new required skills, training issues, etc. (Fu and Fitzgerald, 2013).

In the product of time libraries and vendors focused on enriching the back-office workflows that support library functions (Pace, 2009 & Yang, 2013). That was a necessity as the previous years the systems put emphasis on fulfilling the end-user needs ignoring up to a point the librarians’ perspective. Marshall Breeding (2007, p.1) mentions: “We can’t let the current focus on front-end interfaces make us
complacent about the software systems that we use to automate routine library functions”.

Even though the vast majority of academic libraries have not migrated yet to the new systems (Breeding, 2016), though they are moving forward to its adoption. So far, several products have been developed by vendors in order to support academic libraries both in their services and workflows and at the same time facilitating the spread of their resources (printed, electronic, digital) to the public.

The two products that are mostly match the library services platforms model are the Alma by Ex Libris (which has strong popularity among the academic libraries) and Worldshare Management Services from OCLC (Breeding, 2016). Apart from these there is the Innovative’s Sierra that incorporates some features of the model. Beyond these there are several traditional ILS offered by vendors such as Aleph, Voyager, Symphony, Millenium, Horizon, Kuali OLE (mostly in USA and Europe), Capital Alto in the UK, Totals in China and Taiwan and other local companies in Japan while in developing nations tend to use open source products such as Koha (Breeding, 2017).

Table 2 summarizes the most widespread next generation ILS and their native discovery layer. Some argue that it is quite advantageous to use both the discovery service and the back system from the same vendor for better integration (Yang, 2003):

<table>
<thead>
<tr>
<th>System</th>
<th>Vendor</th>
<th>Discovery layer</th>
<th>Installation options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alma</td>
<td>ExLibris</td>
<td>Primo</td>
<td>Cloud</td>
</tr>
<tr>
<td>Sierra</td>
<td>Innovative</td>
<td>Encore</td>
<td>Cloud &amp; local</td>
</tr>
<tr>
<td>Worldshare</td>
<td>OCLC</td>
<td>WorldCat</td>
<td>Cloud</td>
</tr>
<tr>
<td>Intota</td>
<td>Serials Solution</td>
<td>Summon</td>
<td>Cloud</td>
</tr>
<tr>
<td>Kuali OLE</td>
<td>Kuali Foundation</td>
<td>VuFind</td>
<td>Cloud &amp; local</td>
</tr>
<tr>
<td>Koha (open source)</td>
<td>Katipo ltd</td>
<td>-</td>
<td>Cloud &amp; local</td>
</tr>
</tbody>
</table>

All these products allow for flexibility and enable to automate procedures based on library’s rules and on the continuing changing needs for the staff (Wilson, 2012). Especially for Alma the user can define a staff mediation point in case of approval or exception. The Sierra enables libraries to create their own workflows across the modules adapted to the needs of the staff while the OCLC platform provides integrated library workflows, a set of library management applications and platform services built on a cloud-based platform and offers integrated management of library workflows creating new efficiencies for libraries to share work, data and resources, to save money and to deliver value to their users.

Although LSP are able to integrate print and electronic resource management, however it might be difficult to include all libraries’ activities and services such as repositories, archives and special collections into one platform (Chad, 2016) and it
seems that librarians and universities have to put efforts in terms of time and costs in order to cope with these issues and to integrate the most critical services for them into these platforms.

According to Collins & Grogg, 2011 top six priorities have been identified by academic librarians’ themselves for what is needed or at least is desirable:

- Workflow and communications management
- Acquisitions functionality
- License management
- Statistics management
- Interoperability
- Administrative information storage

2.4 Summary of Literature

If we would like to divide the background of the Library Information Systems, we can identify two eras in general: The first era, where the traditional LIS were developed back in the decades of 80's and 90's for the management of the libraries' printed material and then the era in the late of 2000 and thereafter where the Integrated Library Systems started to be developed by the leading vendors in this field, focusing on managing, mainly the electronic material.

Between the two eras there was a period where the traditional LIS implemented and worked in an efficient way allowing libraries to automate a big part of their internal procedures and offering advanced services to their patrons. It was a period where the students, professors and researchers stopped to conduct their research through the old and difficult to use library catalogues and started to use the Online Public Access Catalogue (OPAC).

During this period, libraries were gradually enriching their electronic or digital material, that was restricted in some compact disks, acquiring electronic databases initially in disks format and later signing subscriptions with vendors for access to platforms with full text articles and e-books.

With the invasion of the e-sources the libraries encountered difficulties not only in managing this kind of material, but also in coping with other emerging sources of research such as Google, Wikipedia, etc. rendering their OPACs third or fourth choice of interest. Academic librarians had to face an unprecedented situation trying to keep from the one hand the balance between the printed and electronic sources and from the other hand to support the educational procedure and scientific research.

The vendors that had developed the traditional LIS along with large international companies in indexing journals and e-books realized that libraries needed something new and advanced to meet their needs and their patrons' needs. Thus, both started to
develop systems for handling libraries printed and electronic or digital resources integrating up to point all the internal modules and most of their e-sources. That period academic libraries created institutional repositories as an effort to gather their research and scientific production and preserving their cultural or historical heritage. In the product of time apart from these proprietary systems, emerged and open access solutions that helped libraries with no adequate funding.

Under this spectrum, we can say that today large academic libraries at least in the developed and developing countries run at the same time an ILS and a discovery service engine trying to integrate all library's modules and sources. Sometimes the used ILS and the discovery service are developed by the same vendor but in most of the cases libraries run different systems from different vendors. That is occurring because some libraries prefer to run their ILS from a vendor and their ERM from another one as this is a way to gain flexibility and variety having more possibilities in choosing their e-sources.

The main advantages of this transition are that firstly the tasks of updates and maintenance are not operated locally but by the vendor or in case of open access approach in cloud and secondly these systems support the integration most of library's modules and sources (printed and electronic) and enables searching by one discovery search engine. Moreover, as these systems enables the searching and downloads from knowledge bases and the effective management of library's electronic material, significant number of tasks such as cataloguing, authority work, serials orders and acquisitions have moved or changed so the librarians are able to perform other tasks such as information literacy seminars.

One of the drawbacks is that these systems cannot integrate the entire e-sources of a library such as the institutional repository or other databases due to interoperability reasons and in order to make it possible the IT staff have to put much effort. Some more drawbacks are that all these changes in internal workflows may bring about issues such as advanced skills both from librarians and IT staff, poor technical support from vendors’ side, and staff training seminars. Last but not least, potential disadvantages in case of choosing open access solutions might be the poor usability, the less user-friendly interfaces and the lack of functionality, reliability, security and support (Cervone, 2003).

Table 3 below, summarizes the findings. As there is yet a blurry situation and both the terms "next generation ILS" and "Library Services Platforms" are in use we decided to summarize our findings in three categories : a) traditional LIS meaning the first systems that used to automate libraries' procedures for printed material, b) Integrated Library Systems (ILS) the systems developed to unified libraries' workflows and having possibilities for managing the electronic material and c) Library Services Platforms systems that integrate unified workflows and ERM for better management, including open source options and data analytics services.
<table>
<thead>
<tr>
<th>MODULES</th>
<th>TRADITIONAL L.I.S.</th>
<th>INTEGRATED LIBRARY SYSTEMS (ILS)</th>
<th>LIBRARY SERVICES PLATFORMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataloguing</td>
<td>Yes (in one module)</td>
<td>Yes (in different modules)</td>
<td>Yes (in different modules)</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>Yes (in one module)</td>
<td>Yes (in different modules)</td>
<td>Yes (in different modules)</td>
</tr>
<tr>
<td>Circulation</td>
<td>Yes (in one module)</td>
<td>Yes (in different modules)</td>
<td>Yes (in different modules)</td>
</tr>
<tr>
<td>Interlibrary loan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>O.P.A.C.</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>E.R.M.</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Link Resolver</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Discovery service</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>All in one search</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Data analytics</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Updates &amp; Maintenance</td>
<td>Locally</td>
<td>Locally</td>
<td>Cloud</td>
</tr>
</tbody>
</table>
3 Methodology

Chapter 3 presents the methodology of inquiry. The followed methodological tradition is discussed to illustrate its relevance in the research study. Data collection and data analysis methods are mentioned in detail. The chapter concludes with the issues of validity, reliability, reflexivity and ethical considerations.

3.1 Methodological Tradition

3.1.1 Hermeneutics

As this is going to be an interpretive approach for our study, hermeneutics are going to be applied as well. Myers (2004) informs us that hermeneutics mainly has to do with the “meanings” of a text or a text – analogue. Meaning that the main target of hermeneutics is to understand what humans mean by their acts and why they act at a specific manner. At that point we must refer to the term text – analogue, by whom, according to Myers (2004) we refer to anything that can be treated as text no matter if it is some tacit technological artefact, action, culture, even an organization. Even if there is a range of hermeneutic, from “pure” to critical, the common aspect is the concern with the treatment of social phenomena and settings as text.

Lately hermeneutics are getting used by sociologists and cultural anthropologists to treat culture like a text that must be interpreted and been understood (Myers, 2004). In that case the ethnographer is looks to find out the essence of the actions within their organizational structure. Within the field of Information Systems, hermeneutics may help us to discern how information systems are built, used and how the information itself influences the social and organizational contexts (ibid).

Myers (2004) states that hermeneutics can stand both as an elemental philosophy and as a definite approach of analysis. As an elemental philosophy offers the philosophical base for interpretivism, while as a methodological approach provides a way of the text – analogue data.

Of course, in order to interpret the phenomenon of LISs, next generation ILSs and library platform services, we make use of one of the principles of the hermeneutics, the historicity (Myers, 2004), which implies that we are able to understand ourselves and the phenomenon through a history line, thus we are able to talk about it with the community, in our case the Academic Libraries staff.

Another cornerstone of hermeneutics is the hermeneutic circle of understanding of the text or the text – analogue (Myers, 2004; Butler, 1998) where dialectic is used between understanding the text as a whole and the interpretation and understanding of its parts. Due to understanding is always related to a phenomenon there is a need to presume the elemental structure of such phenomena (Butler, 1998). Gadamer (1975) as cited in Butler (1998), indicates that the “whole” that is a phenomenon includes and contains “parts” or “details” that compose it. In other words, actors do understand
the context of their organization by interpreting the parts that constitutes it and the same time they understand the “parts” of the “whole”, by interpreting their prior knowledge they have upon the “whole”.

As we already mentioned above Academic Libraries are complex organizations articulated by people and information systems. In that context we are able to see the Library as a “whole” and then the information systems that are being used within library as a part. Accordingly, the Information system of a library can be perceived as a “whole” and the different modules that constitutes it as the “parts” of the “whole”.

Our effort is on trying to interpret the implications of the transition and migration from one type of information system to another, over the workflows of the library and the everyday routines of the staff.

3.1.2 Interpretive Research.

According to Orlikowski and Baroudi (1991) interpretive studies assume that people while interacting with others, create and come along their subjective meanings of the environment they are into. So, the interpretive researchers are trying to understand phenomena by understanding the meanings that participators in research assign to them, thus in interpretive studies researchers are trying to find a shared relativistic understanding of the phenomena (ibid.).

Interpretivism claims that the knowledge we have for what is named reality are social products and for that reason it is not possible to understand them if we try to separate them from the factors, including the researchers, that consist that reality, because the world is not considered as a static set of objects but an ongoing social process that is the “extension of the human consciousness and subjective experience” (Orlikowski and Baroudi, 1991).

The interpretive perspective accentuates the preponderance of subjective meanings and action through which people construct their reality (Orlikowski and Baroudi, 1991) and researchers knows that as interpretations are forming meanings that are used and transferred, those meanings are questioned and consequently the interpretations of the reality are possible to change over time and in different circumstances as well (ibid.).

Interpretive philosophy suggests that in order to understand the social process one have to get inside the world that generates them (Rosen 1991 as cited in Orlikowski and Baroudi, 1991). Everyday practices, according to interpretivism, are consisted by the language used by the people when trying to describe them (Orlikowski and Baroudi, 1991), thus the research methods that are appropriate for producing interpretive knowledge are field studies because they let researchers to examine humans in their natural everyday environment.

Academic Libraries is a well-organized system of humans and information technology systems and technology. In our study we will try to investigate how the use of a library information system can affect the workflows of a library by
investigating how librarians understand and make use of the system and how their understanding leads to the alteration of workflows.

For that reason, we are going to use the Interpretive approach in our study as it lots of organization researchers used it as they are concerned on interpreting patterns of symbolic patterns that form and compose and maintain the sense of an organization (Walsham, 1995).

Geertz (1973 as cited in Walsham, 1995) states “What we call our data are really our own construction of other people’s construction of what they and their compatriots are up to”. This is the difficult assignment that interpretive researchers face, the filtration of other people's understandings through their own conceptual lenses. (Walsham, 1995).

According to Walsham (1995) in interpretive research there are two roles that a researcher can be assigned with. The first one is the role of the outside observer and one of the involved researcher. In the case of the outside observer role keeps distance from the staff of the organization causing them to think of the researcher as an extraneous person and this can be in favor of the researcher as the interviewees recognize that the researcher has no personal interest and they can express themselves more open and free especially if an environment of mutual trust is developed between them. On the other hand, as the researcher will not be able to be on site he or she may be not able to get a full understanding of the organization.

The second role, the one of the action researcher or the participant observer (Walsham,1995) allows the researcher to get mixed with the focus group at least for a short period of time. The advantage of that role is that the researcher is able to get a full image and a more complete understanding of the organization, as he or she will not be denied access. As a counter effect the researcher can be considered as a person that have same interest and thus the staff of the organization may be more careful towards the researcher (ibid.)

3.2 Methodological Approach

3.2.1 Exploratory Study

According to Manerikat and Manerikat (2014) is used to provide an in depth understanding of a problem, thus it is a research that is used and conducted in order to determine the problem and specify its nature.

Saunders, Lewis and Thornill (2007) argues that an exploratory study is a way to detect and determine what is the happening and then try to find new vision and understandings and stress questions to determine, judge and weigh the phenomenon or phenomena under a new sight or angle of view.

As exploratory study is well suited for explaining, clarifying and sensing a problem (Saunders, Lewis and Thornill, 2007), we are going to use it as the changes in
Academic Libraries routines and workflows are ongoing and the nature of these changes are not always the same, nor are easy to describe in precision.

Moreover, Exploratory Study fits to our way of conducting this research as we are willing to conduct a qualitative research using an amount of literature for reviewing it as well as semi – structured interviews and some observation to gather our data and as Saunders, Lewis and Thornill (2007) reports, the three main ways to conduct exploratory research are the search of the literature, the interviews of people that are experts in the subject and the focus group interviews. In our case the focus group interviews replaced by on site observation.

In our work we intent to gather, classify and assay our data using an inductive prospect.

3.2.2 Hermeneutic circle

As it is already aforementioned, hermeneutic circle is the most fundamental principal (Klein & Myers, 1999) to an interpretive study. That principal of hermeneutic circle implies that one will try to understand a complicated whole by understanding the parts of that whole. Moreover, according to (Gadamer 1976b) as cited in Klein & Myers (1999) both terms, parts and whole, must be interpreted in a broader and flexible way. In our study they are the workflows that consists the whole of an academic library.

Then alternatively as parts can be considered both researchers’ and participants’ prior perceptions and understandings and then the whole can be the mutually shared meanings and understandings that arises from their communication and relations (Klein & Myers, 1999).

In our study we iterated between the separate understanding of the workflows of academic libraries and the whole context that is the academic libraries and the understanding of their role in the academic community.

In order to do so we considered our data about academic libraries as a whole, while parts of that whole were the literature references and the empirical data that emerged from observation and semi-structured interviews.

That triggered another cycle of the hermeneutic circle whereas parts of the new whole that is our empirical data, were the codes and keywords we used to categorize our data according to the workflows mentioned by the interviewees and the ones that being collected during the observation.

By performing these cycles of the hermeneutic circle, we managed to gain understanding of the workflows that were present when a traditional LIS was in use, as well as what the implications were upon these workflows and academic libraries in general by the transition to an ILS.
We also gained a better understanding of how the current socioeconomical factors affects the academic libraries thus their workflows and the relations between librarians, technical staff and patrons.

### 3.2.3 Patterns and transition in academic libraries

In every system change there are some libraries that they are willing to adopt the new system early and some others that are preferring to wait a little bit before acting (Breeding, 2012). In this phase we can recognize the four levels of “digital masters” as they have been identified by Westerman et.al. (2014, p. 15) and depicted below at figure 6:

![Figure 6. Digital Capability adopted from Westerman et. al. (2014)](image)

As Beginners considered all organizations who fall behind their competitors as they have only an elementary set of digital skills, thus they are usually follow a wait and see schema struggling to acquire certainty before they move forward (Westerman et al., 2014). Fashionistas on the other hand are willing to buy and try every new technology trend without second thoughts but their outcomes are not analogues to their investments as according to Westerman et al. (2014) they also have, in most of the cases, leadership and governance deficit. Sometimes after acquiring a new information system they decide that they have to move backwards trying to integrate,
model and assess their digital skills, wasting this way a great amount of their investments.

Quite opposed to fashionistas comes the conservative who while having the needed leadership and governance, they are no interested in technology fashion and also, they do not want their investments proved to be a waste of time or money thus they are fully focused on how every investment they make in technological artefacts and information systems will be fully coordinated and profitable. But such an effort of avoiding failure, prevents these organizations to move ahead and make any progress (Westerman et al., 2014).

Finally, there are the digital masters who, as Westerman et al. (2014) argues, have managed to overcome all the problematic situations their opponents are facing and they find the golden mean on leadership, governance, investments and are moving with all their power to digital future, where they will outperform over their competitors by exploiting to the most of the technology they invested up to.

The ILS and Library Services Platforms are provided by the international companies worldwide, but some products are represented in specific regions such as China, Taiwan or Japan even in United Kingdom. In these cases, libraries run mostly systems that are provided by local companies while in developing nations generally tend to use open source solutions (Koha is the most widespread) rather than Library Services Platforms (Breeding, 2016).

According to the aforementioned we can say that the academic libraries in USA and north America (Canada) have overcame difficulties and they know exactly how and where to invest, although the transition from ILS to library service platform is in an early phase, we can assume that they belong to the “Digital Masters”. The libraries in Northern and Western Europe we believe that belong to the “Conservatives” because they do not want to make mistakes and waste time, while the libraries in southern part of Europe along with libraries in Africa and Asia belong to the “Beginners” as they follow a wait-and-see strategy (Breeding, 2016).

3.3 Methods and Techniques for Data Collection

3.3.1 Research Design

Our method narrowed down the analysis for the implications of the next generation ILSs on academic library systems in their workflows, including the potential effects on them both from positive and negative perspective. Through our analysis we will attempt to identify how these systems affect the libraries’ organizational structure and librarians’ designed positions in order to manage the different tasks that are derived from the implementation of the next generation ILS.

Moreover, we will try to identify what are the limitations that these systems incur for the universities libraries in the sense that they were developed to manage electronic
and digital material and there are conflicts when it is attempted to integrate on them other local library’s resources such as the OPAC and the institutional repository.

What is more we will search for the current situation in Greek academic libraries identifying possible implications on their workflows and we will try to depict the recent developments on this field.

More specifically, in our study the qualitative approach is followed using observations and semi-structured open interviews in order to explore, describe and interpret (exploratory, descriptive and explanatory) both the past and the current situation and to identify the future plans. A qualitative strategy is based on the study of the whole situation of the phenomenon and tries to give some answers or to interpret the examined situation through the meaning that is assigned to it (figure 7).

The Inductive Approach – Qualitative Research

- Collect detailed data / information by using qualitative methods such as observations and interviews
- Analyze the collected data in order to identify themes and categories
- Look for broader patterns from themes and categories
- Compare the patterns with existing literature and your own experience
  \(\rightarrow\) Generalization

\textit{Figure 7. The inductive approach adopted from lecture 5 (Jokela, 2016)}

3.3.2 Observation

Bodker et al. (2004) argues that observation is a technique for understanding and getting practical knowledge of current work processes, technological means or even a proposed new system. Observation allows researchers to view by their physical presence how a system works, how tasks are applied and what kind of communication exists.
Tacchi, Slater and Hearn (2003) state that observation is a tool in order to produce knowledge and to be taught by our experiences and being able to plan future actions more adequately and productively by critically reflecting on the observed actions.

The main reason for using observation in a research is because of the reconnaissance of possible differentiation of what the staff reports they do and what the researchers as an external actor observe them doing (Bødker et al., 2004). Observation can also be used when the staff is unable to describe the processes and the workflows of their everyday tasks. There are several ways a researcher can apply observation. Bødker et al. (2004) refers to two extreme methods. The first one is a passive observation method, the “fly on the wall” method where the observer tries to be as far and out of the way as possible. The counter extreme method is energetic, where the observer comes a member of the group and is able to facilitate the tasks that staff has to accomplish and is called as “participatory observation”.

Another reason for using observation in our research is because of the research question itself, which narrows down the scope of this thesis. Thus using observation we hope to perform a targeted research (Tacchi, Slater and Hearn, 2003) in order to focus on the implications in the internal workflows of academic libraries caused by the adoption of next generation library systems.

Observation is a key tool on ethnographic research (Tacchi, Slater and Hearn, 2003), yet we do not call ourselves as ethnographers nor claiming that we conduct an ethnographic research. Our aim is to come in contact with people in their everyday life environment and routine in order to see and listen what they are doing and what they are saying to each other in order to accomplish their daily tasks. This will allow us to distinguish the differences between what librarians say they do and what an external observer observes what they are doing (Bødker et al., 2004).

In order an observation to bring the utmost gains it is important a proper preparation. This may include the place, the people and the processes that will be observed, the person who will be assigned the role of the observer, the time and the length of the observation, according to the content of the project. Thus, an observation can be focused according to four pivotal points of event, person, place and object (Bødker et al., 2004).

As a conclusion Bødker et al. (2014) states that the observation process must be on what is happening, if something works as should, if there is lack of information or not, what are the means of passing information. It is also recommended that when an observation is planned a schedule is good to exist.

### 3.3.3 Semi Structured Interviews

The data were collected studying the international literature and conducting semi structured interviews with the head librarians and IT specialists from the above mentioned academic libraries. Moreover, in the framework of the observation appropriate methods and techniques are used in order to “extract” data for our study. These techniques allow us to study how specific tasks are performed and coordinated
in real situations, and how patterns of cooperation come into play under actual conditions (Bødker, 2004).

The interviews were contacted either face to face or via skype and the names of the interviewees and the libraries will not be published in the report. Instead pen names will be used.

Of course, as observation and interviews took place in Greece, both notes and the interviews will be conducted in the Greek language and will be translated in the English language by us. Then after summarizing our notes we will go through an interpretive analysis and comparison towards the findings from the international literature.

We came in contact not only with librarians in Greek academic libraries but with vendors’ sales representatives and technical support staff as well. Reader must keep in mind that because this is a Master’s degree thesis and not a full scale research, we will research the current situation in four Greek academic libraries, meaning that in no way we are claiming that the outcomes of that research can be either generalized nor the norm of academic libraries in Greece, but as there is a lack of such research in Greece, we believe that our work will be a point of comparison to current international trends and a point of reference for future research in Greece.

Moreover, we carried out an interview with a former associate Dean for university libraries in USA (St. Louis) in order to have the American perspective on this point and how they implemented the next generation system in their library and its branches, how this migration took place and in general what his opinion about the current situation as he is a very knowledgeable person with big experience on ILS’.

3.4 Methods and Techniques for Data Analysis

The process of data analysis and interpretation may include several components and involves the understanding of collected data through texts and images (Creswell, 2009). It also includes the preparing of data for deeper and deeper analysis, conducting different techniques with ultimate goal to represent them and to make an interpretation of their larger meaning.

If we want to summarize the procedure of analyzing the data, we can identify according to Creswell (2007) and Rossman and Rallis (1998) four main steps:

- It is an ongoing process where reflections, analytic questions and writing memos are present. The qualitative analysis of data is happening at the same time with the data gathering and interpretation and the researcher, for instance may be analyzing an interview conducted earlier and this could be included in the final report as a narrative

- Data analysis involves gathering data from open-ended interviews and analysis from the participants sayings.

- The basic qualitative analysis includes the collection of data from the researcher, their analysis and the creation of 4 or 5 categories (the usual)
- Qualitative researchers often use a general procedure for data analysis and coding from the specific to generic.

In our analysis, we followed a linear, hierarchical approach trying to organize, analyze and present our data in a way that it would be easier and understandable for the reader. We can say that this approach is a deeper analysis of the inductive approach as it was mentioned in the previous chapter for data collection methods. This approach is shown in figure 8.

![Data analysis in Qualitative Research diagram](image-url)

*Figure 8. Data analysis in Qualitative Research adapted from Creswell (2009)*
Very briefly we can say that in our analysis we followed the following steps:

**Step 1:** Organize and prepare the data. We type our field notes both for the observations and the interviews and we arranged the data depending on the type of information from the participants and the interviewees.

**Step 2:** Read through all the collected data. A first attempt to understand and to have a general sense of the data. What the participants said? Did we fulfill our expectations? Did the participants have a deep knowledge regarding the theme? Did we want to add or to ask something more? We are sure that hundreds of questions emerge here.

**Step 3:** Coding process. Perhaps the most interesting part of the procedure where we had to consider how to make categories of the findings both from the literature and the empirical data. Regarding the literature we mention the workflows they are affected by the implementation of the new systems as they were identified presenting them in a table. Regarding the empirical data we decided to code the findings in a way that it would be familiar both for the professionals and the individual reader "a coding that would expect to find" along with our previous experience on the field. So, we can say the we used a mixed coding method from predetermined and emerged codes.

**Step 4:** Using the codes we moved on the description of the identified categories trying to be as detailed as possible regarding the implications of the new systems in libraries' workflows mentioning both the changes in the traditional ones and the emerging of new tasks or roles.

**Step 5:** Depiction of the findings in tables

**Step 6:** Data interpretation. Lessons learned, personal interpretation according to previous experience, comparison with the previous studies, new emerged questions.

### 3.5 Ethical Considerations

As the observation took place in actual work places and there was a need of gathering data using semi structured interviews or unstructured dialogues, all participants were informed for the purpose of the research and were provided with a written consent form that beyond the aforementioned issues there was also information about their benefits on being part of a research as well as their right to keep their anonymity and the right to withdraw at any time from the process in case they felt uncomforted.

As anonymity was one of the main points in our thesis that we dealt with, in the sense that from the one hand we wanted to secure that the original names of the participants and the interviewees will not be disclosure and from the other hand that we, the researchers, assured them that their names will be known only to us and will not be mentioned in the text.
At this point we thoroughly explained that full anonymity is not guaranteed in the sense that our thesis is a work that will be published in the university’s repository available to the public and perhaps someone who is interested in, would like to have access to the collected material as well as to the participants’ names.

In that case and given the fact that from the one hand in Sweden the open access policy is widespread and on the other hand the produced research material in the university has to be accessed by the stakeholders, we explained that we are obliged to reveal their names to the interested person (or people) in accordance with the human rights regulations (The National Committee for Research Ethics in Science and Technology, 2008).

Consequently, anonymity is not applied in the strict sense, but still exists and is applied only for the reader of this thesis as pen names will be presented within the text instead of the real names of the participants and their organizations.

Plagiarism is also avoided in any means and any research that would be referred and presented or used as a source in this research is being cited as should and is balanced and used in an honest way. (ibid).

Also, as Pimple (2012) argues, this research follows the three categories of truth, fairness and wisdom. Thus, in the question “Is it true?” the answer is yes because this research is about an issue that exist in physical world and this is the way the academic libraries make use of the LIS and ILS and the implications and the way they affect them. Also, the data that occurs are real and not fabricated. In the question of the second category “Is it fair” the answer is yes because informed consent was provided and also there is fair citation of other researchers’ work. Then coming to the final question “Is it wise?”, the answer is yes because as the research is up to a topic that exists, it is contemporary and as libraries are living organizations their ILSs will keep changing at the future constantly. So, we wish that this research will affect the future to the best, both libraries and the librarians.
4 Empirical Findings

In chapter 4 the findings of the empirical data are presented in two parts. First, we present the findings from the observation in a library and how the implementation of the new system has affected its workflows. Changes, improvements and problems are depicted in both traditional and new emerged workflows. The second part, presents the findings from the interviews, illustrating in tables the most widespread changes making categories for better understanding.

4.1 Observation

As it has been described above observation is a technique that allows researchers to be present and along with participants to explore and understand how a system works, how duties are applied and what kind of communication exists (Bødker et.al., 2004). Observation is also used within the participatory design where both researchers and participants together find ways to facilitate the research process and to become familiar with the research topic (Simonsen and Robertson, 2012).

In our case and trying to identify how the implementation of a next generation ILS has affected not only the library's workflows but also the entire communication between the personnel of a library, one of the researcher (Antonios) applied this technique in the library where he works (Library of the Athens University of Economics and Business). The fact that Antonios has been working in this library for over twenty years, participating in several projects and at least in three migrations from traditional ILS to next generation ILS enables the researchers to run to important conclusions regarding these issues. Moreover, Antonios is responsible for the library's acquisitions for mainly printed material so he can act both as a passive and as an active observer.

Prior to the implementation of the technique the observer explained to his colleagues the entire project informing them with details and answering to their questions. Furthermore, the observer assured them that their privacy would be kept without releasing their names and tasks. The participants agreed on these matters bearing in mind that the long term professional relationship with Antonios enables this approach.

The whole procedure took place in the library's facilities during the working hours enabling the researcher to observe the changes of the workflows after the implementation of the new system and lasted a couple of days with the participation of five colleagues: one from the acquisition department, two from cataloguing department, one from IT department and the electronic resources librarian.

The library runs Sierra platform developed by Innovative since September of 2015 participating in a consortium of 26 academic libraries under the umbrella of one leading institution. The Sierra platform enables the administrator to create different tasks with different modules and by this way a staff member can work on one or more modules using logging in the system with his/her password.
4.1.1 Acquisition module

Acquisition module is one of the main modules of any ILS and deals with ordering of library materials (printed and electronic), monitoring, invoicing and accessioning. It also maintains expenditures and budgets under a variety of accounts.

It is true that the implementation of Sierra has changed significantly the procedure in the acquisition module as enables ordering and purchasing printed books in a more convenient manner. In the old system the acquisitions librarian had to type the requested orders to the system in the specific module (creating or not a new record) and then to pass along them to the vendor. After that the vendor in a designated time provided the books to the library, the librarian had to check out the incoming books, invoicing them and delivered to the cataloguing section.

In Sierra platform the significant change is that before typing the requested order, the acquisition librarian can search both on the existing database and the database of the Library of Congress. If the record already exist in the L.C. just downloads it without typing creating at the same time a new record in the local catalogue adding at the end the ordered copies. In case that the record exists in the local database from previous processing then he adds only the ordered copies.

By this way the time of ordering has been significantly reduced enabling the librarian either to execute other duties such as circulation or to organize information literacy seminars for the academic community. Here we must mention that the proportion between the orders from abroad (mainly in English) are 70% and from Greek publishers are 30%. This difference occurs because the policy of acquisitions is patron driven and most faculty members order printed books from European or American publishers mainly in English language.

4.1.2 Cataloguing Module

The cataloguing module provides various orders making them available under a variety of searchable fields to suit the requirements of a modern library. Except for the data entry function, the system can accept data in standard machine-readable formats, (MARC format) making it possible for the ILS to import/export bibliographic data in standard exchange formats.

Alike with the acquisitions the time of originally cataloguing has been dramatically reduced, regarding the ordered titles, as the cataloguer can see and process the created record from the acquisition module and to make minor changes. It is estimated that for the English (or American) editions the proportion of the original cataloguing has been reduced for over 80% and for the Greek editions almost 50% comparing to the old system where it was necessary 100% original cataloguing.

The difference between the Greek and English editions occurs because unfortunately there is no a database including the whole Greek publishing production enabling the automated downloading of the record to the local catalogue and as a result the cataloguer has to make a cataloguing from the scratch.
Another emerging issue that affect, up to a point, the cataloguing workflow is that in some existing records there are mistakes need to be corrected by the cataloguer resulting in delays.

Moreover, the library has three other important sources of acquiring printed books: donations, the OECD library, the IMF and the World Tourism Organization. In the first case the library receives a significant number of donations each year regarding printed books from alumni and individuals. Most of these books have to be catalogued from the very start resulting in delays. For the other two cases the library has been designated as a repository library of the aforementioned institutions meaning that receives every year almost 500 printed publications from these institutions that must be also catalogued from the beginning.

4.1.3 Library’s IT Department

The main change that happened from the implementation of the new system is that currently the local IT specialist(s) is(are) no more responsible not for updates, maintenance and upgrades as these procedures have been transferred to the leading institution.

The local IT staff when needed, can communicate with the central IT specialists for specific matters or when a problem occurs. This enables the local IT department to perform other tasks such as suggestions for improving upgrading policies or contributing the electronic resource librarian to manage the entire e-material of the library.

The fact that the burdens of updating and maintenance are not anymore local responsibility enables the IT department to handle with functionality and interoperability issues improving library's interfaces and making the interconnection library's resources easier and friendly to the users.

4.1.4 Electronic Resources Librarian

This task was created when the library started to acquire electronic and digital material and making contracts with vendors for subscriptions in e-platforms for access in full text articles and e-books. During the product of time and once the new system established, this duty has been maximized as all the e-sources of the library has to be managed and integrated in the library's web site in a user-friendly interface.

The new system "Sierra" has an ERM system where the e-sources of the library can be managed and controlled along with the discovery service by EBSCO. The point here is that there is also an ERM established the previous years by HEALink consortium under a leading institution (Aristotle University) located in Thessaloniki. The total of the academic libraries in Greece are under the umbrella of this consortium following the guidelines and participating in negotiations and agreements with leading vendors worldwide.
The new system enables for including the whole of our e-sources to its ERM system allowing not only for better management but also for more efficient acquisition policies. So far, the library has decided to follow the first model under the umbrella of the HEALink consortium, but this has led duplicate records in ordering to be created, as well as matters in coping with the e-sources, resulting in discussions and questions whether we have to change our policy and up to what extent.

4.2 Summary of the Interviews

4.2.1 Method

As it is mentioned in methods chapter we conducted semi-structured interviews with open ended questions to identify the main implications on academic libraries' workflows regarding the implementation of a next generation ILS (or Library Services Platform). In our case a qualitative-interview approach was more suitable as it was needed from the one hand to match the findings from the literature and on the other hand to identify the current situation in Greek context as well as in the globe if it is possible.

Before conducting the interviews, we followed a two steps approach: firstly, we evaluated and categorized the findings from the literature to see the most relevant for our case and secondly, based on these findings we developed an interview guide for semi-structured interviews to identify whether the findings from the literature are in accordance with the finding from the interviews.

The criteria for recruiting libraries were:

a. the library has implemented a new next generation ILS (proprietary or open source) within the last three years because these systems are the current generation of ILS,

b. the possibility to conduct an interview with the head librarian or alternatively with the head of IT department,

c. the size of the library and

d. we would like to have as much as possible a represented sample in Greek context.

Moreover, we decided to conduct two more interviews one with a former associate Dean librarian in a university from USA (in St. Louis) to have the American perspective on this subject as American academic libraries, as derived from the literature, are pioneers and another one with a representative in Greece one of the leading vendors in LSP worldwide in order to have her commercial approach to our case.

An e-mail was sent to all the selected participants explaining to them in brief at first and in more detail later our project and goals. As we mentioned the interviews were semi-structured, were conducted via skype or hangouts and in all the cases the conversations resulted in an open discussion where the total of the interviewees were
willing to discuss not only the implications of the libraries' workflows but also the fact that the role both of libraries and librarians has altered (and it is always changing) and if they are ready to adopt changes and to conform with them.

Five academic libraries participated in the procedure and only one of them has not migrated yet to a new system but is willing to change the old system (Horizon) with a new one. The other four libraries (three in Greece and one in USA) have recently migrated from their old systems to new ones (three of them in proprietary and one in open source) trying to keep up with the developments. Table 4 summarizes features of the five libraries and numbers instead of university names are used to protect identities of libraries and interviewees.

<table>
<thead>
<tr>
<th>Table 4: Libraries of the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Library</td>
</tr>
<tr>
<td>Type of University</td>
</tr>
<tr>
<td>Positions of interviewees</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>ILS used before</td>
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<tr>
<td>LSP implemented</td>
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<td></td>
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<tr>
<td>Reasons for migration</td>
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<td></td>
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<tr>
<td>Library employees</td>
</tr>
<tr>
<td>Student population</td>
</tr>
</tbody>
</table>

4.2.2 Results

From the interviews several changes emerged in libraries' workflows not only after the implementation of a next generation ILS but also before it as the libraries had to designate at least two or more people for organizing the transition in terms of preparing the standards, the library’s data (both records and loan data) and the entire project for the transition. We decided to make six categories we believe that
condenses the whole changes: acquisitions, cataloguing, circulation – ILL, ERM, updates and maintenance and data analytics.

One point that made us consider how to categorize the impacts of the new systems to the libraries’ workflows was that studying the literature we identified that some terms are used to express the management of the libraries’ e-resources: ERM, discovery sources, Link Resolver, all in one search, even OPAC where some libraries include some of their electronic material. After discussion and for practical reasons we decided to encompass all these terms under the ERM category. All these changes are categorized as shown in table 5 right below.

<table>
<thead>
<tr>
<th>Library workflow</th>
<th>Library 1</th>
<th>Library 2</th>
<th>Library 3</th>
<th>Library 4</th>
<th>Library 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisitions</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cataloguing</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Circulation-ILL.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>E.R.M. (OPAC, Databases, Link Resolver, discovery layer, Institutional Repository)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Updates, Maintenance &amp; Upgrading</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Data analytics</td>
<td>Middle</td>
<td>Yes</td>
<td>No</td>
<td>Middle</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4.2.2.1 Acquisitions

One of the most significant changes that occurred with the implementation of a next generation ILS is on acquisitions module. Apart from the libraries 1 and 3 which do not use the module due to lack of personnel and funding the rest of them are using the module in a more effective and operating way.

In this point we must mention that library 1 has migrated to a new system (Sierra) but it does not use the acquisition module though it is feasible because is facing financial difficulties and lack of personnel, so they are not able to perform this task yet. Their acquisitions are derived from donations and orders from another local separated system regarding textbooks in Greek language. The same for the library 3, as it runs an updated version of Horizon, they are considering migrating to a next generation system but due to lack of funding and personnel their purchases are restricted to the aforementioned sources as library 1.

The rest three libraries are working on acquisitions module with success and a first common outcome is that the time of ordering has significantly reduced either in terms of time or money. More specifically, the library 2 in USA (which actually is consisted of ten university libraries and one central library) performs their orders separately as they have different disciplines, but the library staff is able to see and check the ordered material avoiding duplicates and handling the budget efficiently.
Library 4 runs Sierra platform and the procedure of ordering has been significantly reduced as the staff before ordering is able to search in a knowledge base (the Library of Congress or the local database) and if the record exists then it downloads and just add the ordered copies.

"The ordering workflow has been affected as it became ten times easier and faster as in most of the cases the only task the librarian must do is just to add the number of the copies of the recommended book" (library 4)

Should the record does not exist he has to create one filling some basic fields and then add the ordered copies. After that the total orders are saved in pdf format and are delivered to the vendor or the publisher. The system enables also for invoicing and checking the ordered material and handling budget with multiple choices (different vendors and different budget codes).

Library 5 runs Koha which is an open access source that can be tailored to library's needs. Alike the process of acquisitions has been significantly improved as the designated staff is able to download records and to add the ordered items. The difference between the other libraries is that this library has decided to download records from certain and accurate databases to reduce the time for changes and corrections that can affect the cataloguing module

"We made the decision to choose and downloads records that are qualitative sufficient in order to make as less corrections as possible" (library 5)

4.2.2.2 Cataloguing

Following the acquisitions module, the cataloguing task has entirely affected by the implementation of the new systems as they enable the extensive copy cataloguing almost eliminating the original cataloguing. More specifically, the next-generation ILS provides the ability for consortia users to manage more effectively local holdings and collections as well as shared resources and to share its knowledge base so every member of the consortia to see what is licensed by other members.

Records are shared at the consortium in real time and each institution can benefit from original cataloging records added to the system and from improvements to existing records. Authority control is built into the system so there is no need for authority processing to the local bibliographic databases. Whenever a member library performs ordering, any other library can determine if other consortia members have already ordered and cataloged the title. This may affect the local selection, allowing consortia members to more collectively develop their collections and avoid duplications.

Apart from the library 3 that runs Horizon and they make original cataloguing the other libraries have benefited from the new system as they are able to avoid original cataloguing and to reduce the requested time. It is estimated that the time has been reduced in 80% on average enabling the staff to do other tasks such as corrections or improvements to the existing records.
"We are able to make copy cataloguing reducing the time.... there is lack of personnel and adequate funding, so the new system was a bonus for us, even if there are still changes in common cataloguing policies (library 1)"

"The original cataloguing was a burden because two people have to catalogue over 1,200 items per year...now this has changes at least 70% "(library 4)

"There is no original cataloguing at all...."(library 2)

The point here is regarding the books in Greek language which that do not exist in a knowledge base then the libraries make original cataloguing. This can lead to delays or mistakes but there is no alternative at this point of time. The participating libraries in Sierra consortium are able to find some of these records in the local database but the library that runs Koha make original cataloguing regarding the books in Greek language.

In conclusion we can say that the new system is compatible to most of the suppliers and cataloguing systems, the cataloguing has become ten times easier and faster in comparison to previous system.

"The new possibilities are following the policies of the University's central library and now the cataloguing is performed centrally" (library 2)

So far, two main drawbacks have been emerged not necessarily due to lacks of the system but mainly because of librarians' requirements. The first one is that there are ongoing changes to the cataloguing policies among the members of the consortium in an attempt to follow common policies and this has resulted in detail:

"Better cataloguing, but different policies between the partners that need to be integrated. Moreover, common policies in subject heading and keywords need to be decided for better workflows" (library 1)

The second drawback is that in some records there are mistakes that need to be corrected and sometimes communication (via phone or skype) is needed with the library that first created the record for clarifications. This may result in delays and extended conversations between the librarians

"Sometimes the required changes in a record are too many resulting in delays. I remember that once I had a long conversation with a colleague trying to identify if the copy I had was the same with hers" (library 4)

4.2.2.3 Circulation – Interlibrary Loan

This task has also been affected by the implementation of the new system as the loaning workflow has changed to the better as loaning process is now easier to accomplish and to track and as a surplus there is an automatic loaning system with the use of RFID technology, where the student can loan a book and then return it, without the need of the librarian to be present.
Moreover, regarding the Sierra consortium the ILL function has improved as the new systems enable the on-line communication between the library members for delivering requested books from library to library. A separated system called "IRIS" is connected with the existed ILS and the librarian is able to send and receive requests.

All the new ILS offer possibilities and options for better management of this sensitive module enabling libraries to integrate services such as alerts to users for borrowed material, notification returns, etc.

"We have the possibility to send alert and notification messages to the users at no time. We are also able to send a message just after he/she has borrowed the book, but we do not want to proceed so deeply because finally after so many messages and notifications the user will lose the important part of the information" (library 5)

One problem that had occurred during the first days of implementation in Sierra consortium was that one book from one library could be borrowed by mistake to the student of another library. This problem was solved with the suitable system customization.

"In the first days of the live operation I realized that a book from our library was borrowed to a student in another university by mistake. When typing his name, I found two students with the same name and surname, one from our university and one from another one, I chose the wrong person and... I did it!" (library 4)

4.2.2.4 Electronic Resources Management

This perhaps is the most important development with the implementation of the new systems ERM as has improved the management of all types of electronic or digital material that libraries hold enabling their patrons to have remote access in plenty of resources:

"Today the library is able to fulfill, compared to the past, its users' needs, as everybody has access everywhere outside the physical library's boundaries" (library 3)

As it is mentioned in the literature and according to the findings from the observation and the current interviews the management of the electronic resources has become an extremely interesting and at the same time demanding issue for the academic libraries, especially since their printed material is gradually declining and their e-material is gradually increasing. It is estimated that more than 50% of libraries' budget is spending for e-resources and more than 70% of their material is in electronic or digital form.

In doing so the academic libraries established ERM systems and in the product of time along with vendors use the so-called discovery search engines in order to make their resources searchable to the users.
From the literature is made clear that some libraries run an ERM system along with a discovery service for better management of e-resources, but some libraries do not use ERM at all and they are satisfied with its discovery service itself:

"The discovery service is Primo – Ex Libris, yet there are some parts of other vendors that are attached to that system. The library does not have any ERM and never had" (library 2)

In Greek context libraries 1, 3, 4 and 5 use an ERM system under the umbrella of the HEALink consortium which is administered by one leading institution. This system is separated from the existing ILS that these libraries run and can handle the multiple sources from multiple vendors.

Recently a new search engine has been developed for better searching and improved services. The existing ERM system is compatible with the libraries' ILS (both Sierra and Koha) and can be integrated any time they wish but for the time being the libraries' administrations have decided to remain under the guidance of the leading institution rather than following the first option. This is a political approach and it will not change soon.

Libraries 1 and 4 run in parallel the EBSCO's discovery search engine that integrates almost most of their e-sources along with the existing ERM by the consortium. The arising problem here is that in library 4 the EBSCO discovery service does not integrate, due to financial reasons, the library's OPAC and institutional repository and these services are not searchable by the library's discovery service. So, the if users want to search for printed books or in the repository have to do it separately from EBSCO service:

"In order to integrate the OPAC and institutional repository in EBSCO service, more money is needed, approximately 10.000 euros per year, and is something that we cannot afford" (library 4)

Library 3 run the VuFind discovery service developed by Villanova University and integrates all of library’s resources, including the institutional repository, by replacing the traditional OPAC:

"VuFind is completely modular so the staff can implement just the basic system, or all of the components. And since it is open source, the modules can be modified to best fit the library’s needs or add new modules to extend resource offerings" (library 3)

In general, when technology comes to the libraries things are getting easier but then we have to discuss for whom things are getting easier as in most of the cases in any transition from one system to another there is always a learning curve. After all we can say that the library systems do reinforce the departments of the library and the entire library.
4.2.2.5 Updates and Maintenance

Updating and maintaining library’s data bases and hardware infrastructure were two tasks that were and still are two of the most critical operations and are vital for library’s operation and existence. It is well understood that in case of operational failure due to server’s or data bases’ malfunction, library’s operation and reputation is under dispute. Therefore, libraries pay an important amount of money both in IT staff and hardware infrastructure to maintain a high level of security and services.

In the past these tasks were operated locally by librarians and libraries’ IT department and staff, and every library had to update and even upgrade its software and hardware infrastructure from time to time making at the same time disaster recovery scenarios. With the invasion of the next generation ILS these tasks have been transferred either to the vendor or to the cloud in case of open source selection, unburdening the designated staff from doing these tasks and enabling them to perform other duties.

In our case, libraries 1, 2 and 4 run Sierra and the duties of update and maintenance are operating remotely either from the vendor or a leading institution in case of Greek context (libraries 1 and 2). In all cases the outdated servers and the high cost of maintaining locally these services led the libraries to this option. Of course, it is at library's wish to support these services locally if wants to have the control of its data.

"Every year we had to pay a significant amount of money in maintenance and updates signing contracts...now this has been undertaken by the leading institution" (library 1)

Library 3 has not migrated yet to a next generation system and runs an upgraded version of Horizon retaining the entire former procedure. They hope that when migrating to the new system (proprietary or open source, local or cloud) they will have all their problems solved:

"Now we have an outdated server with all the accompanied issues...we are seeking to move to a new system having all these matters solved" (library 3)

The fact that these tasks have been undertaken by the vendors have allowed the IT staff to perform other duties such as proposals for improving upgrading policies or contributing the electronic resources librarian to manage the entire e-material of the library. Moreover, the IT department can cope with issues such as functionality and interoperability, improving library's interfaces and making the interconnection library's resources easier and friendly to the users.

"Now we have plenty of time to cooperate with the librarians improving library's e-services...we are not anxious any more for library's data and machine maintenance..."(library 4)

An issue that some libraries are seriously considering is that of their data and whether they want to "grant" them to someone else or not. It is a matter of discussion among the librarians because apart from the records data, there is also sensitive data (loans,
users' addresses and names, etc.) and some libraries want to keep them under their control:

"It was a point of thought to having our data not in our control but the fact that we would be together with other 26 libraries under one consortium with central guidance and one well-known vendor surpassed our concerns" (libraries 1 and 4)

"We want to be autonomous and for that reason we made the decision to retain a local server and to have our data local" (library 5)

Another one thing that has emerged is that of the maintenance cost in current situation with the Greek consortium. The library members have to pay 3000 euros each per year to the vendor not only for the annual maintenance but also for the continuing support to the consortium. This amount was stable since 2015 but from 2019 will be doubled and that is a point for some libraries which encounter financial difficulties:

"The amount of maintenance and support will be doubled in 1/1/2019 (from 3000 euros to 6000 euros. It is a significant raise that we do not know yet how if we are going to afford it" (library 4)

**4.2.2.6 Data Analytics**

With the term data analytics, we mean not only the library statistics in terms of numbers of loans or acquisitions but all the services and collections that can be measured.

The library statistics can include: a) the number of the libraries (if there are central and branches), b) the size of its collections (printed or electronic material), c) the evaluation of its services in cardinal numbers (number of records, loans and interlibrary loan, reference transactions, facilities, etc.). Apart from the traditional ones, libraries have developed on line questionnaires and other methodologies in order to measure some qualitative features such as users' satisfaction or users' technology perceptiveness.

The new systems can prepare several reports for the library administration enabling to evaluate all library's services and procedures providing them in a dashboard environment (figure 9). Having this data, the library's council is able to assess, compare and decide in short time about policies, better budget management and efficiently workflow policies.
"We are able to have data and library statistics in no time, not only from the existing queries but also creating the SQL queries we want" (library 5)

The only drawback in greek context is that in case of the consortium with the Sierra platform the reports need to be asked and prepared centrally by the leading institution:

"The reports are operated yet by the administrator, we would like this service to be operated by each library separately..."(library 1)
5 Discussion

Chapter 5 constitutes a discussion of the findings both from the literature and the techniques along with an interpretation of them. The advantages and disadvantages of the new systems implementation are mentioned along with the Greek context and finally, a general valuation is attempted.

5.1 Global context

The academic libraries have been playing a vital role in educational procedure and their support in higher education is mentioned by both students and researchers and in the international literature as well. For these reasons, academic libraries worldwide are granted with adequate funding in order to provide high quality services to their patrons in terms of facilities and resources (printed and electronic).

In Greek context the last eight years the academic libraries have been experiencing difficulties due to financial crisis with decreasing budgets and human resources resulting in problems in supporting users' needs. For these reasons, academic libraries in Greece started to create consortiums and synergies in order to overcome these obstacles and to continue supporting their patrons as the role of the libraries has not reduced but in addition has increased and along with the invasion of the electronic and digital material we can say that the role has completely changed and both libraries and librarians have to be conformed with the developments.

These main reasons along with the ongoing developments in library information systems led us to conduct this exploratory qualitative study to identify the possible implications in academic libraries' workflows from the implementation of the next generation ILS, how these changes have affected the libraries and if new roles for both libraries and librarians have emerged.

Given the fact that this is an exploratory qualitative study and the given limitations, we decided to move in two axes: from the one hand we studied the international literature trying to identify possible implications on academic libraries' workflows and on the other hand conducting two techniques of qualitative approach, observation and semi-structured interviews, to identify the changes. We also tried to carry out feasible techniques and for that reason the observation and the interviews were conducted in Greek academic libraries apart from one interview that conducted with a former associate Dean for university libraries in USA (St. Louis). Furthermore, from the interviews and the observation some problematic situations emerged in terms of systems functionality and interoperability and for that reasons future research is needed.

Our findings are summarized in table 6 below.
### Table 6: Findings

<table>
<thead>
<tr>
<th>Workflows affected</th>
<th>Before the transition</th>
<th>After the transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional workflows (cataloguing, acquisitions, circulation - I.L.L.)</td>
<td>No</td>
<td>Yes (Reduced times)</td>
</tr>
<tr>
<td>E.R.M. - Electronic Resources Librarian</td>
<td>No</td>
<td>Yes (New workflow)</td>
</tr>
<tr>
<td>Updates, maintenance &amp; upgrading</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Many tasks integrated into one workflow)</td>
</tr>
<tr>
<td>Data analytics</td>
<td>No</td>
<td>Yes (Reduced times)</td>
</tr>
</tbody>
</table>

It was a matter of discussion between the researchers how to depict the results in this table in the sense that we wanted to summarize the findings in a way that it would be both easier for the reader to understand from one hand and practical from the other.

In that sense we finally decided to present the main affected workflows in a compact form, rather than too analytically (e.g. Traditional workflows includes all workflows named in the parenthesis), by providing a comparison in the implementation of the next generation ILS towards the traditional LIS. Moreover, we wanted this table to depict participants' views about the associated workflows.

We used the hermeneutics circle, as following hermeneutics enabled us along with the collected data from the literature, the observation and the semi-structured interviews to review those data, to repeat ideas and concepts or elements and to be able to tag them with the codes that were extracted from the empirical data and being able to interpret both data and phenomena.

During the process of collecting and analyzing the data we created categories that were based on participants' sayings and on our previous experience. The hermeneutics facilitated our approach as we were able to derive from the participants a general abstract theory for those actions in order not to be considered an arbitrary conclusion.

It is obvious from the literature that the academic libraries worldwide are moving from the traditional LIS to the next generation ILS or Library Services Platforms in
order to manage both their printed and electronic material and to integrate as many as possible of their e-sources.

Leading vendors in this field (such as ExLibris or Innovative) along with multinational companies (such as EBSCO) have developed several new systems and services targeting in fulfilling libraries' and users' needs.

It is still a blurred picture and sometimes confusion about the used terms for these new systems. In the literature we can see four different cases: "Next Generation ILS", "Library Services Platforms", “Web-scale management solution” and “Library Management Service”.

All these terms come to cover a broad range of libraries' activities and actually express the ability from library side to handle a heterogeneous and a gradually increasing electronic or digital material. It is expected that the new systems will improve library's services integrating not only traditional services (acquisitions, cataloguing, circulation, OPAC), but also new and advanced ones such as discovery search engines, Link resolvers, API's etc.

5.1.1 Transition

One of the things that a library must consider when decides to migrate from an old system to the new one is if the system will be proprietary or open source, depending on library's wish. It is critical decision because in both cases additional efforts will be required from library's staff side, especially from IT staff before the transition, in order to specialize the standards and to determine the system requirements, tailored to library's needs.

In case of a proprietary system the library's designated staff, consisted of librarians and IT staff, along with the vendor work together in advance in order to specify library's needs and to customize library's modules and services to the new system. After the implementation changes and amendments might occur to improve library's procedures. In case of an open source choice then additional effort is required by the library as from the one hand the system is free of charge with no obligation but on the other hand the library must have an adequate number of specialized personnel, both librarians and IT specialists in order to work prior to implementation and after that as well.

It is apparent that the library's workflows are affected in some extent before and during the implementation of the new system as a significant number of staff need to be designated to prepare the transition in a smooth and functional way. This is one of the critical parts of the transition from the old to the new system where we can identify elements of the linear or iterative IS development models. In most cases academic libraries follow the first model of a linear approach as they describe in advance their needs, which are adjusted in up to a point to the new system. Regarding big projects (in case of consortiums) we can say that after the implementation some improvements or amendments are being made in order to mainly improve internal procedures.
5.1.2 Traditional workflows

The traditional workflows of acquisitions, cataloguing and circulation have also been affected by the implementation of the new systems enabling to create different unified modules for each of these tasks. This is the main variation comparing to the old systems where a librarian was able to perform all these duties under the same module logging in at the system only once. The new systems support roles that can be defined by the system administrator, thereafter the system identifies the librarian’s role by logging to a dashboard where all the tasks associated with the role are displayed. By this way an acquisitions librarian is able to do cataloguing, or circulation and can see list of links for acquisitions, cataloguing and circulation tasks.

5.1.3 ERM – Electronic Resources Librarian

The most important impact, at least in our opinions, is that in the Electronic Resource Management (ERM) where we can include the entire electronic library's modules such as the OPAC, Link Resolvers, Discovery search engine, Institutional Repository, etc. It is widely accepted not only by the librarian community but also from the international literature that the next generation ILS have been developed to help libraries cope with their electronic and digital material, managing to a large extent to eliminate difficulties and avoid duplications in ordering. The impact of this new service was the creation of a new role: The Electronic Resources Librarian, the person or the people who are responsible in managing library's e-sources which most of them are not library's holdings.

There is an overall positive impact as the new application, offered not only by the leading vendors such as Innovative or ExLibris but also by great companies like EBSCO or Proquest, has helped academic libraries to include the most of their electronic material and to integrate every new e-source or database using Link Resolvers or API's replacing the traditional library's catalogue (OPAC) with a new advanced service. Moreover, some vendors offer additional services in ordering printed material if needed.

Two main drawbacks have emerged so far during the implementation of the ERM's: the first one is that in some cases (due to financial or functional issues) the system cannot integrate the library's local catalogue and its Institutional Repository and the other one is that in order to be possible to include a new e-source to the system much effort is required from the IT staff in terms of customization.

5.1.4 Updates, maintenance and upgrading

There are also impacts for the tasks of updates and system maintenance as in the old systems the IT library's department had to do daily updates in order to save library's data and to keep and maintain servers and the related technology. That was in some cases, especially for small libraries, an important burden in terms of human resources and funding, as from the one hand the IT staff were occupied with other tasks and on the other hand the contracts for annual maintenance were quite expensive. Moreover, the responsibility for keeping library's data (records, patrons' data, files, databases,
repository's data) became too heavy for the libraries that they were obliged to looking for other more useful ways to save and store their data.

Under this spectrum some libraries which did not have the possibility or the adequate staff to do this duty, they came into agreements with vendors to store its database for a certain period of time and in case of a data loose or a system's crash down then the vendor were giving back library's database.

The new systems both proprietary and open source offer "cloud computing solutions" to the libraries with a variety of options. In case of an open source solution the library after the implementation of the new system is able to keep and store its data in cloud environment without having local servers and contracts with vendors for maintenance. This is a quite good advantage for the library as from the one hand saves time and money and on the other hand the IT staff is able to run other tasks.

In case of a proprietary solution we can identify two options: a) the library can decide to keep and store its data locally and b) to decide and to give this duty to the vendor paying each year an additional cost.

In the first case the library follows the traditional procedure retaining local servers and maintenance contracts. For the second option we can identify two categories: a) the vendor itself is designated by the library to keep and store its data and b) in case of big libraries consortium a leading institution takes the responsibility to play this role. In both cases, the library or the consortium library members do not have local servers and maintenance duties as all these services are undertaken by others.

In conclusion we can say that on this field the library's workflows have significantly affected as the huge burdens of daily updates and maintenance have transferred from the library either to the cloud or to the vendor's side. By this way the library's IT staff is free to execute other tasks such as closer cooperation with the vendor for system issues, advanced support to library's site or for its Institutional Repository, additional support for a variety of emerged functionality issues for library's e-sources, participation in library's information literacy seminars, etc. We can conclude that along with the librarian's role the IT's role has also altered, keeping up with the developments and conforming with current progresses.

5.1.5 Data analytics

In case of data analytics or library statistics there also changes and improvements that help libraries not only to have access to sensitive data but also to run changes or to make decisions based on this statistical data. The traditional LIS did not offer this opportunity and the libraries had to collect data regarding their collection development, circulation rate or ordering material putting much effort in terms of staff involvement and time cost. Moreover, in some cases the data was based on subjective opinions or previous experience from librarians' side.

The new systems offer a variety of tools and possibilities for collecting data that give the libraries the opportunity to have in no time a full picture of their collections,
circulation rate, orderings, frequency of use of their electronic and digital material, numbers of downloads, numbers of daily users on their sites and in their facilities, participation in seminars, online questions, etc.

It is understandable that as the designated library staff or the head of the library are able to know very quickly the library's sensitive data therefore they are able along with the library council to make fast decisions for acquisitions or subscriptions or to decide for the circulation policy. We can say that this part of workflow is as important as the previous ones and represent the library's "big data" which finally lead to a business analytic procedure.

The requested time for collecting the data has been significantly reduced allowing the staff to conduct other duties and giving the head of the library the possibility to have a complete picture of library's data. The data can be collected through web management reports where the designated staff or the head librarian can extract data with many ways. In case of consortia the leading institution can produce these reports after library's request. In the following figure 10 we can see a report for library circulation for April 2018 from Sierra dashboard.

![Figure 10. Sierra dashboard statistics adopted from Antonios’ desktop at work](image)

The comprehensive gathering of data analytics provides timely and focused action for budgeting, selection, weeding, floating, etc. By using current and complete data, about circulation, holds, transits, patrons, and acquisitions, libraries are able to improve patron-driven acquisitions establishing streamlining collection and coping better with their workflows.

All in all, we can conclude that also in this case the library's workflow has been significantly affected enabling for quicker and efficiently data gathering allowing libraries from the one hand to reduce time and personnel and from the other hand to make fast and important decisions.
5.2 Greek context

Back in 2009 in Greece there were forty (40) autonomous academic libraries owning two hundred and twenty-five libraries (225) in sixty-two (62) cities. All those libraries were using six (6) different LISs in forty-eight (48) implementations and were using two (2) different formats for describing their bibliographic data, the UNIMARC in most of the cases and the MARC21, while most of them did not use the UTF-8 font format. (Sampatakos et al., 2016).

The LISs in use by institutions were ALEPH, Advance, Symphony, Horizon, ABEKT, and VTLS most of them outdated lacking support contracts while the same time many of libraries lacking the needed number of staff to support and maintain the more than three million (3.000.000) instances of library material, raising the cost of maintenance above the amount of two hundred and fifty thousand (250.000) euros annually (Sampatakos et al, 2016), while according to Papadatou et al. (2017) that cost went up to three hundred and seven thousand (307.000) euros annually excluding seven (7) institutions that were not paying for support and maintenance.

It was the time where a plan of creating a consortium of Academic libraries, where in the first place there was going to participate thirty (30) of the Academic Institutions, which was the ¾ of the total number of Institutions but due to changes to their organizational structure and some other changes finally twenty-six (26) of them are today participating in this consortium with the number of one hundred and nineteen (119) libraries (Sampatakos et al, 2016; Papadatou et al., 2017).

This shift along with the fact that some academic libraries made the decision to migrate to a completely open source solutions (Koha) has changed the picture in Greek academic libraries as the spreading of the various LIS has significantly reduced, synergies are created, and cloud computing solutions are used.

That was an extremely interesting development for Greek academic libraries as according to the literature libraries in developing nations tend to implement open source solutions as their collections consist of large proportions of printed rather than electronic material and limited subscriptions to electronic resources.

The fact that many Greek academic libraries made the decision to move forward jointly under the umbrella of one proprietary next generation ILS (Sierra) following the model of one leading institution, overcoming difficulties, obstacles and the current financial crisis, shows that there is a strong wish to follow international practices and patterns. From the other hand there are academic libraries in Greece who have the staff and the expertise to adopt and migrate to open source solutions, upgrading and customizing existing ILS such as Koha. Finally, there are few academic libraries that run former ILS versions such as Horizon, Aleph and Advance but are planning to migrate as soon as possible either joining the Sierra consortium or following the open source solution offered by Koha. The following diagram depicts the current situation in Greek context:
These changes have affected libraries' workflows allowing for economies of scale in terms of co-operative cataloguing, economic benefits in acquisitions, operation and maintenance and at the level of technical management and related functions the benefits are multiple for the libraries.

5.3 Future developments

Talking about developments in the field of library systems we do not only mean progress or new information systems as such, but we also refer to special or specialized tools and applications that facilitate daily work for librarians and provide with new and advanced services the libraries' patrons. Especially in the academic libraries' field the developments are continuous focusing on empowering libraries to reinvent the very nature of their services and deliver value well into the future.

As it is mentioned an interview with a representative in Greece of such ILS was carried out aiming at identifying not only the possibilities of these systems and their impacts on libraries' workflows but also to explore what are the possible developments regarding the Library Services Platforms, in the near or distant future. It was a very interesting conversation that first confirmed our findings for the current situation in Greece and the global and second revealed some of the new and advanced solutions offered by the leading vendors in the field of the ILS.

Firstly, the provided technology of these systems enables the creation of automated unified workflows by the libraries themselves, the integration of the resources' management and the access to open data resources. All these allow library staff to tackle with many challenges, and at the same time the system have the possibility to interoperate with other systems. With the system's open design, libraries retain the freedom to choose from open-source, and third-party products that enable the functionality vital to their unique situations and make direct connections with
databases providing libraries with better ways to take advantage of their data and to customize their services for greater staff and patron success.

Apart from these evolutions, the leading ILS vendors are working on offering new tools and applications to library staff that will facilitate their daily work, reducing the requested time, the tasks' management will be efficiently and the handling of the material will be easier. These new tools reduce the back and forth between the stacks and the desk, cut down on repetitive materials handling, and decrease reliance on paper reports. This new service is about "mobile working" is fully cloud-based and provides new functionality for traditional library operations. Among others can include:

- Weeding
- Managing new collections
- Placing items on display
- Labeling projects
- ILL delivery tracking
- Inventory projects
- The ability to e-mail lists from the mobile device to other library staff, faculty, students, or patrons interested in a specific set of materials.

Another very useful application that can be used by the libraries in their users' service is the resource sharing solution where different libraries with different ILS or LSP are under the same umbrella and their users have access and can borrow material from one library to another one.

Moreover, web applications allow library staff to work remotely on a desktop, notebook, or tablet, even outside the library walls, and to complete tasks where it is more convenient.

Some large academic libraries in USA have used some of these tools and applications mainly in designing relocation projects where huge printed collections had to be relocated and transferred from one floor to another, reducing the requested time and simplify the manual process. The offered solutions proved to be effective and reliable.

No one is able to predict the future let alone in the field of informatics. It is a common sense that once we are accustomed to using an information system, this is going to be changed due to the developments and we have to keep up with them. We cannot say for sure how will be the library systems in the future, but what we can say is that the current orientation is twofold: a) effective management both printed and electronic material and b) better and effective workflows for the staff. These two axes serve both the professional librarians and the libraries' community.
6 Conclusion

*In the final chapter general conclusions are made, our research target is presented along with problems and challenges we encountered during this procedure. The contribution to the research is also presented and finally we propose future research studies.*

6.1 Conclusion

Beginning this study, we aimed at exploring the current situation regarding the implementation of the so called "next generation ILS" and the potential implications on academic libraries' workflows. Both the researchers are familiar with the information systems in general and particularly with the library information systems as Antonios holds a degree in Librarianship and has been working as a university librarian and Stratos holds a degree in Computer science and works as a school teacher.

Our target was twofold: from the one hand we wanted to examine the phenomenon in the global context, identifying possible implications on libraries' workflows and on the other hand to examine in brief the current situation in Greek academic libraries and making a comparison with the global situation.

Facilitating the procedure, we decided to conduct an exploratory qualitative study, studying the international literature and conducting two techniques for collecting empirical data: an observation and semi-structured interviews applying interpreting qualitative approach to answer to our research question forming categories and generalizing.

Both techniques were carried out in academic libraries in Greece, because we wanted to be able to collect the data from libraries that we have contacts. One interview was carried out with a former Dean for university libraries in an American university and finally, we conducted an interview with a representative vendor for ILS here in Greece.

Our goal was to collect as many data as possible to answer to our research question:

"*What are the implications for the academic libraries regarding the adoption of the next generation ILS in their internal workflows?*"

As the recent years several academic libraries are moving from traditional LIS to next generation ILS or Library Services Platforms, there is an ongoing discussion among the university librarians about these systems, how they have affected libraries' procedures, what are the advantages and disadvantages of their implementation and how libraries' role has been changed.

Our findings from the international literature revealed that apart from the ongoing discussion and evaluation of the new systems there is an overall positive sign about their implementation so far as offer to the libraries the flexibility to design their
internal workflows tailored to their needs, creating unified workflows. It is also mentioned that after a long period of time that library's systems were focused on patrons' needs now these systems are more focused on library's needs and its back-end procedures.

According to the literature the workflows in academic libraries have been significantly affected by the implementation of the next generation ILS, improving the traditional ones such as acquisitions, cataloguing and circulation, creating new roles such as the Electronic Resource Librarian, responsible for the library's electronic material management and relieving library's IT staff from the tasks of daily updates and maintenance offering cloud-based services.

Alike, the findings both from the observation and the interviews, confirmed our findings from the literature in general as we identified that the requested time for the traditional workflows has been significantly reduced allowing the library staff to execute other tasks, the role of the Electronic Resource Librarian has been extremely assisted as the new systems offer a plethora of new tools and applications and the cloud based approach has allowed the IT staff to get rid of the daily duties of data updates and maintenance, supporting the library in other tasks.

Moreover, the library statistics has been upgraded as the new systems have contributed to the data analytics gathering allowing the library council to know library's "big data" in no time, making faster and efficiently decisions.

On the other side there are some views that though they agree that the new systems have significantly improved libraries' services and contributed to their workflows, however they argue that there are some drawbacks. The first one is that in some cases the library's needs have to be adapted to the system's requirements and this could be a laborious procedure and the second is that the new systems along with its discovery layer cannot integrate the entire library's e-sources but a number of them resulting in multiple systems in play at the same time.

Despite these "flaws" we can conclude that there is an overall positive impact on academic libraries' workflows, as the requested time for the traditional tasks has been reduced, new roles emerged, and the management of the library's electronic material has been actively assisted.

6.2 Research challenges

Conducting a master thesis work is a challenging and at the same time an enthusiastic procedure that provokes mixed interchanged emotions, many ups and downs resulting at the end in a sense that not only you have finished a demanding task but also that you have learned many thinks: how to collaborate, how to make research, how to write, how to present you thoughts, etc. We can condense our feelings with the following:

"It is the journey that matters not the destination"

C.P. Cavafy, Ithaka
Many challenges were emerged during the progress and the first one was the theme as such. Both the researchers are familiar with the library information systems but the decision of what exactly we want to study and to present was an interesting and at the same time new experience. At that point we realized the difference between of what "I want to explore and what I can finally, do".

Another challenging task was the search and the study of the literature on our research phenomenon. Even though we had decided the theme and its parameters, we had to conduct an exhaustive research in the international literature to identify related papers and publications. Linnaeus library's e-resources and of course other databases facilitated our work.

The qualitative techniques were also an interesting experience because even though our contacts and professional relationship with the interviewees and the observed people was a real help for us, in order to conduct the interviews and the observation, nevertheless sometimes was difficult to distant ourselves from the situations and not to be part of it. In these situations, the sense of responsibility is ubiquitous present.

### 6.3 Research Contribution

We believe that our research study is a contribution to the evolution of the library information systems from the integrated library systems to the library services platforms in the field of the implications on academic libraries workflows. Our study revealed not only that the implementation of the new systems has significantly affected the internal library's procedures improving existing tasks and creating new roles but also revealed that there is an ongoing public discourse among the librarian community worldwide about the new academic libraries' role, how it has changed and what the libraries have to do in order to keep up with the developments.

Moreover, we strongly believe that our study is a contribution for the academic libraries in Greece because the past three years a big consortium was created in order to unite at first, twenty-six libraries all over Greece promoting synergies and upgrading their procedures. The findings of our study are depicted in the text and we believe that future researchers will find them useful.

### 6.4 Future Research

Ending up with our study we would like to suggest some points for future research that are based on our findings and results.

Firstly, from the international literature is derived that there is a public dialogue between university librarians, vendors, computer specialists in LIS and independent consultants for the implications of the new systems in academic libraries in general.

We can note that academic libraries worldwide are required to play a role that is completely different from the recent past and are gradually transformed in learning centers. This requires special skills and advanced knowledge for the professional
librarians and the new systems come to cover up to a point this gap by offering new tools and applications.

Our study focused on the implications in libraries' workflows, how they have been altered and what new have emerged. We propose that a research can be conducted regarding the new roles that have emerged for the librarians and what are the characteristics of the new frame for the libraries that are being formed from the implementation and the operation of the next generation ILS.

Second, we believe that a fully research study need to be conducted in the Greek academic libraries in order to identify the implications on libraries' workflows, the ongoing changes in libraries' role and to measure the results of the recent consortium in the Greek context.
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Appendices

8.1 Consent Form (In English)

Informed Consent Form

Informed Consent Form for professional librarians and IT specialists who are invited to participate in research titled: “Towards from integrated library systems to library services platforms: an exploratory qualitative study in academic libraries”

Introduction

The research is being carried out by the postgraduate students Efstratios Grammenis and Antonios Mourikis in the framework of an Msc program thesis in Informatics from University of Linnaeus (Sweden) regarding the next generation Integrated Library Systems and its implementation in the academic libraries. We are going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words that you do not understand. Please ask us to stop as we go through the information and we will take time to explain. If you have questions later, you can ask them.

Purpose of the research

The scope of this research is twofold: from the one hand to describe and explore the previous and the future situation regarding the integrated library systems (ILS) and its offsprings the library services platforms and the implications in its workflows and on the other hand to describe in brief the aforementioned issues for the university libraries in Greece.

The possible implications for academic libraries by changing their internal workflows covers broader matters such as advanced skills both from librarians and IT professionals, poor technical support from vendors’ side, interoperability issues and staff training seminars. We believe that our study will contribute both the librarians and the IT specialist to identify the most important aspects of the migration from the old system to the new one by focusing on their workflows and how these are changed or amended.

Type of Research Intervention

This research will involve your participation in a discussion (either face to face or via skype) that will take about one hour including a semi-structured interview

Participant Selection

You are being invited to take part in this research because we feel that your experience as a university librarian (or as an IT specialist) can contribute much to our research

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose to participate and later on you change your mind you can stop participating (even if you agreed earlier.)
Procedures

A. Brief Introduction

We are asking you to help us learn more about the next generation ILS. We are inviting you to take part in this research project. If you accept, you will be asked to learn from your experience so far about the implications of these systems in internal academic libraries' workflows.

B. Explain the type of questions

You are going to participate in an interview with the researchers (Stratos and Antonios). The interview will be conducted either face to face or via Skype. If you do not wish to answer any of the questions during the interview, you may say so and the interviewers will move on to the next question. No one else but the interviewers will be present unless you would like someone else to be there. The information is confidential, and no one else except Stratos and Antonios will access to the information documented during your interview. The entire interview will not be tape-recorded.

Risks

"We are asking you to share with us some confidential information, and you may feel uncomfortable talking about some of the topics. You do not have to answer any question or take part in the discussion/interview/survey if you don't wish to do so, and that is also fine. You do not have to give us any reason for not responding to any question, or for refusing to take part in the interview."

Benefits

There will be no direct benefit to you, but your participation is likely to help us find out more about our thesis subject.

Confidentiality

We will not be sharing information about you to anyone outside of the research team. The information that we collect from this research project will be kept private.
Sharing the Results

Nothing that you tell us today will be shared with anybody outside the research team, and nothing will be attributed to you by name. Each participant will receive a summary of the results if she/he asks for it.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so, and choosing to participate will not affect your job or job-related evaluations in any way. You may stop participating in the interview at any time that you wish. We will give you an opportunity at the end of the interview to review your remarks, and you can ask to modify or remove portions of those, if you do not agree with my notes or if we did not understand you correctly.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact any of the following: Stratos (eg222rz@student.lnu.se) and Antonios (am223gi@student.lnu.se)

You can ask us any more questions about any part of the research study, if you wish to.
Do you have any questions?

Part II: Certificate of Consent

I have been invited to participate in research about the next Generation ILS and its implications to the academic libraries’ workflows

(This section is mandatory)
I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Print Name of Participant

Signature of Participant

Date

Day/month/year
Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. 
2. 
3. 

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Print Name of Researcher/person taking the consent____________________

Signature of Researcher /person taking the consent____________________

Date ____________________
          Day/month/year
8.2 Preparation Questions for Semi – Structured Interviews

1. Does your library use a Library Services Platform and which one?
   
   Yes  
   No

If the answer is yes

a. What type of LSP does your library use? proprietary or open source?

b. When did the library migrate to the new system and which system migrated from?

c. What are the new system possibilities?

d. i Do the workflows changed and in which modules?

   ii Do they become easier to accomplish?

e. What are the differences between the old system and the new one regarding the workflows?

f. i Does the new system fulfill your expectations for better and efficient workflows?

   ii If not why, what should be done

If the answer is no

a. What type of Integrated Library System (ILS) does your library use – open source or proprietary and which one?

b. Is the library planning to migrate to a new system and when?

c. Would you keen on moving to a Library Service Platform?

d. What are your expectations from such a platform?
Interview with a Greek Academic Librarian

QUESTIONS

Library 1  Harokopio University (Athens, Greece)

1. Does your library use a Library Services Platform and which one?
   Yes

   Sierra – Innovative. The library first used ABEKT ILS a system developed by the National Documentation Centre and then continued with Horizon developed by SirsiDynix

If the answer is yes

   a) What type of LSP does your library use? Proprietary or open source?

     Proprietary - Cloud

   b) When did the library migrate to the new system and which system migrated from?

     2015/9

   c) What are the new system possibilities?

     There are many possibilities in the modules of cataloguing, circulation and authorities’ management. One of the advantages of the new system is that the time of cataloguing has been reduced as the new system enables the download of existing records changing some parts of the record. The drawback is that sometimes the required changes in a record are too many resulting in delays.

     This library does not use the module of acquisitions yet due to lack of funding and personnel.

     One of the drawbacks is the ongoing system upgrades due to librarians’ requirements.

   d) Do the workflows changed and in which modules?
Better cataloguing, but different policies between the partners that need to be integrated. Moreover, common policies in subject heading and keywords need to be decided for better workflows.

ii Do they become easier to accomplish?

It is a middle situation with pros and cons but the overall sense is positive. One problem that this library came across is that during the migration from Horizon to Sierra the server of the former system crashed down resulting in losing all the data. Fortunately, the data had been migrated to the new system but serious problems emerged because some records from the old system were lost. This is a problem that affects the library’s workflows until now.

e) What are the differences between the old system and the new one regarding the workflows?

There are no important changes comparing to Horizon. There are better and improved procedures enabling for better management of the workflows.

f) i Does the new system fulfill your expectations for better and efficient workflows?

Up to a point yes but improvement need to be done not necessarily due to the system’s flaws but mainly from the librarians’ perspective. Moreover the system could be more friendly, for instance in reports or some changes that need to be operated by the administrator.

ii If not why, what should be done

*If the answer is no*

a. What type of Integrated Library System (ILS) does your library use – open source or proprietary and which one?
b. Is the library planning to migrate to a new system and when?
c. Would you keen on moving to a Library Service Platform?
d. What are your expectations from such a platform?