



# **THE EFFECT OF THE CRISIS IN SCHOLARLY COMMUNICATION ON UNIVERSITY LIBRARIES IN SOUTH AFRICA**

**by**

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2009

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# Declaration

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# Dedication

This thesis is dedicated to my parents Percival and Geraldine Hoskins.

# Abstract

The study examined the effect the crisis in scholarly communication had on university libraries in South Africa. The crisis in scholarly communication or the 'serials' crisis as it is better known to librarians has affected many academic libraries worldwide. The monopoly commercial publishers have on the academic serial/journal market has resulted in high priced subscriptions and many libraries have simply cancelled subscriptions or limited the purchase of monographs (books) to pay for ongoing journal subscriptions.

A study population consisting of 17 university libraries in South Africa was surveyed by means of an online questionnaire to establish how university libraries in South Africa were affected by the crisis in scholarly communication. The research questions underpinning the study examined the cause of the crisis together with its characteristics, the factors that influenced journal cancellations, the effects of open access on journal cancellations, institutional support for open access repositories and the funding of university library budgets. A total of 12 university libraries (representing 70.6%) responded. Telephonic interviews with the Deputy Vice-Chancellors, Directors or Deans of Research at selected universities were conducted to gather supplementary data as well as verifying some points that emanated from some of the responses to the questionnaire. Results were analysed in terms of frequency of responses and graphically displayed in the form of pie charts and tables.

Interpretation of the results reveals South African university libraries, like most academic and research libraries world wide, have been adversely affected by the crisis in scholarly communication. On an annual basis university librarians are faced with hard choices in terms of deciding which journals to cancel. In terms of South Africa, open access initiatives are in the early stages of development and as university librarians have not embraced such initiatives, the benefits are not being realised. Thus university libraries in South Africa are dependent on paid-for journal subscriptions. Maintaining

these subscriptions will be more and more difficult as a result of the high cost of such subscriptions and the fluctuating rand. To mitigate some of these difficulties experienced university librarians should make a concerted effort to facilitate access to local research by way of institutional repositories and free content available via open access initiatives. Recommendations for university libraries and librarians are made in light of the results of the survey and the literature review. These recommendations relate to the library budget, librarians knowledge of their library collections, librarians administering and maintaining institutional repositories and facilitating access to open access content.

# Acknowledgments

I would like to record my gratitude to the following people.

The university librarians and periodical librarians for all their assistance in completing the questionnaire; this study would not have been done.

The University of Technology library directors and periodical librarians who pretested the questionnaire.

Academic staff at the Discipline of Information Studies, especially my supervisor, Professor Christine Stilwell, for her professional and excellent supervision, Athol Leach and Fiona Bell for their support and encouragement.

Zawedde Nsibirwa for her assistance with SPSS.

Barbara Gentil, for meticulous proofreading and my colleagues at the University of KwaZulu-Natal, Pietermaritzburg Library for their encouragement and support.

My mother, Geraldine Hoskins, for all the love, care and encouragement.

Finally, to my Lord and Saviour for giving me the strength and wisdom to complete this study.

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# List of acronyms and abbreviations

AAU	Association of African Universities
ACCUCOMS	Accurate Communication for Publication
ACRL	Association of College and Research Libraries
AJLAIS	African Journal of Library, Archives and Information Science
AJOL	African Journals Online
ALPSP	Association of Learned and Professional Society Publishers
APA	American Psychological Association
ARL	Association of Research Libraries
ARROW	Australian Research Repositories Online to the World
ASSAf	Academy of Science of South Africa
BOAI	Budapest Open Access Initiative
BSP	Bureau for Scientific Publications
CHE	Council of Higher Education

CREST	Centre for Research on Science and Technology
CSIR	Council for Scientific and Industrial Research
DACST	Department of Arts, Culture, Science and Technology
DoE	Department of Education
DOI	Digital Object Identifier
DISA	Digital Innovation South Africa
DSC	British Library Document Supply Centre
DST	Department of Science and Technology
EAGLE	European Association for Grey Literature in Europe
eIFL	Electronic Information for Libraries
E-journal	Electronic journal
E-mail	Electronic mail
ERIC	Educational Resources Information Center
EU	European Union
FOS	Free Online Scholarship
FTP	File transfer protocol

HAIs	Historically Advantaged Institutions
HDIs	Historically Disadvantaged Institutions
HEQC	Higher Education Quality Committee
HTML	Hypertext Markup Language
IAC	Information Access Company
IBSS	International Bibliography of the Social Sciences
ICOLC	International Coalition of Library Consortia
ICSU	International Council of Scientific Unions
ICT	Information and Communication Technology
IFLA	International Federation of Library Associations and Institutions
ILL	Interlibrary Loan
INASP	International Network for the Availability of Scientific Publications
IOP	Institute of Physics
IR	Information Retrieval
ISI	Institute for Scientific Information

ISBN	International Standard Book Number
ISSN	International Standard Serial Number
IT	Information Technology
ITU	International Telecommunication Union
JISC	Joint Information Systems Committee
LIASA	Library and Information Association of South Africa
LIS	Library and Information Science
LISA	Library and Information Science Abstracts
MIT	Massachusetts Institute of Technology
NACI	National Advisory Council on Innovation
NASAC	Network of African Scientific Academies
NEAR	National Electronic Article Repository
NRF	National Research Foundation
OA	Open Access
OAI	Open Access Initiative

OECD	Organisation for Economic and Cooperative Development
PAD	Periodicals Analysis Database
PDF	Portable Display Format
PhD	Doctoral Degree
PLoS	Public Library of Science
R&D	Research and Development
S&T	Science and Technology
SAJS	South African Journal of Science
SAK	SA Knowledgebase
SAPSE	South African Post Secondary Education
SARIS	South African Research Information Services
SCANUL-ECS	Standing Conference of African National and University Libraries in Eastern, Central and Southern Africa
SCI	Science Citation Index
SciELO	Scientific Electronic Online Library

SIGLE	System for Information on Grey Literature in Europe
SPARC	Scholarly Publishing and Academic Resources Coalition
SSCI	Social Sciences Citation Index
STM	Scientific, Technical & Medical
UK	United Kingdom
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNISA	University of South Africa Library
UNISIST	World Science Information System
US	United States
WSIS	World Summit on the Information Society
XML	Extensible Markup Language

# Chapter 1

## Setting the scene

### 1.1 Introduction

Research librarians, that is, librarians who work in large college or university, and private research libraries, today face the difficult challenge of managing their collections and information services during a period of crisis and profound change in scholarly publications. This crisis and change effects all fields of knowledge, but the sciences, including mathematics, are at the centre in defining the causes and innovations that are shaking the foundations of the established, scholarly publication system. As Belle (2002: 29) comments:

Not since Melvil Dewey came up with his now ubiquitous Decimal System have librarians faced such challenges to their status quo. The dawning of the information age, with all its consequences, has transformed the job of the “keeper” more than Dewey could ever have known, as libraries are now as apt to negotiate electronic content licenses and administer server configurations as to wade the stacks. In all, the electronic impact on libraries has been for the good. But there are unhappy whispers circulating between the periodical stacks. And if you listen closely, you can hear the beginnings of a response to the so-called “journal-pricing crisis”.

According to Branin and Case (1998: 475) research librarians at present are particularly concerned about three issues in scholarly publishing. First, there is the very specific problem of reversing, or at least containing, the rising cost of scientific journal subscriptions. Librarians often refer to this as the ‘serials crisis’ in scholarly publishing. Second, there is the growing concern among research librarians that revisions to local, national, and international information policies and procedures governing intellectual property rights may threaten the free flow of information in scholarly communications. Finally, there is the librarians’ overriding preoccupation with the application and effect of new technology. Will the new digital information

system fundamentally change the scholarly publication system and the research librarian's role? Will the new information technology help solve current economic and structural problems in scholarly publication, or merely exacerbate these problems?

The sheer volume of scholarly publications, the rising cost of this scholarship (particularly in the sciences) and the array of new options brought about by advances in information technology all conspire to make this an exciting and difficult time for research librarians. Underlying this challenge and change is the fundamental question of who owns scholarly publications. Ownership is the key to both the cost and accessibility of scholarship in the traditional print information system. Research librarians are increasingly troubled by the growing commercialisation of scholarship in the sciences, where the authors assign their copyrights to commercial publishers. By placing ownership of publications outside the circle of the academy, scholars run the risk of making their works unaffordable and unavailable to research libraries. Research libraries and their concerns form only a subset of the players and issues in the overall scholarly publication system. The librarian's perspective on the problems and solutions in scholarly publication is important, but this perspective must be viewed in the context of the overall system, which has depended on the interplay of authors, publishers, librarians, and readers (users) in a highly interdependent process (Branin and Case 1998: 475).

## **1.2 The research problem**

The research problem is essentially the topic to be investigated, or what needs to be known. It is assumed that one plans a research study because one has identified some problem worthy of investigation (Powell 1997: 19). The crisis in scholarly communication has resulted in ongoing journal and monograph cuts in many academic libraries. Commercial publishers as a result of the monopoly control of the academic publishing system have annually increased journal or serial prices above the rate of inflation. Academic libraries with their ever limited budgets cannot afford to maintain their journal or serials subscriptions as a direct consequence of the crisis in scholarly communication. The crisis has therefore resulted in fewer scholarly resources being made available to scholars. It is this problem that the study

addresses within the context of the South African academic library. However, academic libraries are only one of the key players in the scholarly communication system. In order to address the crisis and its effect on the academic library, the system of scholarly communication has to be examined holistically, understanding the role of all the major key players or elements.

## **1.3 The purpose of the study**

Since the research problem is what the research is about, the purpose of the study is therefore the reason why the research is conducted (Powell 1997: 22). The purpose of this study is to investigate the crisis in scholarly communication and its effect on university libraries in South Africa.

### **1.3.1 The research questions**

Based on the above-mentioned purpose, the following research questions guided the conduct of this study:

- Is there a crisis in scholarly communication, and if so, what are its characteristics?
- To what extent have university libraries in South Africa been effected by the crisis?
  - What factors influence journal cancellations?
  - How does open access influence journal cancellations?
  - Do parent institutions support open access repositories for institutional publications?
  - What is the status of university library budgets?

For the purposes of this study both research questions are equally weighted and data to support the research questions was obtained in the following manner. A systematic review of the literature provided evidence to support and answer the first research question relating to the crisis and its characteristics. Data for the second research question with its sub-questions relating to the extent of the crisis and its effect on university libraries was obtained from a questionnaire sent out to heads of

university libraries and an interview schedule directed at Deputy Vice-Chancellors, Directors or Deans of Research at the universities.

### **1.3.2 Justification for the study**

The justification and significance of the study are concerned with three major questions identified by Creswell (1994: 111): How is the study going to add to scholarly research and literature in the field? How will the study improve practice? Why will the study improve policy? Although studies that relate to the effect of the scholarly communication crisis have been carried out in other parts of the world, no comprehensive studies had been carried out in South Africa. Therefore, the most significant parts of the study are the survey results, which contribute to a better understanding of the system of scholarly communication. The study is important particularly since the South African academic or research library is not exempt from the effects of the crisis in scholarly communication. Since most journal titles subscribed to by South African academic libraries are paid for in United States (US) dollars and British pounds, the situation in South Africa is exacerbated by the fluctuating rand or the exchange rate. Therefore, the study plays a vital role in understanding how the academic library is affected by the crisis in scholarly communication within the South African context.

### **1.3.3 Scope and limits of the study**

The study surveyed South African traditional and comprehensive university libraries. The main data collection instrument, a questionnaire, was sent to university library directors or librarians. In the absence of a library head the periodicals or serials librarian completed the survey. Universities of technology or technikon libraries were not included in the scope of the proposed study because research is not a major function for such institutions. Due to the contextual background the study focused primarily on journal cancellations as a coping mechanism used by university libraries to relieve the effects of the crisis.

### **1.3.4 Definition of key terms and concepts used in the study**

For the purpose of this study, the concept of scholarly communication is described and defined below after the historical background on the concept.

#### **1.3.4.1 Historical background to scholarly communication**

When scholars began to communicate in writing they in effect began documenting their work and communication. Libraries were created to facilitate the diffusion and preservation of that communication and to further its growth; they were intended to be places where scholars congregated, a nucleus of communication, both oral and written (Milne 1999: 71). Enhancing this purpose was the principle of compiling a complete record of the achievements of humanity. All of the functions that can be imagined for the research library of the 21st century were in place by the third century BC, only with greater simplicity. This earlier library was more than a physical site; it was the conceptual framework for a system (Osburn 1989: 277). The system of scholarly communication in place today has been largely determined by print technology and the social system of print technology that has evolved through the print era is now well established:

Scholars and publishers interact accordingly to widely understood and well defined practices in order to translate the results of research onto formalized and authenticated records of scholarship. Publishers and librarians interact by means of recognised, traditional processes so as to gather these scholarly products into collections that comprise the record of scholarship. Librarians and scholars interact through formal structures that preserve and organize the scholarly record for access and use (Smith 1999: 84).

The success of the system of scholarly communication in the past is demonstrated by the continued, progressive advance of scholarship with the various components having generally fulfilled their responsibilities. This in turn contributed to the effectiveness of the contributions of the other components, but by the late 1980s it was generally regarded that the system was experiencing severe, if not fatal,

difficulties (Arms 1992: 160). Arms also pointed out that while traditional methods were under stress, a plethora of technical developments, most involving computing, offered prospects for new forms of scholarly communication. When computers and, later, network technology were applied to the system of scholarly communication, a new age was heralded. Although computer solutions reduced the seriousness of old problems, these were counterbalanced by the introduction of a new set of problems brought about by the great potential of the computer. It was the enormous impact of the computer on scholarly communication and the swiftness of the change it generated that were largely responsible for the attention later given to scholarly communication as a system according to Milne (1999: 72). Computer technology has now been adopted by all agents participating in the scholarly communication system:

What the computer has made possible is the performance of many functions simultaneously and at great speed, the impact of vast stores of information into manageable formats, the facile manipulation and modification of that information, and the interconnectability and correlation of different sets of information. When we think of information as communication, we see why the advent of the computer is such a landmark in the history of scholarly communication: it tightened the system by intensifying the immediacy of the influence of each agent upon the others (Osburn 1989: 278).

#### **1.3.4.2 Defining the concept of scholarly communication**

Scholarly communication has been simply defined by Shaughnessy (1989: 68) as “the social phenomenon whereby intellectual and creative activity is transmitted from one scholar to another”. However, the system of scholarly communication represents a complex process involving several important elements: the scholars themselves, academic libraries, publishers of academic journals and books and the learned societies. While the members of this broadly defined scholarly community still function as they traditionally have, the rapidly evolving electronic age and very serious financial constraints have blurred the once clear distinction and relationship among them (Praeger 1984: 22). That this form of communication functions as a system was both a premise and a conclusion of the National Enquiry into Scholarly

Communication (1979). In its report, the committee conducting the enquiry articulated this concept for the first time, and in 1990, an occasional paper of the American Council of Learned Societies stated that the concept was “still valid and still sufficiently attended to” (American Council of Learned Societies 1990). Prior to the National Enquiry there was a large amount of literature on each of the separate components, never before had the process been viewed as a holistic system (Milne 1999: 70). Branin and Case (1998: 476) described the system as follows:

To oversimplify, the established formal scholarly publication system is made up of three major constituents: scholars who create, describe, and use new knowledge: publishers who evaluate, edit, package, and distribute this knowledge: and librarians who collect, organize, preserve, and share this published knowledge.

The process of scholarly communication was elucidated by Wadham (2003: 23) who maintained that:

The process of scholarly communication begins when faculty members at a university do research, and submit this research to scholarly journals for publication. The process continues when publishers review, accept, edit, and publish the articles written by the faculty. And it comes to a close when libraries buy the journals where the faculty's articles have been published so that other scholars can access them.

Significantly the report also noted that all parts of the system were fundamentally dependent on the others and the single system, in all its parts, was highly sensitive to influence from outside factors: the actions of the funding agencies, and the developments of the new technologies (Osburn 1989: 280). These two factors have influenced significant changes in each of the elements of the system and consequently, in the system as a whole. These changes have sometimes been referred to as a ‘technological revolution’, but while technology provided the means for the change, the cause of the change lay elsewhere (Milne 1999: 70). Milne further argues that the system had become unwieldy, almost to the point of breaking down. It had in fact reached a crisis and the various elements seized the opportunities offered by advances in information and communication technology to assist them in dealing with the crisis.

### **1.3.4.3 Defining the concept of a university library**

Since university libraries are one of the key elements in the system of scholarly communication it is important to define a university library. For the purposes of this study the following definition is appropriate:

A library or library system established, administered, and funded by a university to meet the information, research, and curriculum needs of its students, faculty, and staff. Some large universities maintain separate undergraduate and graduate libraries. Large university libraries with comprehensive collections are considered research libraries (Reitz 2003).

The importance of university libraries having comprehensive collections to satisfy their users' needs is vital and Reitz (2003) therefore provides the following definition for a research library:

A library containing a comprehensive collection of materials in a specific field, academic discipline, or group of disciplines, including primary and secondary sources, selected to meet the information needs of serious researchers. The primary emphasis in research libraries is on the accumulation of materials and the provision of access services to scholars qualified to make use of them.

These definitions reinforce the role and importance of the university library in the scholarly communication system.

### **1.3.5 Overall theoretical approach of the study**

The study adopted a positivist paradigm with an empiricist theory of knowledge. According to empiricism, the primary source of all knowledge is found in experience and observation (Babbie and Mouton 2001: 27). After outlining the research problem, which was to establish what effect the crisis in scholarly communication had on university libraries in South Africa, the exploration of existing scientific work on the problem provided very little help. Therefore, a decision was taken to carry out an

empirical investigation. The World Science Information System (UNISIST) model for scientific and technical communication provided an appropriate conceptual framework for the study. The study adopted primarily a quantitative approach with data drawn from the literature review and from the university libraries and Deputy Vice-Chancellors, Directors or Deans of Research at the universities.

### **1.3.6 Methodology of the study**

While research methodologies revolve around two major approaches (Creswell 1994; Leedy 1997: 104), namely quantitative and qualitative, this study adopted a quantitative approach which involved the collection of data in the form of numbers and the use of statistical data analysis. According to Locke, Silverman and Spirduso (1998: 124) the quantitative approach is the oldest type of research that is capable of describing, predicting and explaining social phenomena, and as a result has provided a “significant part of the foundation on which the social sciences have been erected”. A two-pronged method of data collection was adopted. The two methods used were the search for and review of the relevant literature and the use of survey research.

As demonstrated in Chapter Five, previous studies relating to the effect of the crisis in scholarly communication, namely journal cancellations by Blake and Meadows (1984), Sweeney (1999) and the Association of Learned and Professional Society Publishers (2008) used the quantitative approach with questionnaires being the major instrument for data collection. The present quantitative study used self-administered questionnaires directed to the heads of university libraries in South Africa as the key source of data. Interviews with the Deputy Vice-Chancellors, Directors or Deans of Research at particular universities were used as a supplementary data collection tool. The population of the study was the university libraries in South Africa. The seventeen units of analysis were drawn from the Library and Information Association of South Africa (LIASA) Heads of Academic Libraries list. The survey data was evaluated and analysed using SPSS. The overall aim of the data analysis was to describe the characteristics of the population as well as the the units of analysis. The methods and procedures used in the study are explored in

greater detail in Chapter Six. In terms of ethical considerations the study followed the Ethics Policy of the University of KwaZulu-Natal (<http://research.ukzn.ac.za/EthicsPolicy12111.aspx>) therefore, the online self-administered questionnaire was anonymous and all responses were treated as confidential. Participation in the study by heads of university libraries and the Deputy Vice-Chancellors, Directors or Deans of Research was voluntary.

### **1.3.7 Structure of the study**

Having outlined the research problem, the purpose and limitations of the study, the next chapter provides the conceptual framework for the study. Chapter Three, Four and Five provide a review of the relevant literature for the study. The research methods used for the study are explained in Chapter Six and the results described in Chapter Seven. Interpretation of the results follows in the next chapter and the final chapter deals with recommendations and conclusions. Appendices are situated after the list of works cited.

## **1.4 Summary**

In this introductory chapter, the problem with which the study concerns itself has been articulated and the purposes of the study, including its justification and the scope and limits have been described. Definitions of terms used in the study have been provided including an historical background to scholarly communication. The UNISIST model for scientific and technical communication provides the overall theoretical approach to the study. The methodology of the study is discussed in terms of the methods and procedures used to collect data from the population of the study. The chapter ends with a brief discussion on the structure of the study. In the chapter that follows the conceptual framework will be outlined and the UNISIST model will be discussed in detail.

# Chapter 2

## Conceptual framework

### 2.1 Introduction

Andersen (2002) notes that scholarly communication is an area of research that has received much attention in library and information science (LIS). In general, this research can be characterised as being centred on the literatures involved in scholarly communication. Bibliometrics, for instance, represents a quantitative approach to the study of the structure and organisation of scholarly communication (Borgman 1990). Citation analysis examines the role of citations in scholarly communication (Cronin 1984). Information retrieval (IR) research seeks to develop retrieval techniques capable of finding relevant documents (Belkin and Croft 1987). Information seeking studies have examined the various uses of information sources by scholars (Ellis 1989). Knowledge organisation theory is concerned with devising frameworks and principles that can lead to the improvement of intellectual access to scholarly literature (Foskett 1974). More recently, Borgman (2000) discussed the relationship between digital libraries and scholarly communication. These studies suggest that many areas of research within LIS are actually devoted, in some way or another, to scholarly communication. In 1971 the World Science Information System (UNISIST) proposed a model for scientific and technical communication (Wysocki and Tocatlian 1971: 603). UNISIST is an intergovernmental programme for cooperation in the field of scientific and technological information.

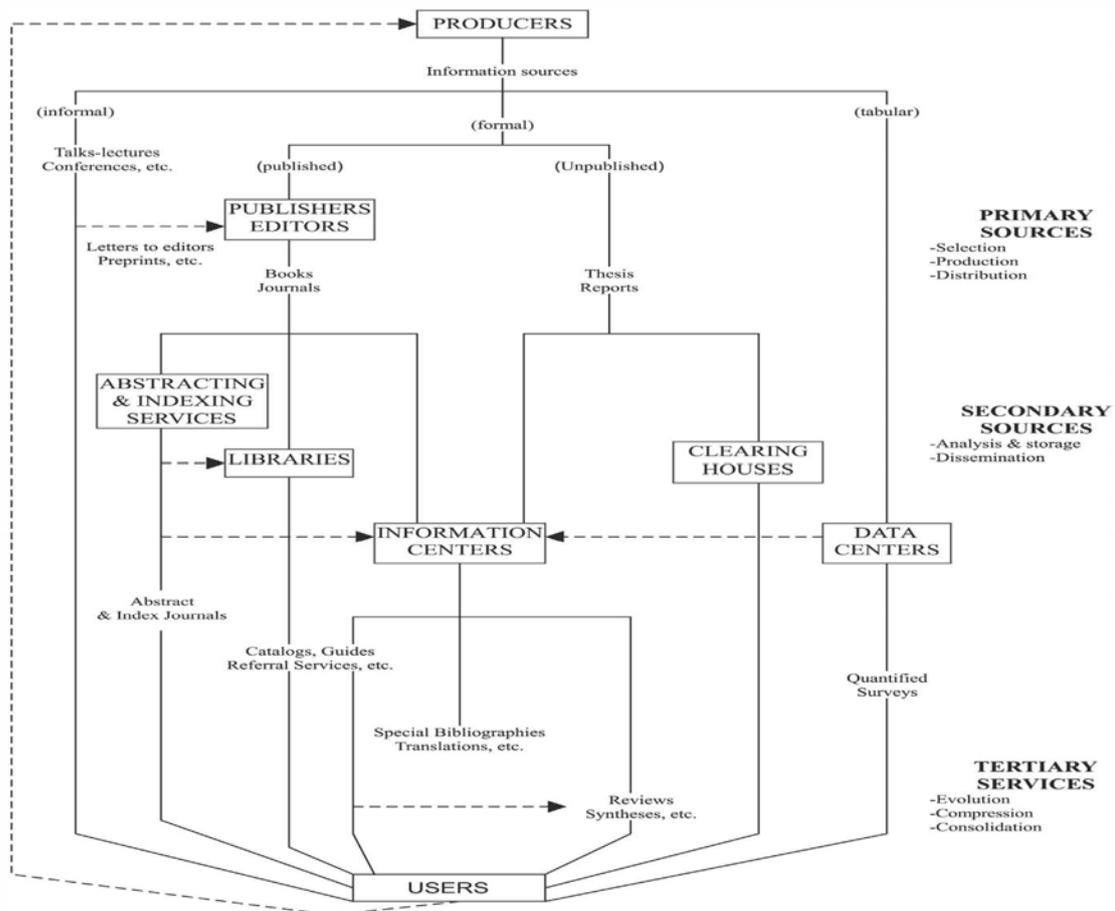
The UNISIST model was a product of four years of cooperation between the United Nations Educational Scientific and Cultural Organisation (UNESCO) and the International Council of Scientific Unions (ICSU). The model is but one of the many communication models. For LIS, the model offers an important socio-technical perspective on the activities of scholarly communication. It draws attention to information communication between knowledge producer and knowledge user, as a

system consisting of diverse organisational and documentary units each contributing to the division of labour in scholarly communication.

In 2003 FjØrdback SØndergaard, Andersen and Hjørland updated and revised the model by considering developments in scholarly communication since 1971, particularly with the development of the internet. They also considered theoretical developments in information science with the introduction of the domain analytic view.

The UNISIST model of scholarly communication as revised by FjØrdback SØndergaard, Andersen and Hjørland (2003) provides the conceptual framework for this study.

**Figure 1: The flow of scientific and technical information**



UNISIST (1971: 26)

In providing this view the model allows one to examine communication within specific domains or discourse communities and to compare differences between them. To understand the model a mapping of the agents, their information services and document production is essential. Figure 1 is a reproduction of the original UNISIST model (UNISIST 1971: 26). This model was proposed as a generalised model of the information structures within science and technology (S&T) and the organisation of communication therein.

## 2.2 Communication channels

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 280) the point of departure in the model is the knowledge producers. Knowledge producers are organised into different groups implying that they have different patterns of information gathering behaviour. In the academic environment these producers are scholars. This group of producers has three main categories of information distribution channels available for communicating research: it can be done through informal, formal and tabular communication channels. Informal communication takes place when the producer and the users know each other and exchange information via informal communication channels. These channels might consist of personal correspondence (for example, letters), manuscripts and preprints, private exchange of bibliographical references and so forth, or they might occur semiformally in connection with professional conferences, meetings, or lectures (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 280). Therefore the informal communication channels consist of two different genres of informal communication, that is a written part and an oral part. These informal communication channels have been used to disseminate and communicate information amongst scholars in the invisible college (see section 3.2.1) using social networking technologies.

As for formal ways for communicating research, two means are depicted in the UNISIST model (Figure 1): published documents and unpublished documents. The published documents (books and journals) go from the knowledge producer to publishers or editors. Once published the documents reach the users via abstracting and indexing services, libraries and information centres. Being a published document

means that it is available to the public. This concept of publicity implies that documents have to be produced in several copies and be accessible to the public (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 280). A crucial key in the model is the existence of publishers as scholarly institutions that are relatively independent of producers and their institutions (mostly research institutions such as universities). This independence for publishers has led to monopoly control of published academic material.

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 282) unpublished documents consist of theses, supplementary material to printed work (for example), numerical tables, films, detailed accounts of experiences, records, and so forth), research and technical reports distributed in limited copies by, for example, government agencies (UNISIST 1971: 29). The unpublished documents may reach the users through clearinghouses and information centres. Therefore they are not subjected to the same selection, production and distribution mechanisms as published documents are, which go through the selection, production, and distribution mechanisms of publishers and editors. At academic institutions the process of peer review is utilised for the selection of published documents. Another important aspect to consider is that of grey literature which falls somewhere in between published and unpublished documents. A private letter is unpublished, while a report registered by a clearinghouse is semi-published or grey literature. Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 282) provide the example of doctoral dissertations as grey literature.

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 282) the third category for communicating research is the use of tabular channels. These channels consist of scientific and technical data and are "... presented in a tabular form as opposed to the linear flow of spoken or written text in the preceding groups ..." (UNISIST 1971: 29). Although the UNISIST report acknowledges that much tabular data is present in printed books and journals and unpublished documents, there are several reasons for operating with tabular data as an information source on its own. These are:

- large numbers of quantitative surveys being carried out have resulted in an accumulation of quantitative data; and

- printed literature is not considered to be the most appropriate publication channel for communicating tabular information due to the progress of mechanized data banks “...that offer in this case better-suited retrieval and computing facilities” (UNISIST 1971: 29).

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 282) primary literature is the point of departure in the production of scientific and scholarly knowledge and, thus, also for the communicative division of labour of the literatures involved. The task of primary literature is to produce and present new knowledge. The “proof” for this new knowledge happens through documentation of knowledge claims in terms of the production and publication of a document. Thus, primary literature constitutes a subject field as a field of knowledge, and contains, ideally, the basic results and insights of a subject field. Scholars are largely responsible for producing primary literature at academic institutions.

Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 282) further argue that in the UNISIST model there are two further levels of information source services between the knowledge producers and users: secondary information sources and tertiary information services. The secondary information services register and describe primary documents for the purpose of retrieval and documentation. Secondary literature such as subject bibliographies, citation indexes, library catalogues and database analyses, describes and registers primary literature (mainly but not exclusively) in these bibliographical instruments. Thus the central working processes of the secondary sources are analysis, storage and dissemination. The role of tertiary literature is to consolidate, collect and synthesise the primary literature (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 283). At academic institutions analysis, storage and dissemination is the domain of the library.

## **2.3 Information services**

In the UNISIST model abstracting and indexing services, libraries, information centres, clearinghouses and data centres are considered secondary information services, but each with particular functions to perform.

### **2.3.1 Abstracting and indexing services**

Abstracting and indexing are major topics in the LIS literature and have received much attention from authors such as Lancaster (1998). According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 283) the UNISIST model distinguishes between two kinds of abstracting and indexing services. The first consists of those printed secondary journals prepared and distributed by scientific associations which operate on a profit basis (UNISIST 1971: 30). An example of this kind of service is the citation indexes produced by Thomson Scientific. The content of these services does not represent a collection of a physical location, such as a library. The other “consists of catalogs and index files compiled by the staff of libraries or information centres, as a means of access to their own collections” (UNISIST 1971: 30). Accordingly, it is only the physical location and the collection attached to it, which differentiates this second kind of abstracting and indexing service (that is, libraries and information centres) from the first one (Fjørdbæk Søndergaard, Andersen and Hjørland, 2003: 283).

### **2.3.2 The concept of the information centre**

The UNISIST report describes an information centre as follows:

... the information centre then combines some of the functions of secondary journals and specialized libraries, to which are added specific duties such as the selective dissemination of information, or the preparation of state-of-[the] art monographs, trend reports, reviews, etc. for the benefit of a specialized field or well-defined and more restricted user groups (UNISIST 1971: 30).

The role of the information centre is that of ‘repackaging’ the information provided by abstracting and indexing services, according to the requirements of specific users. Information centres operate then as ‘tertiary’ services, with a synthesis function added to those of indexing and classification: reorganisation, quality control, compression, synthesis, evaluation (UNISIST 1971: 30). Typical examples of tertiary documents in this regard are reviews and syntheses.

Fjørdbæk Søndergaard, Andersen and Hjørland (2003) therefore argue that according to the UNISIST model an information centre takes on tasks, both having secondary and tertiary functions, such as the preparation of special bibliographies (for example, subject bibliographies), translations and reviews or syntheses (for example, state-of-the-art reports). They do so by getting input from abstracting and indexing services and data centres, which the arrows in Figure 1 seem to suggest. Among other things, this implies that the concept of an information centre, as envisaged by the UNISIST model, is broader than that of a library. By ascribing to information centres functions covering both secondary and tertiary roles, information centres actually differ from libraries (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 284). It may be claimed that libraries are a kind of information centre, whereas the latter is not a kind of library. Libraries do not generally produce reviews or syntheses, or other kinds of tertiary documents. Moreover, information centres are normally not in possession of a physical collection of documents and are not primarily concerned with giving access to these collections, as are libraries. For the purpose of this study the focus is on the university library.

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 286), in the LIS literature the concept of the information centre has also been under scrutiny. They argue that the concept of the information centre is one filled with ambiguity and it is not clarified in relation to similar concepts such as libraries or documentation centres or knowledge centres. The UNISIST model only operates with one outline of the concept. Therefore they suggest that the concept be used as an umbrella term for libraries, documentation centres and other similar activities concerning the collecting, dissemination, storing, retrieval and organisation of documents (or knowledge).

### **2.3.3 Clearinghouses**

The analysis, storage and dissemination of unpublished documents are a task undertaken by clearinghouses. Clearinghouses are defined by UNISIST as "... institutions entrusted with the procurement and dissemination of special categories of documents, such as technical reports, dissertation theses, thesauri,

etc.” (UNISIST 1971: 147). The modes of analysis, storage and dissemination are, according to the UNISIST report, the same as those of libraries or information centres. However, what differentiates clearinghouses from libraries or information centres is the attention exclusively paid to unpublished documents (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 287). With regard to unpublished documents, the UNISIST report seems to differ in its conception of the activities of a clearinghouse when compared to other clearinghouses such as the Educational Resources Information Center (ERIC), an organisation consisting of several clearinghouses covering all aspects of education and pedagogy. These kinds of clearinghouses all collect documents or information from a particular subject field or of a certain type and distribute documents or information about what is collected (Marron 1971; Sauter 1971).

#### **2.3.4 Data centres**

The UNISIST model conceives of data centres as being different from the above-mentioned secondary services, because data centres are concerned with ‘raw’ data and non-written documents such as quantified surveys (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 287). The model considers data centres as instruments for research rather than retrieval.

However, Fjørdbæk Søndergaard, Andersen and Hjørland (2003) consider data centres as a part of the other units in the model as data is being published through formal communication channels such as publishers, implying that data centres are excluded as an independent form of information service and information source. This decision, not to regard data centres as a specific communication channel, is also motivated by the fact that other kinds of messages such as computer programs, pictures and sounds are not represented by separate channels.

#### **2.3.5 Special bibliographies, translations and so forth**

As seen from the UNISIST model, organisations for information and documentation may produce special bibliographies, whether current or closed. Fjørdbæk

Søndergaard, Andersen and Hjørland (2003) provide the example of the American Psychological Association (APA) which publishes the Psychoanalytic bibliography. Often such special bibliographies make use of subject specialists, and may help in the identification of information sources that subsequently are included in more general bibliographies such as the PsycINFO database. Translation services may be commercial or government centres, and may include special translation journals or bibliographies covering translations (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 288).

### **2.3.6 Reviews, syntheses and so forth**

Fjørdbæk Søndergaard, Andersen and Hjørland (2003) argue that reviews in this regard should not be confused with book reviews. They are syntheses of the primary literature, for example, in the form of handbooks, review articles, scientific and professional encyclopaedias, and the like. According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 288) encyclopaedias that are not primarily written for subject specialists are not part of the scientific literature described in the original UNISIST model.

## **2. 4 Users**

The final unit in the model is the user. The users of scientific and technical information are in most cases also identical to the producers, or the users may also be practitioners such as physicians (Fjørdbæk Søndergaard, Andersen and Hjørland 2003). Among other things, this means that the distance between users and producers is short. However, the UNISIST report warns against placing too much reliance on the dotted line from users to producers (UNISIST 1971: 31). This warning is because users have different needs when acting as users and as producers, and because these needs are then stated in different contexts. Søndergaard, Andersen and Hjørland (2003: 288) argue that in this way the model is an idealisation at this point. In terms of the present study, scholars who are producers are also users of the library's information service.

## 2.5 Additional units

Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 290) have added some documentary units which are not clearly emphasised in the original UNISIST model. Since the model notably leaves out book reviews as part of the published, formal mode of communication, they suggest that book reviews are given a place in this communication structure. The reason given is the importance of reviews in the dissemination and evaluation of scholarly monographs. Furthermore, they argue that important secondary literature such as dictionaries and thesauri need to be emphasised in the model and therefore suggest bringing them in. As for tertiary literature, they would also like to add handbooks and encyclopaedias. Fjørdbæk Søndergaard, Andersen and Hjørland (2003) argue that incorporating these documentary units broadens and strengthens the model with regard to its capability of serving as a theoretical model for analysing the differences in communication structures among a variety of scholarly and scientific domains.

Fjørdbæk Søndergaard, Andersen and Hjørland (2003) further critique the original UNISIST model by arguing that it does not seem to take into account how and in what ways primary, secondary, and tertiary literatures shape and respond to each other as part of the communicative division of labour in science. This is an important aspect in terms of how to examine the various ways the divisions of labour work in order to optimise the communication of scientific and scholarly information (Andersen 2002). Furthermore, they argue that the model leaves the impression that scientific communication and scientific knowledge production takes place in isolation:

The UNISIST model does not seem to consider, namely, that there is dialectic between the social organisation of science and the broader social organisation of society because the latter may also serve as an input to specialised knowledge production. We will consider the model of scientific and scholarly communication as an expression of rather stabilised and typified forms of practice (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 291).

Due to the influence of various epistemologies, ideologies, technological innovations (such as the internet), or domain-specific characteristics, each level or unit in the model does not portray the interconnections going on between these levels or units or their potential significance for scholarly domains. Therefore, Fjørdback Søndergaard, Andersen and Hjørland (2003) have proposed a theoretical revision of the UNISIST model.

## **2.6 The internet and the technological updating of the UNISIST model**

The growing use and impact of internet-based communication channels has changed the flow of scientific communication vitally since the creation of the UNISIST model. A technological updating of the model is therefore a necessity. According to Fjørdback Søndergaard, Andersen and Hjørland (2003) an intuitive distinction between formal and informal is possible in internet-based communication. They argue that the distinction is based on how the channels are actually used instead of their ability to carry either informal or formal communication.

### **2.6.1 Informal communication and the internet**

Consistent with contemporary use of the informal communication channels, the most significant informal documentary units on the internet are:

- Electronic mail (e-mail);
- List servers, which are discussion groups or interest groups that distribute messages via mailing lists. Electronic conferences or newsletters are both usually listserv mediated;
- Internet forums, which is a collective term for thousands of newsgroups or discussion groups. Contrary to list servers, internet forms are managed centrally without the use of e-mail. The messages or articles are most often cumulated and archived at least for a while. In most cases this group includes bulletin boards, which are now rarely used on their own but rather as a feature among others in newsgroups;

- Electronic meetings or Webcam conferencing (FjØrdback SØndergaard, Andersen and Hjørland 2003: 292); and
- Blogs and Wikis (collaborative software that allows multiple authors to collectively write web pages) (Mabe 2006).

In the 1980s several authors (for example, Piternick 1989: 265) expressed a tendency for the use of the internet primarily to facilitate informal communication, for instance e-mail. According to a North American survey conducted by Walsh *et al.* (1999) the average doctoral degree (PhD) respondent began using e-mail in 1990, although with notable differences existing between domains. This survey supports the notion that e-mail is the most used and the first generally adopted internet application.

Each of these informal communication channels on the internet may be intentionally located by the user through either various search engines or through diverse types of virtual libraries<sup>1</sup>. However, according to FjØrdback SØndergaard, Andersen and Hjørland (2003) informal communication channels often become known to the users in various ways such as general browsing, inter-personal contact or other less goal-oriented ways.

Generally speaking, the internet mediates a less selective spread of informal communication than the preceding non-electronic communication channels. Thus an invitation is not needed to participate in informal communication on the internet. Information that was once available only through the professional forums is now found on personal or institutional Web pages (Russel 2001: 274). Harnad (1991) has argued that when (informal) manuscripts and feedback are exchanged through the network, scholarship can progress at a speed more similar to that of natural thought and speech. Because of the ease of using the informal internet-based communication channels the path from the producer to the user and vice versa, is

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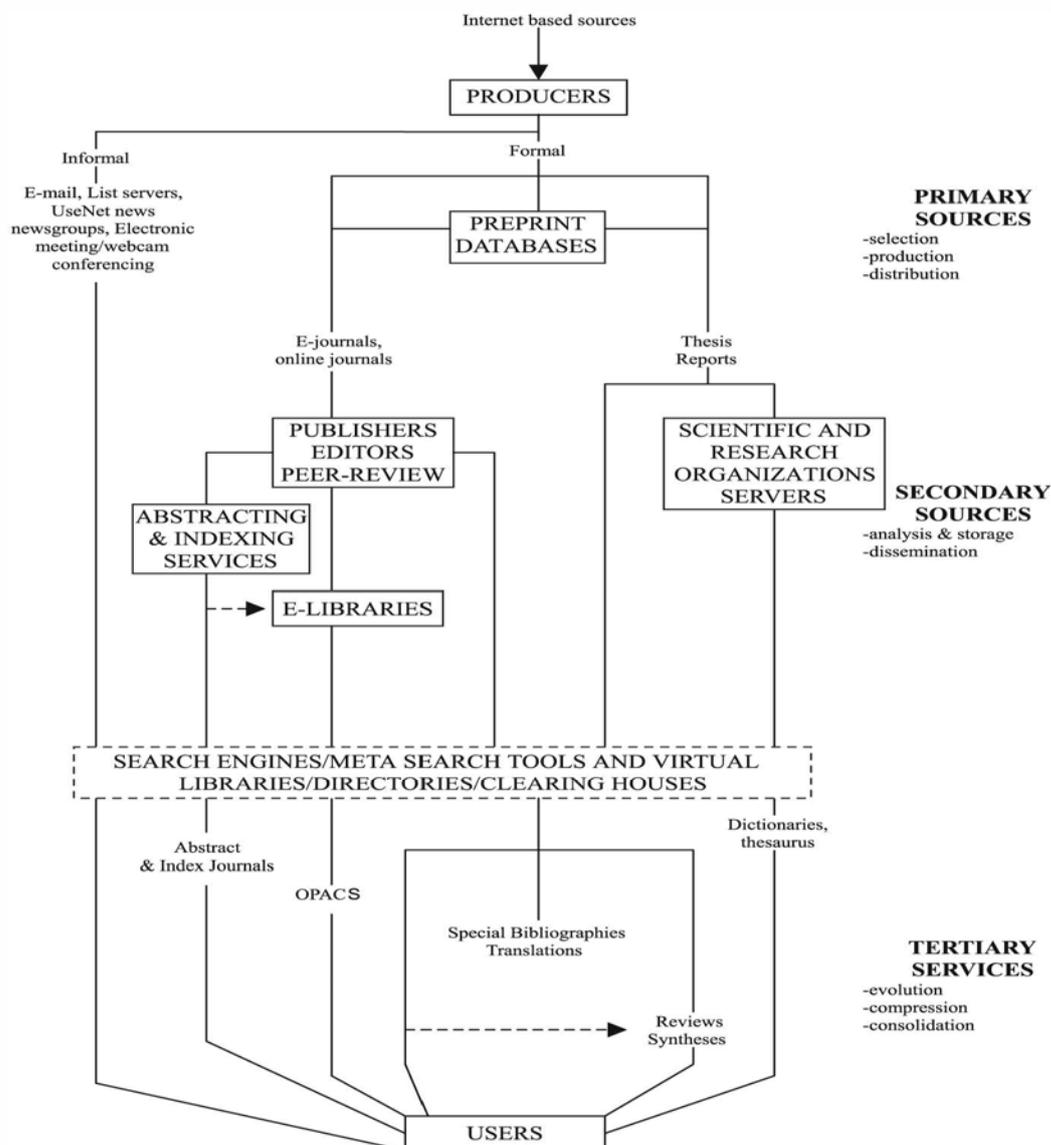
<sup>1</sup> A virtual library is a "library without walls" in which the collections do not exist on paper, microform, or other tangible form at a physical location but are electronically accessible in digital format via computer networks (Reitz 2003).

accessed more freely and more quickly and is less troublesome than, for example, postal mail (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 293).

## 2.6.2 Formal communication and the internet

The increasing number of computer literate scholars in the 1990s, among other things, brought about the transition of the internet from a predominantly informal communication channel to a significant formal communication channel.

**Figure 2: The communication of internet-based scholarly information**



Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 294)

According to FjØrdback SØndergaard, Andersen and Hjørland (2003: 295) the most significant formal documentary units on the internet are:

- E-journals and online journals. The true concept of the 'electronic journal' or simply e-journal, as opposed to the 'online journal', requires that the UNISIST model material be produced and stored only in electronic form (Piternick 1989: 263);
- Online journals on the other hand are electronic spin-offs from paper journals;
- Preprints. Although some reduction has often occurred, preprints are documents distributed before the actual publication and perhaps before the peer review process is completed. Preprints are often considered as part of grey literature, but in recent years the emergence of preprint databases on the internet has offered the means to gain access to this document type. However, not all knowledge domains have or use preprint databases, therefore depending on which knowledge domain is considered preprints may or may not be considered grey; and
- Grey or unpublished literature. These are items such as theses; reports and so forth mostly found on scientific and research organisational servers.

According to Meadows (1998:76) most e-journals devoted to research in the 1980s and the first half of the 1990s were created by enthusiasts, usually in the academic world in North America. Thus operational e-journals are essentially phenomena of the late 1990s. The first peer reviewed, electronic, full-text e-journal including graphics was *Online Journal of Clinical Trials*, which only began publication in 1992 (Keyhani 1993). The status of e-journals is still not fully established. Meadows stated in 1998 that some universities have yet to accept that electronic publications can be equivalent to print on paper for such purposes as deciding on promotion.

Furthermore articles in e-journals are not subsequently accepted for publication in printed journals nor are they necessarily regarded as an equally acceptable source to cite (Meadows 1998: 202). In a longitudinal citation analysis performed by Zhang (2001: 628) from 1991 to 1998 a notable increase in authors who cited e-sources was found. Although there are still fewer e-journals than print sources Zhang's findings suggest a wider use and recognition of e-sources in the scholarly community (Zhang 2001: 644).

Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 295) argue that the peer review system is an important component in scholarly publication and is now a fairly well-described process. Weller (2000) indicates that the peer review process of e-journals is generally similar to the traditional process found in paper-based journals. Although new models of editorial peer review have been suggested it is most important that any new model maintains the integrity of science and scholarly communication and yet implements the new emerging electronic environment. As an example Weller (2000) mentions that in the electronic environment there is a need to re-examine the anonymity of reviewers. Peer review is an important issue when considering the scholars role in the scholarly communication system. The number of fee-based online journals has risen dramatically, confirming the notion that traditional academic publishers have joined the ranks of electronic publishing (Mogge 2000).

Regarding the development of preprint databases the internet as a new medium played a vital role. Arising out of the scholarly community's discontent with publishing delays and distribution problems with paper journals, Paul Ginsparg created Los Alamos ePrint archive in 1991 (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 296). Smith (1999: 5) who sees traditional journals merely as an overlay on preprint databases describes the powerful position of eprint archives:

The tension concerning responsibility for public distribution and communication of new work has been resolved in favour of the electronic preprint databases. Traditional journals still have some role in communication, providing archival material and inter-linking, but they no longer form the primary communication medium at either the formal or the public levels.

The internet has changed the perception and use of this document type at least in some science domains where rapid dissemination is required. However, according to Fjørdbæk Søndergaard, Andersen and Hjørland (2003) further research is needed to identify and explain differences between domains on this matter.

### **2.6.3 Grey literature**

The Fourth International Conference on Grey Literature defined grey literature as follows: that which is produced on all levels of government, academia, business and industry in print and electronic formats, but which is not controlled by commercial publishers (Grey Literature Network Service 1999). Grey literature on the internet is, if possible to locate, very easily accessed compared with non-internet-based alternatives. The internet has created an opportunity to make grey literature publicly available without the expenses of traditional publication. Goodrum *et al.* (2001: 662) state that “authors, institutions, and archives are making formal research publicly available on their Websites in PDF (portable display format), Postscript, and other formats”.

Several organisations, associations and information systems such as the European Association for Grey Literature in Europe (EAGLE), the System for Information on Grey Literature in Europe (SIGLE) and the British Library Document Supply Centre (DSC) are making special efforts to raise awareness of, and provide access to, grey literature such as reports, theses, translations, noncommercial conferences and official (government) material. Several bibliographies (often domain specific) devoted to grey literature can be found on the internet (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 297).

### **2.6.4 Communication channels and the internet**

According to Søndergaard, Andersen and Hjørland (2003) the formal documentary units (in particular journal articles) on the internet may reach the user through diverse organisational units (see Figure 3), such as the following:

- In the literature these databases are not referred to as clearinghouses as found in the original UNISIST model. On the internet the term clearinghouse seems to denote some kind of annotated directory or resource guide;
- Preprint databases primarily flourish within the science domains such as the Los Alamos ePrint;

- Bibliographic or full-text databases. Representing both commercial (First Search, Lexis-Nexis) and non-commercial databases available on the internet (OPACs also called electronic libraries or e-libraries).
- Scientific and research organisation's servers;
- Publisher websites;
- Virtual libraries; and
- Search engine or meta search tools (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 297-298).

As with the role played by preprints, Smith (1999) also anticipates changes in the function of preprint databases. Preprint databases are expected to become responsible for public distribution and communication of new works. This development means that the user will need to have great domain specific knowledge or expertise since the content of these databases may not necessarily have finalised the peer review process. For this reason Smith presumes the review papers will take on a more prominent role in providing guidance to the literature for those not sufficiently familiar with the domain to deal with the raw (non reviewed) preprint literature. Therefore, according to Fjørdbæk Søndergaard, Andersen and Hjørland (2003) the preprint databases are positioned in the midst of the primary sources in the flow of internet-based scholarly information (Figure 2). The majority of bibliographic or full-text databases, for example, Web of Science are available via the internet. Commercial bibliographic and full-text databases mainly evolve around articles from peer reviewed journals and to a lesser degree conference proceedings and books.

Fjørdbæk Søndergaard, Andersen and Hjørland (2003) argue that the preservation of paper-based scientific communication is a part of the secondary organisational units in the original UNISIST model (for example libraries' copyright deposits). However, regarding internet-based scientific communication exclusively, the division of labour is still inconsistent and selective.

According to Søndergaard, Andersen and Hjørland (2003) publishers' Websites are increasingly providing access to publications in addition to more traditional

information such as subscription prices, contributor instructions and review policies. The specific searching and browsing facilities on these sites vary. Likewise both opportunities to view, print or request documents differ and whether or not such services require payment varies also. Traditionally the publishers' role was principally connected to selection, production and distribution of the primary sources. However, a movement towards the tasks of storage and dissemination can be found on the internet. Some publishers are beginning to utilise cross-referencing or reference linking as a browsing option. CrossRef is a collaborative reference linking service that functions as a sort of digital switchboard (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 299). It holds no full-text content, but rather effects linkages through digital object identifiers (DOIs) that are tagged to article metadata supplied by the participating publishers. The end result is a linking system through which a researcher can click on a reference in a journal and access the cited article.

These facilities, however, are only available to the users who subscribe to the various publications. A researcher clicking on a CrossRef link will be automatically connected to a page on the publisher's Website showing a full bibliographical citation of the article, and, in most cases, the abstract as well. Subscribers are generally authenticated for full-text access, and non-subscribed users presented with other options for access (such as subscription, document delivery or pay-per-view). Researchers in library environments may find that CrossRef links redirect to local holdings (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 299). This development suggests that publishers are addressing the task of providing traditional secondary sources such as indexing and abstracting services. Fjørdbæk Søndergaard, Andersen and Hjørland (2003) argue that if cross-referencing between the diverse publishers becomes standard a new and potentially powerful information-searching tool may arise.

Virtual libraries can be used for detecting some formal communication units as well as most informal types. Lally (2001: 84) describes virtual libraries as:

... [b]ringing together the diverse kinds of information which researchers draw in during the process of doing and disseminating research, including things which were never found in the library in the traditional sense, clearly makes sense in an electronic environment.

Aids such as domain specific dictionaries, glossaries, taxonomies and thesauri of various quality and coverage can be found on the internet, mostly free of charge or as value-added service connected to fee-based databases, virtual libraries or clearinghouses (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 300). The documentary units of the internet can also be reached by search engines or diverse meta search tools. Although very often helpful, these retrieval algorithms or search engines typically suffer from a lack of semantics (controlled vocabulary) which effect efficient retrieval of information (Dornfest and Brickley 2001).

In Figure 2 the various internet searching tools (search engines/meta search engines and virtual libraries/directories/clearinghouses) are positioned collectively in the centre box. According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003) the dotted line surrounding the searching tools shows that although the box embraces all lines from producer to user, none or all may be used in the user's information-seeking activity. Fjørdbæk Søndergaard, Andersen and Hjørland (2003) conclude that the internet as a medium does in fact include some kind of representation of nearly all the diverse organisational and documentary units presented in the original UNISIST model (as shown in Figure 2). The original organisational and documentary units of the UNISIST model are replaced with those of the internet. However, only a few changes have been made to the overall structure to fit the internet-based communication flow. The most influential changes found in the flow of internet-based scholarly information (Figure 2) compared with the original UNISIST model (Figure 1) are: the presence of preprint databases, and the box in the centre of the model containing various internet searching tools (such as search engines/meta search engines and virtual libraries/directories/clearing houses). In addition the absence of data centres (as justified previously) must be noted, as well as the somewhat different use of the term clearing houses when dealing with the internet.

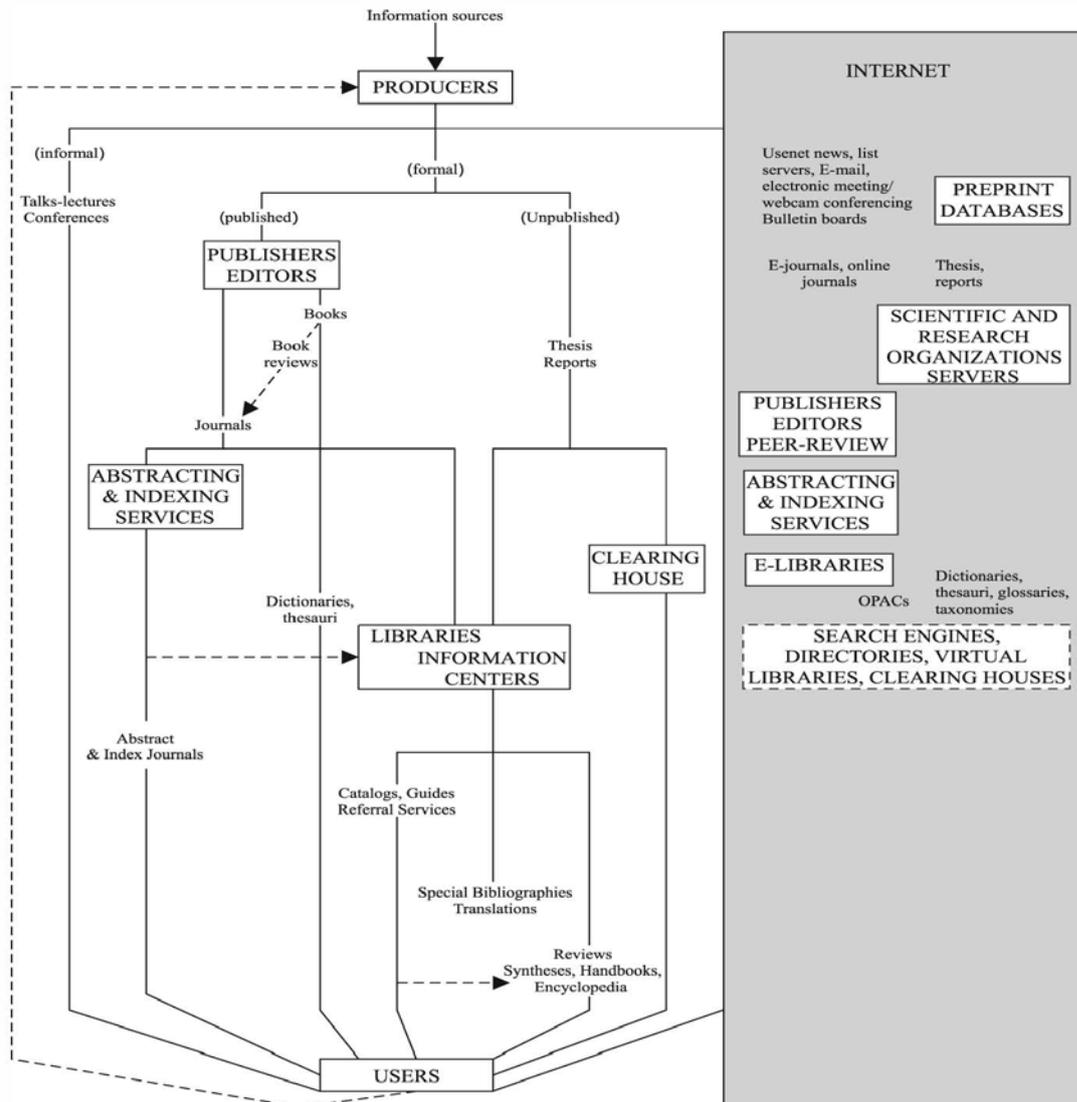
Furthermore, as stated by Smith (1999), the flow of computer-mediated communication can cause a modification of the traditional categorisation of documentary units in document types. Some of the documentary units may broaden or even modify their categorisation in document type (primary literature, secondary literature and tertiary literature), and this has resulted in problems defining exactly when an internet document is 'published' or not. In the electronic environment it also

becomes difficult to define the concept of a document. When is something an independent document and when is it only part of a document?

### **2.6.5 A suggestion for the integration of the internet in the UNISIST model**

An update of the UNISIST model must integrate the organisational and documentary units found on the internet, since these have become significant in the scientific flow of communication. The flow of scientific communication is in a transition phase where both the computer mediated communication and the well-established traditional communication system (the left side of Figure 3) are often used for much the same purposes. Figure 3 thus should embrace both the more traditional communication channels (displayed at the left) and the later computer-mediated communication channels (displayed at the right) (Fjørdbæk Søndergaard, Andersen and Hjørland 2003: 301).

**Figure 3: The communication of scholarly information**



Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 302)

According to Fjørdbæk Søndergaard, Andersen and Hjørland (2003: 301) Figure 3 contains the entire computer-mediated communication in a box. Here the various organisational and documentary units presented in Figure 1 are “floating” around with possible direct interaction with each of the elements – whereas the traditional communication channels (displayed at the left-hand side) have a somewhat more restricted flow. Several researchers have pointed to the fact that each domain will adjust and take advantage of those aspects of the new media which best fit into its social organisation (Russel 2001; Hurd 2000). In other domains, acceptance and use of computer-mediated communication will catch on more slowly as argued by Thompson (2002). Based on an analysis of citation patterns in the humanities,

Thompson (2002) found that, “[e]lectronic publishing is not generally considered a viable alternative to print publishing”. However, a number of electronic publishing projects have been undertaken in the humanities (Thompson 2002: 132), and Thompson believes that the citations are lacking due to the relatively long median citation age found in the humanities. This means that the renewed UNISIST model may fit some domains better than others.

It is this updated model depicted in Figure 3 that was adopted to provide the conceptual framework for this study.

## **2.7 Summary**

In this chapter, the UNISIST model which provides the conceptual framework for this study is discussed. Aspects of the model that relate to the study are highlighted. In terms of the model the knowledge producers in the academic environment are the scholars. These scholars have three main categories of information distribution channels available for communicating research. The final unit in the model represents the users who are also the producers. In the context of the present study, scholars who are producers are also users of the library’s information service. In the model, libraries together with other information services are considered secondary information services and have a particular function to perform. In the context of the university library this would be to provide access to information for scholars and other users. Since the internet-based communication channels have changed the flow of scientific communication, the UNISIST model had to be revised to reflect and accommodate these changes.

## **Chapter 3**

# **Scholars and the gift exchange economy**

### **3.1 Introduction**

The review of related literature involves the systematic identification, location, and analysis of documents containing information related to the research problem (Gay 1976: 29). It intends to indicate where the present study fits into the broader debates, thereby justifying the significance of the study (Pather 2004: 72). The scholarly communication system as mentioned in Chapter One is made up of three key role players, the scholars (authors or academic staff), publishers and academic libraries and librarians. The broader debates relating to each of the key players are discussed in subsequent chapters in light of their role within the scholarly communication system. Scholars perform their role within the system, within the context of the gift exchange economy and the publish or perish paradigm. For publishers the debate centres on the traditional publishing module, alternatives to the traditional model, such as e-publishing and more importantly the economics of academic publishing. To provide contextual information the publication of South African research is included. The major themes academic libraries face is that of having to provide a service to their users (including the scholars) while faced with budgetary constraints as a result of the spiralling costs of journal subscriptions. For this reason, issues relating to funding of academic libraries and journal cancellation factors are examined in detail.

## 3.2 The gift exchange economy

According to Cheal (1988) in the social sciences, a gift economy (or gift culture) is a society where valuable goods and services are regularly given without any explicit agreement for immediate or future rewards. Lewis Hyde (1983: 8-9) locates the origin of gift economies in the sharing of food, citing as an example the Trobriand Islander protocol of referring to a gift in the Kula exchange ring as "some food we could not eat", even though the gift is not food, but an ornament purposely made for passing as a gift. Information is particularly suited to gift economies since traditional scientific research can be thought of as an information gift economy. Scholars produce research papers and give them away through journals and conferences. Other scholars freely refer to such papers. All scholars can therefore benefit from the increased pool of knowledge. The original scholar receives no direct benefit from others building on their work, except an increase in their reputation.

In order to understand the concept of the gift exchange economy one has to understand the context in which the key role players, namely, the scholars (authors or academic staff members), publishers and the librarians, in the system of scholarly communication, operate. In the Middle Ages, the monks through their monasteries were the custodians of knowledge, usually contained in manuscripts. The monasteries were the houses of teaching and learning. It was only with the advent of the Gutenberg printing press that this whole arrangement changed completely (O'Connor 2000). The universities were born and grew while increasingly making their scholarship available with the assistance of these new presses. It is within this context that the role of the library as a repository came to the forefront. The modern library grew from the relationship between scholar as author and the library as repository and navigator. It is important to note that it is only in recent times that the publisher has joined in the process as a role player. The process which now resembles a loop is elaborated on in more detail in Figure 5. The author (scholar) is in fact also the user; while the publisher survives on the business of the authors via the financial sustenance of libraries; the publishers carry out the role of editing, publishing, and distributing, while the libraries carry out the informational/navigation and archival roles (O'Connor 2000). The publisher and the library together have a

symbiotic relationship in support of the author (scholar). Sir Roger Elliott saw this in pragmatic terms:

The scientific community worldwide has come to realize that as author and user it is in a strong position to drive the changes for the maximum benefit of the community (Elliott 1997: 352).

The above comments by Elliot suggest that solutions to the crisis in scholarly communication lie mainly with the scholars.

### **3.2.1 The beginnings of scholarly communication**

According to Oppenheim, Greenhalgh and Rowland (2000) the roots of formal scholarly communication can be traced back to England during the 1640s to what is now called the Invisible College. Later to become the Royal Society, this group of scholars met regularly to learn about new experiments, present papers and announce results. Private letters aided communication and helped to include those scholars who were unable to attend meetings. As the number of letters grew, the journal emerged as a more efficient means to exchange information on a broader scale. Journals were published by the learned societies. Amongst the first journal titles were *Journal des Sçavans* and the *Philosophical Transactions of the Royal Society of London*.

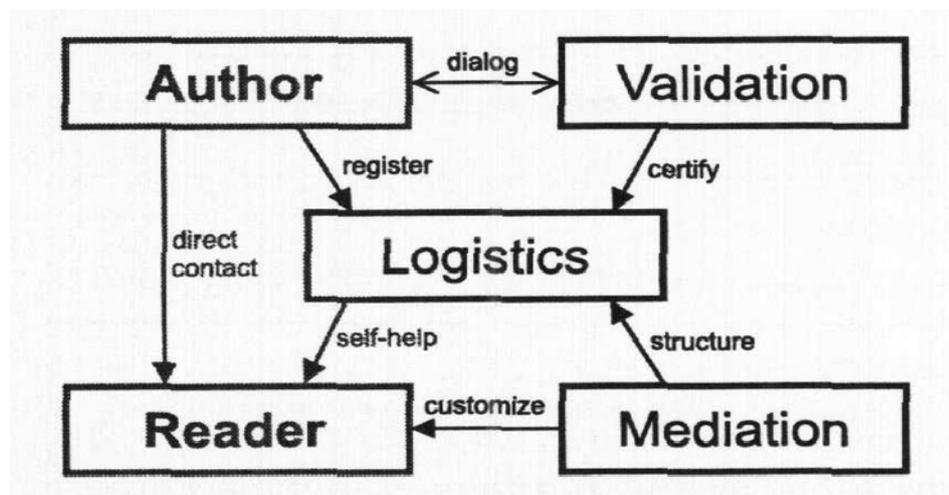
Initially the journal was primarily a collection of letters. These enabled scholars to communicate and keep an archive of results and observations. Scholars began to carry out the function of registering the 'ownership' of scientific discovery and of presenting information as an indexed archive. Today, the journal is entrenched within the academic reward system. Through publishing research in a journal, the author gains prestige and is rewarded through tenure, promotion or funding. Articles are usually validated through peer review using anonymous referees. The scholarly journal has therefore become the medium of pre-selection in the preservation and archiving of scholarly literature. Seen as the final repository of knowledge within academic disciplines, the printed journal is a resource to be distributed and sold (Oppenheim, Greenhalgh and Rowland 2000: 361).

### 3.2.2 Knowledge as a public good

Scholars have long understood the public good nature of scholarship, which has been organised to ensure that research is made freely available to the public. This arrangement has been dubbed a gift exchange: scholars give free access to their research and in turn receive access to the research of others. Until recently, the only major exception to this system was in the area of patented research, but essentially all other research reports were part of the gift economy (Edwards and Schulenburger 2003). Scholars knew that it was in the interests of science and society for the gift exchange to work smoothly, and thus they organised themselves into scholarly societies, the major purpose of which was to publish journals that widely distributed the results of their inquiries.

Thus the cultural values that underlie the process of scholarly communication are the freedom of exchange of ideas and results (Waijers 2002: 166). Therefore, the more that free communication is hampered, the more inefficient the process of knowledge generation becomes. The communication process needs a professional infrastructure that validates authors (Figure 4), and is based on reliable logistics and mediates for users, that is, gives them support.

**Figure 4: Reference model for core competencies in scholarly communication**



Waijers (2002: 166)

These three core competencies; validation, logistics and mediation, represent the classical values respectively of quality, secure storage and adequacy of information. These values fuel the communication process, which would not work without them. The values *per se* are culturally embedded and medium independent, although their appearances may differ as a consequence of the technologies applied. Waaijers (2002) describes the communication process as an inter-human one within the scholarly community, where peers judge the work of scholars. The mainstream of the validation process takes place inside academic institutions such as universities, research organisations and learned societies:

Here, reports are assessed, doctorates conferred, books edited, papers admitted to a conference, tests marked, prizes awarded, articles accepted in journals, documents included in collections and references selected for a library collection or database (Waaijers 2002: 167).

The corresponding professional activity performed by the publishers, is to organise and maintain open selection processes according to objective and acceptable standards. Unfortunately, a relatively small portion of the selection process lies with these global high-profit-driven publishing monopolies, and in the university culture of constant validation and quality assessment, these publishers therefore form an anomaly. What is more, the core activities of editing and refereeing these journals are, in fact, executed by academic staff (Waaijers 2002: 167). Why then do scholars publish in the journals controlled by the monopolies if such an anomaly exists? The reasons why scholars publish are discussed in greater detail later on.

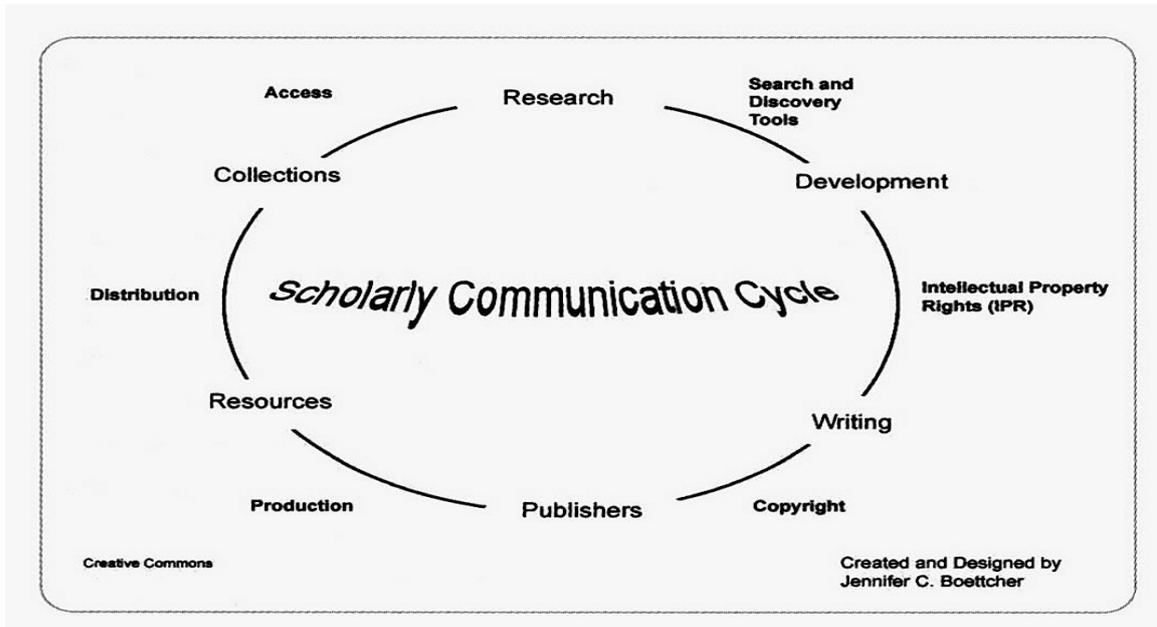
According to Waaijers (2002) information logistics are reliable when they register accurately, secure authenticity, guarantee access and retrievability and safeguard availability. Authenticity in the paper format is best met by mass printing, wide dissemination and distributed storage in library stacks. Cataloguing ensures retrievability, while document supply through inter-library lending safeguards availability. Waaijers (2002) argues that in the digital world, the respective requirements are met by time-stamping and 'freezing' of the article, limited storage in networked repositories, automated indexing and attaching meta data, followed by open access, downloading and printing.

According to Waaijers (2002) scholars and readers do a lot of the logistics work themselves by organising seminars, making telephone calls, e-mailing, and so forth. Confining the argument to information logistics in the direct sense, the main parties are publishers, serial agents, database builders and libraries. The third core competence, user support or mediation, is about structuring information. Structuring information has essentially been the domain of the academic library, which uses various tools to organise information in order to make it accessible to the user. Waaijers (2002: 167) argues that mediation is successful when the user is supplied with the right information.

### **3.2.3 Why publish research?**

The creation and dissemination of knowledge is a fundamental aspect of an academic career. Scholarly journals have been the traditional outlet for disseminating knowledge and the prestige and perceived quality of publications in these journals has enabled the evaluation of academic staff contributions resulting in positive or negative promotion and tenure decisions (Speier, Palmer, Wren and Hahn 1999). According to Boettcher (2006: 24) research is defined as work done by scholars for promotion, teaching, professional development, or social good. This work done by scholars, who are mostly academic staff members, is dependent upon access to information. Boettcher (2006) illustrates this work by referring to the scholarly communication cycle (Figure 5). Half the cycle is made up of the research framework, while the other half is made up of the publishers' framework which is discussed in more detail later.

**Figure 5: Scholarly communication cycle**



Boettcher (2006: 24)

The research can be presented at conferences and in working papers, it can be sent to colleagues, or to weblogs. Additional authors may be added or dropped at this stage. Authors search for previous work and/or browse journals and other sources to be inspired by new discoveries. The scholars or the organisations they work for formulate their intellectual property rights with the part of the completed research work. The scholars then write up the work and submit it to a print or electronic publication. At this stage they have complete control over their intellectual property rights. All their intellectual efforts and hard work in the creation of their articles or books becomes a commodity called copyright, which has an economic value and once controlled by publishers, can be traded (Boettcher 2006: 24).

Therefore different value systems seem to operate within the scholarly communication system. Scholars operate within the gift exchange economy while publishers operate in a for-profit economy:

Universities and colleges find themselves trapped between the expectations of their academic staff members, who often consider the work of research and scholarship as essentially a free good, and the market strategies of commercial publishers, who understand how valuable these commodities are to the workings of the academy.

Caught in the middle of these varying value systems are the librarians:

To focus on the 'library as the problem', however, is to confuse symptom and disease. The underlying issue is the disjunction between the sociology and the economics of academic publication itself – the processes through which the research community disseminates knowledge and judges the quality of work produced by its members (To publish and perish: a policy perspectives roundtable 1998: 19-20).

### **3.2.4 Counting the costs**

As noted above the process of scholarship depends on the free exchange of information, from disseminating the latest research findings to preserving them for future use. Built into this system are standards for evaluating research by way of the editorial boards of scholarly journals made up of scholars who determine who and what gets published. Also built into this system is the willingness of the creators of the research to submit their articles free of charge and the willingness of editors and referees to peer review the articles also without a fee (Yiotis 2005b). Costs are incurred in printing and publishing the journals, rather than in the payments of royalties or fees to the writers or editors (Association of Research Libraries 2000). As noted earlier, scholars publish their research in peer reviewed journals not for financial, but for professional gain because:

Publishing exposes one's ideas to a wide audience and can yield impact and professional recognition. The system of scholarly communications that has existed for hundreds of years consists of research and other scholarly writings created free of charge, edited or peer reviewed also free of charge, printed and published at a cost, and sold to libraries and research institutions for dissemination (Yiotis 2005a:157).

Similar to Boettcher's (2006) scholarly communication cycle with its research and publishers' framework, the scholarly communication system can be viewed as having six parts: creation, quality control, production, distribution, consumption and support (Association of Research Libraries 2000).

Creation, the key of the model, is the domain of scholars. Quality control, the editorial process through rigorous peer review, is also the responsibility of scholars. Production is the job of the publishers. Distribution is handled by both libraries and publishers, with libraries disseminating the finished publication to most readers. Consumption is also the domain of scholars along with students and nonscholars. Underlying the system is the support provided by institutions, such as universities, governments, granting institutions, and taxpayers (Association of Research Libraries 2000).

According to Bjork and Hedlund (2004) a breakdown of the costs of producing and delivering a typical refereed journal paper indicates that perhaps as much as 90% of the cost consists of the actual research work preceding the writing of the paper. The research work is usually financed by public bodies and the costs are in no way recuperated through the sales of publications (as would be the case for commercial products such as books, music compact disks, movies, and so forth). Even if one only looks at the costs of preparing, reviewing, distributing, archiving and retrieving scientific articles, this excluding the actual production costs of the knowledge reported on, almost all the costs are in the end borne by the universities and libraries that hold the collected body of research.

Bjork and Hedlund (2004: 8) further argue that because of the commercial interests of one group of stakeholders, the commercial publishers, which incur a very small fraction of the total life-cycle cost, the access to scientific publications is highly restricted and expensive and the process as a whole is highly controlled by publishers. The dilemma is that it would be in the interests of the researchers and the public to have unrestricted access to the information. Nevertheless it is in the legitimate interest of the publishers to make a profit from selling this information, which leads to restrictions. Thus one could argue that communication of knowledge is currently restricted and hence the crisis in the scholarly communication system. As a result of the "publish or perish" ideology, scholars have produced more knowledge at an alarming rate in order to secure job promotions and tenure. Thus even though more knowledge is being produced its communication is restricted.

### 3.2.5 An explosion in scholarly research

An explosion in scholarly research and information began in the 1960s and 1970s, brought about by increased federal spending in support of higher education in the United States of America, and resulting in great advances in science and technology (Association of Research Libraries 2000). Federal research dollars flowed into higher educational institutions during and after the Cold War. As a result university faculties grew because of expanded enrolments. Many universities aspired to and won research status. The pressure intensified on academic staff to publish and obtain research support through grants. As a result, the quantity of research grew beyond the capacity of the scholarly publication system, which was then still dominated by scholarly or learned societies. Enterprising commercial publishers became interested in the potential profits to be made from publishing in the context of a well-established creative source and an equally well-established pattern of consumption. Scholarly societies ceded their journals to commercial publishers. Existing journals expanded and new journals were formed until a majority of the market was in the hands of the commercial publishers. Eventually, scholarly communication became a multibillion dollar international business:

By the end of the twentieth century, ownership of information content created by scholars and then given away by them-had become the linchpin of a huge and profitable industry (Association of Research Libraries 2000).

Thus the gift exchange economy value system began to break down. At the time commercial publishers recognised that research generated at public expense and given freely for publication by the authors represented a commercially exploitable commodity. These firms approached scholarly societies and others with a simple proposition:

Let us take over the drudgery of publishing, making financial arrangements, and doing the inventory, pricing, and subscription management; this will leave you the refereeing and academic functions. In addition, for the right to manage the business portion of your journal, we will pay a stipend for your scholarly society or university. Reflecting on their experiences that their low journal prices usually only covered costs, and sometimes even required subsidies, some

scholarly societies, universities, and other publishers of journals in the gift-exchange economy accepted these offers (Yiotis 2005a:158).

The commercial publishers, who recognised the relative inelasticity of both supply and demand, acquired top-quality journals, and then dramatically raised prices, expecting that they would lose relatively little of the market, especially since the scholars are also users in the system. Ironically, scholars will not accept a lack of access to the top journals in their fields and will demand that their university libraries provide access, regardless of the price (Yiotis 2005b).

The commercial publishers quickly proved that prices could be set far above the level that the scholarly societies had established allowing for large profit margins. Unfortunately many scholarly societies that did not choose to sell their journals to commercial companies nevertheless learned that there were profits to be made and began raising their prices as well. However, society publishers were a little more modest in their price increases than the commercial publishers (Tenopir and King 1999). The move from the gift exchange economy resulted also in further restrictions on the communication of knowledge in terms of copyright and fair use which operate within the publisher's framework.

### **3.2.6 The publisher's framework**

A publisher takes or buys the copyrighted material, and distributes it to the world. Commercial and nonprofit publishers traditionally provide the services and production necessary to distribute books and journals in print or over the internet. This production includes managing the peer review process and the resubmissions by the original authors, as well as editing the work and coordinating all logistics of the operations. Publishers produce resources such as journals, books, websites and so forth. These resources, be it books or journal articles, are the finished product on which authors develop their reputations. They become records in their field of study, available for others to examine and build upon. Publishers and aggregators distribute these resources. The resources are then destined for library collections. Besides libraries there are also commercial databases, institutional repositories, personal

collections of scholars and other places that hold such resources. Libraries collect from distributors and act as points of access for scholars doing research.

Traditionally, access has included inter-library loan services as well as other ways in which the fair use doctrine has helped the scholarly community (Boettcher 2006: 25). Therefore, the question of ownership of the knowledge created originally in the context of the gift exchange economy is important.

### **3.2.7 Ownership of published material**

In the past 20 years the ownership of many of our publishing houses has changed a number of times. The convergence of ownership among these publishers is a matter of some concern among the world's regulatory bodies such as the International Telecommunication Union<sup>2</sup> (ITU) (O'Connor 2000). Some examples of converging ownership include electronic providers of information. Elsevier and Pergamon were acquired by Reed. Information Access Company (IAC) and the Institute for Scientific Information (ISI) were acquired by Thomson. Knight Ridder who owned DIALOG was in turn bought out by MAID in the United Kingdom (who already operated Data-star) and has subsequently been bought by ProQuest. Carfax and Academic Press were acquired by Routledge. Swets and Blackwells, the two serials subscriptions agencies merged, including as well the academic divisions of Baker and Taylor and Yankee Book Peddler. What this pattern of purchasing amounts to is that the commercial publishers market is dominated by multibillion dollar companies such as Elsevier and Thomson who operate in a for-profit economy.

The ownership of these publishing companies is important in that they singularly and collectively own the intellectual output of the universities in the western world (O'Connor 2000). Under the copyright provisions in most countries the publishers control the output for the lifetime of the author and a further 70 years. Therefore, the authors have transferred all rights for the duration of the copyright declaration, which is required to be signed before publication proceeds. Universities generally have allowed their authors to retain the copyright of the work which they have produced while in their employ. However, universities have not retained any concession of

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<sup>2</sup> The ITU is essentially a technical and regulatory body that regulates telecommunications worldwide (Zhao 2002: 293).

internal use when the author has published the work. Once the work has been consigned to a publishing house the universities have no recourse to or control over what happens to that output. This restriction is despite the fact that their authors conceived the ideas, conducted the research, and gained promotion on the basis of that publishing effort. In the case where the ownership of a publishing house is transferred to another organisation, then the rights to the intellectual property would be sold with it, being the most important asset of the publishing house. Any re-use of the intellectual output of the universities by these new owners would be entirely allowable. Surely, this is not what scholars and their universities envisaged when they created the knowledge in the context of the gift exchange economy? Especially since peer review, conducted by the scholars, is the backbone of this process, and 90% of the costs are covered by the universities, and yet the intellectual property rights are owned by the publishers rather than the authors or universities. Thus questions are raised regarding 'fair use' of the knowledge generated originally within the context of the gift exchange economy.

### **3.2.8 Fair use**

According to O'Connor (2000) 'fair use' has been an implied central tenet of the scholarly communication process since the nineteenth century. Most communication has been published to inform and communicate developments and not for profit, in keeping within the value system of the gift exchange economy. However, the issues of promotion, tenure, and competitive grants-based research publication output within the context of the 'publish or perish' ideology have complicated matters. The fair use concept has a direct link to copyright. The current debates regarding changes to the copyright environment based around the Berne Convention<sup>3</sup> have seen a move to protect the interests of the publisher even further within the scholarly communication system.

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<sup>3</sup> The Berne Convention for the Protection of Literary and Artistic Works, usually known as the Berne Convention, is an international agreement governing copyright, which was first accepted in Berne, Switzerland in 1886 (O'Connor 2000).

According to O'Connor (2000) in the current context, it is true that authors' rights are protected and enshrined in the basic tenets of copyright law. If, however, scholarly communication in terms of the gift exchange economy, is primarily not about profit then the revisions to the copyright acts are very much about protecting publisher interests. The achievement of an author royalty for a journal article is almost, if not entirely, unheard of given the nature of the 'publish or perish' ideology. The tenet of fair use is very much under threat with various proposed revisions to copyright legislation across the globe. The loss of 'fair use' will increase costs, which in turn will effect the functioning of the libraries within the system. In addition and more importantly, it will severely affect the purpose of most scholarly publishing, which is the free exchange of ideas within the gift exchange economy.

There is a clear and sharp economic aspect to this issue. To the universities, 'fair use' is about communication and access; to the publishers 'fair use' is about economic return. For the libraries 'fair use' is about restrictive costs that prohibit access to resources for users.

Therefore, in the last decade or two the scholarly communication system has undergone a dramatic transition, one that is far more fundamental than a simple switch from nonprofits to for-profit publishers. The old model operated on the basis of gift exchange to ensure wide distribution of what was readily acknowledged as clearly a public good. The new model operates for profit; it essentially says, "If you want access, pay up, and we'll set the price" (Edwards and Shulenburger 2003: 14). The impetus for the new for-profit model has been a direct result of the 'publish or perish' paradigm.

### **3.3 Scholars and the publish or perish paradigm**

During the past four decades, the publish or perish principle appears to have become the way of life in academia (Denning 1997). Byrne (2002) referred to this as the publish or perish syndrome. De Rond and Miller (2005: 322) argue that few aphorisms enjoy more familiarity within the academic community since publish or perish signifies the principle according to which an academic staff member's tenure

is primarily a function of his or her success in publishing. De Rond and Miller (2005) further argue that recruitment, promotion, and tenure appear to be decided primarily based on the number of articles published in a fairly select group of peer-reviewed journals, based on their relative impact, selectivity, and relevance to reputation and influence. After all, publishing is the primary currency for academic staff members. Publishing grants academic staff members' mobility on an international scale and, by implication, bargaining power and promotion opportunities. The principal determinant of recognition, prestige, and mobility at international level for academic staff members is publication (Bedeian 2004). According to Calabrese and Roberts (2004: 336) academic staff members, early in their careers, realise that professional success is secured or lost based on how well they understand the competitiveness of publishing in academic journals. However, there are many criticisms to this approach. One may go as far as to argue that this paradigm has fuelled the crisis in scholarly communication.

### **3.3.1. Defining the paradigm**

The *Online dictionary for library and information science* (Reitz 2003) provides the following definition for the publish or perish paradigm:

The expectation that academic professionals (including academic librarians) who wish to qualify for tenure and promotion and further their careers should engage in creative endeavor appropriate to their field and publish their results. Some have argued that this expectation has led to a decline in the overall quality of published output. In August 2001, Tom Abate suggested in an article in the *San Francisco Chronicle* that in the biosciences, the academic credo has become 'patent and profit'.

The above definition is appropriate in describing the publish or perish paradigm in that it highlights the risk of linking academic staff promotions to research outputs. It must be noted that the issue of academic librarians as academic staff members is not a consideration of this study.

### 3.3.2 The context in which higher education operates

In an attempt to understand how scholars or academic staff are effected by the publish or perish paradigm, one has to understand the context in which higher education operates. Vannini (2006) argues that in recent years the system of higher education in the United States, as well as the rest of the world, has been subjected to a large amount of pressure towards change. This pressure has resulted from economic downturns and the need for cuts in public spending which has pushed universities to become more efficient, productive, accountable and flexible (Gould 2003). Faced with many challenges, universities and academic work have undergone a significant structural and cultural metamorphosis (Altbach 1997). Cuts in state funding to universities have pushed institutions to pressure academic staff to do more funded research in order to secure higher amounts of grant money (Gould 2003). Interview data from Vannini's 2006 study showed that academic staff identified two forces that shaped their experiences, forces generally known by them as the paradigm of 'publish or perish' and get 'grants or perish'. Vannini (2006: 241) argues that these distinct but closely interconnected occupational ideologies are forms through which institutional power is manifested across different colleges, schools and departments:

Simply put, 'publish or perish' shapes the academic staff members work by directing their energy toward conducting research and publishing in great volumes. At a research university if a academic staff member fails to publish he/she will perish professionally; in other words, he/she will not receive tenure, promotion, salary raises, or other perks (Vannini 2006:241).

'Get grants or perish' is a newer institutional force according to Vannini (2006) which over the last twenty-five years has increased as a result of decreased state funding to universities. However, it must be noted that academic staff especially in the natural sciences have always needed to seek research grants. The problem with this 'get grants or perish' approach is that it works by rewarding academic staff who engage in funded research and penalises academic staff in fields where grant money is scarce or absent. Therefore, the approach results in structural inequalities in

academic work since the humanities cannot compete for funding with the natural sciences, and as a result their sheer survival is in danger:

The work of the professoriate in these departments is informed by, as professors put it, the CYA and JYE modus operandi: 'Cover Your Ass' and 'Justify Your Existence'. Both CYA and JYE refer to the need that professors have in the humanities to continuously show proof of their relevance in order to justify both their own employment and the very existence of their departments in the face of their status as alleged financial liabilities. CYA and JYE call for carefully documenting every aspect of work in order to defend one's employment whenever asked to justify it (Vannini 2006: 243).

Therefore, university departments have different concentrations of research-active academic staff and 'teaching academics'. Research-active academics are numerous in biology, chemistry and physics. These academics conduct heavily-funded research and some of them also enjoy excellent international reputations. Nevertheless, Vannini (2006) argues that many of these research-active academics are completely uninterested in teaching, especially at the undergraduate level. Instead, it is in the humanities, where funds and prestige are much lower, that teaching truly takes place. Vannini's study also found that academics in the humanities who were committed to teaching were frustrated by the lack of time they had to teach since they were forced to dedicate more time to research.

Therefore, universities have shifted their focus from teaching to research outputs. Luke (2005) describes this change in focus as a shift from pedagogy to performativity which he attributes to neoliberal educational policies. This view sees the modern university as part of the knowledge economy where information and knowledge are commodities. As a result university managers increasingly view their institutions' departments as knowledge assets that can be exchanged for profits through the publish or perish paradigm:

In the sphere of knowledge production, research university products begin circulating along the same lines as money, instead of for its 'educational' value or political ...importance; the pertinent distinction in scholarly communication and academic research would no longer be between knowledge and ignorance,

but rather, as is the case with money, between 'payment knowledge' and 'investment knowledge'... (Lyotard 1984: 5).

In keeping with Luke's (2005) view, Strait and Bull (1992) note that there is no such credo as 'teach or perish'. Teachers are denied promotions and pay raises because they do not do enough writing, and teaching is deemed the low end of the career and prestige ladder. The system has caused professors to treat teaching as 'wasting time with students' because it uses up precious time that might otherwise be devoted to research.

In terms of the publish or perish paradigm, universities require academic staff members not only to write, but to have their writings published, preferably in top tier refereed journals in the field. According to Lawrence and Honeycutt (2005) a typical job description for a senior academic staff member in higher education likely includes the following directives:

Conduct research on [named issues] consistent with the mission of the university, obtain grants and contracts to support a research program in [named program]; support graduate students on funded research projects; present results of research projects at appropriate professional meetings at local, regional, national and international levels; and publish research results in appropriate refereed journals, as well as in other types of information outlets (Lawrence and Honeycutt 2005: 87).

From the above description Lawrence and Honeycutt (2005) argue that it is virtually impossible to achieve these mandates without having published. Publication has long been, and continues to be, a major job requirement for many university academic staff members in tenured tracked positions. Publication records, especially for promotion and tenure decisions, are used to compare the quality and quantity of academic staff publications with those of peers within the same discipline and those of academics from other disciplines (Chan, Chen and Steiner 2002). For academic staff who serve at the assistant professor rank at universities, the words "publish or perish" can be taken literally, that is, publish or risk losing your job because obtaining the associate professor rank along with tenure (job security) has depended largely on the ability to publish (Miller and Harris 2004).

To advance to the rank of full professor, a sustained record of publication is typically required and, once that academic rank has been achieved, academic staff members must continue publishing or possibly fall into the category of the 'unknown' or the 'unproductive' or less compensated (Lawrence and Honeycutt 2005). Also, academic reputation rests on publication (Clemens, Powell, McIlwaine and Okamoto 1996). The work of academics who have published is more credible in the sense that it enables the writer to be perceived as an authority on a specific subject. Being perceived as an authority has numerous benefits, such as being more likely to secure grants and contracts and to attract graduate students. Furthermore, with authority arrives trust, and other researchers will cite the work. Citing is used as a means to determine the influence of the work (Lawrence and Honeycutt 2005 87). Lawrence and Honeycutt (2005) are supported by Hanna (2005) who states that:

There are psychic and other benefits to authors of being cited in various outlets, including the popular press, but the number of citations by other researchers is a key indicator for advancement.

Lawrence and Honeycutt (2005) further argue that not only is publishing a factor in advancement decisions that likely effect academics' compensation and resource allocation, it is a critical factor in dictating the number of opportunities academic staff members have to be considered for position at other universities since cumulative publications reinforce reputation. Academic staff members also gain prestige by having their work published in prominent journals (Keith 1998). Many authors, such as Clapham (2005) have argued that there are advantages in academic staff members publishing.

### **3.3.3 The advantages of publishing**

Some of the benefits of having a manuscript published, as discussed earlier, are promotion-tenure, recognition, discipline, growth, income, communication, or simply a creative outlet for ideas (Matejka 1992). In terms of the advantages of publishing, Clapham (2005: 390) argues that there are many reasons why failure to publish in the sciences is a crime. The most obvious is that the information is lost to the world:

When the scientist who has studied species X for two decades and published not one jot of data gets hit by a truck, most of that knowledge will be buried with him or her. The person lying under the truck's wheel may well have stimulated many colleagues probably by presenting some findings at a conference ...But without publication the scientist's work will have been largely wasted (Clapham 2005: 390).

Thus research is considered to be incomplete unless the results are shared with the scientific community (American Psychological Association 2001). According to Clapham (2005) research scientists who have public funding have an obligation to publish their results. Publishing is therefore viewed as important for disseminating information and not just for academic satisfaction. Also, published knowledge is assimilated by colleagues and leads to more research, hypotheses are modified, rebutted or confirmed, new paradigms are developed or old ones discarded. In the real sense, publications are the scientific method (Clapham 2005: 390). Clapham (2005) further argues that another vital reason to publish is peer review. Peer review can be regarded as a very useful, constructive process that teaches scholars about the business of conducting research. Scholars who do not submit their work to peer review are preventing their work from attaining its full potential. According to Clapham (2005) these scholars risk making uncorrectable mistakes in study design: You can fix bad analysis and poor interpretation, but you can never redo a long-term field study. Imagine someone who has toiled away forever without publishing, and who finally submits his or her life's work to a journal only to be told by the referees that because X, Y, and Z weren't incorporated into the study design 10 years ago, the work was largely a waste of effort (Clapham 2005: 390).

Admittedly there are advantages to publishing for academic staff members. However, the publish or perish paradigm places enormous pressure on academic staff members in an attempt to conform to the paradigm. The peer review process which is very much a part of academic publishing is not without criticism.

### **3.3.4 How are academics affected by the pressure to publish?**

De Rond and Miller (2005) state that a recurring criticism of the publish or perish principle is its emphasis on productivity, with the criteria being the number and quality of publications. Junior academics, in particular, are often forced to play a numbers game to earn tenure, where the criteria for tenure are likely to be some function of the number of articles published. Often many of these junior academic staff members do not engage in research that is not easily published, such as interdisciplinary, ethnographic or longitudinal approaches, or those with a distinct philosophical orientation (De Rond and Miller 2005: 322).

Bouchikhi and Kimberly (2001) insist that the central role universities place on research and the intense pressure they put on academics to publish in a select group of elite journals have increasingly led to the institutionalisation of research. As a result the research produced becomes less innovative and, therefore, is unable to effectively adapt to the world it attempts to understand. De Rond and Miller (2005) also argue that a lack of intellectual boldness and practical relevance may be due, in part, to the journal review process, which in turn has obvious consequences for tenure. The exchange of reviewer comments and author revisions, typical of the peer review process, may also inhibit intellectual boldness and innovation. Since manuscripts are generally not accepted without revision, authors must negotiate with journal editors and reviewers about which revision requests to accept and how they should be made. As a result of this negotiation, “the published version of a manuscript is almost inevitably a compromise between what its authors intended to say and the mandates of an editor and a set of referees” (Bedeian 2004: 199). De Rond and Miller (2005) state that authors who regularly refuse to accept editors’ and reviewers’ revision suggestions are unlikely to publish enough articles in refereed journals to survive in academia. This view is supported by Astley (1985) who argues that:

Our journals exhibit a distinctly conservative bias in which reviewers and editors adopt... a ‘prosecution mentality’ against authors, one that is typically overcome only through intense ‘negotiation and bargaining’... Though papers

must be novel, they must not be offensively contrary to alienating reviewers (Astley 1985: 507).

De Rond and Miller (2005), argue that academics are contributing to their own irrelevance in the sense that their elite scholarly journals have, on the whole, become a means for communicating with those within the discipline, leaving their research at risk of failing any reasonable test of applicability or relevance to consequential practical problems. To support this they quote Sykes (1988) who argues that:

... in tens of thousands of journal articles, the system of academic publishing has been perverted into a scheme that serves only to advance academic careers and bloat libraries with masses of unread, unreadable, and worthless articles.

This viewpoint is supported by Abelson (1990) who refers to the publish or perish paradigm as a syndrome that has resulted in the increase in the number of authors listed on an article. Also the practice of naming people who have had little or nothing to do with the research has proliferated as a courtesy. Furthermore, Abelson (1990) argues that the publish or perish syndrome has also fuelled the creation of an enormous number of new journals. Commercial publishers have discovered that as new subfields open up, they can create a speciality journal for the field. Librarians find it necessary to subscribe, even though the costs per page are extremely high. Once the subscription is started, many librarians find it difficult to discontinue the subscription.

### **3.3.5 Addressing the flaws in the peer review process**

It is obvious from the above discussion that the peer review process is not without its problems. In the sciences authors such as Clapham (2005) have argued that peer review is a useful and constructive process for improving research that is published. Peer review as a process is thus central to the scientific information chain. Judson (1994) highlights a number of reasons for the breakdown in the peer review process. Among these, the process is threatened by three transformations: first, by "declining

standards and the growing, built-in tendency toward corruption of the peer-review and refereeing processes;" second, it is being threatened by the pressures of time, of quantity, and competition as the number of articles being published increase beyond control. The final threat is the advent of electronic publishing since the peer review process can be bypassed before publication. However, it must be noted that "electronic publishing can overcome two grave problems that ink-on-paper journals now present. The first, obviously, is the lag time from submission to publication ... and the mechanics of printing and mailing" (Judson 1994: 93).

Also, a study conducted through the *British Medical Journal*, found that referees failed to spot deliberate mistakes in the submitted paper (Shatz 1996). The article also points out an experiment in the *Medical Journal of Australia* which posts research articles on the web for expert review, followed by review by a more broadly-based group of practitioners. Shatz (1996) postulates that peer review following publication may more effectively promote quality than the current system. Thus, although electronic publishing can be viewed as a threat to the peer review process, it may also result in improving the situation.

However, due to the many shortcomings of the process the British Academy in 2006, set up a Working Group to examine how the practice of peer review functioned at present in a context in which the scope of peer review has expanded beyond its traditional focus on individual publications and grants to include research evaluations of departments (British Academy 2007).

It must be noted that the report produced by the British Academy focused on the peer review challenges for the humanities and social sciences. The Academy acknowledged that the major criticism of peer review was that the process was costly for academic staff, time-consuming and resulted in a bias against innovation. The Working Group however, noted that these criticisms were a result of deficiencies in practice rather than the principle of peer review. The rationale for this is that peer review is both a mechanism of selection and a process for enhancing the published research. In addition the practice retains widespread support among members of the academic community. The report produced by the Academy noted that peer review takes on a wide variety of forms, reflecting diversity of subject matter and

approaches in the humanities and social science research. As a result there are many different models of peer review used and regardless of the models used certain principles of good peer review should be maintained. These include timeliness, transparency and verification (British Academy 2007):

- *Timeliness.* Timely publication is important for a number of reasons. Increasingly, in a context in which demonstrable performance is a crucial condition of academic appointment and promotion, entrants to the academic profession depend upon timely judgement. In many humanities and social science subjects, journals have multiplied, so that a rejection from one journal means that authors can turn to others. However, that in turn implies that authors in fairness ought to know as quickly as possible if their paper is to be rejected, in order to provide them with the opportunity to take their work elsewhere.

The difficulty with this is that quick decisions cannot be guaranteed where peer review is involved. In part this is due to the nature of the refereeing process. Where specialist judgement is needed, there may only be a few people in the world who are able to offer a peer judgement. For perfectly valid reasons, they may not be readily available. Even where a referee is available, the amount of effort involved may be considerable. In this regard, some branches of the humanities and social sciences are closer to the world of Mathematics than they are to other science subjects. In Mathematics, peer judgement is needed as to whether a proof is valid or not. Similarly, in the humanities and social sciences a judgement may be needed as to whether a conceptual or logical argument is valid or really adds value, and verification of this may take some time.

None of these considerations mean that timeliness is unimportant or that unnecessary delays can be excused. In particular, referees need to understand the importance of timeliness and editors need to ensure that timely delivery of reports is an element of choosing referees. Authors are increasingly willing to pressure editors for a decision within a reasonable amount of time, which in many cases is perfectly reasonable.

- *Transparency.* Transparency is important because it is a central element of the scholarly enterprise. The possibility of criticising or refuting established ideas and approaches is at the heart of creative scholarly work. One of the advantages of the peer review system is that referees provide reasons why an article should be published or not. Editors have a responsibility to indicate the basis upon which they have made their decisions. Sometimes these decisions will not be pure quality decisions, but judgements about the extent to which the work under consideration is consistent with the editorial policy or remit of the journal.

The principle of transparency does not necessarily imply a particular range of practices. Some commentators on the peer review system have argued, for example, that the whole system should be totally transparent, with referees knowing the names of authors and authors knowing the names of referees. However, there are advantages in maintaining the practice of anonymous referees (allowing those referees to waive their anonymity if they so choose), if candid reports are to be written. Anonymity is likely to be particularly important in sub-disciplines where there are only a small number of practitioners.

- *Verifiability.* Peer review in an extended sense involves post-publication evaluation of work as well as pre-publication evaluation. A good system of peer review will facilitate post-publication evaluation. Among other things, this means that articles should conform to good citation practices, so that readers can locate the contribution the particular article makes to the wider scholarly discussion. It should also involve access to replication data sets, so that others can re-run and evaluate the findings.

In conclusion the Academy made various recommendations in an attempt to address the challenges faced by the humanities and social sciences. These recommendations related to training, peer review and metrics, the cost of peer review and peer review and innovation. The Academy acknowledged that even though the practice of peer review is complex the process is still necessary for quality research outputs.

### **3.3.6 A different approach to tenure and promotion for academics**

A different approach to tenure and promotion for academic staff members is required. Such an approach should support a reduction in the quantity of publications required for tenure and an emphasis rather on quality over quantity (Teute 2001).

Given the above concerns about the impact of the publish or perish paradigm on academics, De Rond and Miller (2005) suggest a different approach to tenure and promotion. Academics who are applying for tenure and promotion could be asked to limit their submission to what they consider to be their three to five most important publications. These articles (or books) would be read and evaluated by the relevant committee members, in terms of perceived originality, quality, and actual or potential impact. Hence De Rond and Miller (2005: 326) suggest that even if the impact of a journal, defined by number of citations, may be the most objective measure available, it need not, therefore, be the measure of the competence of individual researchers. Hence it is important that the articles be read and evaluated on their own merits. Alternatively, academics might be afforded more freedom of choice as to when to go up for tenure. The emphasis should shift from time to number and quality of output (articles, books, policy reports), citation rates, innovativeness and impact on the discipline as judged by peers, impact on practitioners as judged by publications in professional journals, or contributions to higher level policy making. Hence the criterion for arriving at tenure decisions would shift from time to a negotiated number of publications, and academics would elect to go up for tenure when they feel their record is sufficiently meritorious (De Rond and Miller 2005: 327). Having discussed the major issues that scholars are confronted with, the discussion now shifts to the context in which publishers perform their role in the system.

## **3.4 Summary**

This chapter discussed the scholars' role in the scholarly communication system, particularly with regard to the gift exchange economy. The context in which scholars operate within higher education is explained. In terms of the publish or perish paradigm scholars have been forced to publish to secure tenure and promotion. How

scholars are affected by the pressure to publish is mentioned. The publish or perish paradigm has led to an explosion in scholarly research. The flaws in the peer review process are highlighted and different approaches to tenure and promotion are discussed.

## Chapter 4

# The economics of academic publishing

### 4.1 Introduction

The economics of the gift economy discussed earlier are a stark contrast to the for-profit economics which commercial publishers enforce in the scholarly communication system. In an attempt to understand the economics of academic publishing one has to firstly examine the traditional journal publishing model as well as the publishers' cycle which is discussed from a publisher's perspective. The product system approach used by Houghton (2002) is used to describe the economics of content creation by the scholars, production by the publishers and content distribution by librarians. An economic analysis reveals that publishers wield a monopoly power that is causing the crisis in the scholarly communication system.

### 4.2 Invention of the journal

As mentioned in section 3.2.1, the journal is the principal means by which researchers and scholars communicate. The cause for this growth, as already discussed, has been the publish or perish paradigm which has resulted in more scholarly journal articles being published in order for scholars to satisfy promotion and tenure criteria. As mentioned earlier, scholarly publishing by means of the journal first began in the mid 17<sup>th</sup> century. Henry Oldenburg (1619-1677) created the world's first scientific journal in March 1665 as part of his involvement in the newly founded Royal Society of London (of which he was first Joint Secretary) to solve a number of problems faced by early scientists. One of the first problems scientists faced back then was precedence.

Scholars wanted their discovery of a phenomenon or result to be publicly acknowledged and secured before they were prepared to share their results with

their colleagues. Oldenburg realised that a periodical publication run by an independent third party could resolve this dilemma for the pioneering scientists of his age by recording the name of a discoverer and the date they submitted the paper, as well as a description of the discovery (Mabe 2006). As mentioned earlier, Oldenburg therefore set up the journal called *Philosophical Transactions* in the 17th century for this purpose. In its monthly issues, it registered the name of the authors and the date that they sent their manuscripts to Oldenburg as well as recording their discoveries. This simple act secured the priority for the first authors and encouraged them to share their results with others, safe in the knowledge that their rights as first discoverers were protected in doing so.

*Philosophical Transactions* did not publish all the material it received. The council of the Royal Society reviewed the contributions sent to Oldenburg before approving a selection of them for publication (Mabe 2006). In its primitive form this was the first recorded instance of peer review. In terms of modern journal practices, the four functions of Oldenburg's journal, namely, registration, dissemination, peer review and archival record, are fundamental to the way scientists and researchers behave and how science and research is carried out for all subsequent journals. Even those published electronically in the 21<sup>st</sup> century, have conformed to Oldenburg's model. The unit of scholarly communication is therefore the journal publication.

#### **4.2.1 The unit of scholarly communication**

According to Van de Sompel, Payette, Erickson, Lagoze and Warner (2004) the unit of communication is thus defined as a journal publication. Based on an analysis of formal scholarly communication since its emergence in the 17th century, Roosendaal and Geurts distinguish the following functions that must be fulfilled by every system of scholarly communication regardless of its actual implementation (Roosendaal and Geurts 1997):

- Registration, which allows claims of precedence for a scholarly finding;
- Certification, which establishes the validity of a registered scholarly claim;
- Awareness, which allows actors in the scholarly system to remain aware of new claims and findings;

- Archiving, which preserves the scholarly record over time; and
- Rewarding, which rewards actors for their performance in the communication system based on metrics derived from that system.

By linking these functions together we adopt a value chain perspective of the scholarly communication system. In the established system, this value chain has largely been implemented in a vertically-integrated manner through the traditional publication process, in particular through journal publication. The registration date is recorded by a journal publisher as the date the manuscript was received. The peer review process, conducted under the auspices of the journal publisher certifies the claims made in the manuscript. The eventual published journal article, supported by the availability of secondary finding aids, fulfills the awareness function. Interestingly the reward for scholars has been linked to tenure or promotion, which was the focus of an earlier discussion. Rewarding is based on the mere fact of publishing in a certain class of journal and on being referenced in articles by other scholars, both metrics directly derived from the scholarly communication system itself. The reward for commercial publishers who are able to make phenomenal profits from the system is the focus of this discussion.

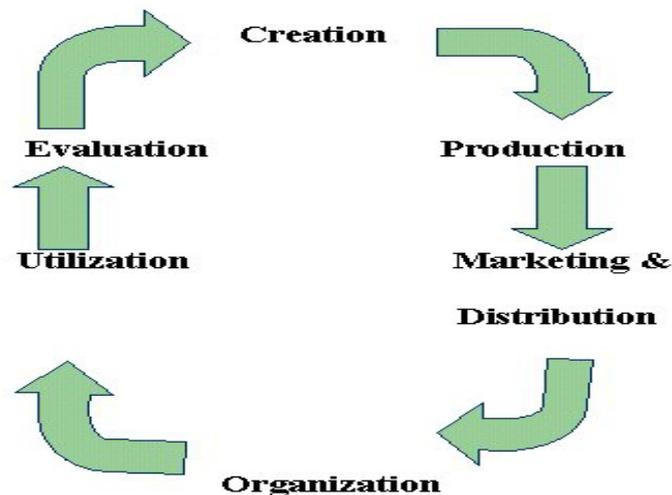
In the paper-based era the published article itself, bundled into a journal issue, was archived in an ad hoc fashion as it was shelved by libraries across the world. It is noteworthy to point out that archiving is the only function of scholarly communication that, in the paper-based system, is implemented by many parties at the same time.

#### **4.2.2 The traditional scholarly journal model**

In the traditional scholarly journal model that has existed for centuries, (Figure 6), authors, publishers and libraries as key players, worked together in partnership performing key roles in the knowledge cycle that resulted in the production of the scholarly journal which captures the research contributions of all scholars (Nowick and Jenda 2004). Scientists submit their works for publication to journals so that their works will be widely distributed and reach peers working in the same field who will provide evaluative comments in support of or against the prevailing paradigms that

guide a given field at the time (Kuhn 1970). Figure 6 depicts the key roles in the traditional journal publication process.

**Figure 6: Key roles in the traditional journal publication process**



Nowick and Jenda (2004)

The authors, as creators of papers, initiate the whole process by submitting their works to editors of established journals for review and editing, leading to the paper production process. The publisher assumes the core functions of marketing and distribution of the finished journal. Libraries are a ready market for the finished journal which is organised into library collections to be utilised and the content evaluated by an author's peers. This in turn generates more work incorporating results reported in all published work in the field to date. This traditional publication process ends with the publisher taking complete responsibility for the entire work, given the prevalent practice of authors signing away their copyright for their work to the publisher. It is easy to see that this journal publication model is a self-sustaining author-driven process. The quality of scientific papers and progress made increases dramatically when authors have access to all the published work in a field at a given time.

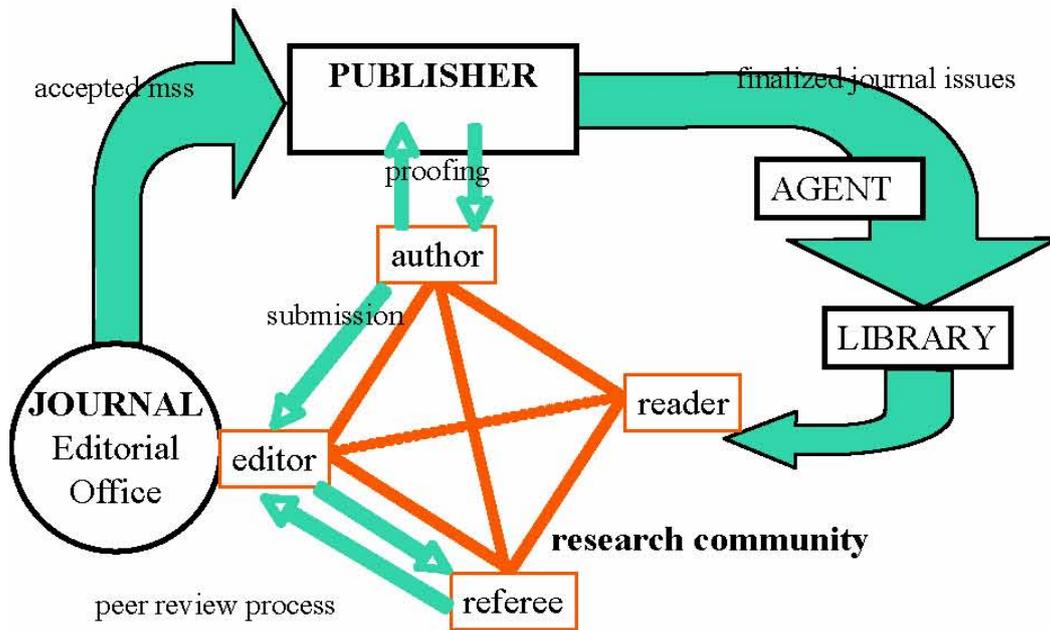
Therefore, when commercial publishers continue to charge journal prices at rates that are beyond the budgets of libraries, the knowledge cycle becomes disrupted because only a few libraries can afford to pay for the overpriced journals. Authors in

turn are no longer exposed to all the key published literature in their field, in a timely manner. Their published work no longer has the benefit of insight from all the published literature. In the sciences, this is a serious omission given that the growth of scientific knowledge results from a careful critical analysis of all published contributions (Kuhn 1970). From journal price studies by Van Orsdel and Born (2007) we see that it is only a few European-based publishers who are responsible for the uncontrollable costs of science journals that are destroying library budgets and disrupting the knowledge cycle. However, it is important to present a balanced view. Therefore, the 'publishing cycle' as viewed by a publisher is presented.

### **4.2.3 The publishing cycle**

From a publisher's perspective, the movement of information between the different role players in the journal publishing process is usually called the publishing cycle and is often represented as in Figure 7. Research information created by an author from a particular research community, passes through the journal editorial office of the author's chosen journal to its journal publisher, subscribing institutional libraries, often via a subscription agent, before ending back in the hands of the readers of that research community as a published paper in a journal (Mabe 2006).

**Figure 7: The publishing cycle**



Mabe (2006: 58)

According to Mabe (2006) this simple graphical representation represents a more complex reality than is depicted. Firstly, the cycle is often interpreted as a simple one-to-one connection between an author and a reader than the one-to-one connections that occur in practice. However, most communities of researchers are international and highly dispersed among research institutions worldwide. Each individual is usually only aware of a small fraction of the total membership of the worldwide community. Secondly, each member of any research community can play one or more of a number of often simultaneous roles. For example, all members of the community will be readers but only a smaller number will also be authors. The degree of author-reader overlap will vary according to the nature of the discipline. In turn, most authors will at some stage also be asked to act as referees, and a minority of these will be journal editors. In any one year, a journal editor can also act as a reader, an author and even a referee. Mabe (2006) maintains that provided these limitations are understood, the publishing cycle does help to convey the sequence of processes and the players involved in them.

## **4.2.4 Role players in the publishing cycle**

The key role players in the cycle include the author, journal editor and editorial board and journal publisher.

### **4.2.4.1 Author**

According to Mabe (2006) about 70% of journal authors are working researchers based in universities. The remainder are connected to research departments of teaching hospitals, government institutions and research corporations, such as pharmaceutical and chemical companies. Regardless of their organisational affiliation all these authors have one common goal, and that is to get published. From an academic scholar's perspective it is easy to understand why there is this dire need to get published in terms of the publish or perish paradigm.

When considering where to publish Mabe (2006) argues that authors self-assess the level of their work and will submit the paper to an appropriate journal. The authors select the appropriate journal in which they would like to have their work published on the basis of a number of factors of which relevance, reputation and ranking in its field predominate. Having identified a 'short-list' of appropriate titles; the actual journal chosen depends upon the direct publishing experience of the author, the author's colleagues or superiors. When an author submits a paper to a journal, the third-party date-stamping mechanism of the journal registers their paper as being received and accepted at a certain date, while the reputation of the journal becomes associated with both the article and, by extension, the author. A journal's reputation is achieved through a host of associations: between the name of the journal and the authors who generally appear there; the quality and originality of the articles published; and the selectivity of the peer review process. As authors publish in more and better journals so they in turn become regarded as the more prolific and better authors. However, as discussed earlier the reason why academic authors publish is to secure promotion and tenure because of the publish or perish paradigm. Therefore, since publications are viewed as the only countable and assessable output of research, they have become intimately associated with the evaluation of

research programmes, the researchers themselves and the institutions they belong to (Mabe 2006).

The publication record of a researcher becomes one criterion by which to assess whether they should be recipients of future research funding, it can also be used to assess eligibility for academic posts and promotions. An additional pressure on the individual authors is the use of their published work in the evaluation of their university department, with reviews affecting the future existence and funding of those departments. Such evaluation is often done on the basis of citations to the articles, the number of published articles and the reputation of the journals. From a scholar's perspective publishing is a communicative practice; a means of sharing ideas in a specific field.

#### **4.2.4.2 Academic publishing as a communicative practice**

According to Kling and McKim (1999: 896) the common dictionary definitions of 'publish' are as follows:

- To make generally known; and
- To make public announcement of.

The above definitions are implicitly appropriate for authors in the scholarly communication process. To publish an article, based on these definitions, an author would need the article to be announced to a substantial part of the scholarly community. Kling and McKim (1999: 897) maintain that an article is effectively published when it satisfies three criteria:

- Publicity;
- Access; and
- Trustworthiness.

Each of these three criteria can be used by scholars to assess how effectively an article has been published.

#### **4.2.4.2.1 Trustworthiness**

Peer review, as discussed earlier, is a form of vetting that is distinctive of the academic community. However, scholars often use a combination of other methods to access the value of a document. They take note of the reputation of a journal or the publishing house as an indicator of reliability. Peer review varies according to the disciplines. Some social science journals rely upon double-blind reviewing. Many journals seek two or three reviews, while others assign one reviewer to each article. At the lower end of the scale of trustworthiness lie practices such as self-publishing, publishing in nonreviewed outlets (such as a working paper series in an academic department), or publishing in edited (but not refereed) journals. Even in nonreviewed outlets, the reputation of the author (as perceived by the reader) may be a major factor in determining trustworthiness. According to Kling and McKim (1999) this analysis of trustworthiness refers to institutionalised practices that are 'beyond the person'. Each scholar knows others whose works s/he trusts and would be eager to read in a prepublication form. However, these judgements rest with a combination of the scholar's personal knowledge and interests.

#### **4.2.4.2.2 Publicity**

An article is more effectively published to the extent that members of its primary and secondary audiences are made aware of its availability. Articles are publicised when readers see a copy of the publication that contains the article. Thus primary publicity and access to the article are coextensive. Sources like books, are also announced to their readership by appearing in abstract indices such as Library and Information Science Abstracts (LISA). This form of announcement is 'demand driven', because potential readers are usually searching for potentially relevant publications by topical indicators.

#### **4.2.4.2.3 Accessibility**

Central to the notion of being effectively published is a perception that an author's work can be readily located and obtained by interested scholars. The improvements in the communication infrastructure of inter-library loan in the last decade has

increased the effective accessibility of books and articles. At the very least, to be accessible to most of its audience, a scholarly publication has to have stable identifiers or bibliographic details (such as name of author, date, publisher, an International Standard Book Number (ISBN) or be published in a journal with an International Standard Serial Number (ISSN), and volume and date).

In addition scholars want materials to be accessible for a long time. However accessibility is a problem for many documents published in electronic format. Networked systems, such as the internet, are not archival media without significant human stewardship. Long-term stable accessibility requires active stewardship and is more reliable to the extent that the stewardship is institutionalised. According to Kling and McKim (1999) the existing paper-based scholarly communication system fulfills both of these criteria. Research libraries provide long-term access to their holdings. Their stewardship is strongly institutionalised. In libraries the institutionalisation of document stewardship is facilitated by shared standards, classification systems, cataloguing procedures, and other professional practices. However, one can argue if libraries cannot afford to maintain their subscriptions to journal literature because of price increases, accessibility is restricted and the act of communicating one's ideas, as a scholar, is limited.

#### **4.2.4.3 Journal editor and editorial board**

According to Mabe (2006) the editor of a journal is usually an independent, leading expert in their field (most commonly a university academic) appointed and financially supported by the publisher. The journal editor is there to receive articles from authors, to judge their relevance to the journal and to refer them to equally expert colleagues for peer review. These reviewers or referees are usually other researchers in the same field. Peer review, as mentioned earlier, is a methodological check on the soundness of the arguments made by the author, the authorities cited in the research and the strength of the originality of the conclusions. While it cannot generally determine whether the data presented in the article is correct or not, peer review undoubtedly improves the quality of most papers and is appreciated by authors. However, as discussed earlier, there are flaws in the peer review process.

Regardless of these flaws though, reviewers can recommend acceptance of a paper for publication, its rejection, or its acceptance subject to specified revisions. The final decision is made by the journal editor on the advice of the reviewers. The review process can take from weeks to months, with similar delays until publication after the article has been accepted, although electronic publishing has greatly reduced delays in this second stage (Mabe 2006).

Historically, each journal had a single editor, but the expansion of the size of journals and the increasing specialisation of fields of research means that it is now usual for there to be several editors each receiving papers and organising refereeing. The editorial board of the journal usually consists of around 20 to 30 recognised authorities in the field of the publication who are prepared to lend their name and prestige to it. The editorial board members are not remunerated for their position but will receive a free copy of the journal. This practice is a direct consequence of scholars operating in a gift economy. Policy issues are also dealt with by the editorial board (Page, Campbell and Meadows 1997).

#### **4.2.4.4 Journal publisher**

The role of the publisher is often confused with that of the printer or manufacturer, but it is much wider:

‘Journal’ publishing is not just about producing and marketing a product – it’s also about serving a community and about helping develop a focus for a community. The community consists of readers, authors and academic editors – who are often the same people – and also involves others who contribute to the information chain, including librarians, subscription agents and other intermediaries (Carrigan 1996: 214).

Therefore, the journal publisher organises and sustains this link between the journal and the community it serves by selecting and supporting the right editor, financially underwriting the journal, and through managing the production, marketing (to both potential subscribers and authors) and distribution, whether in print or electronically.

According to Mabe (2006: 60-61) besides being an entrepreneur, the journal publisher is also required to have the following capabilities:

- *Manufacturer*: copy-editing, typesetting, printing and binding the journals. These services are usually contracted out and the management of the supplier and monitoring of quality levels are the direct task of the publisher.
- *Marketeer*: attract the papers (authors) and new subscribers. The attraction of authors, often called 'input marketing', is principally the function of the publishing or editorial department of a publisher and is achieved through marketing the journal as attractively as possible to potential submitters of research. This involves ensuring the journal continuously matches both their academic needs in terms of coverage and quality as well as being 'mechanically' sound in its services dealings with authors and the fulfillment of their needs (efficient acknowledgement of receipt of papers, good standards of proof preparation, quick publication, good disclosure of the contents of the journal through abstracting services such as ISI, and so forth). The other aspects of the marketeering function are those usually found in any organisation selling goods and services: promotional literature production and mailing, advertising and exhibitions.
- *Distributor*: publishers receive subscription monies in advance of any publication and must maintain a sophisticated subscription fulfillment system which guarantees that goods are delivered on time. They also maintain close working relationships with subscription agents and serials librarians, as well as the academic community.
- *Electronic host*: electronic journals require many additional skills more commonly encountered with database vendors, website developers and computer systems. Such a function is almost entirely new for a publisher given the move towards electronic publishing and involves the recruitment and retention of highly specialised technical staff.

In addition to the above capabilities, commercial publishers argue that they support the academic work of their journals in a variety of ways, providing guidance to the external, academic journal editor and boards, funding offices, editorial meetings and editorial expenses, together with the investment in the journal's development into

new markets or new media, such as the internet. The publisher also has to invest in the 'back office' systems which keep the journal in business, such as peer review databases, production tracking systems, customer service and subscription systems, warehousing and distribution (Mabe 2006).

From the above, the publisher's view of the cycle is merely that of operating a business. However, as many authors in the literature have pointed out commercial publishers wield monopoly power that has resulted in the crisis in the scholarly communication system.

#### **4.2.5 The monopoly power of publishers**

In order to understand whether publishers wield monopoly power, one has to define a monopoly in economic terms. The *Routledge dictionary of economics* (Rutherford 1995: 307) defines a monopoly as:

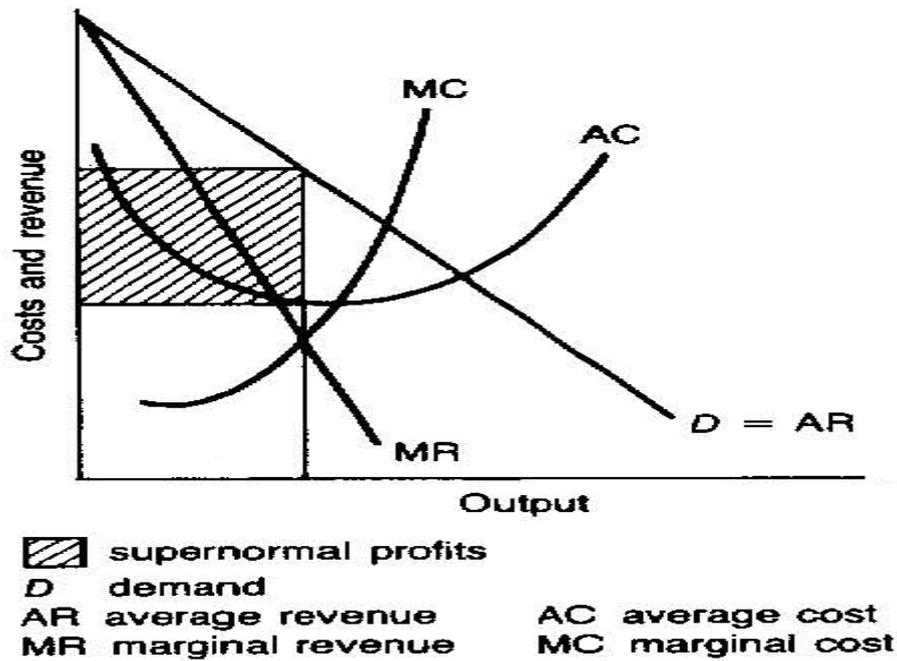
The sole producer of the entire output of goods and services of an industry. A monopoly usually has inelastic demand<sup>4</sup> for its products, unless the industry is so narrowly defined that there are some near substitutes produced by the other industries, under monopoly, the demand curve for the firm is also the demand curve for the industry. If the monopoly follows the rule of profit maximisation, i.e. it equates the marginal revenue and marginal cost of production, it has an opportunity to earn supernormal profits.

Figure 8 below illustrates the above definition and shows that commercial publishers because of the nature of the industry have been allowed to wield monopoly power because of the nature of the traditional publication model.

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<sup>4</sup> In economics and business studies, the price elasticity of demand is a measure of the sensitivity of quantity demanded to changes in price. It is measured as elasticity, that is, it measures the relationship as the ratio of percentage changes between quantity demanded of a good and changes in its price. Demand for a product can be said to be very inelastic if consumers will pay almost any price for the product, and very elastic if consumers will only pay a certain price, or a narrow range of prices, for the product. Inelastic demand means a producer can raise prices without much hurting demand for its product, and elastic demand means that consumers are sensitive to the price at which a product is sold and will not buy it if the price rises by what they consider too much (Rutherford 1995).

Figure 8: A monopoly in economic terms



Rutherford (1995)

(Note: **AC** is equal to total **cost** divided by the number of goods produced. **MC** is the change in total cost that arises when the quantity produced changes by one unit. **AR** is the total revenue divided by the number of subscribers. **MR** is the extra revenue that an additional unit of product will bring)

From the above definition commercial publishers have sufficient monopoly control over the publishing of academic journal research by way of subscription services to determine the terms on which libraries and other organisations have access to the published journals. Only a few commercial publishers control the academic publishing market therefore, there is a lack of competition to provide viable substitutes which organisations or libraries can purchase. Due to the inelastic demand for published journals, the publishers can increase journal subscription prices without affecting the demand for the journals by libraries. Therefore, commercial publishers are able to secure large financial profits within the system of scholarly communication.

#### 4.2.5.1 The beginnings of monopoly power for publishers

Merrett (2002) describes the beginnings of the commercial publishers' monopoly with the key figure of Robert Maxwell. Robert Maxwell was born Jan Ludvig Hoch in 1923 in Ruthenia, then part of Czechoslovakia. Although his early life is obscure, he however, was a resourceful individual who fought in the Czech legion in France in 1940 and by 1945, in an extraordinary process of assimilation; he became a British officer named Maxwell with a Military Cross won in Normandy. After the war, Maxwell eager to gain financial wealth, investigated the economics of selling encyclopaedias. At the time he owned a publishing house called Pergamon. The key event in Pergamon's history was the 1955 United Nations Geneva Conference on the Peaceful Use of Nuclear Energy. According to Merrett (2002) Maxwell knew nothing about science, but quickly realised the commercial worth of conference papers, particularly those researched and written by European academics lacking publication opportunities. Maxwell thus began to establish a series of journal titles with well-populated editorial boards for these academics to publish in. Maxwell understood too well the 'publish or perish' paradigm and the consequences it had for scholars. Having secured the Geneva papers Maxwell then began to take over the publications of learned societies, such as the *British Abstracts of Medical Sciences*, and moved from conference to conference making contacts.

Needless to say, Pergamon increased its publishing range of titles from three in 1951 to 400 by 1990. This increased publishing range provided scholars with opportunities to publish their work that would not usually be accepted by the more established journals of the time. Universities worldwide were thus offered an increasing range of journals which, because of the prestige of their editorial boards, their librarians were eager to purchase these titles. These events marked the beginnings of commercial publishers wielding a monopoly in the scholarly communication system. However, Merrett (2002) notes that as early as the 1960s there were complaints about unrealistically high subscription rates, a growing monopoly, and the duplication of published conference papers in journals (*Biochemical Pharmacology* was a notorious example). The commercial publishing

industry has grown with only a few European-based publishers (as discussed in more detail in the following section) wielding monopoly power.

#### **4.2.5.2 Consuming the opposition by merging**

According to Van Orsdel and Born (2007) in their *Periodicals price survey 2007: serials war* article, commercial publishers enjoyed on average a profit of about 25% in the 2006 financial year. The top ten Scientific, Technical & Medical (STM) publishers brought in almost 43% of the revenue in a market that totals just over \$19 billion. Publishers grew these profits by levying double-digit price increases on the library subscribers. However, library budgets have not been able to keep up, so publishers, as discussed earlier, have turned to mergers and bundling content to negate dwindling library budgets.

In 2006, the seven dominant commercial STM journal publishers were Elsevier, Wiley, Springer, Taylor & Francis, Kluwer Medical, Thomson, and Blackwell (Van Orsdel and Born 2007). Wiley and Blackwell have merged. The US Department of Justice denied appeals to review the merger, and the European Union had already allowed larger mergers to proceed. As a result, the handful of publishers with which academic libraries do the bulk of their business shrunk from seven to six. About half of Blackwell's titles are published for scholarly societies, and some societies may move to other publishers as a result of the merger. Also, it was expected that Elsevier and Kluwer Medical would merge. However the merger, which would have resulted in five major commercial publishers, was abandoned (Van Orsdel and Born 2007).

Candover and Cinven brought Springer and Kluwer together as Springer Science and Media Business. Van Orsdel and Born (2007) argue that Springer could be bought by another publisher, or the sale of stock might be intended to raise capital for future acquisitions. The company has been trying to acquire Taylor & Francis, for example. The increasing mergers of top publishers draw attention to the saturated condition of the scientific publishing market. This saturation is an indication that revenue and profit growth expected by shareholders can no longer be obtained by

the publisher's own stable of journal titles. Thus larger profits depend on assimilating the competition.

#### **4.2.6 Some industry statistics**

These statistics provide support for the notion that commercial publishers do have monopoly power.

##### **4.2.6.1 Number of publishers**

According to Mark Ware Consulting (2006) it is estimated that there are 2000 journal publishers globally. The main English-language trade and professional associations for journal publishers collectively include 657 publishers producing around 11,550 journals, that is, about 50% of the total journal output by title. Of these, 477 publishers (73%) and 2334 journals (20%) are not-for-profit. Analysis by Elsevier of the ISI Journal Citation database indicated that the proportions of article output by type of publisher were:

- commercial publishers (including publishing for societies) – 64% (This is significant because of the focus of this study);
- society publishers – 30%;
- university presses – 4%; and
- other publishers – 2% (Mark Ware Consulting 2006).

The distribution of journals by publisher is highly skewed, with two publishers (Elsevier and Springer) having around 2000 journals each. The top 2% (11 publishers) produce more than 70% of the journals in this group, that is, about 35% of all journals. This skewed distribution again is an indication of monopoly power. There are also other organisations producing a small number of journals, and many of these may not even regard themselves as publishers.

##### **4.2.6.2 Journal economics and market size**

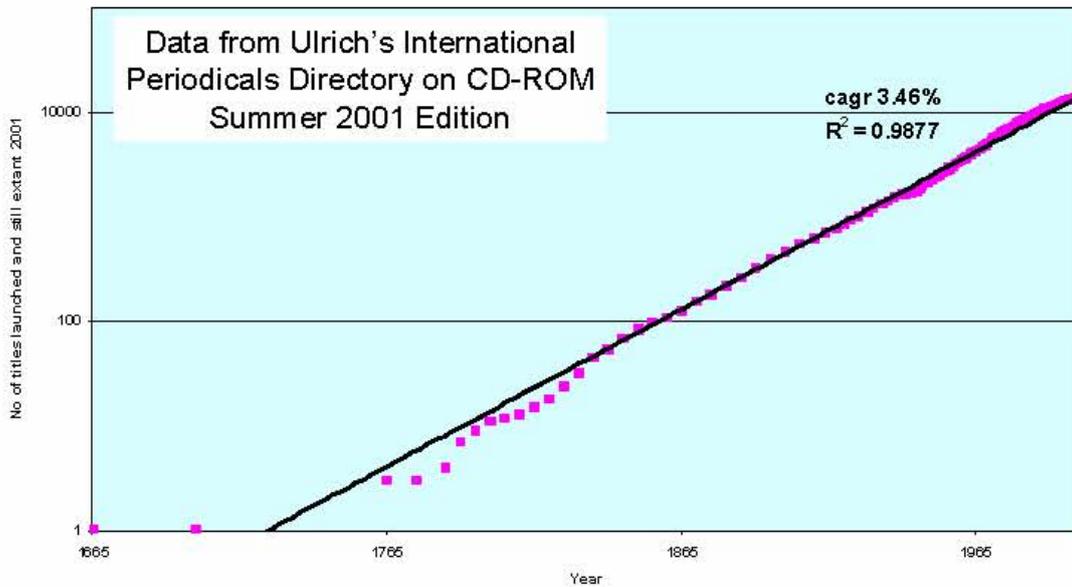
The annual revenues generated from English-language STM journal publishing are not well documented but are estimated at around \$5 billion in 2004 (Mark Ware

Consulting 2006). This is a subset of the wider STM publishing market (including books, secondary information services, Abstracting and Indexing databases, and so forth, which were worth \$9–12 billion in 2004. STM journals represent a relatively small niche in the overall global publishing and information market, which Outsell estimated to be worth some \$263 billion, when compared to educational publishing (\$19.4 billion in 2004) (Mark Ware Consulting 2006). The industry employs an estimated 90,000 people globally, of which about 40% or 36,000 are employed in the European Union (EU). In addition, an estimated 20 to 30,000 full-time employees are indirectly supported by the STM industry globally (suppliers, freelancers, external editors, and so forth).

#### **4.2.6.3 Journal and article numbers and trends**

There are about 23,000 scholarly peer-reviewed journals, collectively publishing about 1.4 million articles a year. An important subset is the 8700 journals included in the ISI Journal Citation database, of which 5900 are in the Science Edition, 1700 in the Social Sciences and 1130 in the Arts & Humanities Editions, which collectively publish about 1 million articles annually (Mark Ware Consulting 2006). This subset is important because it contains the most cited journals, that is, by this measure at least the core literature. The number of peer reviewed journals published annually has been growing at a very steady rate of about 3.5% per year for over two centuries (see Figure 9, although the growth did slightly accelerate in the post-war period 1944–1978).

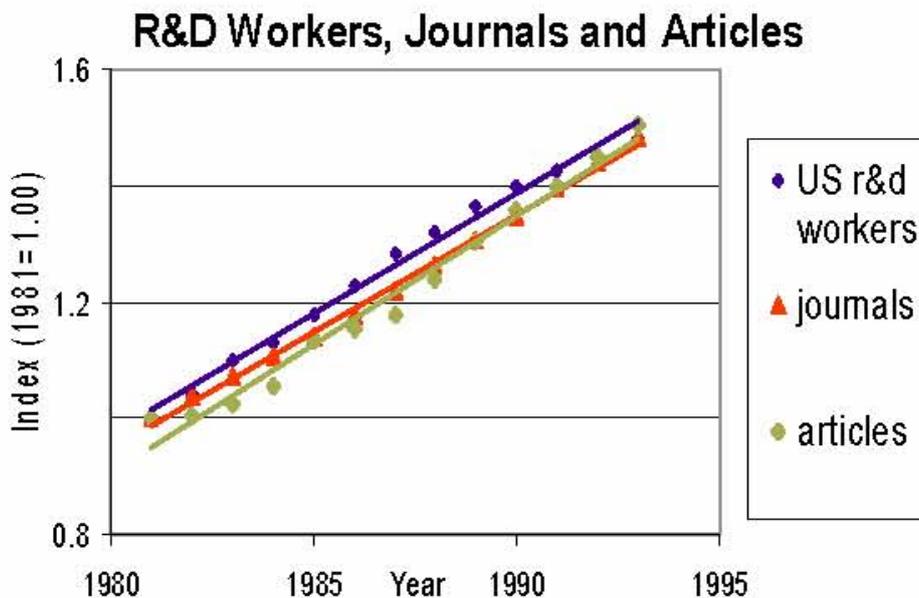
**Figure 9: The growth of active, peer reviewed journals since 1664**



Mabe (2003)

The number of articles has also been growing by about 3% per year over similar timescales. The reason for this growth is simple: the growth in the number of scientific researchers in the world. This growth is illustrated in Figure 10, which plots the increase in numbers of articles and journals alongside the number of US researchers.

**Figure 10: Relationship between number of researchers, journals and articles**

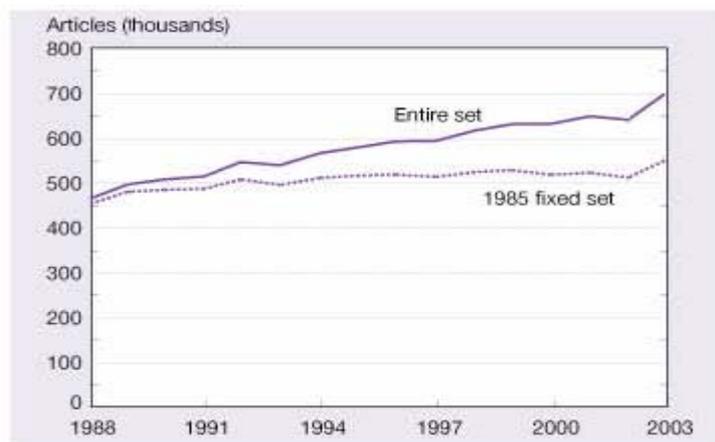


Mark Ware Consulting (2006)

#### 4.2.6.4 Global trends in scientific output

According to Mark Ware Consulting (2006) the number of articles catalogued by the ISI's Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) grew from approximately 466,000 in 1988 to nearly 700,000 in 2003, an increase of 50% (see Figure 11). The growth of publications reflects both an expansion in the number of journals covered by the SCI and SSCI databases and an increase in the number of articles per journal during this period.

**Figure 11: Worldwide scientific article output of selected journal sets 1988-2003**

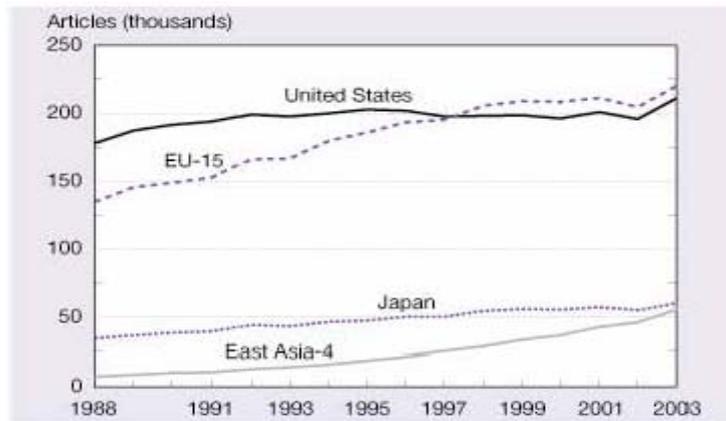


National Science Board (2006)

(Note: Entire journal set consists of journals tracked by SCI and SSCI that increase over time. The 1985 fixed journal set is the fixed number of journals reflecting SCI and SSCI journal coverage in 1985)

Within this overall growth, there are important regional differences, with the EU's output growing faster than the US and overtaking it in the late 1990s (Figure 12). The most dramatic growth, however, is in the output from the East Asia region (China, Singapore, South Korea and Taiwan), which has been around 14–15% over the period (compared to 1–2% for the US, for example).

**Figure 12: Scientific article output by major publishing region or country/economy 1988-2003**



National Science Board (2006)

Research is becoming more international and more collaborative, driven by factors including the scientific advantages of sharing knowledge and know-how beyond a single institution; the lower costs of air travel and telephone calls; increased use of information technology; national policies encouraging international collaboration and the ending of the Cold War; and graduate student study abroad programmes (Mark Ware Consulting 2006). This growing globalisation of science is reflected in both an increase in the average number of authors and institutions on an article, and in the proportion of foreign addresses. So for articles published in the EU, for example, the average number of co-authors per article increased from 3.33 to 4.81 between 1988 and 2003, while articles with at least one co-author from a non-EU country accounted for 36% of all articles in 2003, which shows an increase in 17% from 1988. However, at the same time as with these co-authorship trends, the annual productivity of each unique author has fallen slightly from one paper per annum per unique author in 1950 to about 0.7 in 2000. As a consequence, although each author is on average getting their name as a collaborator on about four papers each year, they are each solely responsible for only 0.7 of a paper per annum. Thus the driving force behind the growth in the number of papers in the world remains the number of authors. These statistics provide background information for understanding the economics of academic publishing.

#### **4.2.7 Background and context for the economics of academic publishing**

According to Houghton (2002) in the context of a knowledge-based economy, innovation and the capacity to create and disseminate information are becoming increasingly fundamental determinants of national prosperity. Therefore, an efficient and effective system for scholarly communication is of enormous economic importance. However, there is a crisis in scholarly communication, which according to Houghton (2002) is born of a combination of system dysfunction and technological change.

Universities are under increasing funding pressures, and there is greater focus on the efficient allocation of resources and on achieving demonstrable returns on investment in those resources. Not only does this make the cost of access to information a major issue, it also increases the significance that the producers of the content (authors) and their employers (universities) place on performance indicators (publication and citation).

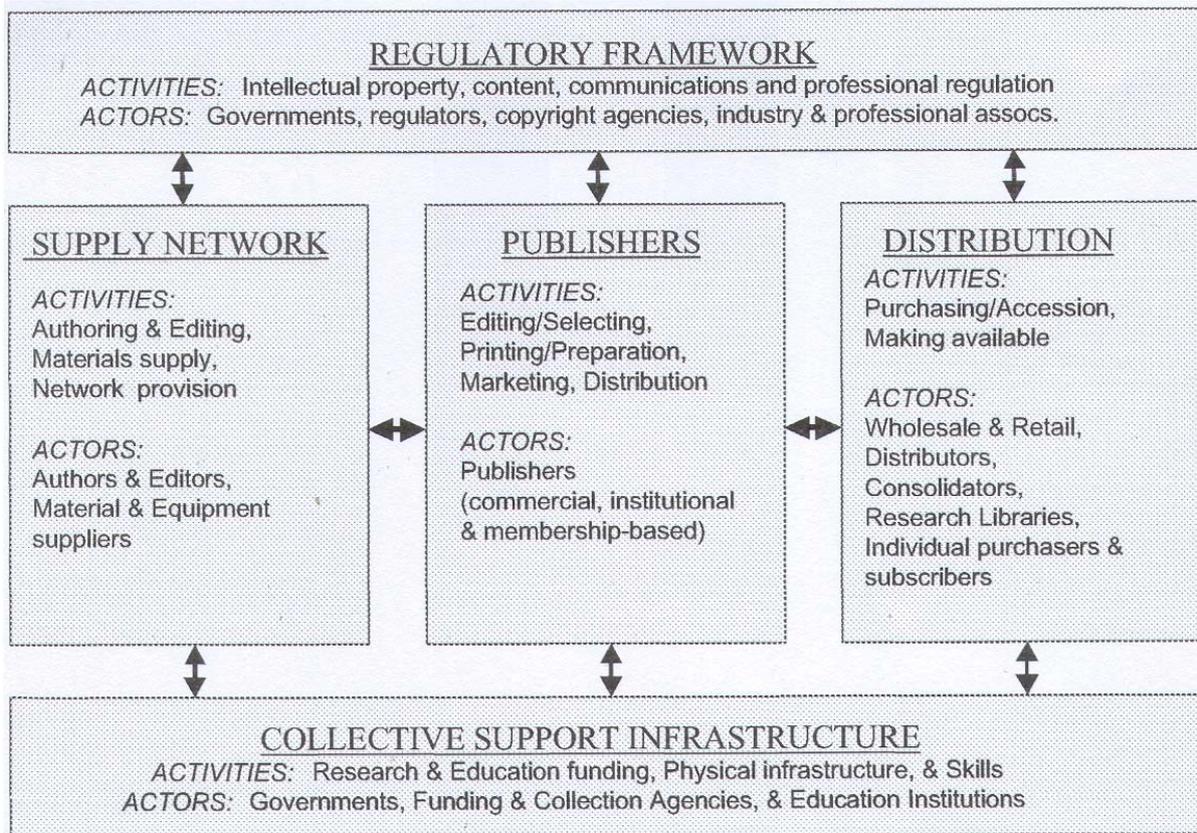
There have been rapid increases in the price of scholarly content, especially journals in the science, technology and medical areas in recent years. It appears from the literature that there is no consensus on what causes the increase in journal prices. Some authors such as Wyly (1998), Hunter (1998) and Odlyzko (1998) have argued that commercial publishers have increased their market power and are pushing prices up, that is, abusing their monopoly power. While other authors have argued that an increase in the number of new titles over time lowers the average circulation of journals and thereby raises fixed costs (first copy costs) as a proportion of the total costs (Lieberman and Steinmuller 1992; King and Tenopir 2000). This study supports the views of Wyly (1998), Hunter (1998) and Odlyzko (1998) and will demonstrate why.

#### **4.2.7.1 The product system approach**

To describe the economics of the scholarly communication system the 'product system' approach adopted by Houghton (2002) is useful. This approach focuses on the linkages between the role players in a complex system that effects the transformation of materials and activities into goods and services through the process of creation, production and distribution. The advantage of this approach is that it enables us to distinguish between, rather than confuse, the economics of each of the key stages in the process (creation, production and distribution) while, at the same time, keeping the entire system in view. According to Houghton (2002) the scholarly communication product system includes five major elements. At the centre are the publishers engaged in the production of content-based products and services. These include commercial, institutional and membership-based publishers, such as learned societies. To the left of the publishers is the supply network, which includes the creators of content, the authors and editors, and the suppliers of materials and equipment to the printing and publishing industries. To the right of this is the distribution network, which includes all the publishers' clients (Houghton 2002):

- The channel, which is made up of wholesalers, retailers, consolidators, aggregators, distribution and subscription agents;
- Public and private research libraries, state and national libraries, and document suppliers; and
- Individual institutional purchasers and subscribers.

**Figure 13: The scholarly communication product system**



Houghton (2000)

These three groups form the core value chain of creation, production and distribution. Their activities are underpinned by a collective support infrastructure, and are subject to an overarching regulatory framework. The collective support infrastructure includes: the research and education funding agencies which support the research and education activities that both create and consume scholarly content; and various kinds of infrastructure including:

- Research, education and library infrastructure, such as building and equipment;
- Information technology infrastructure, including internet, network equipment and services;
- Reproduction rights and collection agencies; and
- Education and training infrastructure, including a range of technical and professional training institutions (for example library schools).

The regulatory framework for scholarly communication includes: intellectual property regulation, such as copyright and licensing; content regulation, such as censorship and privacy; telecommunications and broadcasting regulation; and professional regulation, including professional qualification standards, regulated access to practice as a professional, and professional codes of conduct. Hence, the scholarly communication product system includes all the activities and role players involved in the creation, production and distribution of scholarly content (Houghton 2002).

#### **4.2.7.2 Defining information and knowledge**

In terms of the nature of the content that is produced in the scholarly communication system it is important to understand the difference between information and knowledge. As alluded to earlier, the literature relating to knowledge management draws a common distinction between tacit and codified knowledge. Codified knowledge consists of information or ideas that can be written down and transmitted. Tacit knowledge consists of ideas and understanding that are more difficult to acquire and transmit, and therefore remain inherently human. This distinction can be used to show a key difference between knowledge and information. Knowledge (tacit knowledge) is something that is held by people, and is developed through education and learning. Information (codified knowledge) is knowledge that has been ordered and written and it can be transferred in that form. Thus information can be viewed as the product of the act of codification of knowledge. In terms of the scholarly communication system this information is produced by the scholars and their universities. There is a cost to this production and intellectual property rights exist to give those who create information the opportunity to recoup those costs thereby giving an incentive to produce. Therefore, Houghton (2002) maintains that while it can reasonably be argued that knowledge is a 'public good', as already discussed, typically information is not.

#### **4.2.7.3 Economics of content creation**

As discussed earlier, it could be argued that there are negative institutional incentives that underlie the creation of scholarly content. Promotion, tenure, and

funding allocations in universities are often linked to publication in a few, leading, refereed journals. Houghton (2002) argues that scholarly communication and widespread dissemination of scholarship, on the one hand; and publishing in a few key refereed journals for purposes of funding, promotion and tenure, on the other, are different and increasingly divergent, if not conflicting goals.

However, some analysts have argued that authors are not simply content originators, suggesting that they drive the information explosion by seeking the most prestigious outlet for their work (Halliday and Oppenheim 1999). Such an approach has led to suggestions that journal subscription prices could be reduced if authors paid to have their work published. This suggestion is in keeping with the idea of levying a charge on authors as a payment for the widespread distribution of their work, thus suggesting the recovery of costs through author submission fees (Harnad 1996; Harnad and Hemus 1997). Variations suggest payments for published, or for papers submitted regardless of whether or not they are published, and various other cost recoveries through submission and subscription fees (Halliday and Oppenheim 1999). For example, the Public Library of Science initiative involves author payments per published paper to cover handling and refereeing fees. However, this is an example that relates to the open access initiative which will be discussed later in more detail.

Houghton (2002) argues that there are a number of issues arising from the underlying economics of such approaches:

- First, the public goal in a knowledge economy must be to encourage and facilitate the dissemination of information. Thus any disincentive to publish goes against this aim;
- Secondly, it is a fundamental principle of the scholarly publication system that publication should be on the basis of merit only. Introducing an author payment system introduces the possibility that younger, less established scholars will be disadvantaged relative to those from prestigious institutions who can afford to pay for publication;
- Thirdly, the money payments involved would incur considerable transaction costs. The process might involve individual authors or their employing

institutions raising cheques, commonly in foreign currency; and publishers collecting, recording, and accounting for all the thousands of relatively small payments. This would result in the growth of collection agencies and systems for such micro payments. It is likely that the transaction costs involved would reduce the potential cost savings, and may prove prohibitive; and

- Fourthly, the implicit assumption that reduced costs would be passed on by publishers in the form of reduced prices to distributors and consumers is dubious (except where the model involves alternative publishing methods. Such methods will be discussed in more detail later). If major publishers have a monopoly (McCabe 1999), then a reduction in serials' prices would be unlikely to automatically follow a reduction in costs.

Other issues that need to be considered include the different patterns to publication in the arts, humanities and social sciences when compared with the natural sciences. It is typical for a majority of the papers submitted to science journals to be published, whereas only a minority of those submitted to humanities journals are published. Where the model relies on payment for publication, the publishers of a humanities journal would confront an economic incentive to accept a higher proportion of papers for publication than they do under the current system. Houghton (2002) argues that it would be possible for a publisher to increase revenues by accepting more articles that may have not met the stricter quality control standards. Making payments to authors, editors and reviewers in exchange for their work and intellectual property appears to be a somewhat fairer system according to Houghton (2002). However, given the current institutional tenure and promotion reward system for scholars, it is unlikely that publishers would be willing to, or be required to pay very much.

Also, such payments would raise questions as to who the rightful recipients of the payments should be. Should it be the authors, their institutions or the many private or public funders of the work? These questions could prove highly controversial and disruptive and could work against the underlying principles of scholarship. Institutions that could afford payments could afford to pass payment to authors and editors thereby attracting more senior staff and increased funding support.

From a publisher's perspective, Houghton (2002) argues that payments by publishers to authors would simply raise input costs for the publishers. Assuming the publishers are operating in a competitive market on low margins, these costs would then be passed on to their customers (libraries) in higher subscription prices, which having a monopoly, would enable publishers to continue at will. In their modelling of a system involving author and editor payments, Halliday and Oppenheim suggest that such a system does not compare well with the traditional or alternative models for journal production, being relatively expensive due to the internalisation of creation costs (Halliday and Oppenheim 1999: 94).

#### **4.2.7.4 Economics of production**

The economics of production or publication focus on incentives facing publishers, production costs, various publishing business models and the issues of competition and concentration in the scholarly publishing industry. Houghton (2002) maintains that books and journals are typical information content products in that 'first copy costs' are high while marginal costs of reproduction are low, often virtually zero when in digital form. Therefore, such products are subject to increasing returns, rather than decreasing returns which is characteristic of a resource-based economy or the constant returns assumed in the neoclassical economic paradigm. It is widely believed that the outcome of increasing returns, in the absence of strong competition, is industry concentration, that is, fewer, larger firms. Therefore, commercial publishers have grown through mergers and acquisitions and developed even larger portfolios of titles, resulting in monopolies in which certain publishers dominate the market.

#### **4.2.7.5 Production costs and business models**

The key features of journal publishing costs in the print environment are:

- High first copy costs, low marginal costs;
- High article processing costs, approximately 45% of the total production costs;
- High marketing and administration costs, approximately 28% of the total; and
- Low physical distribution costs (King and Tenopir 1998).

An understanding of the economics of subscription purchasing, bundling and price discrimination helps shed light on how the publishing business works. The traditional pricing mechanism for journal publishing (annual subscription per title) is good for publishers because it creates a very low risk market, with consumers (libraries) paying subscriptions in advance (Halliday and Oppenheim 1999: 15). The issue of bundling is crucial. According to Houghton (2002) an issue of a journal is a bundle of articles, a journal title is a bundle of issues, and publishers are increasingly bundling titles into lists or portfolios and selling subscriptions to the entire list. This practice not only ensures payment in advance and revenue maximisation through bundling, it also secures payment for marginal and low use journal titles which the subscribing institutions might otherwise cancel. Thus perpetuating the production of what might otherwise be non-viable titles, and aggravating the 'serials crisis' by increasing the number of products on the market and thereby increasing aggregate fixed (first copy) costs. Bundling lists and selling on subscription also tends to increase monopoly power by reducing divisibility and substitutability, and maximising revenue by pricing at the average willingness to pay.

Also, Guedon (2001) suggests that publishers may reap a further advantage from aggregated titles in electronic format. If publishers control citation data and the ability to influence citation patterns, they can make their journals the leading titles in the field. These factors have allowed commercial publishers to wield monopoly power in the system.

#### **4.2.7.6 Economics of distribution**

The economics of distribution examines library distribution costs and how common library purchasing practices in the print environment have interacted with, and reinforced, publisher business models. According to Odlyzko (1998) the 'serials crisis' is really a library costs crisis, claiming that for every \$1 spent on journals a further \$2 is spent on library processing and storage costs. However, Odlyzko (1998) based this calculation on the ratio of serial subscription costs to total costs.

Therefore, it is important to consider distribution costs in order to address the whole

systems costs. To do this one needs an understanding of the print purchasing practices of research libraries over recent years, such as:

- Journal titles and books have competed with each other as substitutes across broad fields, rather than being considered separately;
- The budget for purchasing in each field has been determined by the strategic priorities of the institution, such that titles across fields do not compete on cost per use;
- The budget for each field has been determined largely independently of price information, and largely independently of demand or usage information;
- The budget allocations to each field have taken little or no account of price per use across field; and
- Price signals have rarely reached end users (Houghton 2002).

Thus the features of the print acquisition system are made up of two things. First, an almost complete failure of market signals, especially of price signals to the end users. Second, very high inelastic demand, with large price changes having relatively little effect on demand. In general, wherever one sees inelastic demand, one sees high prices. In other words, the system might be good at delivering scholarly content, but is extraordinary bad at the transmission of market signals. As a result of these characteristics Houghton (2002) refers to the system as a vicious cycle.

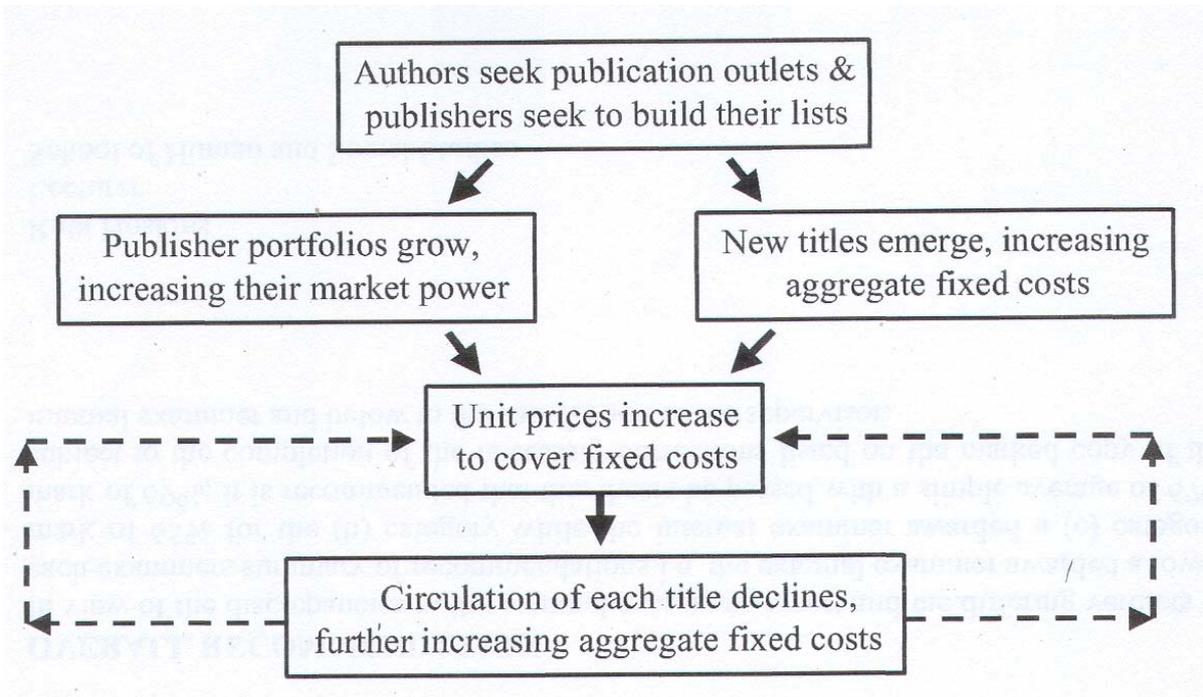
#### **4.2.7.7 A vicious cycle**

Houghton (2002) suggests that there are a number of key economic features of the scholarly communication product system that explain its operation:

- High first copy costs and low marginal costs of production mean that unit price must be high enough to cover first copy costs, and cannot be set at marginal cost unless an alternative cost recovery mechanism is in place;
- Circulation is critical, with extending circulation essential to reducing unit cost, smaller circulation journals and lower demand books tend to be more expensive. Lack of information about circulation makes price setting difficult;
- Limited substitutability of products, with purchasers unable to easily swap with alternative titles; and

- Inelastic demand (low price elasticity of demand) with sales relatively unresponsive to price changes.

**Figure 14: A vicious cycle in scholarly communication**



Houghton (2000)

Thus Houghton (2000) argues that new titles increase aggregate fixed costs, because each new title has high first copy costs. As a result of these factors a vicious circle is created: authors seek publication outlets, and publishers seek to build their lists; new titles emerge, increasing aggregate fixed costs, and publisher portfolios grow, increasing their market power; unit process increases to cover fixed costs and, since publishers wield monopoly power; the circulation of each title declines, further increasing aggregate fixed costs; and prices increase still further. Evidence for this vicious cycle can be found in examining the business interests of commercial publishers.

## 4.2.8 Business interests of commercial publishers

Since publishers are the main intermediaries apart from the libraries in the scholarly communication system it is important to understand their business interests. Thus, the main interests of commercial publishers are:

- Expanding their readership base despite low print volume;
- Widening subject coverage;
- Establishing editorial supremacy;
- Earning more profits and increasing market share;
- Maintaining of quality norms;
- Providing both print and non-print media; and
- Establishing global partnerships with intermediaries (Rao 2001: 173).

According to Rao (2001) due to the exponential growth of information and developments in computer technologies, the publishing industry is undergoing drastic changes. The increase over the years in the cost of printing has led publishers to increase journal prices, and consequently libraries are forced to cut down their journal subscriptions which resulted in reduced print volumes for publishers. This in turn pushed the unit cost up for the remaining subscriptions. As discussed earlier there is a large margin between commercial publishers and institutional publishers in terms of pricing, accessibility and ownership rights.

According to Gasson (2004) to understand what is happening in the commercial publisher sector it is first necessary to understand how the business works. Gasson, a publishing analyst, summarises the economics on the journal publishing side as follows:

The typical publisher-owned academic journal (as opposed to journals which are owned by learned societies) has around 200 subscribers paying around £600 per year for six issues. This brings in around £120,000, of which direct costs such as printing, typesetting, marking up in HTML, distribution, copy editing, marketing and the editor's expenses and honorarium add up to around £40,000 per year. The rest goes towards the publisher's overheads. Each year 3 per cent of the subscribing libraries decide to cancel their subscriptions, either

because they can't afford it any more or because their faculty is no longer interested in the relevant field. It is almost impossible to sell new subscriptions to replace these lost sales because libraries struggle enough to maintain their existing subscriptions and are generally very reluctant to take on new ones unless they are really forced. Unless the publisher puts up the price to compensate for the six subscriptions who have cancelled, the total revenue for the journal would fall by £3,600. But the publishers' shareholders don't like to see sales falling: it makes them feel that academic publishing is in trouble. So the publisher puts up prices by 10 percent to £660 per year. At this higher price, another six subscribers find they cannot afford the journal and don't renew. But the publisher doesn't mind because with 188 subscribers paying £660 per year, it still makes more money than with 200 subscribers paying £600 per year. And the profit is better because the costs are still the same (Gasson 2004: 7).

This explanation of how the business of journal publishing works shows that as long as publishers can raise prices more quickly than libraries can cancel subscriptions; publishers can increase their profit margins and their sales every year. However, the problem for journal publishers was that by the late 1990s publishers were finding that they could not raise prices quickly enough to off-set the cancellations. Gasson (2004) argues that once the number of subscriptions started to fall below 100, the journal starts to become irrelevant to the academic community because fewer people read it and it starts to lose prestige, and fewer academics want to write in it. With less good papers being submitted to the journal, it becomes even less relevant to the academic community. The journal then starts to free fall and revenues then fall below the direct operating costs. The publisher either has to close the journal and return the library's money or find another title to merge it with. According to Gasson (2004) this technique of raising prices faster than libraries can cancel is known as price gouging, that is, the customer (predominantly libraries) gets no improvement in the product but still has to pay more for it.

From the above discussion it is easy to understand why the scholarly communication system is in crisis. The content product (research paper or article) is created by scholars in a gift economy. Commercial publishers operate merely in a for-profit economy and because of their monopoly power libraries cannot afford to maintain

the ever increasing subscription prices. In terms of the economics of academic publishing there is definitely an irony that exists. This irony is articulated very well by Edwards and Schulenburger (2003: 15):

Observe the irony: scholarly journals are filled with material that was created by public subsidy; however, access to that material is now increasingly being rationed in a manner most inconsistent with its public-goods nature. It is being rationed at price. Worse, the market in which this material is sold has such inelastic supply and demand that the result is an increasingly effective transfer of resources from institutional subscribers, especially universities, to commercial publishers. ... Had university libraries' budgets increased fourfold between 1986 and 2000, these market defects would likely have led to dramatically greater price inflation but little or no additional scholarly information. This is the classic public-goods situation, in which markets are unable to produce an optimal distribution of the good.

Rao (2001) argues that since publishers are not willing to share their profits with the creators (scholars) of information, in an attempt to remedy the situation scholars have turned to the internet which has partly allowed them to claim back some of their power in the system.

Publishers quickly became aware of this changing scenario and then took the lead and adopted various electronic publishing activities in order to stay ahead in the business. Publishers now collaborate with scholars in the process and have invested billions of dollars in converting back files into the digital medium. The fact that commercial publishers already have large amounts of data already in print which can be converted to digital form means that they are well placed to maintain their control in the system (Langner 1996). Since this study examines the effect of the scholarly communication crisis on university libraries in South Africa the context for the publication of South African research is important.

### 4.3 The publication of South African research

Much has been published on LIS research and publication in Africa. Aina and Mabawonku, for example, have published extensively on African scholarly research. Aina (1984) described an analysis of the availability of periodical titles used by scientists in Nigerian libraries. Results of this study indicated that only 67 of the 578 periodical titles cited in the bibliography were not available in any of the other major libraries. Aina and Mabawonku (1996) discussed the background to the launching of the *African Journal of Library, Archives and Information Science (AJLAIS)* and its mission, vision, goals and objectives. The article outlined problems encountered during the planning and implementation period and summarised the strengths and weaknesses of the journal. In a study published in 1997, Aina and Mabawonku analysed 80 articles published in AJLAIS with respect to the characteristics of the authors, research trends and citation patterns. In 1998, Aina and Mabawonku described a study which was done over a five years period in which a comparative analysis was done on manuscripts that were accepted and rejected for AJLAIS.

In 1999, Aina and Mooko, reported on a survey conducted to investigate the research and publication patterns of 34 top ranking researchers in LIS in Africa. The study found that of the 15 top ranked periodicals used by the researchers, only two were published in Africa.

In 2002, Aina, discussed again the establishment of AJLAIS and provides an appraisal of the journal from 1996 to 2000. A comparison with 3 other journals was made with AJLAIS with a view to identifying frequency of consultation and use by researchers in Africa. Findings reveal that AJLAIS performed creditably as a resource base for research in Africa. In 2005, Mabawonku and Aina, reported on a study that surveyed 12 active LIS journals published in Nigeria and Ghana in order to establish the characteristics of LIS journals in West Africa.

The focus of this study, however, was on South Africa university libraries therefore, the publication of South African research is the central focus.

According to Crewe (2006) the effect of globalisation on knowledge exchange, which is mediated very largely through scientific journals being published in English, and having their origins in Europe and North America, has resulted in the neglect of regional journals. This has also led to the development of benchmarks based on bibliometric analysis of publication patterns that has resulted in global ranking of tertiary institutions. Crewe (2006) argues that these trends are being countered in the African context, with its relatively neglected tertiary sector, by a need that is expressed by the African Academies of Science that are members of the Network of African Scientific Academies (NASAC), to consider the publication of high-quality journals that report work of significance to African scientists.

Two major influences have effected the publication of local scholarly journals in South Africa in the recent past. The first of these was the establishment of the Bureau of Scientific Publications that subsidised the publication of a number of journals that had been established during the 20th century. The 'Bureau journals' were an attempt to foster academic publication in South Africa and to make their products available to an international readership. The second influence was a new mechanism of funding universities, which rewarded them directly for the academic publications that they produced.

Both of these influences had a significant impact on the development of local journals, the behaviour of individuals, the financial sustainability of learned societies that produced the journals, and the institutions that received the 'output' subsidy. The Bureau was recently closed, with only one journal, *The South African Journal of Science*, continuing to receive support through the Academy of Science of South Africa on the basis of its international impact. The funding for 'outputs' of the tertiary institutions has continued, although in a modified form that includes a reward for completed masters and doctoral degrees.

Following the closure of the Bureau for Scientific Publications (BSP) and the termination of the policy of state subsidisation of selected research journals, the Academy of Science of South Africa (ASSAf) signed a contract with the then Department of Arts, Culture, Science and Technology (DACST), now the Department of Science and Technology (DST), in December, 2001. The contract required ASSAf

to recommend and support a new strategic framework for South Africa's research journals, on the basis of evidence and comparative information; ASSAf was to work in partnership with a number of organisations. The main objectives of this strategic framework were to:

- Promote/enhance the standing and effectiveness of South Africa's research journals, nationally and internationally;
- Improve the productivity/efficacy of publication through different modalities (for example, electronic publication);
- Establish the *South African Journal of Science* (SAJS) as a 'national asset' of high quality; and
- Ensure that discoveries and insights gained through research published in South African journals were made known to a wider public than the research community itself.

The strategic goal, which resulted in a six-chapter Report (*Report on a strategic approach to research publishing in South Africa*), was to help develop and maintain a robust national system of research that contributes materially to the sustainable prosperity of all South Africa's people.

#### **4.3.1 Introduction and background to South African publishing**

The introductory and background chapter of the report was prepared by Wieland Gevers and provides valuable statistical information on the South African publishing context. According to Gevers (2006), South Africa occupies the paradoxical position in the arena of research publishing of being a dwarf internationally and a giant on the African continent. About 3500 listed papers, with at least one South African author address were published worldwide in 2000. This represents about 0.5% (five in every 1 000) of all papers in the three major databases of the Thomson ISI system, which covers over 5500 selected international journals in Science, Engineering and Medicine, 1800 in the Social Sciences, and 1200 in the Arts and Humanities. South African research journals constituted only 19-23 (depending on the year) of the indexed journals on the combined databases in 2002 (0.2%, or two in every 1000) containing about 350 papers of the ISI total for the country (one in every 10), and the

rest of Africa, only two. South Africa's share of world citations in this database was 0.31 (just over three per every 1000) for the period 1997-2001, while only 0.15% (1.5 per 1000) of the 1% of top-cited articles had one or more South African address. Altogether, about 7000 research articles are published annually from South African addresses in ISI-indexed journals or in un-indexed journals accredited by the Department of Education (DoE).

According to Gevers (2006) recent surveys of the South African S&T indicators put the total number of potentially publishing researchers in the country at about 16000. The active researchers in this group are the producers of the 3500 ISI-listed papers per year mentioned above, as well as the approximately 3500 that are not so listed but are accredited by the DoE. In summary, 16000 researchers publish about 7000 papers a year, or on average about 0.4 papers per researcher per year.

The first point of departure of the ASSAf Journals Project has been that science publishing should take place inside South Africa on a significant scale, because of the beneficial effects this has on the research system:

- In promoting the active participation of South African scholars in editing journals (both as editors and as members of editorial boards), and in refereeing/reviewing and improving submitted papers;
- In networking local scholars and their research students through research publication in a working context smaller than the massively diffused international system;
- In facilitating the contribution of South African research and scholarship to the general body of scientific knowledge;
- In reflecting local focus, depth and strength in particular fields, thus showcasing the country's scientific activity in a concentrated way; and
- In allowing the context and potential impact of original research papers to be highlighted through professional editorial enrichment of the content in terms inter alia of peer analysis, background review, and evidence-focussed correspondence (Gevers 2006).

The second point of departure was that local journals should be of high quality, and should therefore meet a number of important specifications, in that they should:

- Be competently edited by an editor(s) of high academic standing, supported by an effective editorial board, with proper peer review (by more than one peer expert in the case of each submitted paper);
- Be published regularly and frequently; each issue should contain enough articles to further and broaden the understanding of readers more than would happen through the reading of singly reprinted/downloaded articles;
- Have guaranteed financial viability through a reliable and sustainable set of revenue streams; and
- Showcase the South African scientific enterprise by having a wide international distribution, and achieving recognition through listing on a reputable database (such as ISI) as well as through internet publication (both accompanying print versions, or as the sole modality) (Gevers 2006).

Gevers (2006) argues that the importance of the second point of departure was that in principle it established preconditions for the validity of the first; as all or most of the arguments for in-country research publishing become counter-arguments for not investing resources of time, effort and money in this area, if the journals that are published in the country are of poor quality in the sense of the criteria listed above.

### **4.3.2 Bibliometric assessment of South African research publications**

Chapter two of the ASSAf Report was prepared by Pouris, who undertook a bibliometric assessment of South African research publications included in the internationally indexed database of Thomson ISI.

All South African publications indexed by ISI in 106 selected research disciplines were analysed by Pouris (2006) with a view to identifying the absolute numbers of articles published in each discipline, and trends over four 5-year periods stretching from 1981 to 2004. The results showed that three disciplines produced more than 1 000 publications in the period 2000-2004: plant sciences (2182 publications), animal

sciences (2108 publications) and environmental ecology (1187 publications). The fastest growing disciplines were clinical immunology and infectious diseases (+967%), and the public health and health care sciences (+891%, starting, however, from a relatively small basis of 23 publications during 1981-85). The contrasting substantial decline in the number of publications in “general and internal medicine” from 2337 publications during 1981-1985, to 566 publications during 2000-2004 was alarming.

According to Pouris (2006) citation rates for different disciplines are known to vary, inter alia as a function of the total numbers of articles published and the typical length of bibliographies. The average citation rates of world publications was determined in each of the same 106 disciplines, varying from 0.10 (art and architecture) to 14.66 (cell and developmental biology). The impact of South African articles relative to world output per scientific discipline (defined as the citation impact for the country’s discipline divided by the citation impact of the world for the particular discipline) was also determined for each discipline and for a number of aggregated groups of disciplines within this set. In 22 disciplines, South African articles had a relative impact equal to, or higher than the world impact. Oncology had the highest relative impact (2.17) during the most recent five years, followed by anthropology and classical studies, with relative impacts 1.99 and 1.80, respectively.

The South African research journals indexed in ISI had aggregate impact factors for the period 2000-2004 varying from 0.113 for a total of 66 articles (*South African Journal of Minerals and Metallurgy*) to 1.111 for 30 articles (*South African Journal of Geology*). Only four journals exceeded the median Impact Factor for all world journals in their disciplinary group, namely, the *South African Journal of Geology*, the *South African Journal of Science*, *Social Dynamics* and the *South African Medical Journal*.

In terms of the number of journals indexed as emanating from individual countries, South Africa with 20 journals shared position 26 with Sweden, way behind the US with 2288 indexed journals; Egypt and Kenya from the African continent had one journal each. The intrusion of multi-national publishing houses into regional research

publishing has made the figures for some countries artificially high (for example, the Netherlands).

Pouris' (2006) bibliometric analysis of South African publications in the ISI system points to a clear need for support of selected local journals to improve and entrench their position in the ISI system, and the existence of possible opportunities for locally published journals in a number of new areas which must, however, be carefully contextualised in terms of their potential appeal to international authors as well as to South African scholars willing to transfer their papers to high-quality local journals.

### **4.3.3 Analysis of South African research journals**

A comprehensive analysis of South African research journals was undertaken by Mouton, Boshoff and Tijssen in the third chapter of the Report. They found that there were currently 255 South African scientific or scholarly journals recognised by the DoE as meeting the minimum requirements for state subsidy under the policy of supply-side support for authors (and their institutions) who publish in these journals. Of these journals, 23 appear in one of the ISI Citation Indexes, 14 are indexed in the International Bibliography of the Social Sciences (IBSS) (two journals appear in both), while the remaining 220 journals are 'accredited' separately by the DoE (2003 list) on the basis of having the main purpose of disseminating research results and content that supported high-level learning, teaching and research in the subject areas concerned; having an ISSN; being published regularly; having an editorial board of high standing and expertise in the field; using peer review; and wide distribution.

SA Knowledgebase (SAK) is a dynamic database of public science in South Africa, developed by the Centre for Research on Science and Technology (CREST) at the University of Stellenbosch. It collects bibliographic information (excluding citations) on articles, with any South African author addresses, which have appeared in journals accredited by the South African Department of Education (including those included in the ISI and IBSS indexes); it also captures information on every article title, full authorship, journal name, publishing details, and keywords, and other

websites. At present, almost 100000 articles are included in SA Knowledgebase, which not only covers articles produced by the South African higher education sector, but also those produced by the science councils, national research facilities and government research organisations located in South Africa. The database also provides author-specific information by disaggregating the article output by selected demographic variables (gender, race, year of birth, highest qualification, areas of specialisation and institutional affiliation).

According to Mouton, Boshoff and Tijssen (2006) of all the South African-authored articles in the SAK database, 56176 (or 57%) appeared in ISI journals and the remaining 43% in non-ISI journals. Distributed differently, 55157 (or 57%) appeared in local journals and 43% in foreign journals. Three quite different trends for each of the 'index type' journals were observed over a 13-year period: the number of articles in South African ISI-journals remained stable, while the number of South African authored articles in South African journals not indexed in ISI declined steadily as the number of articles in ISI-journals increased. The numbers of articles in foreign and local journals nearly converged by 2002; great strides have been made in breaking out of the isolation mould of 1990 when only 36% of articles were in foreign journals. A wide range of publication patterns was found between and even within a scientific field, as shown by a breakdown of all articles for the period by main field: in the engineering sciences, the majority (58%) of articles during this period appeared in foreign ISI journals; if the additional 604 articles that appeared in South African ISI-journals were added, an overall total of 67% or two-thirds appeared in ISI-indexed journals. The profile for publications in the natural sciences was not dissimilar, the vast majority (21664 or 61%) of all articles appearing in foreign ISI-indexed journals. If articles appearing in South African ISI journals (8523) were added, an overall total of 85% of articles appeared in ISI-journals. A very similar profile emerged in the medical and health sciences where 12749 articles or 64% appeared in foreign or overseas journals, articles in SA ISI-journals adding another 3112 to bring the total proportion of articles in ISI-journals to nearly 80%. Not surprisingly, the profiles for the human sciences were quite different; in the social and economic sciences, the vast majority of articles (11826 or 77%) appeared in local, non-ISI journals, while in the arts and humanities, an even higher proportion (90% or 18642) articles were published in local, non-ISI journals during this period.

Mouton, Boshoff and Tijssen (2006) assessed the 'spread' of where scholars in a particular field published their papers. As a measure of 'spread' the number of journals was counted in which 50% of the articles over this period appeared. A total of 15339 articles appeared in 734 journals that were classified as "social and economic sciences"; 50% of these articles appeared in 21 journals only, all of them local and only two ISI-indexed. A total of 20383 articles appeared in 611 journals that were classified as "arts and humanities" over the period 1990 – 2003; 50% of these articles appeared in 25 journals only, implying a high degree of concentration, especially in law. A contrasting picture was afforded by the more laboratory-oriented disciplines. A total of 135499 articles appeared in 2357 journals that were classified as "natural sciences"; 50% appeared in 90 journals only, of which local ISI journals represented 17 of the top 34 on the ranked list. A total of 19983 articles appeared in 1677 journals that were classified as "medical and health sciences"; 50% of these articles appeared in 63 journals only, as much as a quarter appearing in only six journals. A total of 6352 articles appeared in 576 journals that were classified as "engineering sciences"; 50% of these articles appeared in 16 journals only, half of them South African.

The issue of systematic trends (even biases) in reviewed articles was examined by Mouton, Boshoff and Tijssen (2006). Nine universities were selected with the highest research output over the past 13 years. There was a clear correlation between the 'size' of an institution's research activity, measured in terms of total article equivalents, and the number of journals in which staff at that university published their papers; for example, staff at the Universities of Cape Town, the Witwatersrand and Stellenbosch each published their articles in more than 2000 journals over the study period. Two other indicators measured the degree of 'internationalisation' of academic output at each university, either as the proportion of total article output that appeared in South African journals or the number of foreign journals that appeared in the list of the 50 most-used journals by that institution. The historically English-speaking, research-active universities ranked highest on both counts. A further issue examined by Mouton, Boshoff and Tijssen (2006) related to institutional authorship patterns of publication in South African journals which had published 300 or more articles over the past 13 years. Some disturbing trends were evident, in that a single institution contributed 30% or more of the article content to 21 of these journals; in 11

of these cases, the journal concerned was published by the same institution/unit that produced the majority of articles. More reassuring was the fact that five local journals had percentages of foreign authors in the range of 6-11%.

Interestingly, Mouton, Boshoff and Tijssen (2006) found that there is a significant ageing cohort of actively publishing scientists in the South African science system. The analysis of authorship by age against Journal Index Category revealed that the age profile of authors in South African ISI journals (predominantly natural sciences) shifted from 22.4% of authors above the age of 50 in 1990 to 47.4% in 2002. For the foreign ISI-journals, South African-authored articles showed a similar but lesser shift: from 23.8% of authors over the age of 50 in 1990 to 41.6% of authors over the age of 50 in 2002. For local, non-ISI journals (predominantly social sciences and humanities), a similar shift occurred from 18.8% of authors over 50 in 1990, to 45.4% of authors over 50 in 2002. Gender authorship trends between the two ISI categories (South African ISI and Foreign ISI) showed a substantive increase in female authorship from around 13% to 24% and 13% to 23%, respectively. The increase in female-authored articles in local South African journals was more substantive, however, with an increase from 19% in 1990 to 20% in 2002.

The bibliometric analysis undertaken by Mouton, Boshoff and Tijssen (2006) presents a general picture of South African journals as being differentiated into several categories: there is a small cluster of South African journals (both ISI and non-ISI, mostly in the natural and health sciences but also in some of the social science and humanities) that have 'acceptable' impact factors, record moderate to high citations from non-South African authors and generally present an 'international' profile. At the other extreme, there is a substantive cluster (perhaps effecting as many as half of all South African journals) that does not have any international visibility in that articles in these journals are not cited outside South Africa, and the production of content is dominated by one or two institutions and in some cases by the same institution (or department) that publishes the journal.

#### 4.3.4 South African editors

Mati (2006) in chapter four of the report presented the results of a survey of South African editors. A questionnaire was sent to the editors of all journals accredited by the DoE. The intention was to obtain relevant opinions and related information from this sector, focusing on draft criteria for the accreditation of South African research journals drawn up by the Steering Committee for ASSAf Journal Project. Of the 213 journals captured in the database, five journals were listed in IBSS, and 15 in the Thomson Scientific (Thomson ISI) databases, while the other 193 South African journals were accredited only by the DoE.

Mati (2006) found that all but two of the journals had a functioning editorial board, mostly comprising fewer than 20 members and turning over every 2-5 years; the great majority of the editors rated the performance of both the chairpersons and the boards themselves as being excellent or good.

In almost all cases, independent peer review was used to assess the acceptability for publication of submitted articles; two or three peer reviewers were used per article. In most cases, peer reports were from two to three pages, which in the circumstances of skilled, voluntary work of this kind suggested that considerable care was usually taken in carrying out the review and reporting on it. A core panel of peer reviewers was maintained by 141 of the 213 editors, of whom 171 believed they used a 'blind' peer-review system, mostly referring to anonymous referees. There were 70 journals that regularly published a full list of contributing peer reviewers, which may be one of the ways in which this essential and highly skilled service can be better recognised. The overall acceptance rate for submitted articles was over 70%, although in more than half of these cases, minor or major revisions were first required. Interestingly peer review of an entire journal was not practised in a single instance (Mati 2006). The other major findings of the survey undertaken by Mati (2006) included:

- Most journals were published bi-annually and this was closely followed by those appearing annually or quarterly. The survey was unable to distinguish whether infrequent publication was caused by financial stringencies or cost

- A majority of journals (about 55-60%) catered generally for the Social Sciences, Social Studies, Law and Education; many represented specialised sub-fields, but editors were generally unenthusiastic about the benefits of possible consolidation of titles to increase the flow of good manuscripts and the frequency of publication.
- Journals sourced their income from a mix of revenue streams, with the largest contributions coming from subscriptions, subsidy (from various sources) and page charges, followed by advertisements, donations and sale of electronic copies; the great majority had considerable difficulty in making ends meet.
- An average of between 75 and 80% of journal content (but with wide variations) was said to be devoted to peer-reviewed scientific articles, indicative of a clear focus on the dissemination of original scholarly work.
- The print runs of 75% of South African journals were below 1000 copies, and institutional subscriptions numbered below 200 in the large majority; generally, South African institutions had ready access to most of the journals in the set.
- The editors took considerable trouble in completing the questionnaires, with a return rate of 100%. They appear as a group to devote much time and effort to their task, few being professionally trained or provided with significant office/logistic support.

### **4.3.5 International eResearch and South Africa**

Chapter five of the Report prepared by Page-Shipp and Hammes (2006) examined international eResearch and the implications for South African research publishing in print or online. Page-Shipp and Hammes (2006) refer to the print and electronic publishing paradigms and their implications for scholars. They argue that South African researchers are particularly disadvantaged, in global communication terms, by the high cost of internet bandwidth and in many cases by poor institutional infrastructure. This disadvantage has promoted adherence to the local print publication medium whereas developed countries are moving steadily towards online publication. Significant movement to online publication has been made, however, although not in a form that really provides the benefits of open access. According to Page-Shipp and Hammes (2006) an important player on the local scene is Sabinet Online, which launched a platform, SA ePublications on which more than 192 journals have been incorporated. Sabinet Online seeks to add value by aggregating the titles from many different publishers under one interface and search system, while simultaneously increasing market awareness of the publications, both locally and abroad, and growing their revenue streams; no role in peer review and content definition is played by the host organisation. Furthermore, Page-Shipp and Hammes (2006) note that from 2002 to 2003 there was a doubling in downloads from the Sabinet Online e-journals, which being a good indication of use is also influenced by increased content. In financial terms, most publishers have gained from going the e-route; journal subscriptions have increased, and in 2005 Sabinet Online paid out a total of R1 million in royalties to the publishers, many of whom had never been able to make any margin before.

Another prominent and competitive player according to Page-Shipp and Hammes (2006) is NISC-SA in Grahamstown; in addition to being the full-service, online publisher of ten South African journals, NISC-SA also hosts African Journals online (AJOL), a high-potential catalogue and current awareness service to increase the visibility of African journals (195 journals offering over 13 000 articles) amongst the global research community. The success rate for archiving articles in institutional repositories has so far been extremely low, and no local university at the time of the

*Report on a strategic approach to research publishing in South Africa* (Academy of Science of South Africa 2006), had an institutional repository for archiving locally produced journal articles either as pre or postprints (Page-Shipp and Hammes 2006). Harvesting of South African open access (OA) repositories has also not received concerted attention, so far. A few South African repositories are listed in the Registry of Institutional Open Access Repositories and are harvested by OAlster.

Also, the academic research system in South Africa is currently strongly driven by the DoEs (supply-side) subsidy system which pays institutions a subsidy per publication in one of the peer reviewed journals listed in the two accredited international databases (ISI and IBSS) and in the DoE list of accredited journals. Page-Shipp and Hammes (2006) maintain that open access publishing will need to attract benefits if researchers are to be induced to use this mode; incentives for self-archiving and harvesting should be considered; for example, it could be a precondition for subsidy and for the National Research Foundation (NRF) and other agency grant-funding. Support will also need to be given to the creation and maintenance of the necessary repositories and networked infrastructure.

Page-Shipp and Hammes (2006) conclude that encouragement and incentives are required for South African authors to publish in recognised open access journals by way of increased awareness and the provision of grants to cover author fees. There needs, however, to be recognition of the fact that open access and other online initiatives merely make innovative and system improving alternatives possible: for researchers to be willing to participate, a thoughtful and enlightened set of incentives will thus be needed. Finally, there needs to be a strategic decision on the best balance between visibility in global terms and local relevance and capacity building.

#### **4.3.6 Recommendations to enhance publishing in South Africa**

The final and sixth chapter of the report provided concluding remarks and recommendations. The following recommendations for a strategically enhanced role of research publishing in South Africa were meant to provide a strategic framework

for research publishing in South Africa (Gevers, Mati, Mouton, Page-Shipp, Hammes and Pouris 2006):

- That all stakeholders in the South African research enterprise should each in their own way support local/national research journals that actively seek to be of international quality and are indexed in an internationally recognised, bibliometrically accessible database, through following best-practice in editorial discernment and peer review, including adaptations:
  - That address inherent problems and capitalise on technological innovations;
  - That judiciously enrich content to promote coherence and value-adding functions;
  - That provide the local scholarly community with opportunities for participating in the full range of scholarship-enhancing activities associated with the process of publishing original research outputs;
  - That vigorously seek financial sustainability from multiple income streams; and
  - That accept systemic peer review and periodic audit which has a marked developmental focus.
  
- That both high-level (Departments of Education and of Science and Technology, Higher Education/ Higher Education Quality Committee (CHE/HEQC), National Advisory Council on Innovation (NACI) and NRF) and wide-ranging (higher education institutions, science councils) discussions be held to design a robust, well-informed and accountable mechanism for the accreditation of research journals (and probably also of books and other outputs of scholarship), that will meet the different, although often convergent, requirements of the multiple stakeholders in the national system of innovation.
  
- That the proposed best-practice guidelines presented in chapters one and six of this Report be widely discussed under the aegis of the Academy of Science of South Africa, formulated into a concise readable document, and then publicly adopted by editors and publishers throughout South Africa, especially

those relating to effective peer review and wise and appropriate editorial discernment.

- That the quality assurance system now being put into place by the CHE/HEQC be used by that agency and by its partner higher education institutions to promote best-practice in publishing of original research work, and to emphasise and enhance the training function served by the whole exercise of publishing original papers in the peer-reviewed literature.
- That ASSAf be mandated jointly by the Departments of Education and Science and Technology to carry out external peer review and associated quality audit of all South African research journals in five-year cycles, probably best done in relation to groups of titles sharing a particular broad disciplinary focus, in order to make recommendations for improved functioning of each journal in the national and international system.
- That the Department of Science and Technology takes responsibility for ensuring that open access initiatives are promoted to enhance the visibility of all South African research articles and to make them accessible to the entire international research community. Specifically:
  - Online, open access (“Gold route”) versions of South African research journals should be funded in significant part through a per-article charge system (linked in the case of higher education institutions to an agreed fraction of output publication subsidies, and in the case of other research-producing institutions to adapted budgeting practice), but publishers should still sell subscriptions to print copies and should maximise other sources of income to lower the article-charge burden;
  - A federation of institutional open access repositories, adhering to common standards, should be established (“Green route”), with resources made available to help institutions in the preliminary stage, this virtual repository to be augmented by a central repository for those institutions which are unable to run a sustainable repository;

- National harvesting of South African open access repositories should be undertaken as a matter of urgency, preferably by the NRF; and
  - The importance of affordable bandwidth for research communications for this purpose is drawn to the attention of DST officials negotiating for better rates.
- That a consortium of agencies be asked by the Department of Science and Technology to form a virtual national research publications information and research centre, probably best overseen by the Academy of Science of South Africa, which will continuously gather and analyse information on South African journals as well as on publications in foreign journals emanating from authors working in this country.
  - That a wide-ranging project be initiated by the national Department of Education and the provincial education authorities that will sharply increase the exposure of teachers, teachers-in-training and learners to local science journals and magazines that present the country's foremost scientific work in accessible form, and are effectively linked to the media.
  - That the Department of Science and Technology should assume responsibility for seeing to it that the South African science/innovation community, including itself and other government agencies, becomes involved in international action to promote the rapid but evolutionary development of a non-commercial, expanded, diversified and more inclusive international listing and indexing system for research journals, including those published in developing countries, within the evolving electronic knowledge-disseminating and -archiving system.
  - That the findings and recommendations contained in this Report be presented to key stakeholders in a series of consultative workshops, and that the outcomes and the impact of the publication of the Report be evaluated in three years time.

The ASSAf has established an OA platform for South African scholarly journals. This development is discussed later in terms of the alternative publishing models. Having outlined the South African publication context the discussion now moves to the alternative publishing models that have developed as a result of the drawbacks to the traditional publishing module. The alternative publishing models have been facilitated by modern information technology tools.

#### **4.4 Alternative publishing models**

The existing system of scholarly publishing evolved over many years to serve the needs of research in specialist institutions in a print-based environment. But the scholarly information environment is now undergoing profound change as a result of new technologies allowing new modes of research dissemination, changing research practices and needs, and increased focus on research performance for scholars (Van de Sompel, Payette, Erickson, Lagoze, and Warner 2004; Houghton 2005a; 2005b). In the traditional journal publication model, scholars are no longer getting the widest possible distribution for their works, since most libraries can no longer afford overpriced journals. As a result, the existing publishing model no longer serves well the needs of researchers for uninhibited access to the research findings of others. Among the major avenues for change, are a wide range of alternative paths for publication that seek to bypass existing mechanisms and existing commercial publishers. A number of organisations such as Scholarly Publishing and Academic Resources Coalition and the Public Library of Science, offer support and encouragement for alternative and self-publishing initiatives, while others, such as the Open Archive Initiative, are developing the tools to make self-publishing a reality. Electronic publishing is bringing new opportunities for innovation in terms of both the institutional and cost structures of the scholarly communication industry.

Alternative mechanisms for dissemination that are often discussed include the use of open archives, pre and postprint servers and simple direct internet publication. To be effective the e-publishing alternatives have to incorporate the key elements of the print system. Communication of findings is but one, and by no means the most important of these. Other key elements of journal publication include quality control

through peer review, the evaluation of academic performance, the nurturing of schools of thought and the development of research communities and networks (Houghton 2002). Although quality control features in most alternative approaches to a varying degree, it remains a critical issue. As more and more information becomes available, reliable filtering is increasingly valuable. There is a growing need for the consumers of scholarly content to know what to read, or more importantly, what not to read. One of the great strengths of the current system of scholarly communication for both authors and consumers is the filtering process involving reliable, consistent, open and trusted peer review and selection (Houghton 2000).

#### **4.4.1 The electronic publishing reform movement**

According to Kling and McKim (1999) electronic publishing is not simply a set of professional practices; it is also the focus of the e-publishing professional reform movement. The e-publishing reform movement has a core group of activists, and is organised around common reforms and ideology. Many other professionals and scholars have agreed with some of the reforms (advocate some form of e-publishing) without becoming active members of the movement.

This movement's core group of enthusiasts (for example, Paul Ginsparg, Steven Harnad, Andrew Odlyzko, and Ann Okerson) are well known for their proactive writings about e-publishing (Kling and McKim 1999: 892). Harnad, for example, is also known as the editor of the electronic journal *Psycholoquy*, as the originator of 'scholarly skywriting', a short discursive, and iterative form of scholarly communication (Harnad 1991), and for his 'subversive proposal', a radically decentralised scholarly publishing model, where scholars self-publish their works, which then may or may not be peer reviewed (Brent 1995; Harnad 1995a). Ginsparg is best known as the developer of the Los Alamos National Labs Physics ePrint Archive (<http://www.arxiv.org/>), a working article server used by physicists. These initiatives are discussed in more detail later. The e-publishing movement's arguments are anchored in the precepts that "electronic media are almost always better than paper". This position is arguable, but is often treated as a dogma, and based on several claims:

- Electronic publishing is dramatically less expensive than paper publishing;
- Access to electronic publications is easier and wider; and
- Electronic publishing can speed up scientific communication (Kling and McKim 1999: 893).

It is interesting to note that both Harnad's 'subversive proposal' and Ginsparg's eprint server bypass peer review (although Harnad also values peer review and discusses a way of augmenting his 'subversive proposal' to include peer review) (Brent 1995).

This reform movement has been an interesting source of ongoing debate by raising fundamental questions about the costs and efficiency of the traditional paper-based system of scholarly communication. The major problem with the movement is its claim that a single model for electronic scholarly publishing is appropriate for all scholarly communities.

#### **4.4.2 The publisher perspective on e-publishing**

Mabe (2006) argues from a publisher's perspective that despite all the gains in terms of electronic publishing, the move to digital forms of article creation and delivery has introduced challenges that were not anticipated. Some of the main problems include amongst others:

- Versions of articles are proliferating;
- The final published versions in print are not necessarily the same as those available online;
- Articles are being made available earlier without page numbers, making citation problematical;
- What exactly is the definitive version of an article, where can it be found and what counts as the official publication date?
- How can a secure digital archive be created?
- Who should maintain it? How can it be financed? and
- Should authors be allowed to put versions of their articles onto public websites? If so, which version, and does it matter? (Mabe 2006: 61).

None of these thorny issues existed in a pre-digital age, but they are becoming practical obstacles to efficient scholarship. Mabe (2006) argues these challenges arise from two main features of digital documents: their infinite reproducibility without control and their infinite changeability without necessary sanction by any authority. In a paper world, a document was published or it was not. If it was, then that version was the fixed official and final one. In an electronic world, a continuum of versions can exist of varying degrees of 'published' and 'final'. Some scholars have argued that this makes it possible for entirely new approaches to exist: a world where papers evolve rather than being published. Although attractive, this possibility overlooks the desire of most scholars to see what was known at a particular time, and that of authors to finish a project with its publication. According to Mabe (2006) most investigators (particularly publishers) do not see this as an enhancement of the current paradigm. The digital transition has effected (and continues to effect) every party in the publishing cycle: while some processes have become very easy (such as distribution), others have become much more complex. In part, this is a natural consequence of the phenomena of infinite reproducibility and changeability noted above. But it is also due to a breakdown of the Aristotelian unities<sup>5</sup> where documents are concerned: for paper documents, the content, the 'browser', and the archive are indivisible; for digital documents, content and browser are separable, the browser implies additional hardware on which to run it, and the archive may or may not be included (Mabe 2001).

#### 4.4.3 The research community and e-publishing

According to Mabe (2006) the advent of electronic submission as the norm and the rapid introduction of electronic peer review management systems mean that researchers have had to change their publishing behaviour whether they are

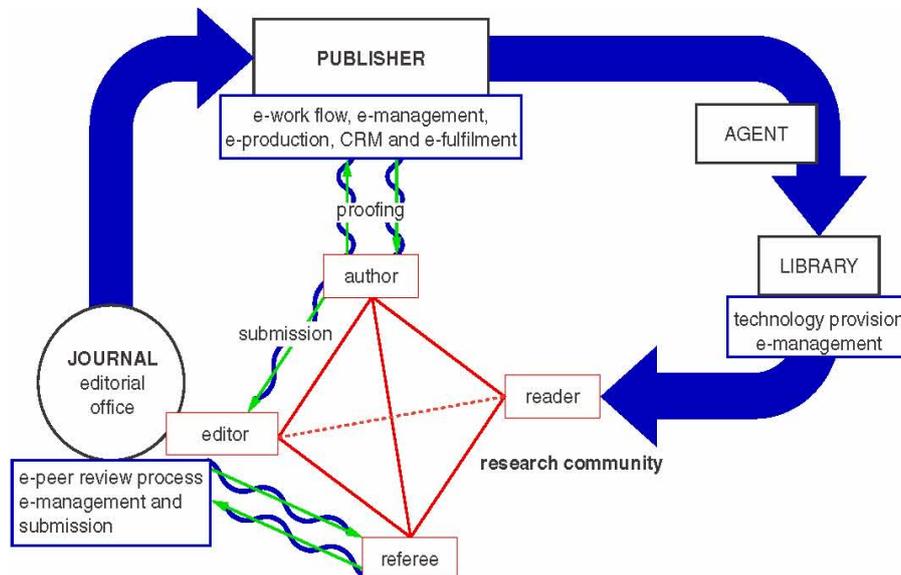
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<sup>5</sup> Aristotelian unities refers to the rules for drama derived from a passage in Aristotle's *Poetics*. In their neoclassical form they were as follows:

- The *unity of action*: a play should have one main action that it follows, with no or few subplots.
- The *unity of place*: a play should cover a single physical space and should not attempt to compress geography, nor should the stage represent more than one place.
- The *unity of time*: the action in a play should take place over no more than 24 hours. (Kiernan 1962: 63).

authors, referees or editors. Authors are expected to submit electronic manuscripts via an electronic gateway for the journal of their choice, imposing constraints on the software and formatting they can use. In turn, editors are expected to use electronic peer review and manuscript management systems to select referees from a database, forward the manuscript on to them and receive comments back. Referees can expect to receive image files of the manuscript as an e-mail attachment (usually in the Adobe PDF format) which some find tricky to annotate electronically and will often require printing out locally. Mabe (2006) argues that while the transition has undoubtedly improved the speed of transit of documents, made the preparation of tables, diagrams and photos easier, it has also moved much of the burden for such origination away from typesetters, art workshops and the publishers onto the producers, editors or reviewers of the material. Figure 15 attempts to capture (in blue) the main areas of change for both the processes and the actors in traditional publishing cycle after it has gone through the digital transformation.

**Figure 15. The electronic publishing cycle**



Mabe (2006: 62)

The introduction of software and systems has inevitably systematised submission and peer review. The processes and forms adopted now depend much more on the configuration and choice of the electronic submission and peer review management

systems than on the specific journal and editor. The demand by authors to know more about the status of their manuscripts in peer review and production can only be satisfied if common systems are in use between different journals from the same publisher (Mabe 2006). Electronic submission requires routines for the logging and transformation of received files, their management and trafficking. Such facilities inevitably have to be centralised per publisher rather than per journal, with many titles sharing the same system. Authors of electronic manuscripts will effectively submit to the publisher rather than the journal or its editors, although this may be disguised with each journal apparently possessing its own submission website. In addition, peer review processes, once solely in the domain of the journal editor, require websites and support from the publisher, who can only deliver article status information if the editor's data is held on the publisher's computer. All these changes subtly alter the balance that existed between the world of scholarship and the world of commerce, yet instead of simply moving work from one player to another, they have actually created new tasks that never before existed (Mabe 2006). Scholars are now charged with greater involvement with the origination of material than publishers, but the problems of file conversion, management and electronic hosting, and the difficulties of selling virtual rather than actual products, have increased for the publisher.

#### **4.4.4 The digital transition and the publisher**

Very few of the processes that publishers have traditionally managed are unaffected by the digital transition (Mabe 2006). Publishers are said to be performing new activities with implications for staffing and overhead costs: for example, electronic fulfilment systems with complex customer relationship management software, secure archiving and hosting, and so forth. Publishers argue that changes have been so profound that publishing organisations have had to almost entirely reinvent themselves since the early 1990s. The editorial functioning of each journal, once almost totally the domain of the academic editor, increasingly becomes part of the publishers' systems through the introduction of peer review management, submission and trafficking software. The software has to be designed from scratch or

selected and bought in. This process requires support as well as training of editors and staff.

Also, it is argued that the production process has changed much as a result of the digital transition. Electronic files have to be converted from what was received from an author to a common format, special characters, tables and figures transformed, and the final files output in two modes: one for printing; one for online uploading. The development and management of electronic file flows is a very different process from that of the paper world, requiring new tools and software services, retraining of staff and the hiring of those with new competencies. The supply of web editions of journals requires access to, or the development of, online hosting facilities. In the case of the latter, this involves specialised equipment and staff as well as considerations of data security and permanence, none of which were present in the pre-digital world. Mabe (2006) argues that the archives involved are not just simple data stores but living, interconnected collections of papers with complex cross-linking both externally and internally. Unlike a paper archive, these require active intervention. All this has economic implications for publishers: in paper, the archive was delivered and paid for together with the browser and the content, with no further action required by the publisher; electronically, for the archive to work and remain accurate, the publisher has to maintain links and services. Publishers argue the problem is that customers legitimately expect perpetual electronic access to the archive of material to which they have subscribed without further cost, and they expect this for material they no longer purchase as well.

#### **4.4.5 The library and e-publishing**

Electronic publishing has created new tasks for both the publisher and the librarian. For libraries, even relatively simple tasks, such as checking in journal issues to ensure a subscription is being fulfilled properly by the publisher, become much more complex. Instead of a package automatically arriving through the mailbox and needing to be opened and processed, the library has to go online and check that access to each of the issues of each journal it subscribes to has been enabled. The breakdown of the Aristotelian unities for electronic publication, that is, the separation

of content, browser and archive, means that although shelving and space are no longer issues for electronic journal collections, the purchase of computer hardware and software and its regular updating certainly are (Mabe 2006). Also, the increasing popularity of bulk purchasing and consortial arrangements means that the act of purchasing is much more complex. Instead of single decisions to subscribe to titles, a library is faced with negotiating and implementing licensing agreements for access to a range of titles with differing conditions of access and cost. These issues shall be discussed in more detail later.

#### **4.4.6 Initiatives to solve the problems inherent in the traditional publishing model**

Having discussed the effect e-publishing has on the research community, publishers and libraries it is important to examine these e-publishing initiatives in greater detail. The three major initiatives of the e-publishing model or paradigm include the Scholarly Publishing and Academic Resources Coalition (SPARC), Public Library of Science (PLoS) and the Open Access Initiative (OAI).

#### **4.4.7 New competition in the form of SPARC**

In 1998, the Association of Research Libraries (ARL) launched SPARC, an alliance of university research libraries and organisations. SPARC addresses the high cost of scholarly journals by supporting competitive and OA repositories. SPARC's goal is to expand information dissemination using a network digital environment by helping existing journals adopt an OA format and by forming partnerships with new journals to get them started (Association of College and Research Libraries 2008). SPARC's agenda focuses on the three strategic pursuits: Incubation, advocacy, and education. (Association of College and Research Libraries 2008). The Publisher Partners programmes set-up partnerships for incubating new journals and converting existing ones to OA. Alternative Partnerships set-up competitive alternatives to existing high-priced STM titles. Scientific Community Partnerships develop non-profit information portals that serve specific scientific communities, such as the Directory of Open Access Journals (Directory Open Access Journals 2008). Leading-edge Partnerships

create new, peer reviewed, electronic journals that compete with traditional STM proprietary journals. Examples include the *New Journal of Physics*, and BioMed Central (Public Library of Science 2008a). As a result of the SPARC initiative, PLoS now publishes three peer reviewed journals that compete with the leading existing publications in biology and medical research such as: *PLoS Biology*, *PLoS Medicine*, *PLoS Computational Biology* (with *PLoS Genetics* and *PLoS Pathogens*) (Public Library of Science 2008a).

Many journals have been created by SPARC to be in direct competition with commercial journals. Products like Bio-One, a collection of scholarly society journals belonging largely to the American Institute of Biological Sciences, have been assembled as an electronic database in an effort to keep those journals available at a modest price. In addition, SPARC has assisted on several occasions when journal editors left commercial enterprises and decided to create competitive journals on their own. SPARC has shown some indications of success. Journals facing new competitors have reduced their rate of price increase. In other cases, commercial journals have approached financial failure when the SPARC journal became established, leaving a SPARC journal as the remaining avenue. However, to date, SPARC has directly or indirectly effected only about 100 or fewer journals out of the over 161,000 titles listed by Ulrich. Some fear that SPARC will inadvertently aggravate the problem by adding to the number of journals that libraries must take if SPARC publications compete with, but do not replace, older journals.

In 1999, SPARC launched the Create Change campaign as its advocacy and education arm. Create Change works with university academics and librarians to build momentum to further the cause of OA by providing information and resources on its website. Designed for librarians and scholars, the site features resources pertaining to the scholarly communication crisis, including graphs that show rising costs for journals, information about intellectual property rights, and alternative models for scholarly communications. The site provides librarians with an advocacy kit that includes PowerPoint presentations and brochures that summarise the issues; scholars are provided sample letters of resignation from board membership and refusal-to-referee letters in protest of publishers' pricing policies (Association of Research Libraries 2000).

#### **4.4.8 Public Library of Science (PLoS)**

Edwards and Shulenburg (2003) describe two parallel initiatives that could in principle have the effect of eliminating the ability of commercial publishers to charge high prices or to raise prices. In 1998, David Shulenburg, proposed the creation of the National Electronic Article Repository (NEAR). In terms of his proposal, all articles, in the form in which they are published, would be entered into a National Electronic Article Repository 90 days after they appeared, at which time they would be freely available to all. Following on this, in 2000, a group of scientists at Stanford University began the second initiative, the Public Library of Science (PLoS). This initiative places articles in PubMed Central, a public electronic repository operated by the National Library of Medicine of the National Institute of Health, six months after they appear in journals.

The initiators of PLoS asked scientists to subscribe to the following pledge:

We will publish in, edit or review for, and personally subscribe only to those scholarly and scientific journals that have agreed to grant unrestricted free distribution rights to any and all original research that they have published through PubMed Central and similar online public resources within six months of their publication date. By June 15, 2002, over 30,000 scientists had signed the pledge to boycott (Edwards and Shulenburg 2003: 16).

Both NEAR and PLoS would attempt to continue the current refereed-journal system of scholarly communications curbing inflation in journal prices and, ultimately, making all scholarly publishing in science available to the public for free. This objective is important as the refereeing process creates significant value for scholars, allowing them to rely on published papers as having undergone strenuous review. Since managing the review process requires resources, both NEAR and PLoS initiatives would permit journals to have exclusive rights to published manuscripts for a fixed period of time (90 to 180 days). The assumption is that research universities would still pay to receive scholarly information upon publication, as their researchers would demand it. Journals thus would retain subscription

revenues sufficient to cover refereeing, editing, and other publishing costs. However, very high journal prices or unwarranted price increases would lead some libraries to decline to subscribe and their users would have to wait until the materials were available for free. According to Edwards and Shulenburger (2003) this customer option would cause some very expensive journals to cut their prices to retain subscribers, thus society and commercial publishers would be cautious about price hikes.

In December 2002, PLoS recognised that its boycott of publishers had failed. In a new initiative, it announced receipt of a major foundation grant to underwrite the creation of online journals to compete with expensive commercial journals. Ongoing operating costs for these journals are to be maintained by charging authors (or their universities) \$1,500 per article published. This approach eliminates subscription charges entirely, but it shifts the costs of journals to research universities. While the overall cost of a journal financed in this manner might be lower than that of commercial journals, it surely will seem inequitable to research universities that they are being asked to pay to publish research in addition to paying their faculty who produce the research (Edwards and Shulenburger 2003: 16). Also, this method of funding is subject to exploitation by commercial journals that, from the author's perspectives, publish their articles for free. Indeed, many commercial journals got their start by committing to publish research work free of the 'page charges' to authors that society journals were beginning to charge. Finding other sources of financial support to cover such author charges would eliminate this problem. However, Edwards and Shulenburger (2003) argue that it is doubtful that enough foundation support exists to permit all journals to follow this financial model. While both NEAR and PLoS offer novel approaches, strict appraisal would suggest that they must overcome significant hurdles if they are to transform the scholarly journal market. NEAR has never been implemented.

#### **4.4.9 Open access initiative**

The idea of a new paradigm emerging in post-Gutenberg era began to form in 1994, when Steven Harnad posted 'A subversive proposal' to the discussion list VPIEJ-L

based at the Virginia Polytechnic Institute, a list devoted to 'electronic journals' (Harnad 1995a). Harnad, Professor of Cognitive Science at Princeton University and the University of Southampton, United Kingdom, was for many years a researcher and editor of *Behavioural and Brain Sciences*, a journal published by Cambridge University Press (Yiotis 2005a). As mentioned earlier, in 1990, he introduced *Psychology*, the first peer reviewed scientific journal on the internet, and in 1997, the Cognitive Sciences eprints Archive. In 1998, he started the American Scientists Open Access Forum, a high-volume discussion list concerned with OA and open archives (Harnad 2003). Harnad's proposal was the inspiration for OAI (Brent 1995). He suggested that scholars publish their preprints of unpublished, unrefereed, original work on a globally accessible archive, freely available to scholars with network access anywhere in the world. When a work is formally published, scholars will substitute the published work for the preprint. Harnad made the point that scholars need not withdraw preprints from public viewing after being refereed and accepted for paper publication (Yiotis 2005a). Once this process becomes common, journal publishers will then be forced to restructure their costs for electronic-only versions to be truer to actual costs, which he estimated to be 25% less than the paper page costs (Harnad 1995b). Harnad also suggested that the cost for local archiving should be built into the cost of research and be paid in advance by the author or the funding agency rather than the end user. Thus the current publishers would have to restructure. If they did not, a new generation of electronic-only publishers would take over the market.

The intention of 'A subversive proposal' was to bypass restrictive copyright legally. Publishing unrefereed preprints by self-archiving before submitting the paper to a journal enables the author to negotiate to hold, rather than transfer, copyright. If the author holds copyright, the author would self-archive the refereed postprint. If the author loses copyright, the author would self-archive the corrigenda, the differences between the preprint and the postprint (Yiotis 2005a). Either way, the article would be freely available and the author's research impact would continue unfettered. In Harnad's 'Post-Gutenberg galaxy', permission is not a barrier (Harnad 1991). The discussion that followed Harnad's proposal is recorded on a file transfer protocol (FTP) directory and in a book, published by the ARL, titled *Scholarly journals at the*

*crossroads: a subversive proposal for electronic publishing, an Internet discussion about scientific and scholarly journals and their future* (Harnad 1995a).

#### **4.4.10 Open archives initiative**

Cornell physicist, Paul Ginsparg, in the early 1990s initiated an open electronic archive in which more than 70% of all papers published in physics journals now appear either in manuscript form or in the form in which they appeared in their respective journals (Edwards and Shulenburger 2003: 17). Authors self-archive their work on this site, making it available at no cost to all who want to see it. According to Edwards and Shulenburger (2003) the website costs are approximately US \$1 per paper per year. These costs were initially covered by the National Science Foundation and are now paid by Cornell University. Many academic physicists go to this website first for access to the physics literature. Even if a physicist's university does not subscribe to certain physics literature it is available through this server. The success of this website has led to others like it in the areas of psychology, economics, and mathematics, although none of them appear to contain so large a portion of its discipline's literature as does the Ginsparg's original. At research universities throughout the world there is now much interest in promoting the creation of such open archives, which would contain all the research manuscripts published by academics at each institution. Edwards and Shulenburger (2003) argue that if every research manuscript is placed in such an open archive and these archives are created to common standards, it would be possible to obtain any research manuscript by doing a single worldwide search of these archives.

Such an environment would eliminate the ability of journal publishers to command large prices for journal subscriptions, as there would be no need to subscribe in order to obtain easy access to articles. Edwards and Shulenburger (2003) point out that commercial publishers have not been able to dominate the field of physics, perhaps as a result of the existence of the Ginsparg archive.

While many journals now permit work that they publish to appear (with proper attribution to the journal) on the author's local website, some journals maintain tight

restrictions that prohibit consideration for publication if even a near-final draft of the manuscript submitted to them appears on a publicly accessible website. From this perspective, placement on such a website constitutes 'prior publication'. Any possibility that putting a manuscript on a website might jeopardize publication in a scholarly journal would ensure that many scholars would not use institutional repositories. Thus, if archives do not permit complete access to literature, their presence will not further science or drive down journal prices.

At an April 2003 meeting in Chevy Chase Maryland, a group of scientists (including several Nobel Laureates), librarians, and representatives of scholarly societies adopted a set of principles designed to further the open access model of publication. This led to the release of the 'Bethesda Statement on Open Access Publishing' (Bethesda Statement on Open Access Publishing 2003). It was decided that open access journals should be accessed for free and generally refereed. The group's set of principles affirms the need for all scientific scholarship to be freely available to scholars but specifies that most authors pay submission fees; however researchers from institutions with "demonstrated financial disadvantage" could publish in them without such charge (Edwards and Shulenburger 2003).

The Public Library of Science, a participant in the meeting, had agreed that it would not let financial disadvantage prohibit anyone from publishing in its new journals. The Howard Hughes Medical Institute had agreed to cover publishers' charges when any of the investigators it funds published in open access journals. On June 17, 2003, it was announced that all universities in the United Kingdom (UK) had become members of the open access group of journals published by Biomed Central, and that the UK's Joint Information Systems Committee would pay submission charges for all university faculty members when they published in BioMed's more than 90 peer reviewed journals. The Public Library of Science endorsed the OA definition of the Bethesda meeting, which defines an OA publication as one that meets the following two conditions (Public Library of Science 2008b):

- The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper

attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.

- A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).

The term 'publication' in terms of the OA definition is considered a property of individual works, not necessarily journals or publishers, and community standards, rather than copyright law, should continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now. While there is much activity in the open access journal movement, the essential economic facts were stated well by David Prosser, European SPARC executive, in the April 2003 ARL Bimonthly Report:

Open access journals are not free journals – only free to the reader. There are significant costs in the peer-review process and production of the journal (even if it is only online). Open access journals will survive only if they can raise sufficient funds to cover the costs of publication (plus whatever profit margin is considered reasonable by the journals' owners and is supported by the market) (Edwards and Shulenburger 2003: 17-18).

Therefore, a truly sustainable model must contain a revenue stream that guarantees coverage of the very real costs of producing peer reviewed journals. Open access journals supported by submission fees would have a revenue stream. However, advocates of open access have not demonstrated that their model would be superior to relying on subscription fees. With no mechanism to reduce costs of publication or to force reduction in profit margins, open access will simply shift the already excessive payment burden from libraries to authors (or other cost centres in the university).

In addition, Houghton (2002) argues that launching papers into the preprint servers at a relatively early stage of the selection process will tend to undermine the value of selection. For example, it has been reported that physicists reading material from the Ginsparg archive tend to read only articles by authors whose work they know (Lesk 1997), suggesting that they apply substitute filtering strategies to preprint server materials. These may have some negative consequences for scholarship, for example, making it harder for new authors to gain recognition and increasing the chances of readers missing important new developments. In the natural sciences, where the majority of papers submitted are published, the selection of articles from the remainder is of limited or at least marginal value. In the humanities, however, where the majority of papers submitted are rejected, the selection is much more important. This high rejection rate would suggest that while preprint servers may work well in the natural sciences (for example, Ginsparg's Physics Archive); they are less likely to be successful in the humanities (Houghton 2002).

#### **4.4.11 OAI repositories**

By 1994, the scientific community had already used electronic files for archiving scientific literature. The first centralised archive, began in 1991, was arXiv.org, a physics archive out of the Los Alamos, New Mexico, which Ginsparg moved to Cornell University (Gustafson and Pitman 2004). With self-archiving, a digital document is deposited on a publicly accessible, institutional website. Until standards emerged that allowed for cross-archive searching, institutional repositories were not interoperable; hence, self-archiving did not guarantee research impact (a major reason why scholars publish their findings) (Yiotis 2005b). Interoperability guarantees that any user anywhere in the world can search archives in repositories that are located anywhere (Harnad 2001). The technical break-through that made such searching possible was Extensible Markup Language (XML).

Interoperability involves a single web interface where the depositor enters XML metadata tags for date, author name, title, and journal name, and then attaches the full-text document (Yiotis 2005a). Full-text documents can be in different formats and locations, but the XML metadata tags make them interoperable. The interoperable

interface was developed by the international OAI. The software that supports cross-archive interoperability is GNU ePrints developed at Massachusetts Institute of Technology (MIT) and the University of Southampton. (Free Software Foundation 2008) GNU (pronounced “guh-noo”), developed by the GNU Project at MIT in 1985, is a free operating system that is compatible with UNIX (Free Software Foundation 2008). Free software means the user is free to run, study, distribute, and improve the program. Eprint software unifies the open archives system.

In 1999, OAI convened in Santa Fe, New Mexico, to work out “a technical and organisational framework to support basic interoperability among ePrints archives” (Digital Library Federation 2001). The framework instituted OAI compliance, enabling interoperability among eprints archives so that all can be harvested, integrated, navigated, and searched seamlessly as if they were all in one global archive (Yiotis 2005b). Standardised protocols for metadata harvesting enable users to search a virtual archive through such cross-archive search engines as ARC Cross Archives Search Service and OAIster, and to retrieve documents throughout the world, eliminating the need for a single, searchable, centralised archive.

OAI established a registry for OAI-compliant, distributed archives using ePrints software. To participate in this network, any individual or institution running a UNIX operating system can download ePrints software for free, set-up a self-archiving repository, and register with OAI. Their local archives then become searchable worldwide (Open Citation Project 2008). Using this system, universities set-up electronic theses and dissertations repositories on which students and academics publish theses and dissertations.

#### **4.4.12 Budapest Open Access Initiative**

The Budapest Open Access Initiative (BOAI) of 2002 was a milestone in the OA movement in that it unified a single statement and under a common name and purpose, the different terms that many groups used for the same idea. The following are some of these terms:

- Free Online Scholarship (FOS);

- Scholarly Communication Initiative;
- Immediate Free Web Access;
- Refereed literature Liberation Movement; and
- Intellectual Property Conservancy (Yiotis 2005a).

BOAI advocates OA for scholarly journal articles and elicits signatures from individuals and institutions at its website (Open Society Institute 2008). Its parent organisation, the Open Society Institute, was founded with a \$13 million donation by the Hungarian financier, George Soros, and is active in persuading foundations and the other organisations to donate resources (Open Society Institute 2008). BOAI endorses two strategies for achieving the goal of OA to scholarly journal literature:

- Institutional repositories that use the metadata tagging standards created by OAI; and
- The creation and nurturing of OA journals (Open Society Institute 2008).

In a 2003 article titled “Removing barriers to research”, Peter Suber, one of the original BOAI signatories, argues the major thesis of OAI: both the serials pricing and permission crisis can be solved by OA, first because:

...it is free of charge to [the user, and] second [because copyright holder[s] consent in advance to unrestricted reading, downloading, copying, sharing, storing, printing, searching, linking and crawling’ of OA articles (Suber 2004).

Suber argues if scholars retain copyright to their work, then they consent to give users OA to research articles for which they expect no payment. If scholars transfer the copyright to the traditional publishers, then the publishers will erect price and permission barriers to prevent OA (Suber 2004). Suber asserts that OA is ideal for this unique form of literature, that is, refereed scholarly articles, and it works because scholars retain copyright (Suber 2004). Scholars seek impact and exposure, which unrestricted publishing provides. They therefore benefit by consenting in advance to unrestricted copying of their work. The motive for publishers is profit, whereby access restrictions and costs are intertwined.

#### **4.4.13 World Summit on Information Society and other declarations**

Following the BOAI the OA movement was accepted by many globally and Zhang (2007: 230) notes that other declarations soon followed suit: the Bethesda Statement on Open Access Publishing in June 2003; Berlin Declaration in October 2003; Association of College and Research Libraries (ACRL) Principles and Strategies for the Reform of Scholarly Communication in August 2003; United Nations World Summit on Information Society Declaration of Principles and Plan of Action in December 2003; Organisation for Economic and Cooperative Development (OECD) Declaration on Access to Research Data from Public Funding in January 2004; International Federation of Library Associations and Institutions (IFLA) Statement on Open Access to Scholarly Literature and Research Documentation in February 2004 and the Wellcome Trust Position Statement on Open Access updated in 2005. In brief, the World Summit on the Information Society (WSIS) is a United Nations-sponsored working group concerned with closing the gap in scientific information between have and have-not nations in terms of the digital divide (United Nations 2008). OA is one concern of WSIS which advocates OA as a move towards removing barriers comparable to removing political and economic boundaries, such as the European Union. There are many other OA initiatives however, only the major ones have been discussed.

#### **4.4.14 South African OA repositories**

Developing countries can benefit from OAI through a variety of ways. According to Chan and Costa (2005: 151) OAI is of particular importance due to improved institutional access to research output and improved citation and research impact. Most scientists in developing countries publish in international journals which are difficult to access as Organ and Mandl (2007: 353) put it "...the materials have been traditionally locked away in print subscriptions or in password protected online-databases". These materials or scholarly literature can be made available to any researcher through OAI. Zhang (2007: 232) also highlights the benefits of OA in that authors are able to more quickly and widely disseminate their research and have increased citations and readership. Other benefits of open access are free open

source software and low infrastructure cost. Software such as ePrint and DSpace has been made freely available (Organ and Mandl 2007: 357; Chan and Costa 2005: 152). A few South African universities have made use of this software to create their institutional repositories. OA can also be used to improve access to primary data such as theses and dissertations, datasets, technical reports, instructional materials, doctoral theses and other forms of electronic publications (Chan and Costa 2005: 152). In addition, eprint repositories improve archiving of scientific data; bringing added benefits to scholars in organisations and countries which are poorly resourced and at institutional level bringing visibility, prestige and public value (Correia and Teixeira 2005: 349).

Repositories have existed in most institutions and universities since the onset of digital libraries. Krishnamurthy (2008: 50) therefore defines Open Access Archives or repositories as digital collections of research articles that have been placed there by their authors. This archiving can be done before or after publication. Krishnamurthy (2008: 50) identifies the following types of OA within the context of academic institutions:

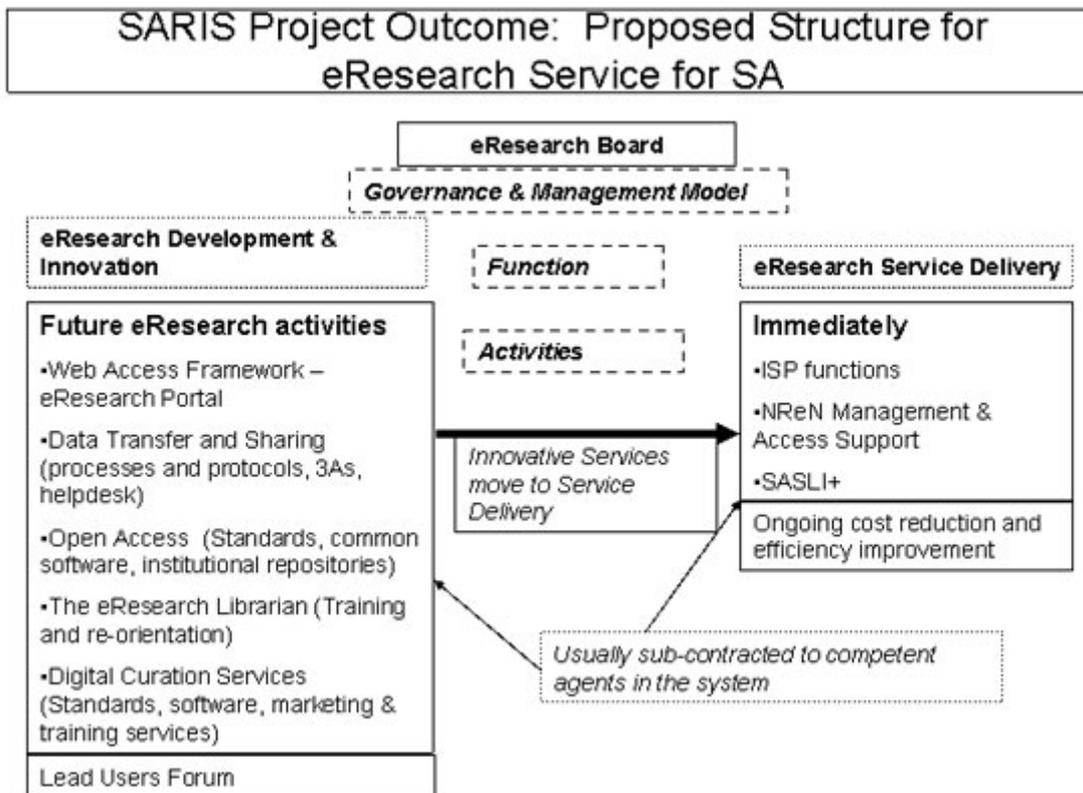
- Eprint archive (authors self archive).
- Unqualified (immediate and full open access publication of a journal).
- Dual Mode (both print subscription and open access version of a journal are offered).
- Delayed open access (open access is available after a certain period of time).
- Author fee (authors pay a fee to support open access).
- Partial open access (some articles from a journal are available through open access).
- Abstract (open access limited to table of contents and/or abstracts).
- Co-operative approach (institutional members support open access journals).

Van Deventer and Pienaar (2008) provide an overview of the background of the South African repository development initiatives and mention the existing repositories. They argue that developing countries can also exploit the opportunity to make their knowledge output more widely known and accessible by utilising the new eResearch paradigm and open scholarship. According to Van Deventer and Pienaar

(2008) in the South African context the implication of eResearch is not yet being fully supported in any co-ordinated way. One initiative to make key stakeholders aware of the changing needs in research, the South African Research Information Services (SARIS) research project report, recommended that South Africa should position itself in the forefront of the new research paradigm (Page-Shipp *et al.* 2005). This implied that individual research institutions should take the necessary steps to implement such strategies, collaborate amongst one another and lobby Government to support open access initiatives.

A national research and development strategy for South Africa was published in 2002. It invited all players in the national innovation system to rethink their role and to find opportunities to face the challenge of increasing economic growth and improve the quality of life for all South Africans. It was clear that the strategy called for a renewal in the information services sector. The SARIS Project was started *inter alia* because of the extremely high costs to South African research institutes and university libraries to access the global research literature. From the research it was very soon clear however that a new research paradigm, sometimes called eResearch, was emerging and that this paradigm presented 'a broader range of information support service challenges (Page-Shipp *et al.* 2005). The project team established that 'activities making up the family of eResearch were to be found in various stages of development in the research life of South Africa in 2004 but, typically, a "Team South Africa" approach was not evident. It was therefore recommended that a framework for eResearch services to the entire South African research community should be created - as depicted in Figure 16:

**Figure 16: Proposed structure for eResearch support service for SA**



Page-Shipp *et al.* (2005)

The intention was that the eResearch development and innovation services would be jointly funded as projects (conducted by competent agents in the system). Those projects that proved to be essential would then be transferred to the ‘service delivery’ arm (see Figure 16), where sustainable funding would be generated by those who made use of the service. The whole system was to be co-ordinated at country level. However, it soon became evident that there would be no national co-ordination of these efforts in the near future, and that individual institutions would have to start their own initiatives. Fortunately organisations such as Electronic Information for Libraries (eIFL) and the Mellon Foundation have been playing an important role in the development of the South African information industry and with their assistance several initiatives were kick-started. eIFL in particular has been very supportive of open access and the development of repositories in South Africa – especially at the academic institutions (Veldsman 2007; De Beer 2006). At a 2007 workshop, to review progress, several institutions were able to share their learning (Veldsman 2007; Peters 2007, Hammes 2007 and Van der Westhuizen 2007).

South Africa currently gives access to at least nine open access repository collections at several of its academic institutions. In addition the Council for Scientific and Industrial Research (CSIR) has also established its repository. Obviously these repositories, as a collection, have become a vehicle through which South African collections could be made accessible to the rest of Africa and ultimately to the rest of the world.

**Table 1: Establishment of South African institutional repositories**

When established	Institution	Typical content	Application
2000	University of Pretoria	Electronic theses and dissertations.	ETD-db
2003	University of Johannesburg	Electronic theses and dissertations	ETD-db
2004	University of the Western Cape	Electronic theses and dissertations.	ETD-db
2005	Rhodes University	Publication output of the university	ePrints
2005	University of Cape Town	Subject based university repository. Publication output and theses and dissertations from its Computer Science department are provided.	ePrints
2006	University of Pretoria	Publication output of the university as well as digitised historical and archival materials donated to the university.	DSpace
2006	Stellenbosch University	Theses and dissertations but also contains maps and items from the university's special and manuscript collections.	DSpace
2007	University of the Western Cape	Materials related to the study, practice and governance of higher education in South Africa.	AHERO platform
2007	CSIR	Research outputs (publication and reports) of the institution.	DSpace
2008	Durban University of Technology	Electronic theses and dissertations.	DSpace

Van Deventer and Pienaar (2008)

The majority of these repositories were apparently established in isolation with very little known interaction amongst those who were actively involved. The situation

changed drastically early in 2007. Many more institutions are investigating the development of repositories and a large number of special collections have been identified to digitise and bring online. Funding remains a concern. An informal mailing list was created for members from African and South African institutions with a common interest in institutional repositories. The list is hosted by University of Pretoria ([inspace@kendy.up.ac.za](mailto:inspace@kendy.up.ac.za)) and is actively used by the community. Individuals are starting to collaborate, to share ideas, find solutions, and come up with innovative ideas regarding the use of their institutional repositories. Electronic theses and dissertations were clearly the initial focus. More and more of the institutions are now investigating the possibility of making their special collections accessible to the wider South African community and researchers internationally.

An important open access initiative in South Africa was the inaugural meeting of ASSAf's Journal Editors' Forum that took place in late July 2007. Gray (2007) reported that the event marked the first step in implementing the recommendations of the Academy's study of the state of scholarly publication in South Africa. Although the study focused primarily on the strengthening of both the quality and the volume of scholarly publishing, it specifically mentioned the use of an open access model to increase the output and reach of South African research publishing. It is anticipated that open access would greatly enhance the impact, reach and speed of the dissemination of South African scholarship.

The ASSAf has thus established an OA platform for high-quality South African scholarly journals. This initiative which is supported and funded by the Department of Science and Technology is led by the Academy's Scholarly Publishing initiative. According to Meyer (2009) the proposed platform will enable users worldwide to access a wide range of top peer reviewed South African academic journals in full, on the internet, at no cost and free from most copyright and licensing restrictions.

The project is inspired by a wide-reaching movement towards the implementation of online journals, pioneered by the Scientific Electronic Online Library (SciELO) project, based in Brazil. This fully indexed platform has been implemented in eight countries, mostly in Latin America, with others being in the developmental phases. SciELO South Africa will be the first site of this growing system on the African

continent. SciELO focuses on developing countries where few citizens have access to traditional peer reviewed academic journals in printed form. Meyer (2009) argues that creating an OA platform for these journals will assist greatly in overcoming the obstacles of price and accessibility, and will enhance the international visibility of South African research. Each journal which is considered for inclusion is required to conform to stringent quality control standards, ensuring that only the best journals are published online. Actual usage by scholars and scientists is monitored by the indexing system in various ways, including journal impact factors and article citation and download statistics.

#### **4.4.15 Economics of alternate publishing models and paradigms**

Houghton and Sheehan (2006) investigated if the new models for scholarly communication were enhancing the dissemination of research findings and, thereby, increasing in the economic and social returns to investment in research and development. According to Houghton and Sheehan (2006: 2) major recent and emerging economic models for scholarly communication include:

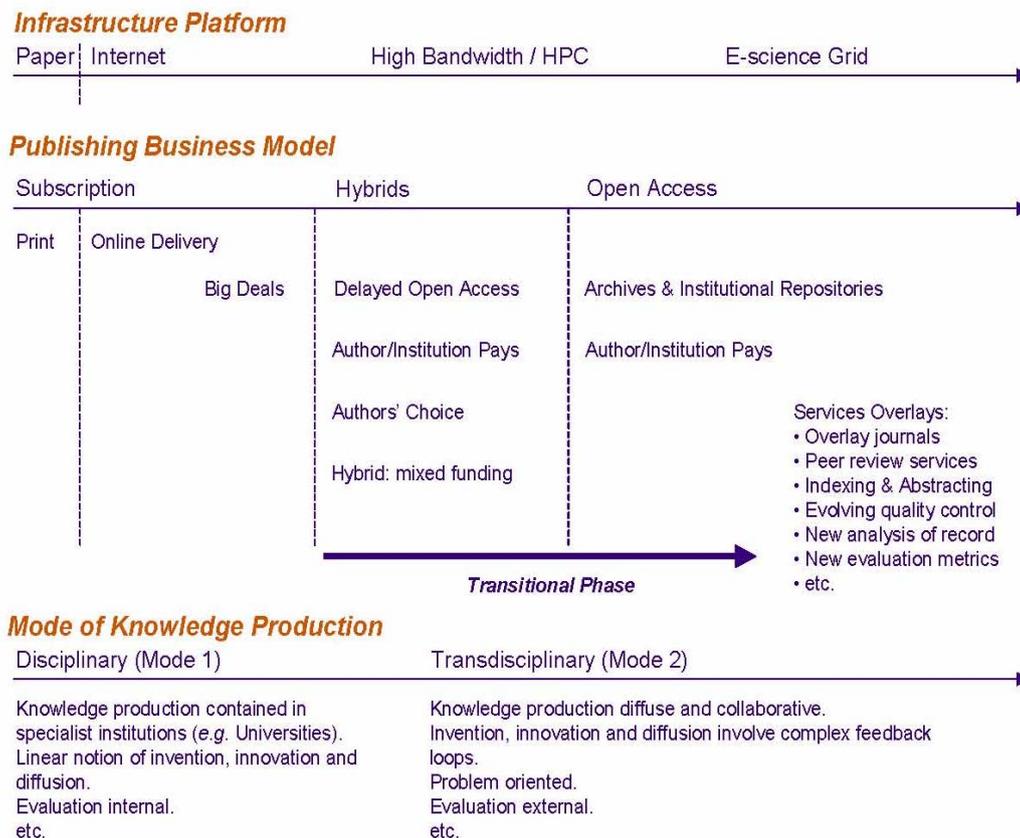
- The ‘big deal’ – where institutional subscribers pay for access to online aggregations of titles through consortial or site licensing arrangements (subscription access is also common for research databases);
- ‘Author-pays’ publishing – where authors, their employing or funding organisations contribute to the costs of publication; and
- Open Access archives and repositories – where organisations support institutional repositories and/or subject archives.

There are also a number of hybrids, such as delayed open access (where journals allow open access after a period during which they are accessible to subscribers only), open choice (where authors can choose to pay author fees and make their works open access, or not to pay and make their works subscription only), and less widespread alternatives, such as pay-per-view (Houghton 2005b: 57-77).

Figure 17 portrays an evolutionary continuum, highlighting the relationship between changes in scientific publishing business models, the information technology

environment, changing research practices and modes of knowledge production – with the information and communication technology (ICT) infrastructure enabling, and changing research practices demanding, new scholarly communication capabilities and mechanisms.

**Figure 17: Evolution of scholarly communication**



Houghton and Sheehan (2006: 3)

#### 4.4.16 A publisher's perspective on publishing economics

Once again in an attempt to provide a balanced view a publisher's perspective of the economics of e-publishing is provided. According to Mabe (2006) many observers of, and participants in, the scholarly communication system seem to equate physicality with cost. That is to say, they believe that the physical processes of printing and distribution have always been the principal cost areas for publishing and that these have been totally eliminated by going digital. Based on this analysis they conclude that 'e equals free' and are surprised when electronic publications are neither substantially cheaper nor free to purchase. A very simple model of publishing costs

can rapidly demonstrate why this is wrong. Mabe (2006) argues that in essence there are only two types of cost: fixed costs that relate to the creation ('origination') of the first copy of any publication and variable costs that relate to its reproduction and distribution. Editor and editorial office, copy-editing and typesetting are among the traditional fixed costs of journal publication and these are unchanged by going digital; paper, ink, printing and binding, postage and shipping are the traditional variable costs that potentially disappear for electronic-only publication.

Thus, for most paper journals the variable costs represent about 10 to 20% of the total. For electronic journals, although the variable costs are essentially eliminated, the change in technology and work processes (the need for electronic peer review systems, file transfer mechanisms, file workflow management, electronic fulfilment, customer relationship management, electronic hosting, disaster recovery and specialised staff, for example) increase the fixed costs over those that applied in paper (Mabe 2006). Consequently any saving in costs of digital publication is largely absorbed by the costs of new activities. Savings potentially range from 0 to 10% at most. Mabe (2006) argues that for such economies to apply across the board, most customers still wish to be provided with a paper version as well as an electronic one. The provision of a paper and electronic version therefore requires publishers to maintain two production tracks with all the old processes as well as the new ones. Publishers are therefore left with a dual cost structure which is more expensive than the traditional paper publishing model.

Having reviewed the publisher's economic perspective of the alternative e-publishing models one is left wondering if the alternative models are making an impact or solving the problems of cost and restricted access created by the traditional paper publishing model. Houghton and Sheehan (2006) examined if OA facilitates access to research and argued that such unrestricted access facilitates research and development (R&D).

#### 4.4.17 Access to journal literature

According to Houghton and Sheehan (2006) there is evidence of access difficulties and limitations with subscription-based scholarly publishing. In a survey of more than 5500 senior researchers, Rowlands and Nicholas (2005: 23) found that almost 74% thought that “high prices made it difficult to access the journal literature”. Sparks (2005: 26-28) reported that almost half of the 750 researchers she surveyed reported having problems gaining access to the resources they needed for their research, with more than half in medical and biological sciences (52.5%) and arts and humanities (53.4%) reporting difficulties. The major reported problems were access to journal articles, books and conference proceedings. Of those reporting difficulties, between 80% and 90% of researchers in medical and biological sciences, physical sciences and social sciences said that their “library did not have the journals they needed to access for their work”, as did 70% to 80% of those in languages, arts and humanities.

These findings suggest that even for researchers in higher education and specialist research centres in developed countries the subscription-based system creates access limitations. Such studies are complemented by those outlining the potential benefits of enhanced access.

- There is an increasing number of studies showing that open access articles are used more, both in terms of citations and downloads (Odlyzko 2002; Prosser 2004; Kurtz 2004; Walker 2004; McVeigh 2004; Brody and Harnad 2004; Getz 2005; Davis and Fromerth 2006). Harboe-Ree (2005) pointed to a number of specific examples;
- Stevens-Rayburn (2003) noted that *Astrophysical Journal* articles that are also on the preprint server have a citation rate twice that of papers not on the preprint server;
- Antelman (2004) found a significant difference in the mean citation rates of open access articles and those that are not freely available online, with the relative increase in citations for open access articles ranging from a low of 45% in philosophy to 51% in electronic and electrical engineering, to 86% in political science and 91% in mathematics; and

- Brody and Harnad (2004) noted a study of physics articles published each year between 1992 and 2001 revealing a variation on an annual basis of between 2.5 to 5.8 times more citations for open access articles compared to closed access articles.

A number of authors have pointed to the particular benefits of open access for developing countries, where access to the subscription-based literature has often been limited (Chan, Kirsop and Arunachalam 2005). Awareness of open access is often found to be higher among researchers in developing countries than it is in Western Europe and North America (Rowlands and Nicholas 2005), and access statistics from open access institutional repositories suggest that researchers from developing countries do use them. For example, during 2005 the Australian Research Repositories Online to the World (ARROW) Discovery Service received hits from 105 domains ('countries'), including 15 from the Dominican Republic, 19 from Armenia, 20 from Egypt, 27 from Zimbabwe, 43 from Belarus, 74 from Latvia, and so on. A similarly broad range of access is revealed in other repository statistics.

What is also notable is that the '.com' domain, the generic top level domain for commercial internet users, ranked 5th – even though it includes only generic top level domain commercial registrants and excludes country domain commercial registrants. Thus repository statistics suggest that wide dissemination of research is possible through open access. Exploring the advantages of open access institutional repositories, Pinfield (2005) noted the potential for greater research impact, the development of innovative overlay services and new forms of analysis. Willinsky (2006: 22) argued that open access is not only about human rights and greater circulation but it is mostly about increasing the research impact since a work's research impact speaks to the recognition and reputation of the author. A study conducted by Moghaddam (2008:89) showed that open access can increase the number of readers and significantly increases citations to the article – in some fields increasing citations by 300%.

Looking beyond the research community, Getz (2005: 11-12) noted three important dimensions of benefit: broader industry, government and society impacts; educational impacts; and the potential for greater integration of publications and the

other digital objects that are increasingly the output of research (for example, numeric data sets, software algorithms, animations, sound and video files). He reported a sevenfold increase in use of the MedLine Index following its move to open access, and 30% use by non-professionals, which clearly suggests that there can be significant impact beyond traditional subscription users. Kircz (2005) explored the 'dis-benefits' of the subscription publishing system, noting that the published literature was often not describing the record of science, at least, not the full record. Firstly, because of timing, it is "the full stop after the fact" with current discussions in many fields already based on preprints and other communication mechanisms (for example, discussion lists, weblogs, and so forth). Secondly, because of selectivity in publishing, it is "only a trophy cabinet" with little reporting in the formal journal literature of failed experiments, and trial and error tests, and so forth. The latter was also noted by Gallagher (2005: 8), who suggested that repositories would be "more likely than existing journals to include accessible archives of negative data". These points highlight two important advantages of open access for the efficiency of R&D namely:

- Timeliness and speed of reporting, especially through the posting of preprints; and
- The potential to create a fuller record of science through mandated deposit of findings and other not previously reported materials (for example, field notes or laboratory notes, related data sets, and so forth), thus speeding up the research process and avoiding the inefficiency of duplicative research and the pursuit of blind alleys (Houghton and Sheehan 2006: 5).

#### **4.4.18 Identifying the impacts that might be measured**

According to Houghton and Sheehan (2006) the potentially measurable impacts of enhanced access to research findings relate to their use by other researchers, industry and government use, and potential use by individuals in the wider community.

#### **4.4.18.1 Research**

The most immediate impact of enhanced access would be likely to be felt within research, wherein the dimensions of potential impact include:

- Faster access, speeding up the research and discovery process, increasing returns to investment in R&D and, potentially, reducing the time/cost involved for a given outcome and improving the efficiency of R&D;
- Improved access leading to better informed research, reducing the pursuit of blind alleys and reducing duplicative research, saving wasted and duplicative R&D expenditure and improving the efficiency of R&D;
- Wider access both providing enhanced opportunities for multi-disciplinary research, inter-institutional and inter-sectoral collaborations, and enabling researchers to study their context more broadly, potentially leading to increased opportunities for and rates of commercialisation; and
- Greater access leading to improved education outcomes, enabling a higher level of educational attainment, leading to an improvement in the capabilities of future researchers and research users (Houghton and Sheehan 2006: 5).

#### **4.4.18.2 Industry and government**

Given relative levels of access under the subscription publishing system, it is possible that greater potential impact lies in enhanced access for industry and government users, wherein the dimensions of potential impact include:

- The potential for wider access to both accelerate and widen opportunities for adoption and commercialisation of research findings, thereby increasing returns on public investment in R&D and on private investment in discovery and commercialisation related activities;
- The potential for much wider access, than that given by the subscription publishing system, for doctors/nurses, teachers/students, small firms in consulting, engineering, architecture, design, electronics/ICTs, biotechnology, nanotechnology, and so forth. A positive impact would result in a better quality of services and, possibly, productivity in both those sectors of the economy and those of their customers and clients; and

- The potential for the emergence of new industries based upon open access content. There are examples of new industries built on publicly accessible data (for example, weather derivatives based on meteorological data), and there are potential futures for publishers to become value adding service providers overlaying open access content (for example, peer review services, bibliometrics and webometrics for research evaluation, and so forth), which might, in turn, enhance research evaluation and lead to better focused R&D expenditures (Houghton and Sheehan 2006: 6).

Impacts might be felt more in particular sectors (for example, knowledge intensive services, biotechnology, and so forth). Impacts in such areas as management and economic consulting and engineering might be significant, raising the quality of advice to the benefit of customers and clients across the economy. There may also be positive impacts on policy development, through better informed policy debate and enhanced access to the information underpinning policy decisions.

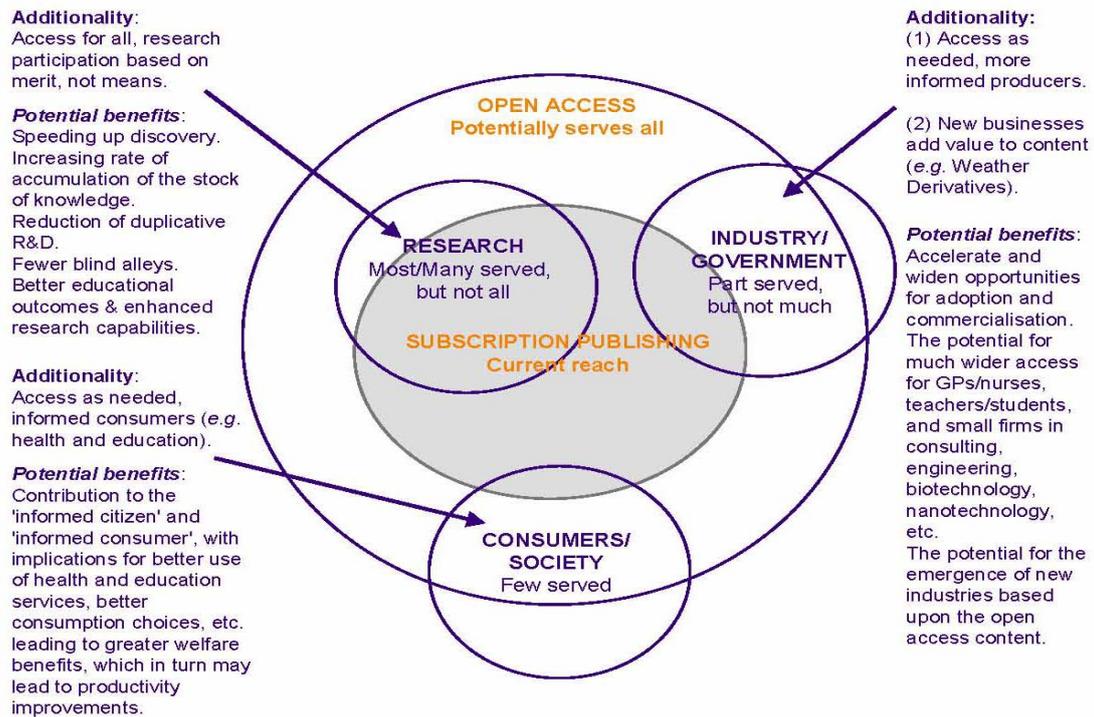
#### **4.4.18.3 The wider community**

In relation to the wider community Houghton and Sheehan (2006) argue that the potential impact includes the potential contribution of open access to the 'informed citizen' and 'informed consumer'. This would have implications for better use of health and education services, leading to greater welfare benefits, better health and education outcomes, and so forth, which may in turn lead to productivity improvements.

#### **4.4.18.4 An impacts framework**

Figure 18 represents the dimensions of impact available through open access. In the three spheres of activity identified, subscription publishing has served most, but not all research users; some, but not many industry and government users, and few consumers. The additionality and some of the potential impacts of enhanced access are also shown.

**Figure 18: Impact framework: subscription publishing versus open access**



Houghton and Sheehan (2006: 7)

From the above discussion it is evident that the traditional paper-based model of scholarly communication has been overtaken by e-publishing models. For the e-publishing models to be effective they have to be cost efficient and incorporate key elements of the traditional paper model such as peer review. Recent studies have shown that e-publishing modules such as that of OA are making a difference and providing cost-effective, less restrictive access to research even though commercial publishers may argue otherwise.

#### 4.4.19 Future prospects

According to Mabe (2006) verbal discussion, written exchange and formal publication were all modes that existed for Oldenburg and they certainly exist for researchers today. Telephony has increased the range and potential for person-to-person discussion; e-mail speeds up the traditional form of the letter; while the World Wide Web allows immediate distribution of the written word and data.

The boundaries between conversation, correspondence and formal presentation are being blurred with new technologies. These social networks are not a new phenomenon. Informal social networks of scholars who disseminated and communicated information using technology resulted in the establishment of the invisible college (Cronin 1984). This technology has allowed scholars to further develop the informal networks that disseminate scientific information. These informal groups of scholars in the 'invisible college' (Cronin 1982) now use the new technologies to collaborate and communicate scientific information. Once ephemeral, conversations between scientists now occur by e-mail, leaving a permanent written record on computer servers, and this changes the status of the interaction: nothing is ever 'off the record'. Even online journals that allow articles to be commented on by readers, such as the *British Medical Journal*, are not an entirely new thing: they are merely a more formal written analogy to one of academia's most cherished institutions: the formal seminar with questions and answers (Mabe 2006).

Mabe (2006) further argues that the growth of social software and tools such as blogs and wikis are also making an impact. Wikis (collaborative software that allows multiple authors to collectively write webpages) lend themselves to certain areas of research rather well: the phenomenon of working papers where scholars collectively write. In addition, the use of internet chat relay software allows real time collaboration and discussion around the world: the creation of virtual workshops and conferences where all interaction gets written down. Each of these tools assist in human interaction and facilitates communication more effectively. Librarians are aware that scholars have used these social networking tools to bypass the library, particularly within the context of the invisible college, to disseminate and communicate information. However, librarians as Waaijers (2002) pointed out earlier are still the leading role players in the domain of user support and mediation when it comes to information dissemination. However, this role has been curtailed by the 'journal crisis'. Library 2.0 recognises the potential of the new networking tools and many libraries have adapted their services in line with Library 2.0<sup>6</sup>.

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<sup>6</sup> Maness (2006) defines Library 2.0 as the application of interactive, collaborative, and multi-media web-based technologies to web-based library services and collections.

## 4.5 Summary

In this chapter the economics of academic publishing are elaborated on in detail. The traditional scholarly journal model is introduced, while the role players in the publishing cycle are discussed in detail. The monopoly power of publishers is examined, while statistics and trends relating to academic publishing are highlighted. A substantial part of the chapter is devoted to the various economic approaches to academic publishing. Since the study is a South African one, the publication of South African research is discussed together with recommendations to enhance publishing in South Africa. Alternative publishing models to overcome the shortcomings of the traditional publishing cycle relating to the electronic publishing reform movement are discussed. The open access and open archives initiatives are discussed and their benefits are highlighted.

## Chapter 5

# Librarians caught in the middle

### 5.1 Introduction

In the present scholarly communication system, libraries which are the main facilitators in the scholarly communication system are caught between the scholars and the publishers. Funding for the library, and the priority given to this within the overall institutional budgets, is a matter of great concern for librarians. As early as the 1960s the Parry Report recommended that a library budget should be 6% of a university's total spending. Martell (2003) argues that during the 1970s academic libraries were faced with two major challenges. The first of these was a deterioration of funding and the second was the never-ending spiral of annual increases for library periodicals and other materials. In the past, academic libraries had generally received budgets in the range of 6% or more of their institution's budget. However, as the university evolved and its needs changed, most specifically for computer-related equipment and software, libraries experienced a decline in their share of the overall university budget. By the late 1990s many academic libraries were receiving as little as 3% of their university's budget.

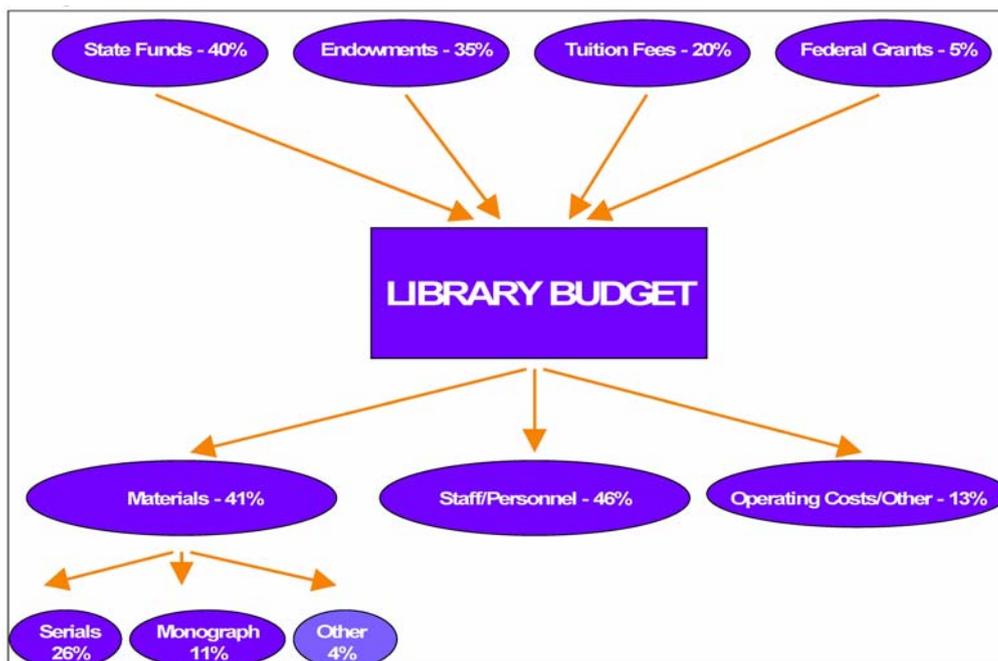
Furthermore, the loss in buying power caused by the annual cost-price increase for library periodicals ranging from 10 to 20% was and is still a major concern for most, if not all, academic libraries. Few academic libraries have been able to avoid the negative impact of these economic forces. Librarians, in an attempt to find solutions to these challenges have had to resort to annual journal cancellations:

Academic libraries are between a rock and a hard place. The decreasing access to scholarly materials is a very tough pill to swallow: It leads to an overall degradation of the library's collection, which in turn can lead to declines in the quality of research and teaching, drops in the reputation of the institution and its faculty, difficulties in recruiting faculty and students, and reduced chances of receiving program accreditation (Hoon 2003: 33).

This loss in buying power has subsequently resulted in a paradigm shift since academic librarians could no longer maintain an adequate local print collection relative to their mission (collection paradigm). Instead they have adopted a paradigm that reflected the fiscal realities, namely, the access paradigm (Martell 2003). Libraries now provide access to resources wherever they are located. Thus the role of the librarian has changed from that of 'keeper of information' to 'facilitator of access to information'.

Figure 19 provides a schematic of the funding from academic libraries in the US. Funding for libraries in Europe varies from country to country, but the basic structure is not that different from the US example (Gooden, Owen, Simon and Singlehurst 2002). The same could be said for academic libraries in South Africa. Academic libraries usually get their funding from the university they serve. The university is funded by a combination of state funds, endowments (funds built up from the contributions of alumni or corporate gifts) and tuition (student fees), and in some cases, local grants (particularly in the US). The exact split of funding depends on the type of university, with private universities getting almost no state funds. They are thus more reliant on endowments and tuition fees.

**Figure 19: Funding for US academic libraries**



Gooden, Owen, Simon and Singlehurst (2002: 4)

It is interesting to note that the serials/journals budget (26%) for US academic libraries at the time was more than double that of the monograph budget (11%) allocation.

From the earlier discussions, the real enemy to acquiring scholarly knowledge is the rate of increase in price, regardless of a journal's initial price. According to Edwards and Shulenburger (2003) for a library budget to have maintained its journal collection unchanged from 1986 until 2000 would have required its subscriptions budget to grow by 226%. To keep pace with both price increases and the growth in the number of journals would have required a budget roughly five times the 1986 budget, that is, an increase of 428%. During this period the average journal budget of ARL members rose to 205%. To increase its budget for journal subscriptions, the average library cut-back severely on monograph purchases, by 17%, as well as other services. Even with these cuts the average ARL library budget still fell short of what was needed, and therefore also cut the number of its journal subscriptions by 7%.

## **5.2 The consequences of bundling**

Edwards and Shulenburger (2003) maintain that an interesting development occurred in the late 1990s. Data on journal prices and acquisitions collected by the ARL showed that the average cost of scholarly journals to ARL libraries dropped by 7.3% between the years 2000 and 2001. This drop in unit price was accompanied by an increase of 12% in the number of titles acquired. As a result, Edwards and Shulenburger (2003) posed an important question regarding these circumstances, namely: "Does this remarkable change in direction indicate that the scholarly journals crisis ended in the year 2000?"

For obvious reasons this did not indicate the end of the 'serials crisis' as many knowledgeable library authorities had another interpretation to provide for the circumstances. In their view what happened was that several commercial publishers bundled their electronic journals into a single package referred to by librarians as the 'big deal'. So what had happened was that many librarians signed this deal because it did not increase the total price they were paying for journals from a given publisher.

According to Edwards and Shulenburger (2003) the increase in the number of journals acquired and subsequent drop in average price per unit were the result therefore of acquiring additional journals as part of these big package deals. Unfortunately, the journals added generally were not ones that the libraries placed a premium on acquiring and, in signing on to the package journals, the libraries lost the freedom to drop individual journal subscriptions for a period of time (generally three years) and thus obligated themselves to a fixed inflation rate for the packages (often 7% per year) for the duration. Edwards and Shulenburger (2003) maintain that while librarians have different views about the 'big deal', it is generally thought that, whatever its merits, it is a choice forced on libraries by those with significant market power over them. The consensus is that once a library has signed on to the 'big deal', the publisher will be able to exert even more market power over the library.

Edwards and Shulenburger (2003) argue further that in a market economy (discussed earlier in more detail), the consumer response to the rising price of a commodity is either to allocate more money to buy the quantity desired or to buy a cheaper substitute. As noted earlier, in a market in which demand is inelastic, the reaction to more purchasing power, such as a general increase in library budgets, simply means higher prices are set by commercial publishers. Thus increasing collection budgets everywhere will only create even more price inflation. Edwards and Shulenburger (2003) then pose two more important questions in their analysis, namely: "Can university libraries purchase substitute journals?"

In answering this question Edwards and Shulenburger (2003) make reference to the importance scholars and scientists place on top-tier journals. Thus, libraries in their bid to meet their users' needs generally tend to respond to price increases for top-tier journals by paying the higher prices, cutting subscriptions to lower tier journals and purchasing fewer monographs. As a result of this Edwards and Shulenburger (2003) then pose their final question, namely: "What is lost in this bargain?", in other words what are the consequences of such purchasing patterns. They argue that access to new ideas and science is restricted since journals below the top-tier include many specialist areas and those in emerging fields. The process of reducing journal subscriptions thus makes the collection less reflective of innovative and more focused on established research in mainstream areas. Incidentally some of these

criticisms were earlier discussed when examining the negative consequences of the peer review system. In terms of the South African context, Darch and Underwood (2005) argued that developing researchers are less likely to secure acceptance in top-tier journals and are therefore more likely to be published in lower tier journals. Therefore, by reducing their subscriptions to lower tier journals libraries may in a way be restricting access to developing research. Edwards and Shulenburger (2003) argue that many important ideas have come to science through lesser publications. They use the example of the idea of plate tectonics which had entered geology as a heresy with many articles being originally published in lower-tier journals. As evidence supporting the theory grew, articles on plate tectonics gradually appeared in top-tier journals.

### **5.2.1 Expenditures in ARL libraries**

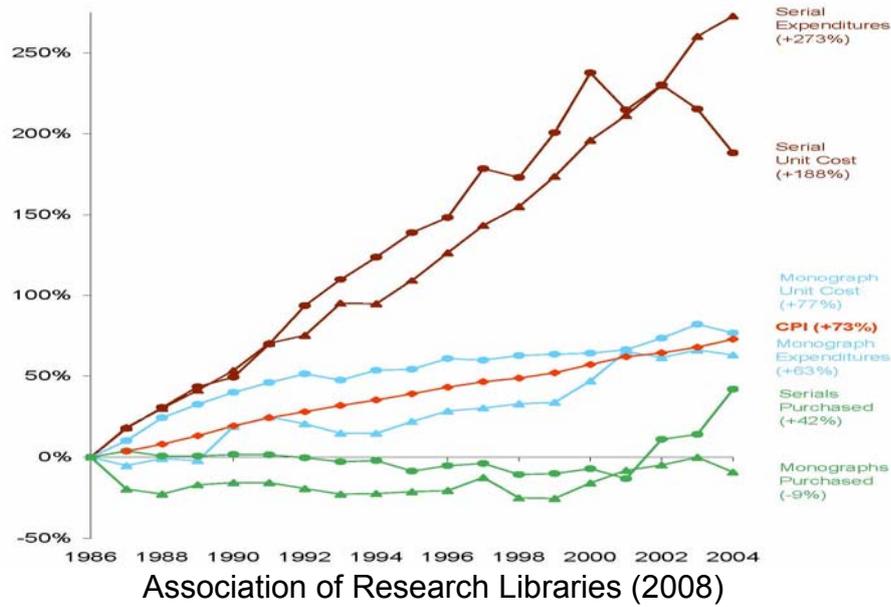
According to the Association of Research Libraries (2008) changes in the pricing models publishers are using for electronic journals have had an observable effect on the data collected on serial prices and consequently the serial unit cost ARL calculations. These changes do not necessarily reflect increased collecting of new content or reductions in the real costs of collection maintenance but are largely reporting increased collecting of long-held subscriptions in multiple formats. In the late 1990s many e-journals were sold as free add-ons to existing print subscriptions. Initially, these subscriptions were counted as single subscriptions (one title received in both print and electronic form). This practice meant that the addition of electronic formats to earlier print subscriptions did not create an immediately observable increase in subscription counts. Beginning with the 2002 statistics, ARL responded to the increasingly common practice of pricing e-journals as either added charges to print subscriptions or as stand-alone subscriptions by allowing libraries to count a title received in two formats as two subscriptions. While not all members immediately adopted this practice, over the last several years the new counting practice, in combination with burgeoning collecting of e-versions of long-held print subscriptions, has begun to generate a noticeable increase in serial collection counts. Over time, as many libraries begin to reduce multi-format duplication by moving to e-only subscriptions for titles, the overall serial counts may decrease. This effect may already be visible in some ARL members' individual statistics.

Similarly serial expenditures have increasingly included added payments made by ARL members to provide journals in electronic form in addition to print. Added expenditure, therefore, may not reflect the addition of new content to a collection. In fact, it is possible for a library's count of unique titles to shrink while both serials counts and expenditures increase if titles are cancelled to provide funds to add electronic versions of other titles collected.

According to the Association of Research Libraries (2008) since serial unit cost is based on serial counts divided by serial expenditures, these changes in the journals marketplace and in library purchasing patterns are affecting the serial unit cost reported. While the serial unit cost is decreasing, this mainly reflects changes in what is being counted. Increasingly libraries are making multiple payments for content in different forms and paying for subscriptions that are linked together. When many journal subscription costs are incremental add-ons to existing subscriptions for a second format, the unit cost is substantially reduced. Where a library starts paying \$20 as an add-on for e-access to a subscription that formerly cost \$100, the unit cost for the now two subscriptions becomes \$60. Without adding new content to the collection, a unit subscription cost based on the "two" titles has been reduced by 40%.

Over time, it could be expected that new trends in ARL member counts of serials purchased, serial expenditures, and serial unit cost will emerge as the practices of both libraries and publishers stabilise. For now the patterns presented by recent data in comparison to data from the era of print-dominated collecting reflect the disruption of a paradigm shift rather than incremental relative change.

**Figure 20: Monograph and serial costs in ARL libraries, 1986-2004**



**Figure 21: Monograph and serial expenditure in ARL libraries, 1986-2004**

Year	Serial Unit Cost	Serial Expenditures	Monograph Unit Cost	Monograph Expenditures	Serials Purchased	Monographs Purchased
(No. of Libraries)	(37)	(102)	(60)	(98)	(37)	(60)
1986	\$89.77	\$1,496,775	\$28.99	\$1,118,931	15,919	32,679
1987	\$105.68	\$1,769,960	\$31.90	\$1,060,754	16,518	26,240
1988	\$117.25	\$1,947,559	\$36.05	\$1,109,845	16,038	25,238
1989	\$128.71	\$2,113,976	\$38.43	\$1,093,858	16,015	27,082
1990	\$134.09	\$2,296,910	\$40.58	\$1,329,950	16,182	27,546
1991	\$152.43	\$2,548,687	\$42.32	\$1,396,566	16,149	27,524
1992	\$173.67	\$2,620,832	\$43.87	\$1,348,786	15,846	26,344
1993	\$188.29	\$2,918,569	\$42.76	\$1,284,116	15,463	25,188
1994	\$200.85	\$2,912,495	\$44.51	\$1,282,569	15,583	25,341
1995	\$214.42	\$3,131,033	\$44.70	\$1,365,046	14,540	25,707
1996	\$222.89	\$3,389,118	\$46.61	\$1,437,028	15,069	25,911
1997	\$249.97	\$3,642,541	\$46.33	\$1,457,789	15,297	28,576
1998	\$245.05	\$3,816,497	\$47.15	\$1,486,436	14,201	24,447
1999	\$269.98	\$4,095,934	\$47.40	\$1,496,687	14,303	24,355
2000	\$303.19	\$4,430,812	\$47.58	\$1,645,248	14,772	27,469
2001	\$282.54	\$4,660,349	\$48.20	\$1,848,622	13,806	29,989
2002	\$296.50	\$4,939,225	\$50.26	\$1,806,964	17,673	31,079
2003	\$283.08	\$5,392,007	\$52.75	\$1,858,280	18,142	32,649
2004	\$258.73	\$5,580,157	\$51.19	\$1,824,296	22,595	29,633
Average annual percent change	6.1%	7.6%	3.2%	2.8%	2.0%	-0.5%

**Median values for time-series trends**  
Association of Research Libraries (2008)

Figure 20 and 21 clearly indicate that journal expenditure in ARL libraries from 1986 to 2004 has increased by 273%, with journal unit costs increasing by 188%. The figures clearly show the impact on monograph purchases with a negative growth of -9%.

## 5.2.2 Periodicals price survey

The annual *Library Journal*, “Periodical price survey 2007: serial wars”, “Periodicals price survey 2008: embracing openness” and *Reality bites: periodicals price survey 2009*, conducted by Van Orsdel and Born (2007; 2008) provide some interesting statistical information. This survey examines the factors shaping the journal marketplace. Three Institute for Scientific information (ISI) databases, namely, Arts and Humanities Citation index, Social Sciences Citation Index, and Science Citation Index, provide the bulk of titles used in the study. In addition data on titles in EBSCO Publishing’s Academic Search Premier are included. According to Van Orsdel and Born (2007) academic libraries in the US saw an overall journal price increase of just under 8% for a second year in a row while in 2008 prices of subscription based journals increased by nine to 10% (Van Orsdel and Born 2008). According to Van Orsdel and Born (2008) non-US titles in the humanities and social sciences increased even more (11%), because publishers in these disciplines tend to price in native currencies, driving US prices up when those currencies are converted to dollars. The sciences, on the other hand, are dominated by large European publishers that price in US dollars, reducing the volatility of prices and keeping price increases in foreign scientific journals under 9%. Van Orsdel and Born (2008) maintain that given the continuing slide of the dollar, increases in 2009 are expected to approach 10% overall. According to Van Orsdel and Born (2009) the global economic recession has severely affected library budgets. Thus further library budgets cuts are expected until 2012 (Van Orsdel and Born 2009). The International Coalition of Library Consortia (ICOLC) and the ARL both issued statements to commercial publishers warning them to reduce publishing costs to avoid further cancellations. Van Orsdel and Born (2009) argued that the statements made by the ICOLC and ARL suggest that consortia and libraries will need to renegotiate existing multiyear contracts for bundled content particularly since many libraries will be unable to meet their payments in terms of these contracts. The Primary Research Group (2008) on the eve of the economic global recession conducted a survey of academic and research library journal purchasing practices. The study found that over the 2006 to 2008 period, academic libraries in the sample cancelled an average of 177 journal titles each. About half of the spending on journals was done through

consortia, and the typical library acquired about 54% of its journals in bundles of 50 titles or more. Spending on pay-per-view articles was negligible across all library types. About 90% of the sample libraries used one of two main subscription vendors, with 75% naming EBSCO and 14% naming Swets.

Table 2 shows that in terms of cost, chemistry journals at an average of \$3,690 are still the most expensive for scientific disciplines, with agriculture being the least expensive at an average of \$1,089.

**Table 2: Average 2009 price for scientific disciplines**

<b>Discipline</b>	<b>Average Price Per Title (\$)</b>
<b>Chemistry</b>	3,690
<b>Physics</b>	3,252
<b>Engineering</b>	2,047
<b>Biology</b>	1,980
<b>Technology</b>	1,950
<b>Astronomy</b>	1,781
<b>Geology</b>	1,632
<b>Botany</b>	1,581
<b>Zoology</b>	1,510
<b>Math &amp; Computer Science</b>	1,472
<b>Health Sciences</b>	1,401
<b>Food Science</b>	1,390
<b>General Science</b>	1,174
<b>Geography</b>	1,145
<b>Agriculture</b>	1,089

Van Orsdel and Born (2009)

Table 3 shows the average price per title per country. Titles from Russia are the most expensive at an average of \$3,712. The US has the most ISI titles with 2593 and a title costing on average \$961. South Africa has 24 ISI titles with a title cost on average of \$199. Overall the average cost of an ISI title is \$1,302.

**Table 3: Average price per title by country 2009**

<b>Country</b>	<b>No. of ISI Titles</b>	<b>Avg. Price Per Title (\$)</b>
Russia	51	3,712
Ireland	39	2,823
Netherlands	516	2,628
Austria	26	2,132
Singapore	22	1,608
Germany	452	1,571
Switzerland	95	1,546
England	1,873	1,508
New Zealand	25	1,179
China	17	1,013
United States	2,593	961
Japan	70	410
France	125	389
Australia	74	375
Norway	14	305
Canada	102	298
Czech Republic	19	289
Spain	30	265
Italy	59	257
South Africa	24	199
Korea (South)	14	187
Chile	17	87
<b>AVERAGE COST OF AN ISI TITLE: \$1,302</b>		

Van Orsdel and Born (2009)

Table 4 reflects the projected costs of titles in EBSCO Publishing's Academic Search Premier database for 2010. On average libraries should expect an increase of anything between seven to 9%.

**Table 4: 2010 cost projections for titles in Academic Search Premier**

Academic Search Premier	No. of Titles	% of List	2009 Average Cost Per Title	% of Cost	Projected % of Increase	Projected 2010 Average Cost Per Title	% of Cost	Projected Overall % Increase
U.S.	1,359	40.2	\$531	31.2	7.5	\$571	30.8	8.9%
NON-U.S.	2,019	59.8	\$1,171	68.8	9.5	\$1,282	69.2	

Van Orsdel and Born (2009)

Tables 5a and 5b provide a price history by discipline for the journals found in EBSCO Publishing's Academic Search Premier database. Again titles from the disciplines of chemistry followed by physics are the most costly.

**Table 5a: Cost history for titles in Academic Search Premier**

Subject	Average No. of Titles 2005–2009	Average Cost Per Title 2005 (\$)	Average Cost Per Title 2006 (\$)	% of Change '05–'06	Average Cost Per Title 2007 (\$)	% of Change '06–'07	Average Cost Per Title 2008 (\$)	% of Change '07–'08	Average Cost Per Title 2009 (\$)	% of Change '08–'09	% of Change '05–'09
Agriculture	70	714	782	9	854	9	921	8	1,005	9	41
Anthropology	30	335	376	12	419	12	463	11	516	11	54
Art & Architecture	39	217	244	13	271	11	292	8	320	9	47
Astronomy	16	1,687	1,811	7	1,974	9	1,987	1	2,142	8	27
Biology	100	1,210	1,338	11	1,505	12	1,639	9	1,785	9	48
Botany	25	1,080	1,230	14	1,339	9	1,443	8	1,512	5	40
Business & Economics	109	298	318	7	347	9	382	10	423	11	42
Chemistry	67	2,419	2,602	8	2,842	9	3,062	8	3,282	7	36
Education	222	336	370	10	409	11	442	8	478	8	42
Engineering	190	927	1,006	8	1,098	9	1,199	9	1,363	14	47
Food Science	14	398	451	13	490	9	499	2	541	8	36
General Science	42	566	612	8	666	9	714	7	775	9	37
General Works	74	97	106	10	115	8	122	6	127	4	31
Geography	42	438	463	6	546	18	638	17	691	8	58
Geology	26	783	760	-3	829	9	878	6	938	7	20
Health Sciences	752	740	824	11	913	11	1,000	10	1,099	10	49
History	233	197	219	11	240	9	267	11	290	9	47

Van Orsdel and Born (2009)

**Table 5b: Cost history for titles in Academic Search Premier**

Subject	Average No. of Titles 2005–2009	Average Cost Per Title 2005 (\$)	Average Cost Per Title 2006 (\$)	% of Change '05–'06	Average Cost Per Title 2007(\$)	% of Change '06–'07	Average Cost Per Title 2008 (\$)	% of Change '07–'08	Average Cost Per Title 2009 (\$)	% of Change '08–'09	% of Change '05–'09
Language & Literature	121	165	184	12	199	8	214	8	233	9	42
Law	86	313	340	9	368	8	404	10	443	10	41
Library & Information Science	58	154	157	2	170	8	189	12	196	3	27
Math & Computer Science	143	1,028	1,109	8	1,193	8	1,304	9	1,404	8	37
Military & Naval Science	22	244	245	0	273	12	288	6	320	11	31
Music	22	150	168	12	179	7	198	11	214	8	42
Philosophy & Religion	169	198	227	15	252	11	275	9	306	11	55
Physics	103	2,326	2,501	8	2,857	14	2,979	4	3,229	8	39
Political Science	75	338	384	13	426	11	455	7	490	8	45
Psychology	85	459	514	12	555	8	607	9	689	13	50
Recreation	13	178	201	13	214	7	242	13	258	7	45
Sociology	232	312	365	17	401	10	442	10	477	8	53
Technology	71	970	1,050	8	1,148	9	1,243	8	1,356	9	40
Zoology	46	773	801	4	868	8	951	10	1,064	12	

Van Orsdel and Born (2009)

In their concluding remarks Van Orsdel and Born (2008; 2009) note that the marked changes brought on by the advance of open access has so far had little effect on the price of subscribed journals, the notable exception being some 3300 peer-reviewed journals listed in the Directory of Open Access Journals, all of which are free.

Although the open access movement suggests dramatic changes are coming to the journals marketplace, librarians are still faced with a serials crisis. A large proportion of the library's budget is spent on a few publishers because of their inflated prices, leaving little money for smaller publishers and new publications. Van Orsdel and Born (2009) argue that publishers generally are not making an effort to accommodate the rising demand for open access even though recent studies, such as the one conducted by the Joint Information Systems Committee (JISC) have found that open access could reform the scholarly communication system.

The JISC (2009) findings estimated that British universities would save around 80 million pounds a year by shifting to an OA publishing system. The study proposed that resources used for subscription would be redirected towards the costs of journal publication and dissemination. It also concluded that significant additional benefits would accrue to business and industry as the result of greater accessibility to research findings.

### **5.2.3 Funding of university libraries in Africa**

Rosenberg (1997) conducted a review of the state of university libraries in Africa. The review highlighted the extremely poor, though widely varying, situations at different universities, both financially and otherwise. This review was discussed at the Standing Conference of African National and University Libraries in Eastern, Central and Southern Africa (SCANUL-ECS) in 1996 and the recurring problem of inadequate and decreasing funding for university libraries in general, was again discussed in detail. As a result, SCANUL-ECS decided to develop, formulate and finalise common guidelines, norms and standards, suitable for practical application in and by university libraries/librarians in the region for the following:

- Percentage of institutional income allocated to the library;
- Percentage of students' tuition fees allocated to the library;
- Recommended charges for income generation activities undertaken by the library; and
- Financial control and management of funds generated through library activities and services (Willemse 2002: 2).

The percentage of institutional income allocated to the library, is the only criterion of concern for the present study. To formulate these norms and standards, John Willemse (2002) was commissioned to conduct a study to investigate the status quo of funding in university libraries in the region, as well as elsewhere on the continent. The study was commissioned by the International Network for the Availability of Scientific Publications (INASP) which wanted to develop strategies to examine and recommend what percentage of the host university budget should go to the library; what percentage of the students' fees should be apportioned to the library; which

income-generating activities would be undertaken by the library; and which system should be used to control university library funds.

The study noted that good libraries are essential for good universities and therefore need good funding. The study reviewed university funding at a global level before examining the state of funding in the region, and at the continental level. The major finding of the survey was that most of the libraries in the region were inadequately funded (Willemse 2002). The general recommendation of the study concerned the recognition of the indispensability of the library to the university, the need for autonomy of university libraries, regular collection of library statistics, and the need for approval by the Association of African Universities (AAU) of the terminology applicable in university libraries. The increasing proportion of the total university budget allocated to the library budget should be about 6% to 7% of the total budget. The university should spend at least 6%, if excellent service is required and 5% if normal generally acceptable levels are required (Willemse 2002: 35). Other recommendations included the adoption of standards as guidelines and performance measurements; income generation schemes to supplement the inadequate library funding and minimise the dependency on funding from the university. Other alternatives such as donor funding should also be explored (Willemse 2002).

#### **5.2.4 Funding of university libraries in South Africa**

Commenting on the history of the libraries of the University of Natal<sup>7</sup>, Buchanan (2008) notes that during the 1970s the South African economy showed signs of continuous increases in the rate of inflation which led to a devaluation of the rand. While these devaluations had a beneficial effect on the South African economy, they negatively affected academic libraries' purchasing power. Musiker and Musiker (1998) commenting on a history of the University of the Witwatersrand Library noted that the Library together with other university libraries entered a doubtful period in its financial history. Buchanan (2008) argued that the devaluation of the rand during the latter half of 1975, the rising costs of library materials and the imposition of a 15% surcharge on imported books which was introduced in 1977 all took their toll on

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<sup>7</sup> The University of Natal merged with the University of Durban-Westville in 2004 to form the University of KwaZulu-Natal.

South African academic libraries. According to Suttie (2005a) the only South African academic library which remained relatively unaffected by the unfavourable economic situation was the University of South Africa (UNISA) Library. On the positive side, Suttie (2005b: 284) maintains that during the 1970s higher costs “forced libraries to co-operate in order to cut down on unnecessary duplication”. However, according to Buchanan (2008) such co-operation proved to have limited benefits for South African academic libraries.

Also, the introduction of the South African Post Secondary Education (SAPSE) information system in 1980 also changed the way in which the government calculated funding for universities. To add to the financial strain in 1984 the government “introduced severe cuts in the subsidy to universities” (University of Natal 1989: 1).

The deterioration in the rand/sterling and rand/dollar exchange rates from 1984 also had a detrimental effect on the library materials budget since most academic libraries were largely dependent on imported books and journals (Buchanan 2008). Buchanan (2008) found that the libraries of the then University of Natal were forced to cancel journals subscriptions and follow an extremely conservative policy when it came to ordering new subscriptions in order to balance their budgets. Alarming, as early as 1958 unexpected increases in the prices of journal subscriptions resulted in over-expenditure on the journals budget of the University of Natal libraries which led to cancellations of subscriptions following a survey of academic staff (Buchanan 2008). In 1975 the University of Natal Librarians in their annual report noted that the overall increases in the cost of journal subscriptions had exceeded 50%, negating the advantages of a considerably larger library allocation granted to the libraries (University of Natal 1975). Two years later, in 1977, when it was discovered that the ratio of journal to book expenditure was becoming unbalanced, a cancellation of journals subscriptions was carried out sporadically in an attempt to control expenditure (Buchanan 2008).

Gultig (2000) commenting on university finances in post-apartheid South Africa, argued that increases in inflation coupled with the declining value of the rand had resulted in dire consequences for library and other parts of university budgets. Also

commenting on the University of Natal, Walker (2003) noted that at the beginning of the last two decades, the resources offered by university libraries were reasonable. However, since 1983 the situation has steadily deteriorated. Every year there have been calls for further cuts in subscriptions to journals. Fewer new book acquisitions have been made. In some faculties the cost of a substantially reduced set of journals exceeds the allocated budget for books and journals combined. It is thus a matter of great concern that the science facilities are the most effected, given that they are by far the most productive in research. Many of the journals cancelled are crucial to leading researchers at these South African universities. Of more concern, is the fact that in more specialised fields these journals once cancelled, are not available elsewhere in the country. Walker (2003) argued that the situation was so bad that university libraries' (multi-campus institutions) ability to meet the research objectives of the Department of Education's funding formula was seriously compromised.

Walker (2003) examined the budget allocations to libraries over a six year period: from 1997 to 2002, which showed a pattern that had simply continued on an historical bias without any regard for circumstances. As a consequence funding had fallen well behind the amount identified in the Government funding formula for library acquisitions. According to Walker (2003) a reasonable benchmark for determining the level of funding for books and journals would be 1.75 times the government subsidy for books and journals. This figure was arrived at by noting that student fees and other income was 0.75 of the subsidy income, assuming that one should budget on the government subsidy plus a *pro rata* of fee income. Using the library budget of the then University of Natal, Walker showed that in 1997 the allocation for books and journals (R8.81 million) was 6% less than the government subsidy (R9.36 million). Over the next six years the allocation steadily deteriorated. In 2002 the situation reached crisis level. On the suggested benchmark figure the University of Natal libraries should have allocated about R41.5 million to books and journals. Their actual allocation was only 42% of that. A further problem is that books and journals were bought from a common budget. As a result book purchases have suffered in order to maintain journal subscriptions. Buchanan (2008) also notes with concern that the book and journal allocation awarded to the then University of Natal was less than what the library had earned via the SAPSE formula.

Walker (2003) showed that the subsidy from the DoE had increased sharply in 2000, from approximately 4% of the subsidy allocation to the University to nearly 6% (which according to Willemse (2002) above, is the benchmark for academic library funding), indicating that the department had taken cognisance of the large increases in the costs of library materials. This increase was not passed on to the University of Natal libraries. Walker (2003: 13) points out that 18% of the subsidy provided by the government for these libraries was being used “to fund other activities” and notably, no resources from non-subsidy income were allocated to these libraries, either. Darch and Underwood (2005: 5) in their study which examined whether pre-compiled citation indexes of peer reviewed journals was an adequate control for research quality particularly for library and information science argued that local South African libraries would struggle to purchase international journals that contained the research of South African researchers which was funded in effect by the DoE and other funding bodies.

### **5.2.5 The library’s future role**

Many of the alternative publishing initiatives mentioned earlier highlight the role of libraries in the transition to a new model of scientific communication. Often the importance of libraries in archiving and in making information accessible is mentioned (Nowick and Jenda 2004). Libraries can assist in the transition to open access, internet-based scholarly communication by promoting open access journals to their institutions, indexing services, users, funding agencies, and other libraries. Libraries can join consortia, and work to provide easy access, and can cancel over-priced journals when open access alternatives are available.

As libraries reassess their role in the rapidly changing information world, it is important to keep in mind the ultimate work that librarians perform of preserving information and providing research guidance to that information for current and future users. What librarians do is vital to the information cycle and will be so in the future.

Libraries face new challenges as researchers’ behaviour changes in response to new technological developments especially in terms of the new informal scholarly

communication systems. These challenges are especially pronounced in the new ways of communicating that have been described as the democratisation of informal scholarly communication (Davies and Greenwood 2004). Libraries will need to plan for and build services that fit new researcher work habits, with an emphasis on the flexibility and repackaging of their content and services. The library offering will be through a network environment which is already bringing change in user behaviour.

Davies and Greenwood (2004) argue that this is one area where researchers are moving a little faster than the library at present. In the study conducted by Davies and Greenwood (2004) which examined researchers' use of academic libraries and their services in the UK, informal peer-to-peer communication within the research community was examined. The findings showed that researchers are adopting social networking technologies very fast and that so far they have done so on their own. In doing this researchers have in effect bypassed the library. The findings of Davies and Greenwood's study (2004) are supported by earlier studies conducted by Maguire and Kench (1981) and Lamoral (2001) who found that the preferred means of receiving information was person-to-person. This highlights the importance of peer-to-peer communication. However concerns over the vulnerability of socially-created, valuable information will require researchers to seek the assistance of libraries especially for issues relating to the management and preservation of such information contained on websites. However, as Lor and Britz (2006) have pointed out the proliferation of websites worldwide pose enormous challenges to heritage institutions such as national, research and repository libraries. In the developed countries the capturing, organisation and preservation of websites have become an important theme in the professional literature of information science. Many difficulties have to be overcome before an adequate proportion of this material is preserved for future use. These difficulties are not only of a technical nature, but also organisational, economic, political, legal and ethical.

Furthermore, researchers have found that not all wikis and blogs are ephemeral. Moreover, departmental server provision, enough to keep up with the amount of information deemed desirable to hold onto, may also be swiftly outgrown by the ever increasing rise in the volumes of data generated and accumulated by researchers. In the networked environment the needs of the research community may thus bring

about a new relationship with the virtual library. Dempsey (2006) argues that a fundamental of the new library world is attention:

...some things you just had to go to the library for. In the current Web environment this is no longer the case. There are many demands on attention and many resources are available .... we see a growing discussion of how to engage with user environments and workflows.

Since the pace of change of user behaviour in the networked world is increasingly faster, planning for the provision of services that match researcher requirements will become harder for librarians. However, this can be overcome if librarians build systems that can synthesise, are flexible and adaptable. Murray (2006) puts this succinctly:

...the business and service model [of libraries] is evolving from acquiring, cataloguing and circulating physical collections to synthesising, specialising and mobilising Web-based services.

In this context, inter-library collaborative ventures between libraries may become appropriate here, too, to remove redundancies, build capacities and remove efficiencies. However, librarians are aware that they cannot collect and store all the information required by their users in their libraries. Particularly since the new social network tools allow users to communicate directly with the producers of information, such as researchers and publishers, without going through the library. Kaniki (1996) argues that the new opportunities presented by these technologies do not mean that librarians will become irrelevant or unnecessary. Rather it simply means that librarians will have to change the way they provide services to their users. Kaniki (1996) further argues that in order to access the information generated using these new social network technologies both librarians and users will be required to have the necessary information skills. Kaniki (1996) writing within the South African context argues that the role of the librarian in imparting information literacy skills to users in academic libraries will be of vital importance in ensuring that users can access information.

## 5.3 Journal cancellation factors

As the inflation rate of journals has outstripped many library budgets, cancellation projects have become a routine part of library collection management for universities. Although there has been a growing effort to find a long-term solution to the serials crisis, academic libraries continue to depend on serial cancellation projects as a short-term, albeit necessary, response to continuing serial costs. These projects are extremely difficult to manage since decisions have serious implications for the collection and for library relations with the academic departments. Deciding which journals should be cancelled becomes a serious and frustrating task for librarians. Since few academic libraries have escaped the need to go through journal cancellation projects, the literature on serials cancellation is extensive. Therefore, possible approaches to journal cancellation projects are as varied as the libraries that conduct them (Moore-Jansen, Williams and Dadashzadeh 2001).

### 5.3.1 Making choices in journal cancellation and retention

The goal of journal assessment is to achieve a journal collection that meets the needs of its users. To achieve the goal, libraries must review the external forces that shape the collection and be ready to take steps to change. 'Reactive' strategies are those forced by circumstances and which demonstrate little thoughtful reflection on the part of librarians. According to Pitschmann (1998: 455) reactive strategies can include:

- Shifting funding among the formats;
- Shifting funding among the disciplines;
- Excluding titles over a predetermined price; and
- Starting no new orders.

'Proactive' strategies on the other hand are those that take into account some reflection and study of the situation by the librarian, and include assessment tools.

Pitschmann (1998: 455) describes proactive strategies as follows:

- Librarians assessing the environment;
- Librarians and academics responding to the assessment;

- Institutional planning for the future;
- Librarians testing new options;
- Librarians and academics evaluating outcomes; and
- Library policy (rather than externals) shaping the collection.

Pitschmann (1998) provided an example of a proactive scenario as well. The strategy included identifying and assessing the variables influencing the environment, seeking expert opinions (from colleagues, academics, vendors, publishers), assessing and comparing the variables, understanding the findings, communicating the findings, and finally, taking charge and managing the collection.

There are a number of variables that Pitschmann (1998) described in detail which are critical to serial assessment. They include price or cost, levels and patterns of use, the variables effecting use, assessing variables, and the shortcomings of use studies.

### **5.3.1.1 Price or cost**

Price is list price, but cost is what the library is paying for the title. Librarians have to remember that there are added costs such as binding, processing, and shelving which need to be considered in an assessment.

### **5.3.1.2 Levels and patterns of use**

Key questions for librarians to consider in terms of use include (Pitschmann 1998: 455):

- How will use be defined?
- Use of issues, volumes, titles?
- Use by whom during what period?
- Everybody or by user status?
- What is high use, what is low use?
- Is a use level measured the same for each title?
- Is the counting of photocopying and ILL being considered? and

- Is use being measured by snapshot, random sample, or a comprehensive count?

### **5.3.1.3 Variables effecting use**

Many factors effect the use of an item. These include the size of the user group (50 academics or five academics?), language of publication, circulation policies, shelving policies, and the scope of the journal's content. Pitschmann (1998) recommended being aware of these variables as the outcome of the study will be effected by their determination.

### **5.3.1.4 Assessing variables**

Pitschmann (1998) argues that raw data does not provide answers, only indicators. Variables need to be compared and considered. Variables may also need to be weighted, to reflect the importance the institution wishes to assign. Ranking of variables is also critical to a complete reviewing of raw data. Variables may also need to be combined, in order to measure the connections between, for example, use and department size.

### **5.3.1.5 Shortcomings of use studies**

Use studies are very labour-intensive; human error can effect the study through uncounted use or skewed counts. Also, the data results can be easily misinterpreted.

The optimal outcomes of a serial assessment project are to identify titles of greatest and least value to users, to create a list of prioritised titles for review and possible cancellation, to identify and define high-use titles, and to create a prioritised list of titles recommended for electronic access. Other outcomes are possible as studies become more detailed or cover a longer period of time.

Pitschmann (1998) identified some trends for serial assessment projects. He believed that past practices are inadequate for the future of journal management, with the role of the monograph decreasing, and that formulas for collection management cannot be employed without the careful review found in human judgment. Journal resources available in libraries often drive use. He also noted that it is important to measure the use of cancelled titles and those received via inter-library loan or document delivery.

### **5.3.2 Studies on journal cancellations**

There are many studies that have been conducted on journal cancellations in libraries. As early as the 1970s, reports appeared on the cancellation of journals by university libraries (Brennan 1977; Carrein 1977). In the 1980s a study conducted by Blake and Meadows (1984) investigated the characteristics of journals which are most likely to be cancelled by British universities when faced with budget cuts. The study also examined the number of journals which were cancelled and the ways in which the cancellation exercises were carried out. Interviews and a questionnaire survey were used to gather data for the study.

The study found that new journals were still being subscribed to, but generally at the expense of other journals or books (monographs). In terms of determining which journals were most at risk for cancellation, the study found that journals with characteristics of high prices, large price increases and foreign language journals were liable to be cancelled. However, the study found it difficult to draw a distinction between the characteristics of the cancelled journals and the actual reasons for the cancellation. Although two-thirds of the librarians in the study had conducted use surveys, most cancellations were decided mainly on the basis of academic opinion. Although the survey showed that some librarians were more inclined to cancel a journal produced by a commercial publisher than a learned society journal, and that some are more likely to retain a journal with a backrun, most felt that academic evaluation of need was the greatest priority when deciding whether to cancel a journal.

In the 1990s a study by Sweeney (1999) described the continuing cancellation crisis in academic libraries in both the US and the UK. The study outlined the methods used to measure the use of paper journals in libraries. The need for accountability and the importance of use measurement to validate cancellation decisions were highlighted by the study. In reviewing the literature Sweeney noted that serial librarians in academic libraries had to reduce their spending on paper journals as a result of rising periodical prices together with reductions in funding. In 1993, Chrzastowski and Schmidt described the situation in the USA, where serial librarians in academic libraries were facing the same problems as their British counterparts and where it could also be said that, serial cancellation is an established trend (Chrzastowski and Schmidt 1993). Sweeney (1999) conceded that the situation was not going to go away. In a later study Chrzastowski and Schmidt returned to the problem outlined in their earlier study and, "... continue to sound the alarm about the diminishing serial collections held in academic libraries" (Chrzastowski and Schmidt 1996).

In 1993, the Follett Report<sup>8</sup> described, among many socio-economic changes of recent years that have effected higher education and academic libraries in particular, the "...disproportionate increase in the price of ... periodicals" (Joint Higher Education Funding Council's Review Group 1993). Sweeney (1999) noted that since the Follett Report the situation with regard to journals and academic libraries has not improved. Greater costs and less money to spend are continuing to result in serial cancellations, which in turn, lead to the publishers demanding higher prices for journals, which leads to further cancellations. The consequence is the current serials cancellation crisis. General factors that influence journal cancellations include the bias of the university towards teaching or research which will also effect its choice of journals. Academics at the institution that the library serves will also effect the nature and the cost of the journals that the library will have to purchase. Science and business journals are considerably more expensive than social science journals.

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<sup>8</sup> This Review of Library and related provision in higher education in the UK was commissioned jointly by the Higher Education Funding Council for England, Scottish Higher Education Funding Council, Higher Education Funding Council for Wales and Department of Education for Northern Ireland. The Review Group was chaired by Professor Sir Brian Follett (Joint Higher Education Funding Council's Review Group 1993).

The study conducted by Sweeney (1999) noted that the prime concern was for the users' needs and an accurate measure of the current use of hard copy journals was an essential tool for the librarian faced with difficult decisions about continued subscriptions and cancellations. As Harter states, "... learning services are under continuing pressure to cancel journals which are not being used" (Harter 1996). This being the case, the librarian needs a good method for measuring which journals are not being used and which will, therefore have to be cancelled. Naylor (1990:10) stated, "...use studies have gained more and more acceptance as a necessary preliminary to the cancellation process". Thus for the library to give its users the most efficient and cost effective service possible it is therefore, essential that the methods employed to measure services and the use of library materials be as accurate as possible.

Therefore, Sweeney's study investigated what kind of use needs to be measured and which methods would suit each particular library. The study made use of a questionnaire to gather data. The libraries were asked which journals could be circulated and which could not. The results showed that 9% did not allow their current (most recent) issues to be borrowed by users and 67% did not allow their unbound retrospective journals to be borrowed; 50% allowed no circulation of journals at all.

In terms of the methods employed to measure the in-house use of journals, the libraries were asked which methods they used to measure the in-house use of their current journals and of their retrospective journals, both bound and unbound. Although bound and unbound journals were categorised separately on the questionnaire, none of the libraries distinguished between them for the methods of measurement used. The retrospective figures received were, therefore, for all retrospective journals, bound and unbound. The results of the questionnaire showed that the methods used by the universities to measure the in-house use of their current journals were as follows:

- 44% used consultation slips;
- 3.7% used the reshelving method;
- 18.5% used observation alone; and

- 22% used observation combined with consultation slips.

The study revealed that it was startling to find that 33% of the libraries in the survey used no method at all to measure the in-house use of their current journals. In terms of cancellation criteria the libraries mentioned the following factors as being important when deciding to cancel a title:

- The changing of courses;
- Multiple subscriptions;
- Research activities;
- Replacement of hard copy by compact disk;
- Alternative sources of information such as electronic document delivery;
- Unacceptable price increases; and
- Availability elsewhere locally.

There was some variation in the frequency with which the libraries compiled usage figures. It was found that 26% compiled figures every year, 4% every other year, and 22% compiled figures less frequently than every five years, some of which were mentioned as one-off studies. This compilation of usage took the form of a list circulated to staff, who were asked to mark the journals R (essential for research) or C (essential for taught courses). A staggering 48% of university libraries never compiled usage figures for the in-house use of their journals. Sweeney (1999) argues that there may be various reasons for this. Use surveys are difficult to organise and can be expensive in terms of staff time. Also, many of the methods were not felt to be particularly accurate by the staff who carry them out, as was shown in the results of the study. The librarians were asked how much value they placed on the results of their measurement on a scale of 1-5 where 1 = a lot and 5 = none: 27% placed a value of 2; 38% a value of 3; 11% a value of 4; and 22% a value of 5.

Enssle and Wilde (2002) provide a comprehensive survey of studies relating to journal cancellation. A definition of thirteen 'do's' and 'don'ts' involved in a journal cancellation project was provided by Metz (1992). Lancaster (1982) delineates the problems and limitations of three approaches to evaluating library collections:

subjective evaluation by subject specialists; checking against external benchmarks and measurement by volume and type of use.

Madison (1999) highlights the importance of involving the academic community in journal cancellation decisions. She notes that at her institution, the discussion on cancellations, which could have been narrowly focused on the library's fiscal problems, was structured so that it created an open dialogue on the future of the library and scholarly communications. The reality of campus politics and the importance of rational decisions in collection management are key factors, as shown by Millson-Martula (1988). Richards and Prelec (1992) provide a thoughtful analysis of the place of serial cancellations as an integral part of overall collection development, and a generic journal review project plan is also provided. Use is an integral part of the majority of journal cancellation projects. As already discussed earlier in Sweeney's (1999) study, various methods of measuring use can be applied: the 'sweep' or reshelving count is quite common, but other methods such as questionnaires, slips and surveys are also widely used. Herzog and Armistead (1994) give an analysis of the general steps required in designing an effective journal use study. Hubbard and Williams (1989) and Dadashzadeh, Payne and Williams (1996), discuss the Wichita State University project which used periodical reshelving statistics as its primary criteria for cancellation and which resulted in the development of the Periodicals Analysis Database (PAD). PAD is a decision support system that provides a model for an automated decision system that produces an actual cost per use figure as opposed to a cost or use ratio.

A procedure for accumulating use statistics with barcodes and scanners is outlined by Ralston and Francq (1995). The 'slip' method, attached slips to be initialled by users, was used in a Canadian study by Marshall (1990). A model defining an 'effectiveness factor' as determined by authors who both write in and cite the journals is proposed by Miller and O'Neill (1990) and a study incorporating academics journal preferences as one factor is discussed by Dess (1997). A thoughtful analysis of the effectiveness and types of use studies is given by Broadus (1985).

Another indication of journal usage can be obtained through interlibrary loan (ILL) data. Duda and Meszaros (1998) analyse the results of a ten year project using fax transmission for articles from cancelled journals requested through ILL, and Khalil (1993) and the Wichita State (1990) study show the value of automated ILL statistics for collection development. Numerous articles show the use of citation and impact data in determining journal cancellations. Garfield (1994) outlines the methodology used to produce impact factors and shows some of the limitations of their use. Schoch (1994) compares citation data collected in a pure science discipline with that in an applied science discipline and explores the implications of the relationships between citation frequency and cost and publisher type. An extensive review of the literature on the use of citation analysis, along with cost and usage, is provided by Altmann and Gorman (1996). Citation analysis is said to also be an effective but somewhat neglected technique of collection development and evaluation. The method of citation analysis consists of counting and ranking the number of times documents are cited in bibliographies, footnotes, and/or indexing tools (Baker and Lancaster 1991). According to Sylvia (1998) the method is simple though time-consuming if online databases are not used. However, it can be difficult to select and collect the sources of citations that reflect local user needs. However, the method does give a picture of the material that local users find essential to their research.

Sylvia (1998) conducted a citation analysis of student research papers as one of the methods of evaluating a journal collection. She argues that journal selection and cancellation may be done on the basis of the use and cost-effectiveness to maximise the usefulness of materials purchased with the library budget. Findings in her study confirmed that the most cost-effective and the most used materials were usually held by the library. Titles that met these criteria and were not held were good candidates for new subscriptions. Likewise, the least cost-effective and least-used titles were candidates for cancellation. However, Sylvia (1998) noted that convergence of data from other sources should be used to confirm citation analysis findings due to the inherent limitations of the method. Also, librarians need to cater for fluctuations in interest as student research topics change.

In a master's paper prepared for the University of North Carolina, Vaughan compares three methods of use measurement; reshelving, citation analysis, and the

ISI impact factor. Vaughan concludes that reshelving and citation analysis generates the most similar rankings of journals. However, it is recommended that results be combined from both methods to achieve the most complete picture of use and journal value (Vaughan 2001). The potential pitfalls of using citation analysis for journal management or cancellation are also outlined by Stankus and Rice (1982).

A comprehensive review of several methods of gathering use data is provided by Soete and Salaba (1999) who define seven different components of analysis, all of which focus on the cost-effectiveness of a subscription. They then outline how these methods can be used to establish a cut-off point, based on the seven components, for review for potential cancellation (Soete and Salaba 1999). The second part of their study focuses on a follow-up to the landmark studies done by Henry Barschall (1986) in 1986 and 1988, which “thrust journal cost issues into the limelight and spurred libraries and library associations to concerted action” (Soete and Salaba 1999). Cost is also a major factor in a procedure delineated by Francq (1994) which develops a relational index for usage and cost.

The role of full-text databases and electronic journals in collection development and journal cancellation projects is the next major issue for libraries. Young (1997) outlines the questions and issues raised in beginning to collect data for these sources. Sprague and Chambers (2000) provide an extensive literature review of the studies on full-text databases in a case study comparing print journals to their full-text counterparts as part of a journal cancellation project. The growing impact of electronic resources on cancellation and storage decisions is explored by Jaguszewski and Probst (2000). Enssle and Wilde (2002) note that despite the wealth of information written about cancellation, obtaining hard facts on actual journal use has always been problematic. Therefore the study they reported on used statistical information about a library collection as a valuable tool to both identify journals for cancellation and justify cancellation decisions. Despite the uneven information from electronic resources, cancellation decisions were made based on several factors:

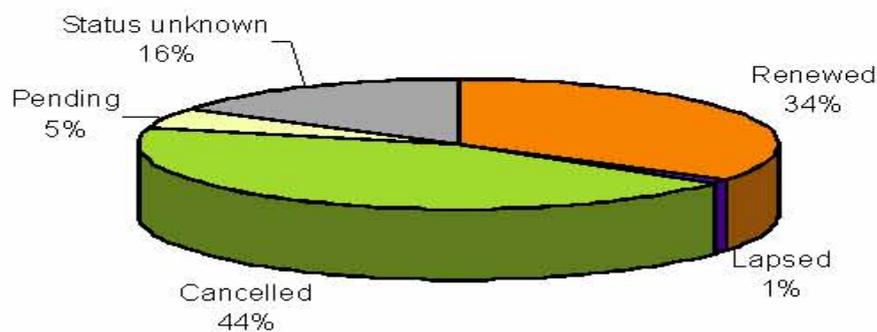
- The actual in-house use current journals were receiving;
- The availability of full-text of the journal online;

- Number of citations and citation impact studies; and
- Provision of copies of articles rapidly and at no charge to the user (Enssle and Wilde 2002: 261).

### 5.3.2.1 The ACCUCOMS telemarketing effectiveness survey

Accurate Communication for Publication (ACCUCOMS), which provides specialist sales, marketing and customer services for commercial and society publishers, made over 17,000 calls to librarians on behalf of publishers chasing lapsed subscribers during the 2006 to 2007 subscription cycle. According to ACCUCOMS (2007) the purpose for publishing their report was to share this information with the industry and help publishers plan their renewal activities and identify customer service issues that could help improve their renewal rates. Needless to say, the collated results of the campaigns, along with selected verbal feedback garnered from librarians during the calls, provide vital information on why librarians cancel journal subscriptions. During the 2006-2007 subscription cycle ACCUCOMS made 17,223 calls on behalf of approximately 40 publishers. The main objective of the calls was to renew lapsed subscriptions. The overall results were as follows:

**Figure 22: Lapsed subscriber campaign results**



ACCUCOMS (2007: 3)

As a direct result of the renewal campaigns, Figure 22 shows over 34% of subscriptions were renewed and a further 5% were still pending. Of the 44% of subscriptions that were cancelled, the reasons given were as follows in Figure 23:

**Figure 23: Cancellation reasons**

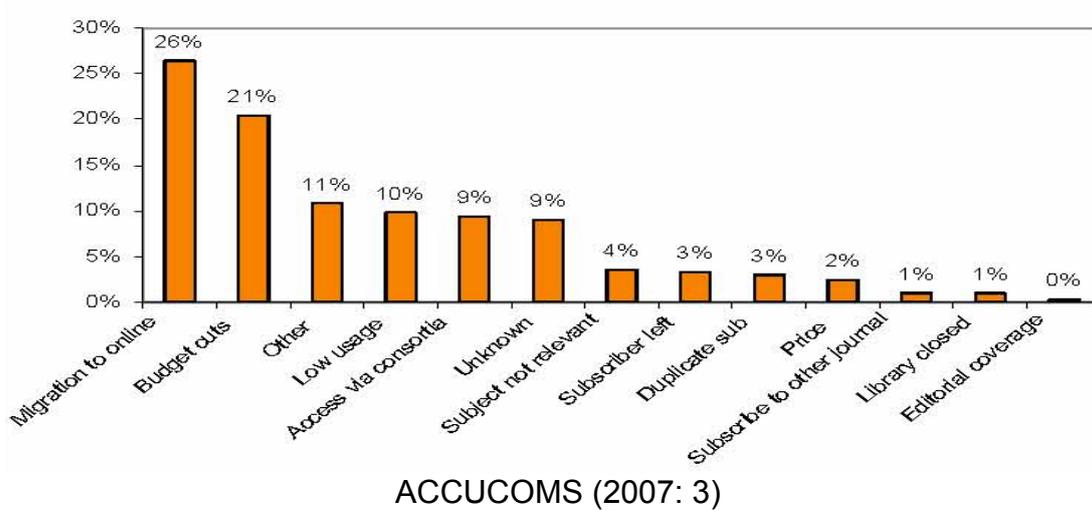


Figure 23 shows the *primary* reason given by librarians when asked why they had decided to cancel a journal. It is important to note however, that reasons for cancellations can often be multi-factorial in that there could be a number of contributing factors that librarians take into account when making a decision.

### 5.3.2.1.1 Moving to online access

Following the trend of the previous year, a shift from print to online continues to be the most common reason for cancelling a subscription with just over a quarter of print subscriptions being cancelled in favour of online access. What this data does not reveal is whether institutions are favouring online access via a licensed database or an electronic subscription directly from the publisher. As a result of this ACCUCOMS recommends that publishers analyse their subscription data carefully to see if libraries are cancelling their subscription or simply migrating to a different format. If a library is migrating to a different format, it will effect the number of ‘true’ cancellations (ACCUCOMS 2007).

#### **5.3.2.1.2 Budget cuts**

Given the feedback from the library sector about the state of their budgets, it is not surprising that the second most popular reason for cancelling subscriptions is budget cuts. However, even when budget cuts were stated as the primary reason for cancelling, many librarians stated that other factors were also taken into account such as usage statistics and subject relevancy. Perhaps surprisingly price was only cited as the primary reason for cancellation in 2% of cases. Librarians comment that an annual above inflation price increase and tiered pricing<sup>9</sup> schemes were a problem when taken in conjunction with budget cuts (ACCUCOMS 2007).

#### **5.3.2.1.3 Usage**

The survey revealed that 10% of cancellations were due to low usage, indicating that usage statistics have an important part to play in cancellation decisions. According to the ACCUCOMS (2007) study, usage statistics could play a larger part in the equation than the figures suggest. Since budget cuts are a key reason for cancelling a journal, many librarians conceded that the ultimate decision about which journals to cancel would have taken into account multiple factors and would include an analysis of usage statistics.

#### **5.3.2.1.4 Duplicated access**

ACCUCOMS (2007) data shows that 9% of subscriptions were cancelled due to access through consortia. This figure shows that libraries can make savings if they are part of a consortium.

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<sup>9</sup> For the purposes of this study tiered pricing is defined as differential charges for both paper and electronic subscriptions to a journal-based on the categorisation of the subscribing institution. Smaller institutions are usually granted a lower subscription price than larger institutions (Hahn 2005).

### **5.3.2.2 The ALPSP survey of librarians on factors in journal cancellation**

The Association of Learned and Professional Society Publishers (ALPSP), was founded in 1972, and is the only international association representing all types of not-for-profit publisher (learned societies, university presses, inter-governmental organisations and others); its associate members include all the major commercial publishers as well, in addition to other suppliers of services to the sector. ALPSP has 340 members in 36 countries: altogether they publish nearly 10,000 scholarly journals, which is between 40% and 50% of the world total (Association of Learned and Professional Society Publishers 2008).

This study was commissioned by ALPSP to ascertain what are the major factors contributing to journal cancellations, and thus to provide some new information for a debate that has so far been short of data. Mark Ware of Mark Ware Consulting conducted the survey on behalf of the ALPSP.

The study examined the question of whether self-archiving of preprints and/or postprints by journal authors is likely to have a significant impact on journal subscription numbers. This issue is currently hotly debated and of considerable importance for scholarly/commercial publishing policy. The moves by funding bodies and some institutions to request or require authors to deposit postprints has given more urgency to this issue as the archives are now likely to grow in number and more importantly in their content.

A 26-question online questionnaire was posted on six listservs, including Liblicense, SERIALIST, and Lis-e-journals, with a single follow-up reminder one week later. The sample was thus a self-selected one from a non-random group (those who chose to join the listservs). Ware (2006) does acknowledge that this was a limitation of the study. Most of the questions were closed-ended and several incorporated a four-point scale of “Very important”, “Important”, “A minor factor”, and “Not relevant”. A few open-ended questions relating to the impact of preprint and postprint repositories on

cancellation were asked. Nisonger (2007: 247) in his review of the study highlights this limitation:

A rigorous doctoral dissertation committee would probably not be thrilled with the methodology. Ware himself acknowledges that the use of a self-selected group rather than a random sample could introduce error due to sample bias, as those with strong views are more likely to respond.

The ALPSP also made available the data from the survey, including the open-ended responses from respondents at SurveyMonkey.com (Coult 2006). The analysis was based on the 340 responses, representing a response rate estimated at 4 to 7%. More than 80% of the respondents were associated with academic institutions and 8% with corporate libraries.

#### **5.3.2.2.1 Results of the ALPSP study**

The main findings of the study as reported by Ware (2006) were:

- The 340 responses were mainly from academic institutions (more than 80%), with 66% from universities carrying out both research and teaching. Only 8% were from corporate libraries. These were evenly spread among small, medium and large libraries. The subjects covered included all of Science and Technology, Medical and Healthcare, Humanities and Social Sciences, and Business and Management (and others, for example, Art). There were few statistically significant differences between these demographic groupings and for that reason most of the results were given for the sample as a whole (Ware 2006: 6).
- The process of journal cancellations was a varied one but typically entails a consultative process involving both librarians and academics (or other library patrons). In most cases, the librarian is primarily responsible for initiating the decision to cancel a journal (for example, via an analysis of its usage or other factors) and for the final decision to cancel (Ware 2006: 7).

- The typical cancellation process therefore follows a path of analysis, consultation, review and finalisation. The consultation may involve the librarian proposing candidates for cancellation, or providing data but asking patrons to suggest cancellations. It may also involve reader surveys of varying sophistication (Ware 2006: 8).
- The three most important factors used to determine journals for cancellation, in declining order of importance, were that the academics no longer required them (i.e. relevance to research or teaching programme), usage and price. Next, availability of the content via OA archives and availability via aggregators were ranked equally fourth, but some way behind the first three factors. The journal's impact factor and availability via delayed OA were ranked as relatively unimportant. Other important factors were the perceived quality, importance or centrality of the journal, and the protection from cancellation afforded some journals either by inclusion in some kind of package, or because of local academic involvement (for example, on the editorial board) (Ware 2006: 10).
- Taking these factors in turn, for price the most important factors were the absolute price and the percentage increase. Price per use, although mentioned quite frequently in the free-text responses, was only scored as of middling importance, while price per article or price per page was hardly used at all (Ware 2006: 11).
- With usage, the most important data were the online statistics provided by the publisher or intermediary. The library's own online statistics were ranked significantly lower, while print usage (perhaps not surprisingly) was the least important (Ware 2006: 12).
- The important factors effecting whether inclusion in an aggregation product would play a part in determining whether a journal was a candidate for cancellation were, in declining order: the length of any embargo, the extent of the archive in the aggregation and the promptness with which new material

- Availability of content via delayed open access was not an important factor in journal cancellations, as seen above. From examination of all kinds of embargoed content (whether from delayed OA, self-archiving or aggregations), it is clear that the embargo has to be very short indeed to compete with a subscription: for 82% it had to be three months or less, and for 92% it had to be six months or less (Ware 2006: 13). The length of the acceptable embargo varies with subject, with embargoes being less acceptable in STM journals. Embargoes were also more tolerable for peripheral journals than for those that were core (Ware 2006: 14).
  
- With regard to OA archives, there was a great deal of support for the idea that they would not directly impact journal subscriptions in the following data:
  - 97% of respondents saw an archived copy of the publisher's final PDF as an acceptable substitute for the journal, but this fell to 39% for a postprint and only 9% for a preprint (Ware 2006: 15);
  - For most librarians (76%) the archive would have to contain over 90% of the journal's content, and 48% wanted 100% before they would see it as a potential substitute for a journal (Ware 2006: 15); and
  - Furthermore, only 16% of respondents currently have estimates of the overlap between their journals and archives (Ware 2006: 16), and only 31% had plans to introduce systems to measure this overlap (Ware 2006: 16).
  
- A key question for this study was: if librarians did not see the free availability of the content on an OA archive as a good reason to cancel a journal, why not? The most frequently cited reasons, in declining order, were (Ware 2006: 18):

- Concerns about the long-term availability of the free archives;
  - Concerns about the completeness and integrity of the archives;
  - Faculty demand for 'the real journal'; and
  - Pre/postprints not seen as an adequate substitute for the final journal article.
- The final section of the questionnaire, turned from gathering facts about the present systems of managing journal holdings to the librarians' opinions about how these would change in the future. Librarians were asked to reconsider the possible factors used to determine cancellation (see bullet 4 above), but this time to say how important they thought they would be in five years' time. The same four factors were seen to be likely to be the most important, but the ranking and degree of importance of some had changed:
    - Price was seen as becoming a more important factor in the future and moved to the first-ranked position: 98% said it would be an important or more important factor; and
    - Although availability via OA archives was still ranked fourth (and well behind the first three factors), respondents thought that its importance would increase substantially, with 81% saying it would be an important or very important factor (Ware 2006: 20).
  - Respondents were asked to sum up their views: what impact would repositories have on journal holdings? Was it too early to tell? Why or why not? (Ware 2006: 20):
    - A small majority (54%) said it was too early to tell; and
    - Of those prepared to 'stick their necks out', 32% said they thought there would be no impact, three times as many as those who thought there would be some impact (11%).

#### **5.3.2.2.2 Conclusions of the ALPSP study**

What does all this mean for the debate on whether or not pre/postprint repositories will reduce journal subscriptions? Ware (2006) notes that this study gives no

conclusive answer, not surprisingly, given the early stage of development of self-archiving in most fields, in support of the view that self-archiving will not harm journals the study arrived at the following conclusions (Ware 2006):

- Repositories were clearly not seen by librarians as a substitute for properly managed journal holdings: they point to concerns over long-term availability, stability, completeness and integrity; the academics want 'the real journal'; embargoes of even three months are a major obstacle; and postprints (let alone preprints) were not seen as an adequate substitute for the journal article;
- Furthermore, the large majority of librarians did not know whether the content of archives overlaps with their holdings, and most did not plan to introduce systems to measure this;
- Availability via OA archives was ranked a long way behind the needs of faculty, usage and price in determining cancellations; and
- Three times as many respondents thought there would be no impact on holdings compared with those that thought there would be some impact.

On the other hand, publishers might be worried by the following:

- 53% say that availability via OA archives is an important or a very important factor in determining cancellations now, and this rises to 81% who thought it would become important or very important in the next 5 years; and
- The clear and growing emphasis on measuring usage of journals via the publishers' or intermediaries' statistics would be of concern for publishers, because there is some evidence (for example, from physics) that a well-used archive can very substantially reduce usage at the journal site.

According to Ware (2006) at present the impact on usage does not lead to journal cancellations for the reasons given above: the academics still want the real journal, librarians want to maintain holdings, a postprint is not seen as an adequate substitute, and so forth. Usage figures were interpreted within a field, so all high-energy physics journals, for instance, will be affected alike. According to Ware (2006) there was no evidence in this study that core journals are under any threat from repositories. There are some hints, however, that very peripheral journals might

find some pressure, and for that reason the threat might be felt more by aggregators than by journals, but only if there was very comprehensive coverage by repositories of the literature.

## **5.4 Summary**

In this chapter the consequences of the economic aspects of publishing are related to libraries and their funding and the ongoing need to cancel journal subscriptions. The consequences of bundling and the expenditure of particularly the ARL libraries are elaborated on. Recent annual *Library Journal* periodicals price surveys are discussed and provide vital statistical data for the study. The funding of university libraries in Africa and South Africa is discussed, while journal cancellation factors are examined in detail. Related journal cancellation studies and their findings are mentioned. Where relevant, significant points identified in the literature reviewed in Chapters Three, Four and Five will be drawn on in the interpretation of the results of the study.

# Chapter 6

## Research methods used in the study

### 6.1 Introduction

In this chapter, the research methods chosen to investigate the effect of the crisis in scholarly communication on university libraries in South Africa are described. Describing the methods used by a researcher is very important because it enables another researcher to replicate the study as well as ascertain the validity and reliability of the findings. This chapter includes sections on the population and how it was obtained, instrumentation used, procedures employed in gathering and processing the data, and statistical treatment of the data. A research design is a plan or blueprint of how a researcher systematically collects and examines the data required to answer the research questions (Terre Blanche, Durrheim and Painter 2006: 34; Babbie and Mouton 2001: 74).

### 6.2 Choice of method

Research is a systematic way of seeking solutions to well-defined problems in order to get a greater understanding of a phenomenon (Leedy 1997:5). Research may be characterised as either basic or applied (Gay 1996:8). There is no consensus on the distinction between these two types of research. The major goal of applied research is to gather information that contributes to the solution of a societal problem. Unlike applied research, basic research does not emphasise the solving of specific or real problems. The main distinguishing feature of basic research is that it is intended to generate new knowledge. This is not to underestimate the fact that although problem solving is not the goal of basic research, its findings could eventually be useful in solving a particular problem. The present study is oriented towards basic research because its objective is to generate new knowledge on the effect of the crisis in scholarly communication on university libraries in South Africa rather than providing

an immediate solution to the problems university libraries face as a result of the crisis. The research methodology assists in controlling the study, dictating the acquisition of data to address the research question, arranging data into logical relationships to enable analysis, and the drawing of conclusions that can contribute to the expansion of knowledge (Leedy 1997:9).

Research methodologies revolve around two major approaches, namely, quantitative and qualitative (Creswell 1994: 1; Leedy 1997: 104). A quantitative study measures a phenomenon using numbers in conjunction with statistical procedures to process data and summarise results (Creswell 1994: 2; Locke, Silverman and Spirduso 1998: 123). On the other hand, qualitative research is conducted in a natural setting and is concerned with viewing experiences from the perspective of those involved and attempts to understand why individuals react or behave as they do (Creswell 1994: 2). The use of two or more methods to study a phenomenon is called triangulation (Cohen, Manion and Morrison 2000: 112). Many studies advocate methodological triangulation because it bridges issues of reliability and validity and contributes to a better understanding of the study (Glesne and Peshkin 1992).

According to Glesne and Peshkin (1992: 7) and Gorman and Clayton (1997: 28) the purpose of qualitative research is to contextualise and interpret results using induction to derive possible explanations based on observed phenomena. Qualitative research does not search for data that will support or disprove a hypothesis. In addition, qualitative research does not rely on statistical analysis for inferences (Glazier and Powell 1992: 6). On the other hand, the quantitative approach generalises and predicts findings based on the use of formal instruments such as questionnaires. The major attraction of the quantitative design is that it is the oldest type of research that can describe, predict and explain a research phenomenon (Locke, Silverman and Spirduso 1998: 124). In addition, the quantitative paradigm has provided “a significant part of the foundation on which the social sciences have been erected” (Locke, Silverman and Spirduso 1998: 124).

More specifically, both quantitative and qualitative methods and data analysis techniques can contribute to the understanding of the effect of the crisis in scholarly communication on university libraries.

Thus, a two-pronged method of data collection was adopted. The two main methods used were the search for and extensive review of the relevant literature and the survey by self-administered questionnaire of the population of university libraries and interviews with the Deputy Vice-Chancellors, Directors or Deans of Research at selected universities.

### **6.2.1 The literature search and review**

A literature survey is a necessary component of any research conducted in the social sciences for several reasons. The search for relevant literature enables the researcher to find out what else has been done in relation to the problem to be investigated and makes duplication of existing studies less likely (Aitchison 1998: 58). In addition, important understandings and insights necessary for the development of a logical framework into which the problem fits can be gained (Gay 1976: 24). Research methods used and evaluated in similar studies can be examined and their suitability for the study in hand can be assessed (Gay 1976:24). A familiarity with related research also makes the interpretation of the results of the study more meaningful, as they can be discussed in the light of what has gone before (Gay 1976: 25). In addition, the purpose of a literature review includes:

- Demonstrating a familiarity with the research topic;
- Explaining the prior path of research and how this study is linked to it; and
- Learning from others and stimulating new ideas (Neuman 2006: 111; Terre Blanche, Durrheim and Painter 2006: 20).

A review of the literature is important in that it shows that the researcher knows and understands the major issues pertaining to the topic and this knowledge and understanding informs interpretation of the results which can be discussed in light of what has gone before. The literature search for this study was conducted to collect information about the effect of the crisis in scholarly communication on university libraries in South Africa. The literature review is not just important for the reasons Gay (1976: 24-25) gives for surveying the literature. In the context of the present study the review of the literature provides an understanding of the crisis in scholarly communication and its characteristics. The recommendations made in the final

chapter of this thesis are also to some extent based on the literature reviewed in Chapters Three, Four and Five.

### **6.2.2 Survey methodology**

This study is exploratory in nature. It is intended to investigate the effect of the crisis in scholarly communication on university libraries in South Africa. Given the nature of the research problem and the purpose of the study, the most appropriate methodological approach for the study of the problem would be to conduct a survey as noted in Chapter One. According to Neuman (2000: 34) survey research is widely used by social science researchers and Babbie and Mouton (2001: 231) note that survey research is very popular in South Africa.

Surveys are concerned with collecting standardised data directly from people about occurrences or incidences of events or instances in varying situations and circumstances (Kidder and Judd 1986: 519; Robson 1993: 49). Surveys are ways of producing “information to describe, compare, and predict attitudes, opinions, values, and behaviour based on what people say or see and what is contained in records about them and their activities” (Fink 1995:14). Surveys are characterised as either cross-sectional or longitudinal (Robson 1993: 49; Schutt 1996: 130).

Cross-sectional studies focus on the state of affairs in the population at just one point in time. On the other hand, longitudinal surveys are used when one intends to describe or assess change or development over time. Longitudinal designs encompass trend, cohort and panel studies. Trend studies essentially look at how concepts change over time; cohort studies are concerned with how historical periods change over time; and panel studies look at how people change over time. The present study adopted a cross-sectional approach. The attraction of the method lies in the possibility of scanning a wide spectrum of issues in order to measure or describe any generalised features (Creswell 1994: 11). Generalisability refers to the extent to which research findings can be credibly applied to a wider setting than the research setting (Bickman, Rog and Hedrick 1998: 34). Cohen, Manion and Morrison

(2000: 104) see generalisability as a *sine qua non* for survey research and the foundation on which the external validity of research findings is based.

Busha and Harter (1980: 62) state that survey research is capable of collecting background information and hard-to-find data, and the researcher would not have the opportunity to motivate or influence the respondents' responses. Survey research shares similar characteristics common to most other research methods, but it also has certain important differences. For instance, survey research is used to collect contemporary data while historical research is concerned primarily with past data (Powell 1997: 58). Survey research is also differentiated from experimental research in that it provides less control for the research environment and, thus, it is not capable of establishing causal relationships. According to Powell (1997: 58) survey research is better suited to studying, exploring and analysing relationships among a large number of, and geographically dispersed, cases. Survey research is appropriate for this study with the university libraries under study located in different areas of South Africa.

The survey method also has disadvantages; one of them is that it is inflexible because it requires an initial study design, which remains unchanged throughout. Therefore it does not allow the inclusion of new variables at any stage of the study even if they are important. Another disadvantage is that standardised questionnaires might miss the appropriate information required to solve the research problem (Babbie and Mouton 2001: 263). In the present study this was overcome by an extensive review of the relevant literature including similar studies and pre-testing the questionnaire on a similar population of technikon and university of technology libraries and by interviewing the Deputy Vice Chancellors/Directors/Deans of Research after the collection of data by questionnaire. In this way the researcher was able to probe aspects of the funding of academic libraries which became apparent during the survey by questionnaire.

### **6.2.3 Collecting information about the population**

The descriptive method of research was selected. Gay (1976: 123) defines this method as the collection of data in order to test hypotheses or to answer questions concerning the current status of the subject of the study. The latter alternative was relevant for the purpose of this study because it enabled the assembling of information about specific attributes of the population, as well as information about specific behaviours (Newell 1993: 99-100).

## **6.3 Population**

According to Busha and Harter (1980: 55-57) the word 'population' refers to any group of persons, objects or institutions that have at least one characteristic in common. Bless and Higson-Smith (2000:84) define a population of a study as a set of objects whether animate or inanimate which are the focus of the research and about which the researcher wants to determine some characteristics. For example, a set of records, or an event, or institution, or people could constitute a study population. The population for the study were university libraries in South Africa. The units of analysis were the administrative units, that is, the university libraries rather than the individual survey respondent.

According to a number of research methodologists, one of the safeguards against getting unreliable information is ensuring that the respondents are capable of supplying the required information with some degree of accuracy (Babbie and Mouton 2001: 234). The heads of the university libraries under study or their periodical librarians were regarded as people who were competent to respond to the questionnaire. In some cases the heads of the libraries delegated the task entirely to their periodical librarians thus endorsing the responses given by their periodical librarians.

### 6.3.1 Size of the population

The seventeen units of analysis of the study were identified from the LIASA Heads of University Libraries list. The list provided the names of the university libraries together with the contact details of the heads of these university libraries. They were as follows:

- Nelson Mandela Metropolitan University
- North West University
- Rhodes University
- University of Cape Town
- University of the Free State
- University of Fort Hare
- University of Johannesburg
- University of KwaZulu-Natal
- University of the Limpopo
- University of Pretoria
- University of Stellenbosch
- Walter Sisulu University
- University of South Africa (UNISA)
- University of Venda
- University of the Western Cape
- University of the Witwatersrand
- University of Zululand

Campus libraries were not surveyed individually since many of the above institutions had undergone mergers and many of the libraries operated and were managed centrally by a university librarian or director.

In the present study, the population was relatively small, which made sampling unnecessary. The entire population was studied. A study of a whole population is referred to as a census. A census is a survey of all the elements of a population and the determination of the distribution of their characteristics (Powell 1997: 67). A census approach eliminates sampling errors and provides data on all probable

respondents in the population (Ngulube 2005: 130). In a census each member of the population is supposed to be included and to be classified in terms of certain biographical variables, for example, gender (Welman, Kruger and Mitchel 2005: 101). Saunders, Lewis and Thornhill (2003: 191) state that censuses are usually carried out by governments (for example the South African Census 2011). They are unique because participation is obligatory in the case of a census by government. They provide very good coverage of the population surveyed, for instance, censuses conducted by governments are usually clearly defined, well documented and of a high quality. Saunders, Lewis and Thornhill (2003: 151) point out that conducting a census survey does not necessarily mean it will provide more useful results than a well-planned sample survey. They mention that sampling provides a valid alternative to a census when there are budget constraints, time constraints or when it seems impractical to survey the entire population.

#### **6.3.1.1 Possible problems with the size of the population**

The very small size of the population could be a problem if data was gathered by means of e-mailed online questionnaire because of the well-known phenomenon of a low response rate to this form of research instrument. It would not be possible to generalise about results if responses were very low (Newell 1993: 96). To overcome the problem of a possible low response rate the researcher contacted the population to inform them of the study before the online questionnaire was sent by e-mail. Also, reminders were sent to the population informing them of the deadline for completion of the questionnaire.

### **6.4 Instrumentation**

A questionnaire is defined as a set of questions on a form which is completed by a respondent in connection with a research project (de Vos 2002: 172). The self-administered questionnaire was used for collecting the data needed for the study. The questionnaire was considered the more appropriate method for collecting data because of the advantages it provides when compared to other types of instruments. Apart from facilitating accessibility, since it permits wider geographical contacts, it

can also facilitate the collection of large amounts of data and information in a relatively short period of time and is relatively inexpensive to administer (Powell 1997: 91). The fixed format of the questionnaire also helps to eliminate variations in the questioning process. As Dillman (2000: 32) states:

...the goal of writing a survey question for self-administration is to develop a query that every potential respondent will interpret in the same way, be able to respond accurately, and be willing to answer.

Also questionnaires usually give respondents a greater feeling of anonymity, which in turn encourages openness to questions and minimises the interview bias.

According to Melville and Goddard (1996: 43-44), a good questionnaire has the following characteristics:

- It should be complete in the sense that the researcher gets all the data he or she needs;
- It must be short, meaning that the researcher must not abuse the respondent's time or concentration;
- It must ask only relevant questions;
- It must give clear instructions;
- It must have precise, unambiguous questions;
- It must have objective questions and it must not suggest answers;
- It must start with general questions;
- It must have appropriate questions, for instance, if there are sensitive questions the researcher must put them at the end of the questionnaire; and
- It must use mostly closed questions.

Therefore, the above guidelines were used in developing the instruments for this study, a questionnaire and an interview schedule. The objective of the questionnaire used in this study was to elicit information on the effect of the crisis in scholarly communication on university libraries in South Africa by surveying the library directors. Telephonic interviews based on an interview schedule with the Deputy Vice-Chancellors, Directors or Deans of Research at selected universities were conducted to gather supplementary data as well as verifying some points that emanated from some of the responses to the questionnaire. Deputy Vice-

Chancellors, Directors or Deans of Research were chosen since most university libraries fall under the responsibility of such university officials.

### **6.4.1 The questionnaire**

A self-administered online questionnaire (see Appendix 2) consisting mainly of limited option questions with some open questions was designed to establish the effect of the crisis in scholarly communication on university libraries in South Africa. The questionnaire was adapted from the ALPSP survey of librarians (see section 5.3.2.2) which investigated journal cancellation factors (Ware 2006).

#### **6.4.1.1 The online questionnaire**

According to Wright (2005) the past decade has seen a tremendous increase in internet use and computer-mediated communication. Studies of online populations have led to an increase in the use of online surveys, presenting researchers with new challenges in terms of applying traditional survey research methods to the study of online behaviour and internet use (Andrews, Nonnecke and Preece 2003 in Wright 2005).

Wright (2005) further argues that the technology for online survey research is young and evolving. Until recently, creating and conducting an online survey was a time-consuming task requiring familiarity with web authoring programs, HTML (hypertext markup language) code, and scripting programs. Today, however, survey authoring software packages and online survey services make online survey research much easier and faster. This study made use of the SurveyMonkey online survey service ([www.surveymonkey.com](http://www.surveymonkey.com)). Advantages include access to individuals in distant locations, the ability to reach participants who are difficult to contact, and the convenience of having automated data collection, which reduces researcher time and effort. According to Andrews, Nonnecke and Preece (2003) research costs, access to subjects, the scope of the research and the nature of behaviour under study may make it impractical or financially unfeasible to use more than one data collection approach. Online surveys provide the ability to conduct large-scale data

collection by individual researchers. The technology is an inexpensive mechanism for conducting surveys online instead of through the postal system and one in which costs per response decrease instead of increase significantly as sample size increases (Andrews, Nonnecke and Preece 2003: 2). Research comparing online versus postal surveys is starting to confirm that electronic survey content results may be no different from postal survey content results, yet provide strong advantages of speedy distribution and response rates (Yun and Trumbo 2000 in Andrews, Nonnecke and Preece 2003: 186).

Disadvantages of online survey research include uncertainty over validity of the data and sampling issues, and concerns surrounding the design, implementation, and evaluation of the online survey. The sampling issue did not apply to this study but to overcome the other disadvantages the questionnaire was pre-tested not only on six librarians but also on four academics who worked in the research, design and statistics field.

#### **6.4.1.2 E-mail versus online surveys**

According to Andrews, Nonnecke and Preece (2003) there are two fundamental differences between e-mail and online surveys. The first of these differences relates to database technology. Online surveys provide the ability to automatically verify and store survey responses using database technology and an HTML user interface. E-mail surveys and responses, whether embedded directly within an e-mail message or attached as a word processed document, must be manually transferred and entered into storage. The second difference is that e-mail is a 'push' technology that allows researchers to directly communicate with prospective respondents. Online surveys do not provide this affordance of direct communication. Therefore the current study used an e-mail to communicate the aim and purpose of the study to the population by way of the cover letter that invited the population to participate in the study. The address of the online survey was embedded directly into an e-mail message and was sent to the population. However, there are advantages and disadvantages in using e-mail to communicate with the population studied. These

advantages are discussed below and where appropriate are related to the present study.

According to Munoo (2000) most universities provide internet access to staff and students. Thus one does not need to be at one physical address to receive and complete the questionnaire as long as he or she has access to the system. All of the university librarians had their own e-mail addresses which were obtained from the LIASA Heads of Academic Institutions' list. E-mail offers savings in cost, as compared to traditional postal and telephonic surveys. Thus e-mail is faster to transmit and reduces paper or stationery costs. However, there are disadvantages in using e-mail to communicate with the population of the study.

According to Munoo (2000: 33) respondents may not be comfortable with responding to an e-mail. If they are not highly information technology (IT) literate they may have problems managing electronic information. Therefore clear instructions must be given in the covering letter. In addition, in terms of information overload, e-mails could be regarded as 'junk mail'. Thus a well-intended study may be deleted if it is considered 'junk mail'. The respondent may also choose not to act upon it immediately, resulting in response delays.

#### **6.4.1.3 Categories of information**

The online questionnaire consisted of questions from the following categories:

- Library collection
- Journal cancellations
- Open access
- Institutional repositories
- Library budget
- General comments

The library collection section contained two questions that related to the subject areas represented in the library and the approximate number of current journal subscriptions accessible to library users at each university. The journal cancellation

section contained 14 questions which related to the cancellation of journals at each university. The open access section contained 10 questions that related to open access. Two questions relating to institutional repositories were asked in the institutional repositories section which was followed by the library budget section which contained seven questions that probed financial matters relating to the university libraries. The final section sought general comments on the issue of journal cancellations.

#### **6.4.1.4 Forms of questions**

Fink and Kosecoff (1998: 9) explain that survey questions may be forced-choice or open-ended. Newell (1993: 101-103) also distinguishes between two types of questions commonly used in questionnaires. These are closed and open questions. Both types were used in the study.

Close-ended and open-ended questions were included in the questionnaire. Busha and Harter (1980: 70) and Powell (1997: 94) refer to close-ended and open-ended questions as structured and unstructured questions, respectively.

##### **6.4.1.4.1 Closed questions (forced-choice)**

Closed questions are drafted in advance, complete with all possible answers, which could be given (Newell 1993: 101). The close-ended or structured questions offer the respondents the opportunity to select one or more response choices from a number of questions provided to them (Busha and Harter 1980: 70; Weisberg, Krosnick and Bowen 1996: 78; Babbie and Mouton 2001: 233). The closed-ended questions are advantageous when a substantial amount of information about a subject exists and the response options are relatively known. The degree, frequency and comprehensiveness of a phenomenon can be ascertained quite meaningfully by means of closed questions. Closed questions are valuable, especially in a large sample and the results of the investigation can be available fairly quickly (de Vos 2002: 179-180). Schuerman (1983: 151) in de Vos (2002: 180) states that closed

questions help the respondents understand the meaning of the questions better and the researcher can compare the responses with one another.

Advantages of the closed questions (or limited option questions as they are also called) are that they can be pre-coded and responses can easily be entered in a computer, saving time and money and they are less time-consuming for the respondent to complete (Newell 1993: 101). Disadvantages of the closed questions are that they force the respondent to choose between the answers provided (Newell 1993:102).

Powell (1997: 94) states that close-ended questions are 'standardisable', easy to administer and more easily understood by respondents, in terms of the dimensions along which the answers are sought. For example, the questionnaire used in this study included questions that forced respondents to choose between fixed responses like 'yes' and 'no'. The shortcomings of such kinds of responses are that they sometimes force a statement or opinion on an issue about which the respondent has no opinion. Respondents may also be forced to choose inaccurate answers (Powell 1997: 95).

Sometimes the responses provided in a close-ended question may not be exhaustive and force the respondent to choose a response that does not apply to him or her. To overcome this problem, partially close-ended questions were included in the questionnaire. These questions provide "a compromise between the open- and close-ended questions" (Salant and Dillman 1994: 84). Thus, although fixed responses are provided, respondents are given the option to provide their own response if different from the series of responses suggested. This is ensured by adding a category labelled something like, Other (Please specify: \_\_\_\_\_) (Babbie and Mouton 2001: 234).

Some of the close-ended questions in the questionnaire were partially closed because they allowed respondents to choose more than one response. However, the problem is that multiple answers or responses create difficulties when processing and analysing the data.

#### **6.4.1.4.2 Open questions (open-ended)**

Newell (1993: 102) describes open questions as those that allow individuals to respond in any way they wish. Open questions were used in the questionnaire where the range of options could not be predicted. Open-ended questions allow respondents to answer in their own words. Respondents are not forced to choose from a fixed series of answers. They are free to express their thoughts and feelings in their own words. This freedom allows the researcher to elicit the respondents' views on the topic under study (Busha and Harter 1980: 70; Weisberg, Krosnick and Bowen 1996: 78).

Newell (1993: 103) points out the drawbacks of the open questions to respondents and researchers. The former are required to spend time considering and recording an answer and the latter might have to deal with responses that are ambiguous, wide-ranging and difficult to categorise as well as time consuming to code and analyse. This view is supported by Fink and Kosecoff (1998: 9) who suggest that forced-choice questions with several choices are easier to score than open-ended, short answer, essay questions. Open-ended questions give the respondent an opportunity to state a position in their own words. Unfortunately, these words may be difficult to interpret and for this reason content analysis can be labour intensive.

Also, respondents tend to approach the same questions from different perspectives which make it difficult for the researcher to compare responses (Weisberg, Krosnick and Bowen 1996: 78; Salant and Dillman 1994: 81). The researcher is required to code the respondents' answers to open-ended questions into categories before analysing them. Responses that are similar are first grouped into categories before they are coded. This process is called content analysis. Conceptual content analysis was used in this study. When coding them the researcher interprets the meaning of responses, opening the possibility for misunderstanding and biases that might occur. Coding open-ended questions is very time consuming and requires a special perseverance and reliability. Responses for open-ended questions need to be cross-coded, for a researcher to make final decisions. Including a large number of open-ended questions in a questionnaire is expensive and makes the questionnaire more susceptible to error (de Vos 2002: 179).

The questionnaire in the present study included open-ended questions. These questions asked the respondents to provide explanations for their response in the previous questions. Therefore open-ended questions are important in light of Salant and Dillman's (1994: 81) following statement:

Open-ended questions are sometimes helpful when they immediately follow a close-ended question and ask respondents to explain why they selected a particular answer. Their explanation may give researchers more insight regarding certain survey results.

Bourque and Fielder (1995: 17) argue that self-administered questionnaires must be closed-ended ones. Respondents of self-administered questionnaires dominated by open-ended questions are not always highly motivated to answer the questions. As a result the researcher finds out that returned questionnaires "will frequently have substantial amounts of missing or irrelevant data" (Bourque and Fielder 1995: 17). To minimise this problem, the self-administered questionnaire used in the present study included more close-ended questions and fewer open-ended questions.

McMurtry (1993) in de Vos (2002: 179) points out that most questionnaires contain both open and closed questions, but researchers must aim at using as many closed questions as possible and just a few open-ended questions for information that is difficult to generate with closed-ended questions. Saunders, Lewis and Thornhill (2003: 293) state that the amount of space that the researcher leaves for a response determines the length and fullness of the response required. Leaving too much space is sometimes off-putting to the respondent.

#### **6.4.1.5 Pre-testing the questionnaire**

A pre-test allows the researcher to "learn how well their questions or instructions are understood and how comprehensive the response categories are" (Bourque and Fielder 1995: 89). A pre-test also allows the researcher to identify questionnaire items that tend to be misunderstood by the respondents and hence do not obtain the information that is needed (Powell 1997: 105). Powell (1997) stresses the importance of pre-testing a questionnaire:

A pre-test gives the researcher an opportunity to identify questionnaire items that tend to be misunderstood by the participants, do not obtain the information that is needed etc.... The pre-test offers certain advantages beyond helping to refine the data collection instrument. It can permit a preliminary testing of the hypothesis, point out a variety of problems not anticipated relating to design and methodology, facilitate a practice run of the statistical procedures to be used, and perhaps even indicate that the final study may not produce any meaningful results and therefore should be rethought or abandoned.

#### **6.4.1.5.1 Population for the questionnaire pre-test**

To examine the clarity, content validity, and relevance of the questions the instrument was pre-tested on six librarians who held either a director's or acting director's position at the following technikons or universities of technology:

- Cape Technikon
- Central University of Technology, Free State
- Mangosuthu Technikon
- Durban Institute of Technology
- Tshwane University of Technology
- Vaal University of Technology

The names and contact details for the library directors of the above institutions were obtained from the LIASA Heads of Academic Institutions list. These librarians were chosen because they were all directors or acting directors of technikon or university of technology libraries. They were considered similar to the population targeted. In addition, the questionnaire was pretested on academics who worked in the research and statistics field at the University of KwaZulu-Natal.

#### **6.4.1.5.2 Administering the questionnaire pre-test**

The online questionnaire was sent via e-mail to the technikon and universities of technology library directors. They were given two weeks to complete the questionnaire. A reminder was sent to the library directors after the first week in an attempt to avoid a low response bias. At the end of the two weeks, four of the six librarians had completed the questionnaire, yielding a response rate of 66.6%. The deadline for completion was extended to three weeks and the remaining two library directors completed the questionnaire, yielding a response rate of 100% for the pre-test.

#### **6.4.1.5.3 Changes to the questionnaire for the pre-test**

Minor changes, in the form of spelling and grammatical errors in the cover letter and questionnaire, were corrected before the questionnaire was administered on the target population. As a result of the pre-test some of the questions were reworded in order to improve their clarity.

#### **6.4.1.6 Administering the questionnaire**

Once the design of the questionnaire had been completed and checked, a copy of the covering letter (see Appendix 1) and the self-administered online questionnaire (see Appendix 2) were e-mailed to all the members of the population using the lists of names and contact details from the LIASA list. The cover letter explained the purpose of the study and requested recipients to complete the questionnaire and submit it to the researcher via the online survey service. Recipients were given four weeks to complete the questionnaire. To mitigate against a low response rate, a reminder was sent to the recipients during the second week. During the third week, recipients were contacted telephonically to remind them of the deadline for the survey.

## **6.4.2 Interviews**

Interviews can be used for verifying, amending and extending data and gathering facts and explanations (Silverman 1993: 92-93). According to Ngulube (2003) interviews have been criticised for being time consuming. In addition, the outcome of the interview could also be determined by the personality of both the interviewer and respondent. Despite these criticisms interviews have a number of advantages and have been characterised as the most effective way of enlisting the co-operation of most populations (Burton 2000: 323). The quality of data is usually superior to that obtained by other methods (Burton 2000: 323). Therefore, interviews were used to gather supplementary data as well as verifying some points that emanated from some of the responses to the questionnaire.

### **6.4.2.1 Types of interviews**

There are different types of interviews. These types have been characterised, as standardised interviews, in-depth interviews, closed quantitative, structured interviews, exploratory interviews and many others (Ngulube 2003: 222). Based on both their target and mode, Burns (2000:582) characterises interviews into three categories. These include personal interviews, focus group interviews and telephone interviews. Although the potential of focus groups is considerable, they were considered problematic both to organise across so many geographically dispersed institutions and for busy senior management staff (Cohen, Manion and Morrison 2000: 288). Personal interviews are relatively expensive, (Powell 1997: 112) again for a geographically dispersed population, therefore telephone interviews were used in this study because of the nature of the study and the advantages of using such interviews. To interview the Deputy Vice-Chancellors, Directors or Deans of Research personally at the universities would have meant a trip to each university and this study was not supported by a funding grant. The greatest advantage is the saving of money and time and the questions posed to the respondents and the answers given are unaffected by the way the interviewer dresses and looks (Babbie and Mouton 2001: 257).

Although the interviews were structured in the sense that a list of issues that were central to the research questions was drawn up prior to conducting the interviews (see Appendix 4), it was reflexive because the interviewer was free to formulate the interview questions as dictated by the circumstances. Thus, the interview measure did not necessarily have the same format and sequence of words and questions for all respondents. In addition predetermined definitions and possible answers were not imposed on the respondents; instead respondents were free to formulate their own definitions and description of the situation or event (Bless and Higson-Smith 2000: 105). Although, unstructured interviews can be time-consuming as well as being possibly influenced by interviewer bias, their major attraction is that they facilitate the “discovery of new aspects of the problem by exploring in detail the explanations supplied by the respondents” (Bless and Higson-Smith 2000: 108). This approach represented an important qualitative direction to the study of the crisis in scholarly communication and its effect on university libraries in South Africa.

#### **6.4.2.2 Administering the interview pre-test**

The interview schedule was pre-tested on a senior member of the academic staff at the University of KwaZulu-Natal who was previously the Deputy Vice-Chancellor of Research. As a result of the pre-test some of the questions were reworded in order to improve their clarity.

#### **6.4.2.3 Administering the interview**

Once the design of the interview had been completed and checked, a copy of the interview covering letter (see Appendix 3) was e-mailed on the 23 February 2009 to the selected Deputy Vice Chancellors/Directors/Deans of Research inviting them to participate in the interview. It has been argued that validity is a persistent problem in interviews (Cohen, Manion and Morrison 2000: 120). For instance, validity can be compromised by asking leading questions, and bias on the part of both the interviewer and the respondent. One way of avoiding bias was desisting from seeking answers that supported any preconceived notions of the interviewer when

conducting the interview. Leading questions were also avoided because they tend to influence the answers of the respondent (Morrison 1993: 66).

Six Deputy Vice-Chancellors from selected universities were interviewed telephonically to get their views about the crisis in scholarly communication and its effect on the university library in South Africa particularly with regard to the funding of university libraries. In the absence of a Deputy Vice-Chancellor the Director or Dean of Research was interviewed. Thus, it was possible to get supplementary information to support the findings of the questionnaire. The six Deputy Vice-Chancellors, Directors or Deans of Research were selected from the 12 university libraries that responded to the questionnaire. Using the 6% benchmark allocation for library budgets (Willemse 2002), the Deputy Vice-Chancellors, Directors or Deans of Research from the university libraries that indicated the highest library budget allocations (see Chapter Seven, Table 18) of 20% and 11% respectively were selected together with the four institutions that had received less than the benchmark figure of 6%. The universities that had allocated 6% and 5.59% were excluded because they had met the norm or close to the norm for funding a university library. Thus purposive sampling was used for the interview population. Of the six Deputy Vice-Chancellors, Directors or Deans of Research five interviews were conducted, yielding a response rate of 83.3% for the interviews. The sixth Deputy Vice-Chancellor did not respond to the request but asked the university librarian to respond to the interview schedule. This data could not be used because the university librarian had already been surveyed and had completed the questionnaire.

After every interview, the interviewer summarised all the answers and presented them to the respondents in order to clear up any misperceptions on the part of the interviewer about what the respondent had said. Convergent validity was also used to validate the interview measure. According to Cohen, Manion and Morrison (2000: 120) convergent validity is the comparison between an interview measure and another research tool that would have been validated. The process involved comparing the interview results with the questionnaire responses. The results of the two tools tended to agree in most cases. Significant differences in the results of the two tools are highlighted in the results chapter (Chapter Seven) and interpretation chapter (Chapter Eight).

## 6.5 Data analysis

In this study the methods for data analysis were determined by the type of data collected, the purpose for which the study was conducted, and to meet the objectives. Data collection produces new information or data, but that data still needs to be checked for completeness, comprehensibility, consistency and reliability. This process is referred to as data cleaning. It involves reading the results, looking for surprising responses and unexpected patterns, and verifying or checking the coding of the data. Data cleaning is done after data collection and data entry into the computer. Data processing involves at least two kinds of operations, namely data reduction, during which the quantitative and qualitative data are summarised. Data analysis includes qualitative analysis, which includes processes like thematic and content analysis, and quantitative or statistical analysis. Data analysis may aid a researcher to arrive at a better understanding of the operation of the social processes. Data processing is then followed by synthesis, which involves interpretation or explanation of the data (Mouton 1996: 67).

Since the questionnaire included both open- and close-ended questions, coding was done after the data was collected. Responses to closed-ended questions during coding were converted to numerical codes, so that they could be tabulated or tallied. The responses to open-ended questions were first content-analysed before they were coded; they were arranged into meaningful related parts or categories (Saunders, Lewis and Thornhill, 2003: 380).

Content analysis was used to interpret the responses to open questions in the questionnaire and the interview. According to Neuman (2006: 44) "content analysis is a technique for examining the content, or information and symbols, contained in written documents or other communication medium". There are two types of content analysis namely relational analysis and conceptual analysis; the latter was used for this study. In conceptual analysis, a concept was chosen for examination and the analysis involved quantifying and tallying its presence. Neuman (2006: 325) states that "measurement in content analysis uses structured observation: systematic,

careful observation based on written rules". Data collected using the interview schedule was thus analysed qualitatively.

Data was entered into a computer and analysed using SPSS. Presentation of data included the use of frequency tables and graphs. The results are presented in Chapter Seven.

## **6.6 Evaluation of the method used**

Evaluation requires assessing the reliability and validity of the research method, as well as the instrumentation. Reliability is defined as the degree to which a test consistently measures what it sets out to measure, while at the same time yielding the same results (Ngulube 2005: 136). Reliability is concerned with the findings of the research and relates to the credibility of the findings. If the same research findings can be obtained when the study is repeated it means it is reliable (Welman, Kruger and Mitchell 2005: 145). Validity refers to the degree to which a test measures what it is supposed to measure (Gay 1996). In other words, a valid research method measures the concepts it intended to measure (Weisberg, Krosnick and Bowen 1996: 93). Validity is concerned with determining if the measurements are correct, meaning that an instrument measured what it intended to measure and that it measured it correctly (Melville and Goddard, 1996: 37).

Reliability is a necessary precondition of validity (Cohen, Manion and Morrison 2000: 105; Neuman 2000: 171). On the other hand, measurement validity is a necessary foundation for social research. As pointed out, validity is concerned with what a survey tool measures and its appropriateness, whereas reliability refers to the consistency with which the research instrument measures whatever it measures. The four common methods of testing validity are: content validation, criterion-related validation, face validity and construction validation (Bless and Higson-Smith 2000: 131-133; Neuman 2000: 169-171).

Content validation tests the relevance of the content of the test to the characteristic being measured (Bernard 2000:50). Pre-testing the questionnaire was used as a tool

for content validation. Content validity was also achieved by making sure that questions were related to the problem of journal cancellations. All the possible aspects of the effects of the crisis in scholarly communication were examined. Construct validity was achieved by linking the items in the measuring instrument to the theoretical components of the research topic covered in the previous chapters. The conceptualised items in the measuring instrument could be generalised to broader constructs of related concepts (Bless and Higson-Smith 2000: 131-133). Criterion validity has been defined as, “a measure of how well one instrument stacks up against another instrument” (Litwin 1995: 37). Criterion validity was achieved by comparing the instruments of measurement to those published in the literature. Questionnaires were compared with those used by Blake and Meadows (1984), Sweeney (1999) and Association of Learned and Professional Society Publishers (2008). Face validity is difficult to gauge because it depends on the way the instrument of measurement is perceived. However, ‘on the face of it’, the questionnaire seems to have face validity because the questions referred to journal cancellations, which were the central concerns of the survey.

All surveys have certain methodological limitations in common. Additional limitations are imposed by constraints in time and money and by other factors unique to a particular object (Doyle 2001). It is not good for researchers to give readers the impression that their research was perfect. Errors and limitations need to be acknowledged.

A factor that should be taken into account when considering the validity of a study is sensitivity (Newell 1993: 106-107). This leads to respondents over-reporting what they perceive as desirable behaviours. Gathering data from a small population by means of an online questionnaire that has to be completed by individuals who have no way of verifying whether their understanding of a question is what the researcher intended, may seem inferior to other data gathering techniques such as interviews. The major limitation in the present study could possibly be seen as non-response in terms of responses to individual questions. If the response rate in the study is too low then generalisation of results across the whole population is difficult. In addition to probable respondents not returning the questionnaire, there could be also non-responses to some of the questions. According to Ngulube (2005: 136), item non-

response “results from the respondents failing to answer all the survey questions”. This would be more prevalent with open-ended questions than with closed-ended questions. The latter could be attributed to the fact that the respondents did not fully understand the questionnaire items.

A high response rate diminishes the chance of non-respondent bias. Thus a researcher should be aware of the possible sources of bias due to the different characteristics among respondents and non-respondents, that is differences that result from those that respond to the questionnaire and those that do not (Weisberg, Krosnick and Bowen 1996: 338; Babbie and Mouton 2001: 261). Lower response rates increase the likelihood of biased results. According to Salant and Dillman (1994: 20), non-response bias occurs when:

... a significant number of people in the survey sample do not respond to the questionnaire and are different from those who do in a way that is important to the study.

Fortunately, the present study yielded a high response rate of 70.6% for the questionnaire and 83.3% for the interview which diminished the chance of non-respondent bias.

## **6.7 Summary**

The research method used to gather data in the study was discussed in this chapter. The use of both a quantitative and qualitative approach was adopted. Descriptions of the population under study, instruments, their form and categories of questions have been provided. The need to gain pertinent information about the effect of the crisis in scholarly communication on university libraries in South Africa resulted in a data gathering strategy consisting of an extensive review of the literature, online questionnaire and interview survey. Data collection procedures and the evaluation of the research method have also been discussed.

## Chapter 7

# Results of the survey

### 7.1 Introduction

The results of the survey of the population of university libraries, which was conducted by means of a self-administered online questionnaire and the interviews with the Deputy Vice-Chancellors, Directors or Deans of Research at selected universities, are reported in this chapter. The purpose behind each question that was asked is explained and the results are reported.

### 7.2 Response rate

Of the 17 copies of the questionnaires distributed, 12 were returned indicating a response rate of 70.6%<sup>10</sup>. This relatively high response rate for an online questionnaire is possibly explained by the fact that various measures, as mentioned in Chapter Six, were undertaken to ensure a good response rate. Of the six interviews, five Deputy Vice-Chancellors, Directors or Deans of Research responded yielding a response rate of 83.3%.

### 7.3 The results

The results for each section of the questionnaire and interviews are discussed as follows. Where respondents did not provide a response to an 'Other (please specify)' option for particular questions in the questionnaire, this is not reported on each time.

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<sup>10</sup> All percentages are rounded off to one decimal place except for the institutional allocation to the library.

### 7.3.1 Questionnaire results

The results of the questionnaire are discussed as follows:

#### 7.3.1.1 Section 1 – Library collection

The information in this section deals with the subject areas represented in each university library's collection as well as the approximate number of current journal subscriptions accessible to users.

##### 7.3.1.1.1 Subject areas

Question 1, a multiple response question, was asked to determine the subject areas represented in the university libraries' collections. Table 6 reflects the subject areas.

**Table 6: Subject areas represented in the libraries  
N=12**

Subject areas	Responses	
	Yes	Percent
Science and Technology	12	100%
Humanities and Social Sciences	12	100%
Law	12	100%
Business and Management	11	91.7%
Medicine and Healthcare	10	83.3%

All 12 of the university libraries' collections covered the science and technology, humanities and social sciences and law subject areas. Only one library's collection did not cater for the business and management field while two other libraries did not cover medicine and healthcare in their collections. Thus 83% of the university libraries which responded to the survey had a multidisciplinary collection.

### 7.3.1.1.2 Number of current journal subscriptions

Question 2 was asked to determine the approximate number of current journal subscriptions that were accessible to library users at each university library. These current subscriptions included both individual licenses or subscriptions and multi-journal ('big deal') (Chapter Four, section 4.4.15) subscriptions. The approximate number of current journal subscriptions accessible to library users at each university library is reflected in Table 7.

**Table 7: Number of journals subscribed to  
N=12**

Number of journals	Responses	
	Frequency	Percent
51 349	4	33.3%
46 780		
40 000		
30 000		
27 000	3	25%
23 000		
20 000		
6 500	4	33.3%
2 769		
2 000		
1 300		
758	1	8.3%
<b>Total</b>	12	100%

30 000+
  20 000-29 000
  <10 000

Table 7 is an indication of the size of each of the university libraries' periodicals collection and the number of titles that were accessible to users at each of the libraries. The number of journal titles held by the university libraries in South Africa ranged from 51 349 to 758. Table 7 shows that four (33.3%) libraries had 30 000 or more journals in their collection. This was followed by three (25%) libraries whose collections ranged from between 20 000 to 27 000 journals. There were five (41.7%) libraries with less than 10 000 journals in their collection. Only one (8.3%) library's collection contained less than a 1 000 journals.

### 7.3.1.2 Section 2 – Journal cancellations

The information in this section deals with journal cancellations in the university libraries.

#### 7.3.1.2.1 Recent journal cancellations

Question 3 was asked to determine if the university libraries had cancelled journals in the last five years.

All 12 university libraries had cancelled journals in the last five years. Like most academic libraries worldwide, university libraries in South Africa are thus cancelling journal titles and for various reasons.

#### 7.3.1.2.2 Reasons for journal cancellations

Question 4, a multiple response question, was a follow-up to Question 3 and required the respondents who had cancelled journals to explain why they had cancelled journals. Instead of providing a reason for cancelling, one (8.3%) of the university libraries pointed out that they could not cancel titles that were tied-up in a 'big deal'. Reasons for journal cancellations are reflected in Table 8.

**Table 8: Reasons for journal cancellations in the past five years  
N=12**

Reasons for journal cancellations	Responses	
	Yes	Percent
Cuts in periodicals budget	5	41.7%
Price increase	5	41.7%
High price	4	33.3%
Duplication of subscriptions resulting from an institutional merger	2	16.7%
Print journals cancelled where electronic version is accessible in a database	2	16.7%
Changes in curriculum	1	8.3%
Not meeting teaching and research needs	1	8.3%
Subject area no longer taught	1	8.3%
Replacing print subscriptions with online	1	8.3%

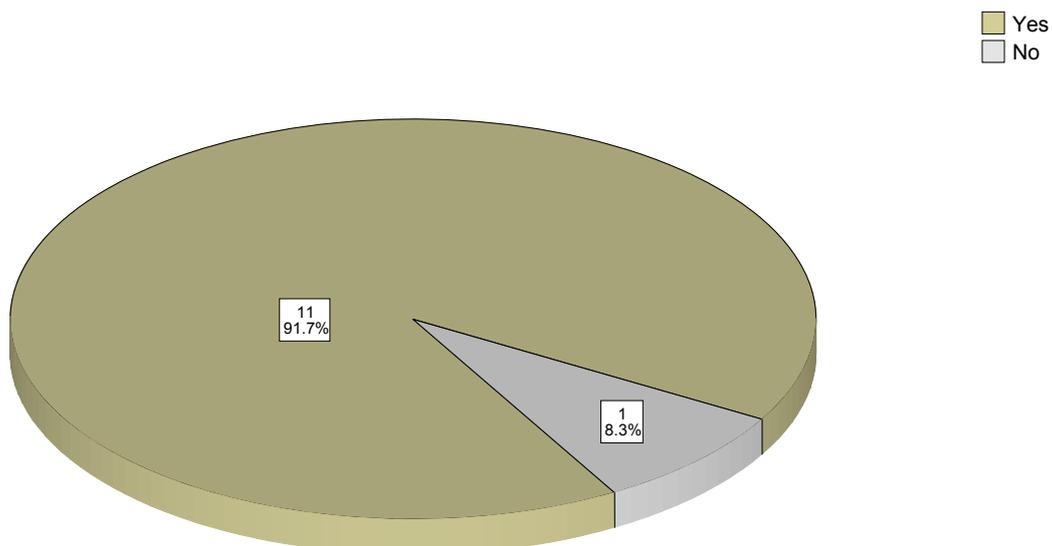
The main reasons why university libraries have been cancelling journal titles include cuts in periodical budgets (five or 41.7%), price increases in journal titles (five or 41.7%) and the high price of journals (four or 33.3%). Institutional mergers of academic institutions had resulted in duplication of subscriptions at two (16.7%) of the university libraries. This duplication provided a reason to rationalise and cancel titles at these two libraries. Print journals were cancelled when an electronic version became available by two (16.7%) of the libraries. Reasons for cancelling as a result of curricula concerns were provided by three (25%). Each of these libraries cancelled because of changes in the curriculum (one or 8.3%), journal titles that were not relevant because they did not meet the institutions teaching or research needs (one or 8.3%), and titles for subject areas that were no longer taught (one or 8.3%).

### 7.3.1.2.3 Cancelling of print in favour of electronic

Question 5 was asked to determine if the university libraries had cancelled print journals in favour of electronic journals in the last five years. Figure 24 shows the number of university libraries that had cancelled print journals in favour of electronic.

**Figure 24: Cancelling of print in favour of electronic**

**N=12**



Of the 12 university libraries, a majority of 11 (91.7%) had cancelled print journals in favour of electronic. Thus many of the university libraries were replacing their print subscription with electronic journal titles for various reasons.

#### 7.3.1.2.4 Reasons for cancellation of print in favour of electronic

Question 6 was a follow-up to Question 5, and required the respondents who had cancelled print journals in favour of electronic journals to explain why they had cancelled. Table 9 reveals the reasons why the 11 university libraries cancelled print journals in favour of electronic journals. Some respondents provided more than one reason for why they cancelled print in favour of electronic journals.

**Table 9: Reasons for cancelling print journals in favour of electronic  
N=11**

Reasons for cancelling print journals in favour of electronic	Responses	
	Frequency	Percent
Increased accessibility on and off campus	3	27.3%
It is cost effective	3	27.3%
Collection development policy prefers electronic to paper e.g. cancellation of all Elsevier and Institute of Physics (IOP) print titles for electronic	3	27.3%
Preferred means of access for academics especially in science and medicine	2	18.2%
It eliminates binding and claiming	2	18.2%
Does not take up storage space	1	9.1%
Mostly due to budget constraints	1	9.1%
Cannot be stolen or mutilated	1	9.1%
No response	1	9.1%

The main reason why the 11 libraries cancelled print in favour of electronic was that the electronic version increased accessibility on and off campus (three or 27.3%), it was considered cost effective by three (27.3%) libraries and the collection development policy of three (27.3%) libraries preferred the electronic to the print. The respondents provided examples of this preference by cancelling Elsevier and

Institute of Physics (IOP) print titles for electronic. Since the electronic version was the preferred means of access for academics, especially in science and medicine, two (18.2%) of the libraries considered it a reason to cancel their print titles. The elimination of administrative duties for library staff such as binding and claiming of journal titles was also a reason to cancel print for two (18.2%) libraries. Other reasons that the libraries provided included the fact that electronic journals require less storage space when compared with print (one or 9.1%), budget constraints resulted in the cancellation of print, and the electronic version, unlike print, could not be stolen or mutilated (one or 9.1%).

#### **7.3.1.2.5 Subscribing to new journals**

Question 7 was asked to determine if the university libraries were still subscribing to new journals.

All 12 university libraries were still subscribing to new journal titles. This finding is significant given that all 12 were cancelling titles as well.

#### **7.3.1.2.6 Restrictions on new journal subscriptions**

Question 8 was a follow-up to Question 7, and required the respondents who were subscribing to new journals to indicate any restrictions they were imposing on new journal subscriptions. Table 10 reveals the restrictions university libraries were imposing on new journal subscriptions. Respondents could provide more than one reason.

**Table 10: New journal subscription restrictions**  
N=12

New journal subscription restrictions	Responses	
	Frequency	Percent
New journals are only considered if journals of equal price are cancelled	5	41.7%
Department must make funding available from their book fund	2	16.7%
Depends on cost of periodical e.g. cheaper titles (such as South African titles) can be purchased without having to cancel anything. The more expensive titles and/or databases usually require cancellation of something	2	16.7%
Will not subscribe to new print if already available electronically in databases subscribed to	2	16.7%
Electronic subscriptions favoured over print	1	8.3%
There should be a reasonable demand for a title	1	8.3%
New title should be relevant and complement the collection	1	8.3%
No response	1	8.3%

According to five (41.7%) of the university libraries, new journals could only be subscribed to if journals of equal price were cancelled. This finding reveals that budgetary constraints are the main restriction on subscribing to new journal titles. At two (16.7%) universities, new journals could only be subscribed to if academic departments made the funding available for these new titles. An interesting restriction imposed by two (16.7%) university libraries depended on the cost of the title where it was argued that South African titles were cheaper so could be subscribed to. However, more expensive titles could only be subscribed to if something else was cancelled. New print titles were not subscribed to by two (16.7%) of the libraries if they were available in an electronic database. A reasonable demand for the new journal was mentioned by one (8.3%) library. Relevance of the new journal was only a consideration for one (8.3%) of the libraries.

#### **7.3.1.2.7 Reasons for not subscribing to new journals**

Question 9 was also a follow-up to Question 7, and required the respondents who were not subscribing to new journals to explain why?

Since all of the 12 university libraries were subscribing to new journal titles none of the respondents were required to answer Question 9 of the questionnaire.

#### **7.3.1.2.8 Who initiates decision to cancel?**

Question 10 was asked to determine who at the university was responsible for initiating the decision to cancel a journal. Figure 25 shows who was responsible for initiating the decision to cancel a journal.

**Figure 25: Person primarily responsible for initiating decision to cancel**

**N=12**

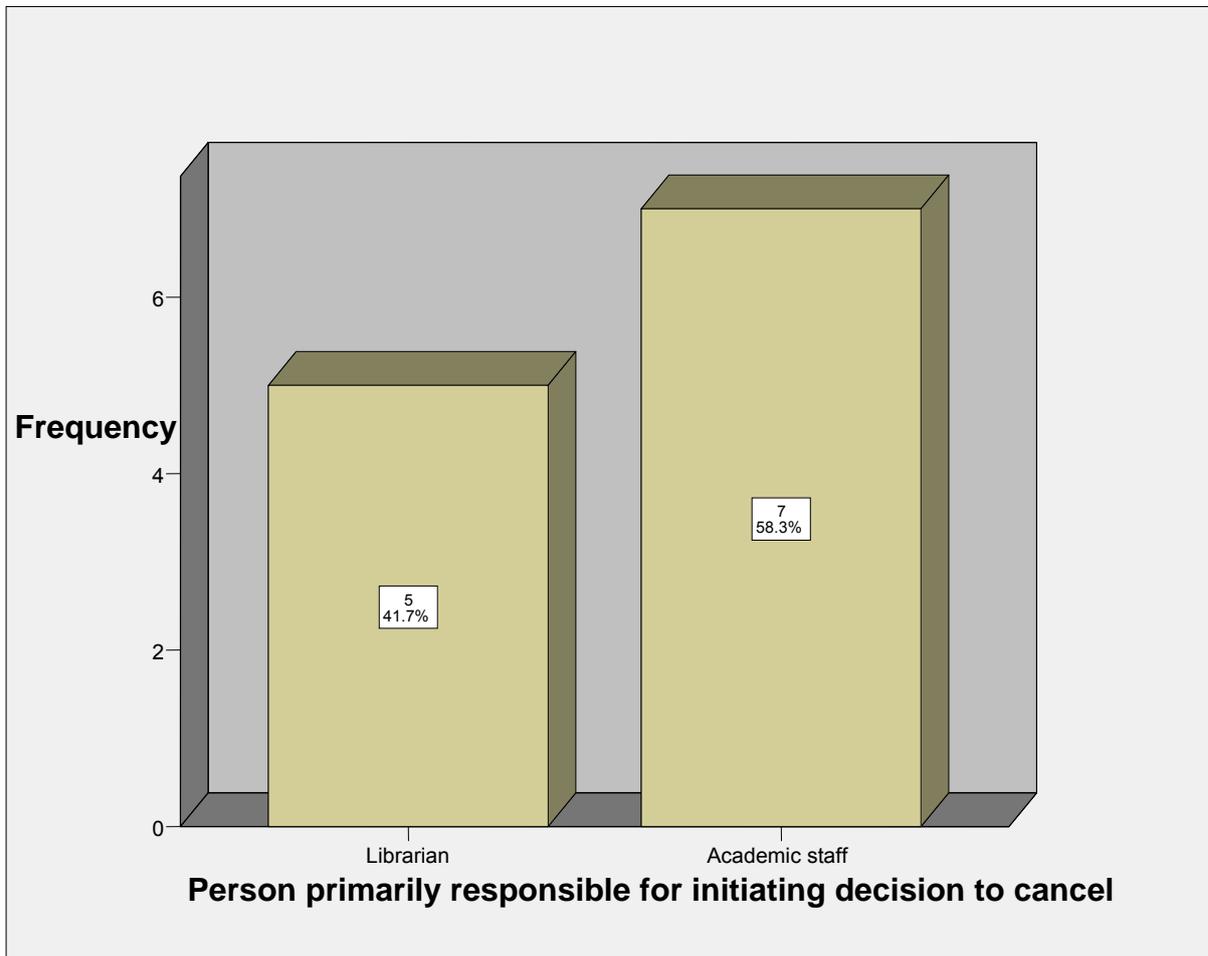


Figure 25 shows that more academic staff (seven or 58.3%) at the universities than library staff (five or 41.7%) were responsible for initiating the decision to cancel a journal.

#### **7.3.1.2.9 Who is involved in the decision to cancel?**

Question 11, a multiple response question, was asked to determine who at the university was involved in, or had input to, the decision to cancel a journal. Table 11 shows who at the universities was involved in, or had input to, the decision to cancel a journal.

**Table 11: Persons involved in decision to cancel  
N=12**

Persons involved in decision to cancel	Responses	
	Yes	Percent
Librarian	12	100%
Academic staff	11	91.7%

All of the university libraries, 12 (100%) maintained that librarians were involved in the decision to cancel journal titles, while 11 (91.7%) said that academic staff were involved in the decision to cancel journal titles. This shows that both librarians and academic staff at most of the universities were involved in the decision to cancel journal titles with the exception of one university library.

**7.3.1.2.10 Who makes the final decision to cancel?**

Question 12 was asked to determine who at the university was ultimately responsible for the final decision to cancel a journal. Figure 26 shows who at the university is ultimately responsible for the final decision to cancel.

**Figure 26: Person responsible for final decision to cancel a journal**

**N=12**

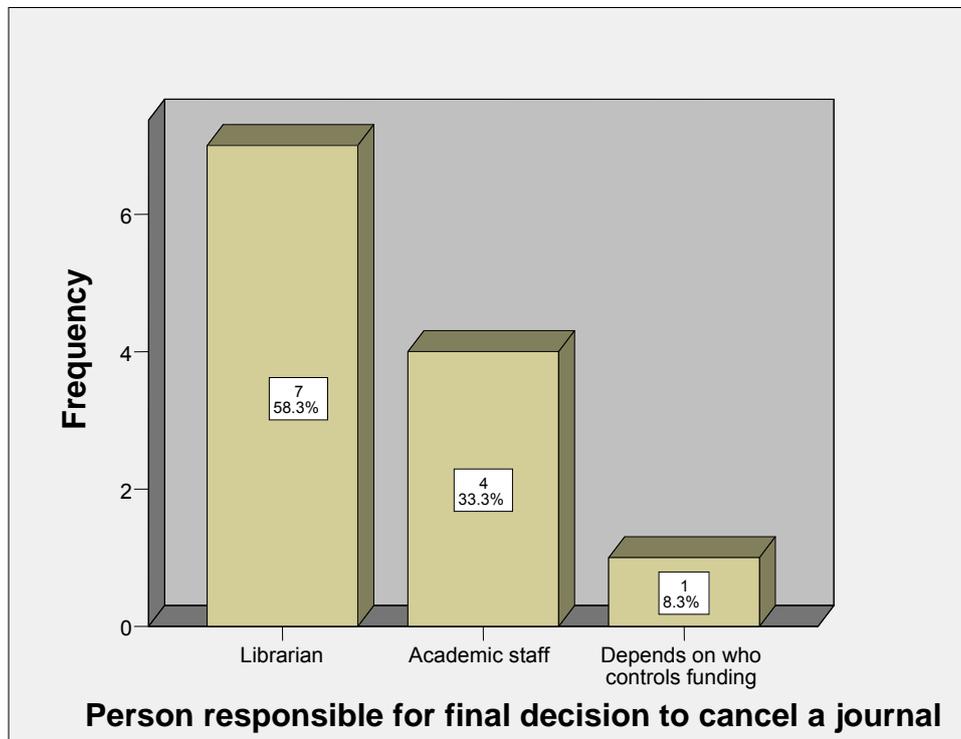


Figure 26 shows that at just more than half of the universities that responded (seven or 58.3%), the librarians were ultimately responsible for the final decision to cancel a title. Only four (33.3%) of the university libraries said that academic staff were responsible for the final decision to cancel, while one (8.3%) university library maintained that the final decision to cancel depended on whether the funding for the journal title was controlled by librarians or academics. Thus, at this university if funding for journal titles was controlled by academic staff, it could be inferred that librarians would not have much control over the decision to cancel a title.

#### **7.3.1.2.11 Process for deciding which journal to cancel**

Question 13 was asked to determine what process was used by the university libraries to cancel journals. Table 12 shows the processes used by the university libraries.

**Table 12: Process for deciding which journal to cancel**

**N=12**

<b>Process for deciding journal cancellation</b>
A title is proposed by an academic and/or a subject librarian. The title is evaluated against current teaching and research needs within the whole university. Holdings at other South Africa libraries are also a factor.
Academic staff evaluate their current subscriptions on a yearly basis and decide which are still relevant or not.
Academic staff identify whether content is no longer applicable, library staff identifies factors pertaining to budget, non-deliverance, duplicates, very high price, electronically available, sufficient coverage of subject, cancellation recommendations made annually to Collection Development Committee.
Acquisitions Policy (draft) states that a periodical should only be cancelled for academic reasons. Library has cancelled only those titles which were unnecessarily duplicated at more than one campus. Titles were identified by Head of Technical Services. Notice sent out to relevant faculty and subject librarians in advance and, provided there are no objections, title is not renewed for following subscription period.
Current journal subscription lists are sent to faculties annually to review and consider for renewal/cancellation.
Currently looking for online packages and going online only.
Firstly the price and usage of the journal are checked, secondly who subscribes to it and whether they still work for the university.
From 2003 annual ranking lists are distributed to the departments during the first semester. Those journals which are given rankings of 4 or 5 by the academic staff are cancelled automatically.
Heads of Departments or Library Representatives in departments are approached by the Periodicals Librarian mid-year for cancellations. The department makes the decision.
If a journal is not used and current issues are available in a database.
Liaise with faculty to determine usage. If any title is not used optimally, it is considered for cancellation. Conduct cost-benefit analysis. Ascertain alignment to curricula and collection development policy. Academic departments are consulted to reach agreement on cancellations. The trend is to consider online as opposed to print formats because a larger audience can be reached.
Usage statistics and price relevancy.

Each library explained their process for cancelling journals. Although the process may vary across the university libraries there are similarities. The process mentioned by each of the libraries above shows that librarians engage in journal cancellations on a regular basis, often annually. These include the consultation with academic staff to determine if a journal is still relevant. At this stage the journal could be ranked

according to relevance. The university libraries also make use of various statistics to ascertain usage. A further important consideration during the process is the cost of the journal. Many of the libraries have formalised collection development policies or guidelines that assist them with the process. Table 13 provides a more detailed analysis of the methods used for evaluating a journal when deciding to cancel. Some libraries used more than one of the methods, hence the multiple responses.

**Table 13: Evaluation methods for deciding which journal to cancel**

**N=12**

Evaluation methods	Responses	
	Frequency	Percent
Evaluate usage	4	33.3%
Evaluate against current teaching and research needs	4	33.3%
Check for electronic availability	4	33.3%
Evaluate price	3	25%
Check for duplicates	2	16.7%
Check for holdings at other South African libraries	1	8.3%
Check if journal has sufficient coverage of subject	1	8.3%
Evaluate journal by ranking	1	8.3%

Journals were evaluated for usage and to see if they met the current teaching and research needs as well as checked to see if they were available electronically by four (33.3%) libraries each respectively. This was followed by three (25%) libraries that evaluated the price of the journal in deciding which journals to cancel. Of the 12 libraries, two (16.7%) libraries checked for duplicates. The checking of holdings at other South African libraries, and if the journal had sufficient coverage of subjects was used by one (8.3%) library each respectively. The ranking of journals was used as a method by one (8.3%) library.

### 7.3.1.2.12 Factors considered when cancelling

Question 14 was asked to determine which factors were considered important and the degree of importance in the process used to make a decision to cancel a journal at the university libraries. Table 14 reveals the factors that were considered important in the process university libraries used to make a decision to cancel a journal.

**Table 14: Factors considered when cancelling**

**N=12**

Factors considered when cancelling	Very important		Important		Neutral		Unimportant		No response		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Academic staff no longer require it	9	75%	3	25%	0	0	0	0	0	0	12	100%
Usage	8	66.7%	4	33.3%	0	0	0	0	0	0	12	100%
Price	6	50%	3	25%	3	25%	0	0	0	0	12	100%
Availability of content in aggregated databases	6	50%	3	25%	1	8.3%	2	16.7%	0	0	12	100%
Free availability-open access archive	4	33.3%	5	41.7%	2	16.7%	1	8.3%	0	0	12	100%
Impact factor/impact factor ratings	3	25%	4	33.3%	4	33.3%	0	0	1	8.3%	12	100%
Free availability-journal's website	1	8.3%	6	50%	2	16.7%	3	25%	0	0	12	100%

The fact that academic staff no longer required a journal title was considered very important when cancelling by nine (75%) of the university libraries and important by three (25%) of the libraries. This was followed by journal usage which was considered as very important when cancelling by eight (66.7%) of the libraries and important by four (33.3%) of the libraries. The price of a title and its availability in an aggregated database were each considered very important by half (six or 50%) of the libraries and important by three (25%) of the libraries. The free availability in an open access archive was considered very important by four (33.3%) libraries and important by five (41.7%) libraries. The impact factor or impact factor ratings were

considered very important by three (25%) libraries and important by four (33.3%) libraries. The free availability of content on the journal's website was only considered very important by one (8.3%) library and important by six (50%) libraries.

The free availability of content on a journal's website was also considered as an unimportant factor when cancelling by three (25%) of the libraries which was followed by two (16.7%) libraries that considered the availability of content in an aggregated database as unimportant. The free availability of content is an important concern for libraries as noted earlier (in section 7.3.1.2.3) particularly since the majority of the libraries 11 (91.7%) had cancelled print titles in favour of electronic. Respondents did not regard any of these factors as not at all important therefore this category is not reflected in Table 14.

#### **7.3.1.2.13 Aspects of price**

Question 15 was asked to determine which aspects of price were considered important in order to determine cancellation at the university libraries. Table 15 reveals the aspects of price that were considered important by the university libraries in order to determine cancellation.

**Table 15: Aspects of price**

**N=12**

Aspect of price	Very important		Important		Neutral		Unimportant		Not at all important		No response		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Percentage increase	5	41.7%	3	25%	2	16.7%	1	8.3%	0	0	1	8.3%	12	100%
Price of overall package	5	41.7%	5	41.7%	1	8.3%	0	0	0	0	1	8.3%	12	100%
Absolute price	3	25%	6	50%	3	25%	0	0	0	0	0	0	12	100%
Price per use	3	25%	3	25%	5	41.7%	0	0	0	0	1	8.3%	12	100%
Price per page	0	0	0	0	5	41.7%	2	16.7%	3	25%	2	16.7%	12	100%
Price per article	0	0	1	8.3%	7	58.3%	1	8.3%	2	16.7%	1	8.3%	12	100%

As noted above the price of the overall package was considered very important and important by five (41.7%) libraries each. Absolute price was considered very important by three (25%) libraries and important by six (50%) libraries. The percentage increase was considered very important by five (41.7%) libraries and important by three (25%) libraries. Price per use was considered very important and important by three (25%) libraries each. Of the 12 libraries, seven (58.3%) were neutral when considering the price per article followed by five (41.7%) libraries each for the price per use and per page.

Price per page was considered unimportant by two (16.7%) libraries and not at all important by three (25%) of the libraries. This was followed by one (8.3%) library which considered price per article to be unimportant and a further two (16.7%) libraries maintained that price per article was not at all important in terms of price.

### 7.3.1.2.14 Evaluating usage

Question 16 was asked to determine which methods of evaluating usage were considered important in determining cancellation by the university libraries. Table 16 shows the methods.

**Table 16: Evaluating usage**

**N=12**

Evaluating usage	Very important		Important		Neutral		Unimportant		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Online usage statistics from publisher	7	58.3%	4	33.3%	1	8.3%	0	0	12	100%
Online usage collected by institution	6	50%	4	33.3%	2	16.7%	0	0	12	100%
Estimated print usage	4	33.3%	1	8.3%	5	41.7%	2	16.7%	12	100%

Table 16 shows that evaluating online usage statistics from publishers was considered a very important method in determining cancellation by seven (58.3%) of the libraries and important by four (33.3%) of the libraries. This was followed by reviewing online usage statistics collected by the institution which was considered a very important method of determining cancellation by half of the libraries (six or 50%) and important by four (33.3%) of the libraries. Estimated print usage was considered very important by four (33.3%) libraries and important by one (8.3%) library. Of the 12 libraries, five (41.7%) were neutral on the estimated print usage.

Only two (16.7%) libraries considered the estimated print usage as an unimportant method. Respondents did not regard any of these methods as not at all important therefore this category is not reflected in Table 16.

### 7.3.1.3 Section 3 – Open access

The information in this section deals with open access and how it influences journal cancellations.

#### 7.3.1.3.1 Factors relating to a journal which becomes available in an aggregation product

Question 17, a multiple response question, was asked to establish what factors determine whether a journal which then becomes available in an aggregation product (such as those offered by EBSCOHost, ProQuest, and so forth) was cancelled by the university libraries. Table 17 shows what factors the university libraries took into account when determining whether such a journal in an aggregation product was cancelled.

**Table 17: Factors relating to a journal which becomes available in an aggregation product**  
**N=12**

<b>Factors relating to a journal which becomes available in an aggregation product</b>	<b>Responses</b>	
	<b>Yes</b>	<b>Percent</b>
Length of embargo period after which content is included	9	75%
Extent of archive included in aggregation	6	50%
Promptness of adding new material	5	41.7%
Functionality in aggregation	5	41.7%

In Table 14 the availability of content in an aggregated database was considered a very important factor in determining cancellation by half (six or 50%) of the libraries. In terms of the factors relating to an aggregation product (e.g. EBSCOHost, ProQuest), a majority of the libraries, nine (75%) considered the length of the embargo period after which content was included in the aggregation product to be the most important factor in determining cancellation. Half the libraries, six (50%) considered the extent of the archives included in the aggregation product to be an

important factor to consider when cancelling. The promptness of adding materials to the aggregation product and the functionality of the aggregation product were each considered as factors for determining cancellation by only five (41.7%) libraries.

#### **7.3.1.3.2 Length of delay period**

Question 18 was asked to determine the length of the delay period that was considered acceptable by the university libraries before deciding to cancel a subscription to a journal when it is available in an open access archive. Figure 27 shows the length of delay period that was considered appropriate by the university libraries.

**Figure 27: Length of delay period**

**N=12**

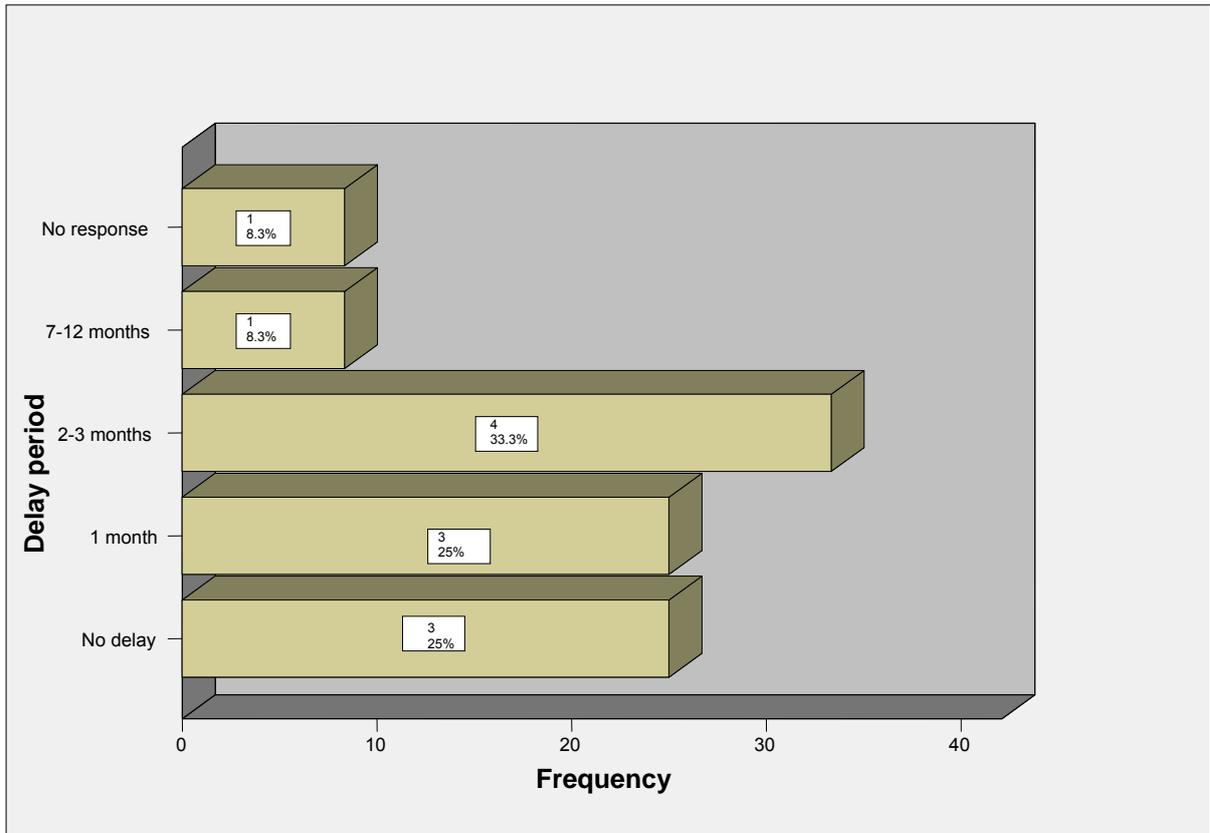


Table 17 showed that a majority of the libraries, nine (75%) considered the length of the embargo period after which content was included in the aggregation product to be the most important factor in determining cancellation. Figure 27 shows that four (33.3%) libraries considered a 2-3 month length of delay to be acceptable before cancelling. This was followed by a month's delay and a 'no delay' period which were each considered acceptable before canceling by three (25%) libraries. Only one library (8.3%) considered a 7-12 months' delay to be acceptable before cancelling.

### 7.3.1.3.3 Factors influencing the delay period

Question 19, a multiple response question, was asked to determine what factors influenced the university libraries' decision on how short the delay period had to be before they cancelled a journal. Table 18 shows the factors that influenced the university libraries' decision on how short the delay period had to be.

**Table 18: Factors influencing the delay period**

**N=12**

Factors influencing delay period	Responses	
	Yes	Percent
Subject area	11	91.7%
Frequency of journal	6	50%

Table 18 shows that the main factor that influenced the university librarians' decision of the delay period was the subject area for the journal. This subject area factor was considered important in determining the length of the delay period by a vast majority of the libraries (11 or 91.7%). The frequency of the journal was only considered a factor in determining the length of the delay period by half the libraries (six or 50%).

#### 7.3.1.3.4 Acceptable substitutes for a journal

Question 20, a multiple response question, was asked to determine what freely available versions of a journal article the university libraries would consider as acceptable substitutes for a published journal article.

**Table 19: Acceptable substitutes for a journal**

**N=12**

<b>Acceptable substitutes</b>	<b>Responses</b>	
	<b>Yes</b>	<b>Percent</b>
Final journal PDF	11	91.7%
Postprint	2	16.7%
Preprint	1	8.3%

A majority of the libraries, 11 (91.7%) considered the final PDF version to be an acceptable substitute for a journal. The postprint version was considered to be an acceptable substitute by only two (16.7%) of the libraries followed by the preprint version which was considered an acceptable substitute by only one (8.3%) library. Thus journals in their postprint and preprint format are not considered an acceptable option by most of the university libraries.

#### 7.3.1.3.5 Availability of journal content in an open access archive

Question 21 was asked to determine how much of a journal's content would need to be immediately freely available in an open access archive before the university libraries would consider that the free content provided an acceptable alternative to a published journal. Figure 28 reveals how much of a journal's content would need to be immediately available.

**Figure 28: Availability of journal content in an open access archive**

**N=12**

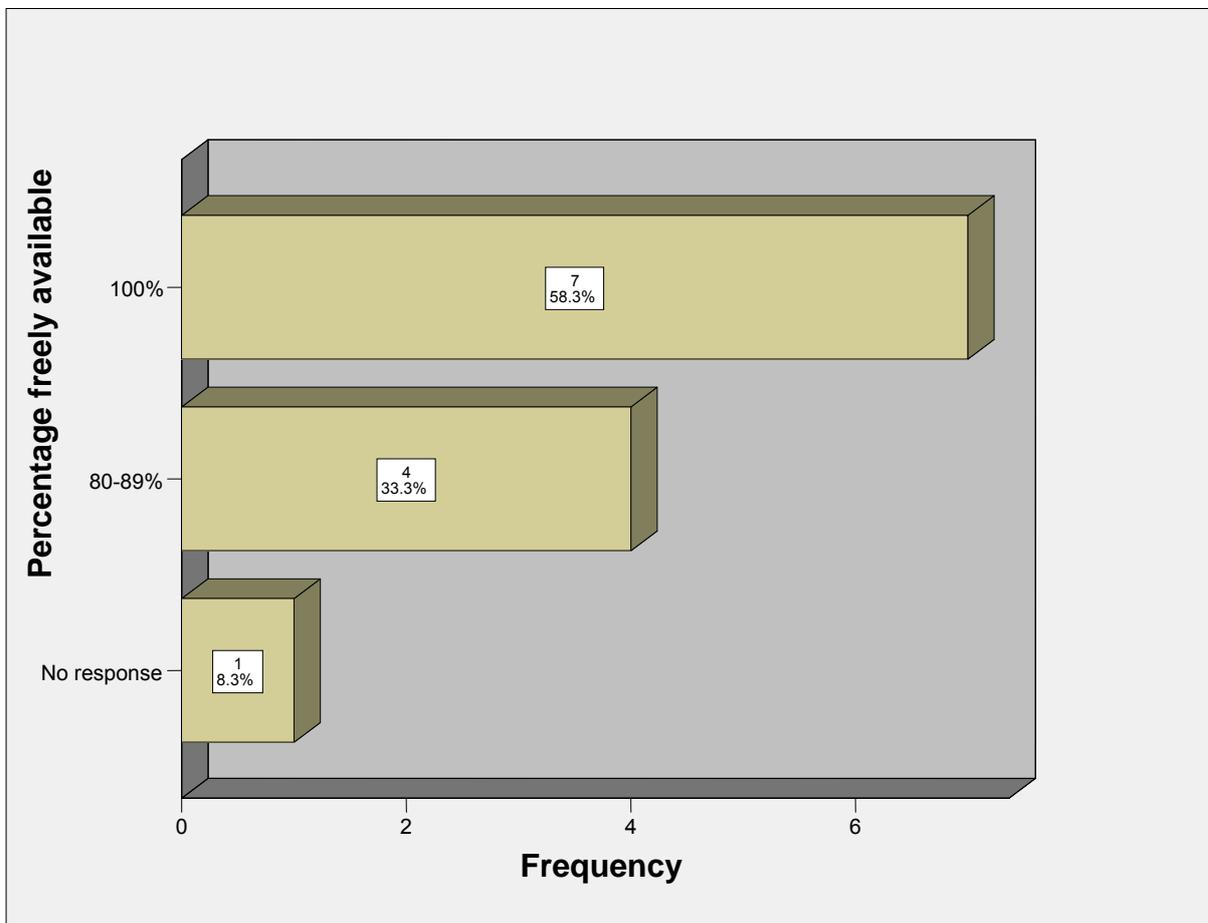


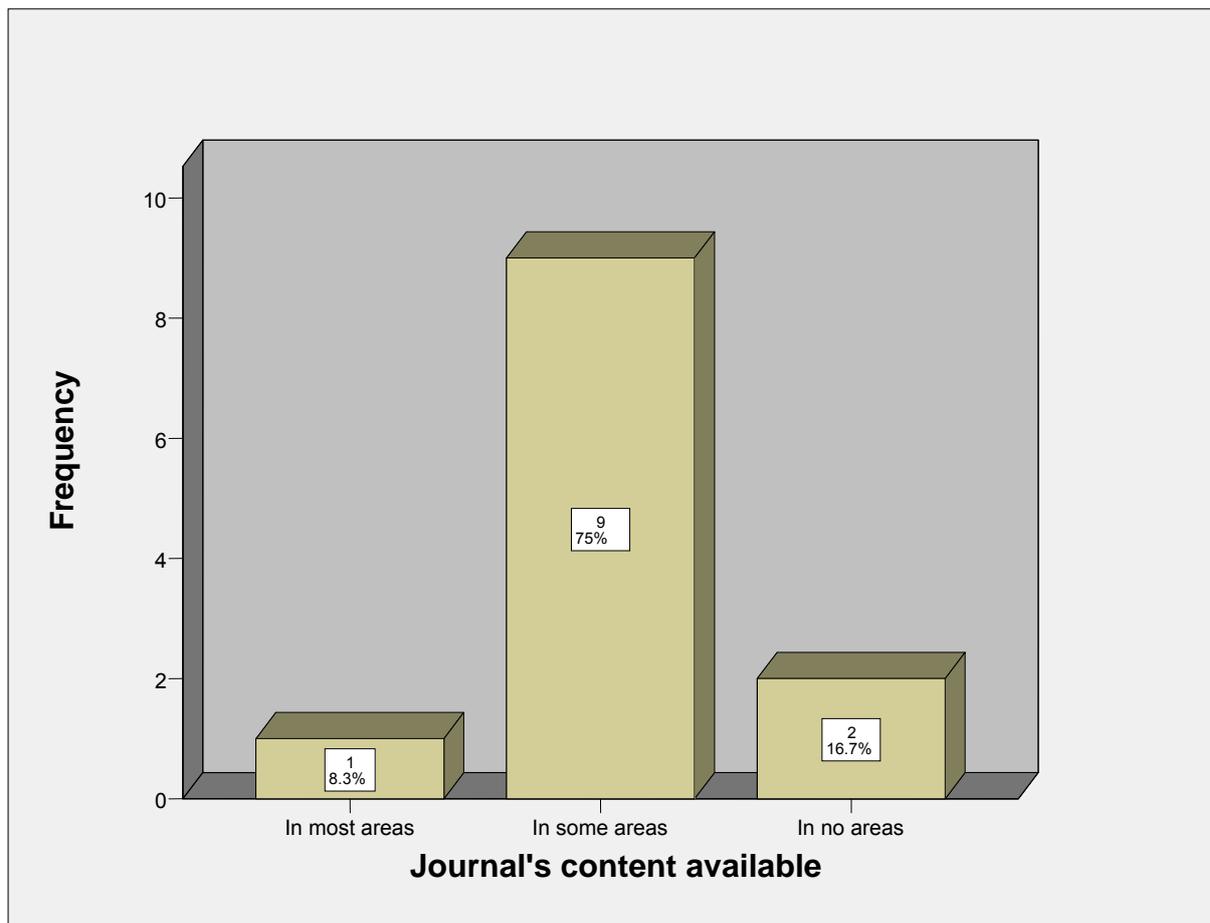
Figure 28 shows that seven (58.3%) of the university libraries wanted 100% of the journal's content immediately freely available in an open access archive before they would consider it an acceptable alternative to the published journal. Only four (33.3%) of the libraries wanted 80 to 89% of the content immediately freely available in an open access archive before they considered it an alternative. Thus the university libraries did not consider anything less than 80% of the content in an open access archive to be an acceptable alternative.

### 7.3.1.3.6 Journal content online

Question 22 was asked to determine what proportion of the university libraries' journal content was freely available online. Figure 29 reveals the proportion of the university libraries' journal content that was freely available.

**Figure 29: Journal content online**

**N=12**



A majority (nine or 75%) of the libraries' journal content was freely available in an open access archive in some areas. Only one (8.3%) library's content was freely available in an open access archive in most areas of their collection. None of the university libraries which responded to the survey had content that was freely available in all areas of their journal collection.

### 7.3.1.3.7 Plans to estimate overlap

Question 23 was asked to determine whether the university libraries had plans to put in place systems that would allow them to estimate the overlap between their journals and freely available online content.

**Figure 30: Plans to estimate overlap**

**N=12**

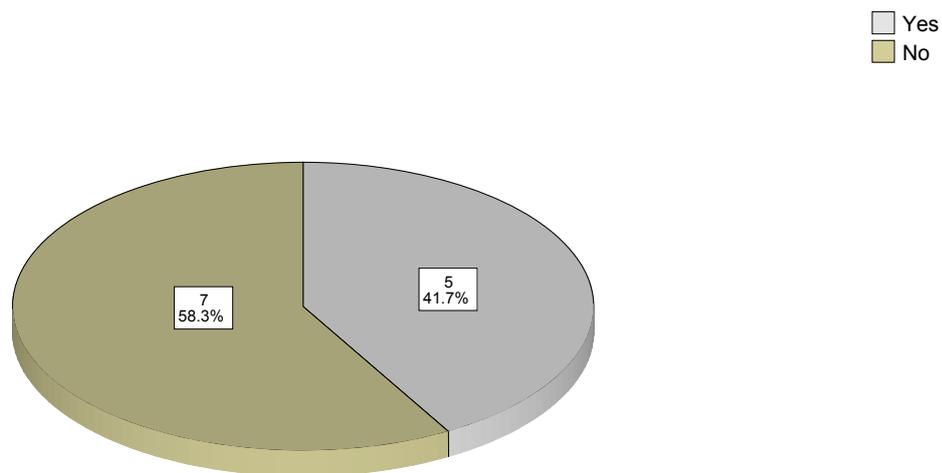


Figure 30 shows that more than half of the libraries, seven (58.3%), did not have plans to put in place systems that would allow them to estimate the overlap between their journals and freely available online content. Only five (41.7%) had planned to put in place a system that would allow them to estimate the overlap.

### 7.3.1.3.8 User access to free content

Question 24, a multiple response question, was asked to establish how the university libraries would expect their users to find and navigate to the freely available content if the journal were cancelled. Table 20 shows how the university libraries expected their users to find and navigate to freely available content.

**Table 20: Users access to free content**

**N=12**

Users access to free content	Responses	
	Yes	Percent
Google Scholar	10	83.3%
Library system	7	58.3%
Subject or institutional repositories	3	25%
Scirus	2	16.7%
OAlster	2	16.7%
Yahoo! Open Archive content	1	8.3%

Google Scholar was the preferred mechanism for users to find and navigate to freely available content by a majority of the libraries (10 or 83.3%). The libraries' own systems were considered as the next best option for users to access freely available content. Subject or institutional repositories were considered as a means for accessing free content by only three (25%) of the libraries. This finding shows that most university libraries were expecting their users to access freely available content from a database that was not managed or administered by their libraries.

### 7.3.1.3.9 Reason not to cancel because of free content

Question 25, a multiple response question, was asked to determine why the university libraries did not consider the immediate free availability of content in an open access archive a good reason to cancel a journal. Table 21 shows the reasons

for not considering the immediate free availability of content in an open access archive a good reason to cancel.

**Table 21: Reasons for not cancelling subscriptions to free content titles**

**N=12**

Reasons for not cancelling subscriptions to free content titles	Responses	
	Yes	Percent
Concerns about long-term availability of free archives	8	66.7%
Concerns about completeness of free archives	6	50%
Lack of additional functionality provided by the published version	6	50%
Preprints/postprints not adequate substitute	4	33.3%
Academic staff demand print edition	4	33.3%
Academic staff demand for 'the real journal'	4	33.3%
Lack of integrating with library cataloguing system	4	33.3%
Lack of reference linking	2	16.7%
Lack of adequate metadata	1	8.3%

A majority of the university libraries (eight or 66.7%), due to concerns about the long-term availability of the free archive, did not consider the free availability of content in an open access archive a reason to cancel a journal title. This reason was followed by concerns about completeness of the archives and lack of additional functionality of the archives that were each a concern for half (six or 50%) of the university libraries. As mentioned earlier in Table 19, preprint and postprints were not considered an acceptable substitute to the published journal and were therefore a concern for four (33.3%) of the libraries. Also, academic staff demand for the print

edition of the journal and 'the real journal' itself were each a concern for four (33.3%) of the university libraries.

#### **7.3.1.3.10 Factors estimated as likely to be important in five years time for cancellations**

Question 26 asked the university libraries to estimate how important various decision factors were likely to be in five years time. Table 22 shows which factors were estimated as likely to be important by the university libraries in five years time.

**Table 22: Factors estimated as likely to be important in five years time for cancellations**

**N=12**

Future factors	Very important		Important		Neutral		Unimportant		No response		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Usage	9	75%	3	25%	0	0	0	0	0	0	12	100%
Price	8	66.7%	4	33.3%	0	0	0	0	0	0	12	100%
Academic staff no longer require it	7	58.3%	4	33.3%	1	8.3%	0	0	0	0	12	100%
Availability of content in aggregated databases	5	41.7%	3	25%	4	33.3%	0	0	0	0	12	100%
Free availability in an open access archive	3	25%	7	58.3%	1	8.3%	0	0	1	8.3%	12	100%
Impact factor or impact factor ratings	3	25%	8	66.7%	1	8.3%	0	0	0	0	12	100%
Free availability at journal's website after embargo period	1	8.3%	7	58.3%	4	33.3%	0	0	0	0	12	100%

None of the university libraries considered these future factors to be either unimportant or not at all important. Table 22 shows that usage was considered a very important factor for future cancellation decisions by nine (75%) of the university libraries and important by three (25%) of the libraries. Price was considered very important by eight (66.7%) of the libraries and important by four (33.3%) of the libraries. This was followed by academic staff no longer requiring a title which was considered very important by seven (58.3%) libraries and important by four (33.3%) libraries. In Table 14 academic staff no longer requiring a title was ranked higher in importance than usage and price when considering current factors.

In the present study, four (33.3%) libraries were each neutral about the availability of content in an open access archive and the free availability at the journal's website after an embargo period.

#### **7.3.1.4 Section 4 – Institutional repositories**

The information in this section deals with institutional repositories.

##### **7.3.1.4.1 Institutional repository**

Question 27 was asked to determine whether the university libraries' parent institutions supported and contributed to an eprint or open access repository for institutional publications.

For half (six or 50%) of the university libraries that responded the parent institutions supported and contributed to an eprint or open access repository for institutional publications.

##### **7.3.1.4.2 Library administration of institutional repository**

Question 28 was a follow-up to Question 27, and was asked to determine whether the six university libraries were involved in the administration or management of these institutional repositories.

All six (50%) of the university libraries whose institutions had repositories were involved in the administration or management of these institutional repositories.

### 7.3.1.5 Section 5 – Library budget

The information in this section deals with the university libraries' budgets.

#### 7.3.1.5.1 Institutional budget allocation

Question 29 was asked to determine what percentage of the institutional budget was allocated to the university libraries. Table 23 shows the institutional percentage allocation to the university libraries.

**Table 23: Institutional budget allocation**

**N=12**

Institutional budget allocation	Responses	
	Frequency	Percent
20%	1	8.3%
11%	1	8.3%
6%	1	8.3%
5.59%	1	8.3%
4.5%	1	8.3%
3.86%	1	8.3%
2.8%	1	8.3%
2.7%	1	8.3%
Unsure	4	33.3%
<b>Total</b>	<b>12</b>	<b>100%</b>

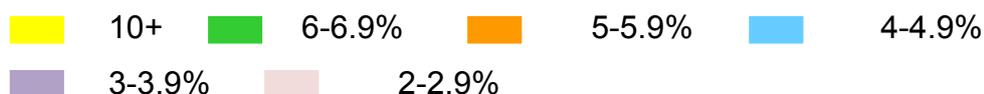


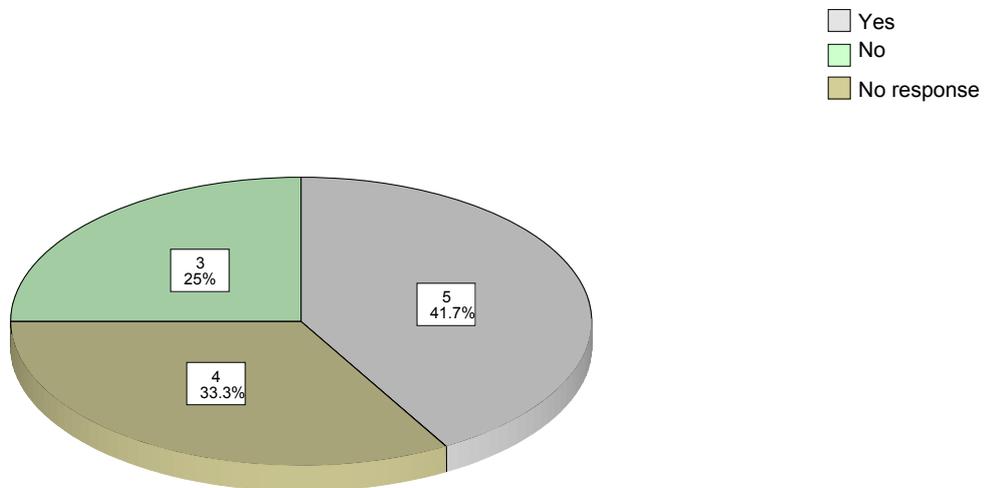
Table 23 shows that only two (16.7%) university libraries were receiving more than the benchmark figure of 6% from their institutions. A further two (16.7%) libraries were receiving 6% or close to 6% (5.59%). However, some university libraries were less fortunate and only received an allocation of close to 3%. More alarming however, was the fact that four (33.3%) university libraries were not sure what their institutional budget allocation was.

### 7.3.1.5.2 Increase in institutional budget allocation

Question 30 was asked to determine whether the institutional allocation made to the university libraries had increased over the last three years. Figure 31 shows which university libraries had received an increase in their institutional allocation over the last three years.

**Figure 31: Increase in institutional budget allocation**

**N=12**



Only five (41.7%) of the libraries stated that they had received an increase in their institutional budget allocation. Almost as many university libraries, three or 25%, stated that their institutional budget allocation to their library had not increased. Coupled with this, four (33.3%) libraries, did not respond to the question. This non-response could have been as a result of not knowing what their institutional budget allocation was. These results are significant since an inflationary increase in the price of subscriptions was considered an important factor in determining cancellation.

### 7.3.1.5.3 Reasons for no increase in institutional budget allocation

Question 31 was a follow-up to Question 30, and required the respondents to explain why their library had not received an increase in their budget allocation from the institution. Table 24 shows the three reasons given by the three libraries concerned as to why the libraries did not receive an increase in their budget allocation.

**Table 24: Reasons for no increase in institutional budget allocation**

**N=3**

<b>Reasons for no increase in budget</b>
Decreased due to lack of appreciation of factors impacting on library expenditure
The merger has complicated matters, we did not have a proper formula in place and there was a general decrease in subsidy overall
University is working with a deficit budget; i.e. total university expenditure is more than income. It has therefore been impossible to raise the library materials budget to the hoped for 6% of the total budget

Each of these three university libraries provided one reason. These reasons for a lack of increase in the institutional budget for these three (25%) libraries reveal the context within which South African university libraries operate.

### 7.3.1.5.4 Separate budgets for print and electronic resources

Question 32 was asked to determine whether the university libraries had separate budgets for their print and electronic resources.

More than half (seven or 58.3%) of the libraries had a separate budget for print and electronic resources, while five (41.7%) did not.

#### **7.3.1.5.5 Reduced expenditure to provide electronic resources**

Question 33 was asked to determine if the university libraries had reduced expenditure in any areas in order to provide electronic resources.

Of the university libraries five (41.7%) had reduced expenditure in other areas in order to provide electronic resources, while half the university libraries (six or 50%) had not.

#### **7.3.1.5.6 Areas in which expenditure was reduced**

Question 34 was a follow-up to Question 33, and required the five (41.7%) university libraries that had reduced expenditure to provide electronic resources to indicate in which areas they had reduced expenditure.

Only two (40%) libraries were aware of the area in which they had reduced expenditure to provide electronic resources. These two (40%) libraries had reduced expenditure on monographs to provide electronic resources. However, three (60%) of the libraries did not respond to the question and one could infer that they were not aware of which areas were being subjected to reduced expenditure in order to provide electronic resources.

### 7.3.1.5.7 Materials budget allocation to periodicals

Question 35 was asked to determine what percentage of the university libraries' materials budget was allocated to periodical/serial subscriptions.

**Table 25: Materials budget allocation to periodicals**  
N=12

Allocation for periodicals	Responses	
	Frequency	Percent
92%	1	8.3%
89%	1	8.3%
85%	1	8.3%
83%	1	8.3%
75%	2	16.7%
70%	1	8.3%
69%	1	8.3%
60%	1	8.3%
40%	1	8.3%
Unsure	2	16.7%
<b>Total</b>	12	100%



Of the 12 university libraries, one (8.3%) had allocated more than 90% of their materials budget to periodicals. This was followed by three (25%) libraries that each had a periodical budget allocation within the 80% range. A further two (16.7%) libraries had a periodicals budget allocation which was in the 70% range, while two (16.7%) more libraries periodicals budget allocation was in the 60% range. Only one (8.3%) library had received less than a 50% periodical budget allocation of 40%. More alarmingly, two (16.7%) of the university libraries were not sure what percentage from their materials budget had been allocated to their periodicals.

### 7.3.1.5.8 Materials budget allocation to monographs

Question 36 was asked to determine what percentage of the university libraries' materials budget was allocated to monograph/book purchases. Table 26 shows the percentage the university libraries allocated to monograph/book purchases from the materials budget.

**Table 26: Materials budget allocation for monographs  
N=12**

Allocation for monographs	Responses	
	Frequency	Percent
60%	1	8.3%
40%	1	8.3%
31%	1	8.3%
30%	1	8.3%
25%	1	8.3%
17%	1	8.3%
15%	1	8.3%
11%	1	8.3%
8%	1	8.3%
Unsure	2	16.7%
No response	1	8.3%
<b>Total</b>	<b>12</b>	<b>100%</b>



When compared with Table 25, Table 26 shows that only one (8.3%) university library had received more than a 50% materials budget allocation for monographs. Again, two (16.7%) were unsure of their percentage budget allocation for monographs and one (8.3%) library did not response. Both Table 25 and 26 are a clear indication that university libraries in South Africa allocate a greater percentage of their materials budget to periodicals than to monographs. The findings in Table 26 bear out the figures given in Table 25 and vice versa.

### 7.3.1.5.9 Number of subscriptions and institutional allocation

The number of journal subscriptions was cross tabulated with the percentage institutional budget allocation of the university library to see if the libraries that received larger institutional budget allocations had more titles.

**Table 27: Number of subscriptions and institutional allocation**

**N=12**

Number of subscriptions	Percentage of budget allocated to library									Total
	2.7%	2.8%	3.86%	4.5%	5.59%	6%	11%	20%	Unsure	
51 349	0	0	0	0	0	1	0	0	0	1
46 780	0	0	0	0	0	0	0	0	1	1
40 000	0	0	0	0	0	0	0	0	1	1
30 000	0	0	0	0	0	0	1	0	0	1
27 000	0	0	0	1	0	0	0	0	0	1
23 000	0	0	0	0	0	0	0	0	1	1
20 000	1	0	0	0	0	0	0	0	0	1
6 500	0	1	0	0	0	0	0	0	0	1
2 769	0	0	0	0	1	0	0	0	0	1
2 000	0	0	0	0	0	0	0	1	0	1
1 300	0	0	1	0	0	0	0	0	0	1
758	0	0	0	0	0	0	0	0	1	1
<b>Total</b>	1	1	1	1	1	1	1	1	4	12

Table 27 shows that the university library with the most subscriptions, 51 349, had an institutional budget allocation of 6%. Two of the libraries that had 46 780 and 40 000 titles each were unsure of their institutional budget allocation. All of the libraries that had less than 10 000 titles had an institutional budget allocation of less than the benchmark figure of 6% for an academic library or were unsure of their budget allocation.

### 7.3.1.6 Section 6 – General comments

The information in this section deals with general comments relating to library cancellations.

### 7.3.1.6.1 Additional comments

Question 37 presented the respondents with an opportunity to provide any additional comments they had about journal cancellations that were not covered by the previous questions. Table 28 shows the additional comments that were made by the university libraries.

**Table 28: Additional comments**

**N=12**

<b>Additional comments about journal cancellations</b>
In general we prefer not to cancel titles unless absolutely necessary - mostly we cancel due to budget constraints
It is important that the materials budget is protected from other budget items, such as staff and consumables. Separate arrangements must be made to deal with currency fluctuations. As much as possible, cancellations should be done for academic reasons and not fiscal ones
Journal cancellation is a difficult exercise because librarians need to be careful especially if they have the print version and also have an online version. Also license issues need to be considered
The institutional budget is not transparent
Periodical cancellation exercises can be fraught. There have been suggestions that the library should look again at its subscriptions and consider cancelling subscriptions to periodicals in those subject areas which are 'out-of-date' and which are just taught 'because they are traditional' in order that funds are made available for titles in new areas of research

The five (41.7%) university libraries that provided additional comments noted that they cancelled as a result of budgetary constraints with one (8.3%) library pointing out that their institutional budget allocation process was not a transparent one as they were not informed of decisions taken by the institution. Another library added that the materials budget should be protected against other library expenditures. More importantly, two (16.7%) libraries mentioned that the cancellation of journals was a difficult exercise that should be done for academic reasons and not because of budgetary constraints.

### **7.3.2 Interview results**

Results from the interviews with the Deputy Vice-Chancellors, Directors or Deans of Research are discussed as follows:

#### **7.3.2.1 Section A – Importance of the university library**

In terms of supporting research the Deputy Vice-Chancellors, Directors or Deans of Research were asked how they would rate the importance of their university library. All five (100%) of the Deputy Vice-Chancellors, Directors or Deans of Research considered the library very important for the research function of their institution because it provided relevant up-to-date information resources. One of the Deputy Vice-Chancellors, Directors or Deans of Research viewed the library as part of the research function of the university and as the main research resource. The library was considered crucial for research by a further four of the Deputy Vice-Chancellors, Directors or Deans of Research. One Deputy Vice-Chancellor, Director Dean of Research noted that the library is a cultural entity in a university and goes far beyond providing scholarly information, while another maintained that “the university is only as good as its library”. Also, one Deputy Vice-Chancellor, Director or Dean of Research pointed out that the library is important not only for supporting research but also for supporting teaching and learning at the university.

In terms of resources the Deputy Vice-Chancellors, Directors or Deans of Research were asked if their university library was sufficiently resourced to meet the research needs of the university. Of the five interviewees, a majority of three regarded their libraries as insufficiently resourced to meet the research needs of their universities. One Deputy Vice-Chancellor, Director or Dean of Research who was satisfied that their university library was sufficiently resourced, based this on the regular feedback they had received from user surveys, while one Deputy Vice-Chancellor, Director or Dean of Research was unsure as to whether or not their university library was sufficiently resourced to meet the research needs of their university.

The three interviewees who regarded their library as insufficiently resourced each provided the following reasons:

- The library is not up to a 100% resourced level and improvements are required;
- The library had been under resourced for decades therefore there is a huge backlog at the university library in terms of the collection as well as the support services within the library; and
- The library is under resourced due to budget constraints. The library is understaffed and lacks sufficient human resource personal especially specialist library staff, for example cataloguers and subject specialists. Since the university is running at a deficit budget many posts are frozen and cannot be filled.

To support the results of the journal cancellation section of the questionnaire the Deputy Vice-Chancellors, Directors or Deans of Research were asked if their library was experiencing any difficulties in maintaining their journal subscriptions. A majority of four of the Deputy Vice-Chancellors, Directors or Deans of Research maintained that their libraries were experiencing difficulties in maintaining subscriptions to journals. Only one Deputy Vice-Chancellor, Director or Dean of Research responded that their library was not experiencing difficulties in maintaining its journal subscriptions since the library was funded each year through a specific formula that was a fixed percentage of the total university income.

The four Deputy Vice-Chancellors, Directors or Deans of Research who acknowledged that their libraries were experiencing difficulties in maintaining journal subscriptions provided the following explanations for this:

- This is due to budget constraints as well as the fact that researchers with different needs are demanding new titles;
- This is major concern for all university libraries. In an attempt to solve the problem the library is trying to go the electronic route but this has become extremely expensive;

- This is a problem that relates to budget constraints. The faculties have not correctly budgeted therefore they are unable to contribute to the library budget; and
- The library is under-funded and the library has in the past cut back on subscriptions. It is very difficult to subscribe to new titles and maintain the existing subscriptions since the library budget is not adequate for the acquisition needs of the library. Journals account for the largest part of the library acquisitions budget. Also, the library budget is at the mercy of the exchange rate and the collapse of the rand has meant that the library has to pay higher prices than expected or budgeted for.

### **7.3.2.2 Section B – Funding**

To support the results of the funding section of the questionnaire the Deputy Vice-Chancellors, Directors or Deans of Research were asked what percentage of their institutional budget was allocated to the library, whether this allocation had increased over the last three years and was sufficient and if there were any initiatives or strategies in place to improve library funding at their university.

All but one of the Deputy Vice-Chancellors, Directors or Deans of Research were not sure what percentage of their total institutional budget was allocated to the library. According to the Deputy Vice-Chancellor, Director or Deans of Research who did know, 5% of the total institutional budget was allocated to the library. One of the Deputy Vice-Chancellors, Directors or Deans of Research who was unsure of the percentage allocated to the library mentioned that their budget has been cut substantially and the library was allocated less than 5% of the institutional budget.

According to two of the Deputy Vice-Chancellors, Directors or Deans of Research there had been an increase in the amount allocated to their university libraries over the last three years. One of the Deputy Vice-Chancellors, Directors or Deans of Research mentioned that their library allocation had increased every year since they budget accordingly for inflation. Three of the Deputy Vice-Chancellors, Directors or Deans of Research noted that their libraries' allocation had not increased over the

last three years. They each provided one of the following reasons why there had been no increase to the allocation:

- The library budget has been decreasing even though there were incremental increases in 2006 and 2007 after the merger. This is due to financial constraints which has resulted in certain budgets within the institution being cut-down;
- The library allocation has been decreasing due to inflation and other institutional demands and as a result the library is providing a fragmented service in certain areas; and
- The annual increase given to the library does not keep up with inflation. In addition the exchange rate does not allow the library to keep up with the purchasing of books and the subscription of journals.

Two of the Deputy Vice-Chancellors, Directors or Deans of Research thought that the current library allocation was sufficient and one of the Deputy Vice-Chancellors, Directors or Deans of Research justified their answer by maintaining that at the institutional level the library was sufficiently funded because of the balance between funding that was allocated to research and funding that was allocated to teaching and learning. However, this particular Deputy Vice-Chancellor, Director or Dean of Research did acknowledge that the researchers at their university were not satisfied with the library allocation and regarded it as insufficient. Three of the Deputy Vice-Chancellors, Directors or Deans of Research acknowledged that their current library budget allocation was insufficient. They each provided the following reasons for the insufficient allocation:

- Due to financial constraints within the institution the current library allocation is less than last year;
- The library is competing with other departments at the institution for financial resources. Due to the pressure on the financial resources there is insufficient finance allocated to support research; and
- The library allocation is insufficient and as a result the library can only make ends meet by juggling payments. The library does this by paying accounts that are immediately necessary and holds back other accounts hoping that the rand will gain strength.

In terms of strategies or initiatives to improve library funding, one of the Deputy Vice-Chancellors, Directors or Deans of Research stated that it was not necessary to have any other strategies or initiatives in place to improve library funding. The other four Deputy Vice-Chancellors, Directors or Deans of Research thought that it was necessary to have other strategies or initiatives in place to improve library funding. Two of the four Deputy Vice-Chancellors, Directors or Deans of Research who were not aware of any current strategies or initiatives to improve library funding admitted to looking at outside foundations and organisations both nationally and internationally to assist them. The other two who regarded strategies or initiatives to improve library funding as necessary provided the following responses each:

- The library has benefited from the Carnegie Foundation project which involves the University of Cape Town, the University of the Witwatersrand and the University of KwaZulu-Natal. As a result of the project research commons for postgraduate students have been setup and the project aims to train research librarians. The local university foundation also supports library projects; and
- The local university foundation and international foundations have provided support in terms of upgrading information technology infrastructure needs and helping with developing new areas of the collection.

### **7.3.2.3 Section C – Institutional repositories**

To support the results of the open access section of the questionnaire the Deputy Vice-Chancellors, Directors or Deans of Research were asked if their institution supported and contributed to an eprint or open access repository for institutional publications. Three of the Deputy Vice-Chancellors, Directors or Deans of Research confirmed that their institution had an eprint or open access repository for institutional publications, while the other two were unsure if their institution had an eprint or open access repository for institutional publications. However, these two Deputy Vice-Chancellors, Directors or Deans of Research noted that there were initiatives to develop repositories for masters and doctoral dissertations at their institutions. Also, one of the Deputy Vice-Chancellors, Directors or Deans of Research mentioned that their institution was part of the Digital Innovation South Africa (DISA) project funded by the Mellon Foundation, while the other Deputy Vice-

Chancellor, Director or Dean of Research mentioned that their institution had received NRF funding for the establishment of a digital dissertations' repository.

#### **7.3.2.4 Section D – General**

The general section of the interview schedule allowed the interviewees to make any general comments they had regarding the library or its funding. The following responses were received from the Deputy Vice-Chancellors, Directors or Deans of Research:

- The needs of students were suffering because fewer books were purchased. Cheaper alternatives should be sought from publishers in Asia instead of using the current British and American book suppliers (20%);
- The decentralised library system is hampering the functioning of the library. As a result of the merger the three campus libraries operate autonomously and there is no central coordination of library processes including funding of the campus libraries. The spread of resources, including financial resources, to the campus libraries is not equitable;
- There should be a fundamental policy shift by government in terms of funding historically disadvantaged universities since there had been no redress for such institutions; and
- It is essential that the library be on par with other university libraries in the country. If the library starts suffering in its reputation then the institution suffers because the library is important for institutional recognition.

### **7.4 Summary**

The results from the study show that the South African university libraries which responded to the questionnaire have been affected by the crisis in scholarly communication as a result of budget constraints. To cope libraries have cancelled subscriptions to journals and are moving from print to electronic subscriptions. Cuts in the libraries' periodical budgets, price increases and the high price of subscriptions were the main reasons for journal cancellations. Most of the South African university libraries were cancelling print journals in favour of electronic because the electronic

version increased accessibility on and off the university campuses. Also, the electronic journals were considered more cost effective since most of the libraries' collection development policies had favoured print. Although South African university libraries were still subscribing to new journal titles, restrictions were imposed on new subscriptions. In most instances, new journal titles were only purchased if journals of equal price were cancelled. University librarians followed by academic staff were ultimately responsible for the final decision to cancel a journal. The process for deciding which journal to cancel varied amongst the university libraries. However, most university libraries used similar evaluation methods for deciding which journals to cancel, such as, evaluating usage, current teaching and research needs and electronic availability. Various factors were considered when cancelling by the university libraries. The most important of these factors were the fact that academic staff no longer required the journal, usage, price and the availability of content in an aggregated database.

Open access and institutional repositories are not currently viewed as alternative substitutes for a journal. However, both open access and institutional repositories were viewed as future considerations when deciding to cancel. Results of the interviews with the Deputy Vice-Chancellors, Directors or Deans of Research provided a contextual background to the challenges university libraries face and support the data from the questionnaire by revealing that most South African university libraries are faced with financial and other constraints that effect the libraries' ability to maintain their journal subscriptions. Results of the questionnaire and the interview showed that at certain universities both librarians and Deputy Vice-Chancellors, Directors or Deans of Research lacked clarity regarding their institutional, hence their library, budget.

## Chapter 8

# Interpretation of results

### 8.1 Introduction

In this chapter, the findings of the study are considered in the light of the research problem which was presented in Chapter One. The purpose of this study was to investigate the crisis in scholarly communication and its effect on university libraries in South Africa.

The research questions that guided the study were as follows:

- Is there a crisis in scholarly communication, and if so, what are its characteristics?
- To what extent have university libraries been effected by the crisis?
  - What factors influence journal cancellations?
  - How does open access influence journal cancellations?
  - Do parent institutions support open access repositories for institutional publications?
  - What is the status of university library budgets?

The order of the discussion in this chapter follows that of the order of the research questions of the study. The first research question is discussed in light of the literature reviewed while the results for each of the sections of the questionnaire and interview are discussed with reference to the second research question and sub-questions. The findings of the questionnaire and interview that are interpreted in this chapter relate only to the university libraries and Deputy Vice-Chancellors, Directors or Deans of Research who responded to the questionnaire and interview schedule respectively. In view of the relatively high response rates for the questionnaire which targeted the whole population of university libraries, and interview which targeted 50% of the DVCs for those institutions' libraries that responded to the questionnaire, it is possible to make generalisations about the whole population.

## **8.2 Is there a crisis in scholarly communication, and if so, what are its characteristics?**

It is clear from the literature review that there is a crisis in scholarly communication. As early as 1993, the Follett Report of the Joint Higher Education Funding Council's Review Group, described how socio-economic changes had effected higher education and academic libraries in particular, the "...disproportionate increase in the price of ... periodicals" (Joint Higher Education Funding Council's Review Group 1993). Sweeney (1999) noted that since the Follett Report the situation with regard to journals and academic libraries had not improved. Greater journal costs and libraries having less money to spend resulted in serial cancellations, which in turn, leads to the publishers demanding higher prices for journals, which leads to further cancellations, the consequence of which resulted in the current serials cancellation crisis.

Milne (1999: 70) also noted that the scholarly communication system had become unwieldy, almost to the point of breaking down and had in fact reached a crisis with the role players using the advances offered by ICTs to assist them in dealing with the crisis.

It appears that this crisis has its roots in the values that underlie the roles of the key players in the system. In terms of knowledge as a public good, Waaijers (2002: 166) argues that the cultural values that underlie the process of scholarly communication are the freedom of exchange of ideas and results. However, the more that free communication is hampered, the more inefficient the process of knowledge generation becomes. Thus the crisis is characterised by the different sociological and economic values held by the key role players in the system, particularly the scholars and commercial publishers. The crisis has severely impacted on the university library's ability to maintain its collection to meet the needs of its users.

The freedom of exchange of ideas and results is a concept which operates within the world of scholars. However, scholars also operate in a 'publish or perish' paradigm. As a result of this paradigm universities find themselves trapped between the expectations of their academic staff members, who consider the work of research and scholarship as essentially a free good, and the market strategies of commercial publishers. Thus the crisis is characterised by a disjunction between the sociology and the economics of academic publication – the processes through which the research community disseminates knowledge and judges the quality of work produced by its members (To publish and perish: a policy perspectives roundtable 1998: 19-20).

The journal is the principal means by which researchers and scholars communicate. According to Mabe (2006) about 70% of journal authors are working researchers based in universities. As authors publish in more and better journals so they in turn become regarded as the more prolific and better authors. From a scholar's perspective publishing is a communicative practice, a means of sharing ideas in a specific field. However, as discussed earlier the main reason why academic authors publish is to secure promotion and tenure because of the publish or perish paradigm. Therefore, publications are viewed as the only countable and assessable output of research. Furthermore, publications are important because they are used to evaluate research programmes, the researchers themselves and the institutions to which they belong (Mabe 2006). The publication record of a researcher becomes one criterion by which to assess whether they should be recipients of future research funding. It can also be used to assess eligibility for academic posts and promotions. An additional pressure on the individual authors is the use of their published work in the evaluation of their university department, with reviews affecting the future existence and funding of those departments. Such evaluation is often done on the basis of citations to the scholar's articles, the number of published articles and the reputation of the journals in which the articles appear. Scholars publish their research in peer reviewed journals not for financial, but professional gain because publishing exposes their ideas to a wide audience and can yield impact and professional recognition. Thus the system of scholarly communication that has existed for hundreds of years consists of research and other scholarly writings created free of charge, edited or

peer reviewed also free of charge, printed and published at a cost, and sold to libraries and research institutions for dissemination (Yiotis 2005a:157).

Bjork and Hedlund (2004: 8) argue that because of the commercial interests of one group of stakeholders, the commercial publishers, which incur a very small fraction of the total life-cycle cost, the access to scientific publications is highly restricted and expensive and that the process as a whole is highly restrictive. The dilemma is that it would be in the interests of the researchers and the public to have unrestricted access to information. Nevertheless, it is in the legitimate interest of the publishers to make a profit from selling this information, which leads to restrictions. Thus one could argue that the communication of knowledge is currently restricted and hence the crisis in the scholarly communication system. As a result of the publish or perish paradigm, scholars have produced more knowledge at an alarming rate in order to secure job promotions and tenure. Although more knowledge is being produced its communication is restricted as a result of the crisis.

Furthermore, Bjork and Hedlund (2004) argue that a breakdown of the costs of producing and delivering a typical refereed journal paper indicates that perhaps as much as 90% of the cost consists of the actual research work preceding the writing of the paper. This research work is usually financed by public bodies and the costs are in no way recouped through the sales of publications (as would be the case for commercial products such as books, music compact disks, movies, and so forth). Even if one only looks at the costs of preparing, reviewing, distributing, archiving and retrieving scientific articles, this excluding the actual production costs of the knowledge reported on, almost all the costs are in the end borne by the universities, and the libraries that hold the collected body of research.

Commercial publishers have thus exploited the scholarly communication system for financial gain. The publish or perish paradigm has created a well-established creative source of scholars who have an equally well-established pattern of consumption and this has led to commercial publishing becoming a multibillion dollar industry. Commercial publishers recognised that research generated at public expense and given freely for publication by the authors represented a commercially

exploitable commodity. Thus the gift exchange economy value system of the scholars had begun to break down.

Nowick and Jenda (2004) noted that it is easy to see that the traditional journal publication model is a self-sustaining author-driven process. Therefore, the quality of scientific papers and progress made increases dramatically when authors have access to all the published work in a field at a given time. This relative inelasticity of both supply and demand created by the scholars, allowed the commercial publishers to dramatically raise prices, knowing that they would control the market. Ironically, since scholars are also library users in the system, they will not accept a lack of access to the top journals in their fields and will demand that their university libraries provide access, regardless of the price (Yiotis 2005b). Also, some analysts have argued that authors are not simply content originators, suggesting that they drive the information explosion by seeking the most prestigious outlet for their work (Halliday and Oppenheim 1999).

The move from the gift exchange economy resulted also in further restrictions on the communication of knowledge in terms of copyright and fair use which operate within the publisher's framework. The convergence of ownership among these publishers is a matter of some concern (O'Connor 2000). The commercial publishers' market is dominated by multibillion dollar companies such as Elsevier and Thomson which operate in a for-profit economy. The ownership of these publishing companies is important in that they singly and collectively own the intellectual output of the universities in the western world (O'Connor 2000). Under the copyright provisions in most countries the publishers control the output for the lifetime of the author and a further 70 years. Therefore, the authors have transferred all rights for the duration of the copyright declaration, which is required to be signed before publication proceeds. Universities generally have allowed their authors to retain the copyright of the work which they have produced while in their employ. However, universities have not retained any concession of internal use when the author has published the work. Once the work has been consigned to a publishing house the universities have no recourse whatsoever to, or control over, what happens to that output. This is despite the fact that authors employed by these institutions conceived the ideas, conducted the research, and gained promotion on the basis of that publishing effort.

In terms of 'fair use' which is the central tenet of the scholarly communication process, most communication has been published to inform and communicate developments and not for profit, therefore, keeping within the value system of the gift exchange economy. However, the issues of promotion, tenure, and competitive grants-based research publication output within the context of the publish or perish ideology has complicated matters. The fair use concept has a direct link to copyright.

For each of the role players in the scholarly communication system 'fair use' has a different connotation. To the universities, 'fair use' is about communication and access; to the publishers 'fair use' is about economic return. For the libraries 'fair use' is about restrictive costs that prohibit access to resources.

In terms of the publish or perish paradigm, universities require academic staff members not only to write, but to have their writings published, preferably in top-tier refereed journals in the field (Lawrence and Honeycutt 2005). Abelson (1990) argues that the publish or perish paradigm, as a syndrome, has resulted in an increase in the number of authors listed on an article, as is the practice of naming, as a courtesy, people who have had little or nothing to do with the research. Abelson (1990) further argues that the publish or perish syndrome has also fuelled the creation of an enormous number of new journals. Commercial publishers have discovered that as new subfields open up, they can create a specialty journal for the field. Librarians find it necessary to subscribe to these, even though the costs per page are extremely high. Once the subscription is entered and a series is started, many librarians find it difficult to discontinue the subscription. An economic analysis reveals that publishers wield a monopoly power that is fuelling the crisis in the scholarly communication system.

Therefore, when commercial publishers continue to charge journal prices at rates that are beyond the budgets of libraries, the knowledge cycle becomes disrupted because only a few libraries can afford to pay for the overpriced journals. Authors in turn are no longer exposed to all the key published literature in their field, in a timely manner. Their published works no longer have the benefits of insights from all the published literature. In the sciences, this is a serious omission given that the growth of scientific knowledge results from a careful critical analysis of all published

contributions (Kuhn 1970). From journal price studies by Van Orsdel and Born (2007; 2008), we see that it is only a few European-based publishers that are responsible for the uncontrollable costs of science journals that are causing havoc with library budgets and disrupting the knowledge cycle.

According to Houghton (2002) in the context of a knowledge-based economy, innovation and the capacity to create and disseminate information are becoming increasingly fundamental determinants of national prosperity. Therefore, an efficient and effective system for scholarly communication is of enormous economic importance. However, as noted earlier, there is a crisis in scholarly communication, which according to Houghton (2002) is born of a combination of system dysfunction and technological change.

Universities are under increasing funding pressures, and there is greater focus on the efficient allocation of resources and on achieving demonstrable returns on investment in those resources. Not only has this increased pressure made the cost of access to information a major issue, it also increases the significance that the producers of the content (authors) and their employers (universities) place on performance indicators (publication and citation).

As discussed earlier, it could be argued that there are negative institutional incentives that underlie the creation of scholarly content. Promotion, tenure, and funding allocations in universities are often linked to publication in a few, leading, refereed journals. Houghton (2002) argues that scholarly communication and widespread dissemination of scholarship, on the one hand; and publishing in a few key refereed journals for purposes of funding, promotion and tenure, on the other, are different and increasingly divergent, if not conflicting goals.

Commercial publishers have grown through mergers and acquisitions and developed even larger portfolios of titles, resulting in monopolies in which certain publishers dominate the market. Bundling lists and selling on subscription has increased the publishers' monopoly power by reducing divisibility and substitutability, and maximising revenue by pricing at the average library's willingness to pay.

Also, Guedon (2001) suggests that publishers may reap a further advantage from aggregated titles in electronic format. If publishers control citation data and the ability to influence citation patterns, they can make their journals the leading titles in the field. These factors have allowed commercial publishers to wield monopoly power in the scholarly communication system.

According to Odlyzko (1998) the 'serials crisis' is really a library costs crisis. New titles increase aggregate fixed costs, because each new title has high first copy costs. As a result of these factors a vicious circle is created: authors seek publication outlets, and publishers seek to build their lists; new titles emerge, increasing aggregate fixed costs, and publisher portfolios grow, increasing their market power; unit processes increase to cover fixed costs and, since publishers wield monopoly power; the circulation of each title declines, further increasing aggregate fixed costs and prices increase still further. Evidence for this vicious cycle is found in examining the business interests of commercial publishers (Houghton 2000).

In explaining the business of how journal publishing works it was shown that as long as publishers can raise prices more quickly than libraries can cancel subscriptions; publishers can increase their profit margins and their sales every year. However, the problem for journal publishers was that by the late 1990s publishers were finding they could not raise prices quickly enough to off-set the cancellations. Gasson (2004) notes that once the number of subscriptions starts to fall below 100, the journal starts to become irrelevant to the academic community. This was because with fewer readers it started to lose prestige and fewer academics wanted to write for it. With fewer good papers being submitted to the journal, it becomes even less relevant to the academic community. The journal then starts to free fall and revenues then drop below the direct operating costs. The publisher either has to close the journal and return the library's money or find another title to merge it with. According to Gasson (2004) this technique of raising prices faster than libraries can cancel is known as price gouging, that is, the customer (predominantly libraries) gets no improvement in the product but still has to pay more for it.

Research libraries provide long-term access to their holdings. Their stewardship is strongly institutionalised. In libraries the institutionalisation of document stewardship

is facilitated by shared standards, classification systems, cataloguing procedures, and other professional practices. However, one could argue that if libraries cannot afford to maintain their subscriptions to journal literature because of price increases, accessibility to knowledge is restricted and as mentioned earlier the act of communicating one's ideas as a scholar is limited (Kling and McKim 1999).

From the above discussion it is easy to understand why the scholarly communication system is in crisis. The content product (research paper or article) is created by scholars in a gift economy. Commercial publishers operate merely in a for-profit economy and because of their monopoly power libraries cannot afford to maintain the ever increasing subscription prices. In terms of the economics of academic publishing, there definitely exists an irony.

Rao (2001) argues that since publishers are not willing to share their profits with the creators (scholars) of information, scholars have turned to the internet in an attempt to remedy the situation, to a certain extent, and claim back some of their power in the system. However, publishers quickly became aware of this changing scenario and then took the lead and adopted various electronic publishing activities in order to stay ahead in the business. Publishers now collaborate with scholars in the process and have invested billions of dollars in converting back files into the digital medium. The fact that commercial publishers have large amounts of data already in print which can be converted to digital form means that they are well placed to maintain their control in the system (Langner 1996). Scholars, however, are making use of OA initiatives to gain back some control they have lost to the commercial publishers. Studies conducted by Houghton (2000; 2002) and Houghton and Sheehan (2006) have supported the view that OA has positive advantages for scholars both as authors and users and will assist academic libraries in facilitating access.

The above discussion has shown that the scholarly communication system is in crisis and this crisis is characterised by the opposing sociological and economic values held by the key role players, particularly the scholars who operate in a gift exchange economy while the commercial publishers operate in a for-profit economy. Academic libraries who are consumers in the for-profit economy have cancelled their journal subscriptions in an attempt to cope with the crisis. Ironically, this has meant

that scholars have less access to information resources thus hampering the free communication of ideas.

### **8.3 To what extent have South African university libraries been effected by the crisis?**

This question is answered by examining the factors that influence journal cancellations, the effects of OA on journal cancellations, institutional support for OA repositories and the funding of library budgets.

#### **8.3.1 What factors influence journal cancellations?**

As seen in Table 6, 83% of the university libraries had a multidisciplinary collection. Table 7 indicated the size of each of the library's periodicals collection and the number of titles that were accessible to users at each of the libraries. The library that had the largest periodical collection had 51 349 journal subscriptions while the library with the smallest periodical collection had 759 subscriptions. This finding reveals that users of South Africa university libraries have access to varying amounts of periodical literature depending on the institution. All these university libraries, particularly the smaller libraries, will have to maintain their periodical collections to ensure that users' access to this periodical literature is not eroded further by cancellations.

A major finding of the study was that all 12 university libraries had cancelled journals in the last five years. Thus none of the libraries which responded were exempt from journal cancellations. In terms of the literature, Moore-Jansen, Williams and Dadashzadeh (2001) argue that although there has been a growing effort to find a long-term solution to the serials crisis, academic libraries continue to depend on serial cancellation projects as a short-term, albeit necessary, response to continuing serial costs. As the inflation rate of journals outstrips many library budgets, cancellation projects have become a routine part of library collection management for universities. This view is supported by Martell (2003) who argues that librarians in an attempt to find solutions to the crisis in scholarly communication have had to

resort to annual journal cancellations. Earlier Chrzastowski and Schmidt (1993) maintained that serial cancellation was an established trend while Sweeney (1999) conceded that the situation was not going to go away. Thus, like most academic libraries worldwide university libraries in South Africa are cancelling journal titles for various reasons.

The main reasons why university libraries have been cancelling journal titles as seen in Table 8, included in order of declining importance:

- Cuts in periodical budgets (41.7%). In the ACCUCOMS (2007) study the second most popular reason for cancelling subscriptions was budget cuts. However, in the ACCUCOMS (2007) study, even when budget cuts were stated as the primary reason for cancelling, many librarians stated that other factors were also taken into account such as usage statistics and subject relevancy.
- Price increases in journal titles (41.7%). In the ACCUCOMS (2007) study price was only cited as the primary reason for cancellation by 2% of the cases
- The high price of journals (33.3%).
- Institutional mergers of academic institutions had resulted in duplication of subscriptions at two (16.7%) of the university libraries. In the ACCUCOMS (2007) study data showed that 9% of subscriptions were cancelled due to duplication. In South Africa, Suttie (2005b) argues that high costs have forced university libraries to co-operate in order to cut down on unnecessary duplication.
- Print journals were cancelled when an electronic version became available by two (16.7%) of the libraries. In the ACCUCOMS (2007) study a shift from print to online continued to be the most common reason for cancelling a subscription with just over a quarter of print subscriptions being cancelled in favour of online access.
- Reasons for cancelling as a result of curricula concerns were provided by three (25%) libraries that cancelled due to changes in the curriculum (one or 8.3%), journal titles that were not relevant because they did not meet the institution's teaching or research needs (one or 8.3%), and titles for subject areas that were no longer taught (one or 8.3%). In the ACCUCOMS (2007)

study only 4% of the libraries cancelled as a result of the subject not being relevant.

Therefore, the primary reasons why South African university libraries were forced to undertake journal cancellations were as a result of budget cuts, and journal pricing issues. However, instead of providing reasons for cancellations one (8.3%) of the libraries pointed out that they could not cancel titles that were tied-up in a 'big deal'. Edwards and Shulenburger (2003), in explaining the consequences of bundling, note that libraries in signing on to the package journal, have lost the freedom to drop individual journal subscriptions for a period of time (generally three years) and thus have obligated themselves to a fixed inflation rate for the packages (often 7% per year) for the duration. Whatever the merits of the 'big deal', Edwards and Shulenburger (2003) argue that it is a choice forced on libraries by commercial publishers who have significant market power over the libraries. The consensus is that once a library has signed onto the 'big deal', the publisher is able to exert even more market power over the library. Therefore, one could argue that South African university libraries have also succumbed to the consequences of the 'big deal' by not being able to get out of the deal they signed with a commercial publisher. Titles that are part of a 'big deal' package cannot be readily cancelled.

In terms of cancelling print in favour of electronic, which was cited as a reason for cancellation above, Figure 24 showed that all the libraries (91.7%) except one had cancelled print in favour of electronic journals. In doing so, Martell (2003) argues that cancelling print in favour of electronic journals has resulted in a paradigm shift since academic libraries could no longer maintain an adequate local print collection relative to their mission (collection paradigm). Instead they have adopted a paradigm that reflected the fiscal realities, namely, the access paradigm (Martell 2003). It could be argued that most university librarians are undergoing this paradigm shift that Martell (2003) refers to as they move from print to electronic journals. Their chief function would then be to facilitate access to these electronic resources. Libraries now provide access to resources wherever they are located. Thus the role of the librarian has shifted even more from that of 'keeper of information' to 'facilitator of access to information'.

Facilitating access to electronic resources has created new tasks for librarians. Even relatively simple tasks, such as checking in journal issues to ensure a subscription is being fulfilled properly by the publisher, are more complex since the library has to go online and check that access to each of the issues of each journal it subscribes to has been enabled. Although shelving and space are no longer issues for electronic journal collections, the purchase of computer hardware and software and its regular updating certainly are now important concerns for libraries (Mabe 2006). Also, the increasing popularity of bulk purchasing and consortial arrangements means that the act of purchasing is much more complex. Instead of single decisions to subscribe to titles, a library is faced with negotiating and implementing licensing agreements for access to a range of titles with differing conditions of access and cost.

The main reasons the libraries provided for moving to electronic journals were that such a strategy increased accessibility (27.3%), was cost effective (27.3%) and was thus preferred as part of the libraries' collection development policy (27.3%). The respondents provided examples of this preference by cancelling Elsevier and Institute of Physics print titles for electronic. From a workload perspective, the elimination of administrative duties for library staff, such as binding and claiming of journal titles, was also a reason to cancel print for 18.2% libraries.

With regard to new journal subscriptions all 12 university libraries were still subscribing to new journal titles. This finding is significant given that all 12 were cancelling titles as well. However, the libraries were imposing restrictions on subscribing to new journal titles. The most prevalent restriction amongst the libraries (41.7%) was that a new journal could only be subscribed to if journals of equal price were cancelled. This restriction in reality meant that libraries were not increasing their collections with new titles, but were only allowed to subscribe to new titles once they had removed certain titles to free up enough money for the new journal subscription.

Other restrictions included cost factors as well, where the libraries (16.7%) pointed out that cheaper South African journal titles could be purchased without having to cancel existing subscriptions. Blake and Meadows' (1984) study also found that new journals were still being subscribed to, but generally at the expense of other journals

or books. This finding is in keeping with Edwards and Shulenburger (2003) who noted that libraries in their bid to meet their users' needs generally tend to respond to price increases for top-tier journals by paying the higher prices, cutting subscriptions to lower tier journals and purchasing fewer monographs. This process of reducing journal subscriptions thus makes the collection less reflective of innovation and more focused on established research in the mainstream areas. In terms of the South African context, Darch and Underwood (2005) argue that developing researchers are less likely to secure acceptance in top-tier journals and are therefore more likely to be published in lower tier journals. Therefore, by reducing their subscriptions to lower tier journals libraries may be restricting access to the research of developing researchers.

Like the ALPSP (2006) study the process of journal cancellations was a varied one but typically entailed a consultative process involving both librarians and academics as shown in Table 11. In the present study it was found that at South African universities more academics (58.3%) than librarians (41.7%) were primarily responsible for initiating the decision to cancel as seen in Figure 25. However, this was not the case in the ALPSP (2006) study where librarians were primarily responsible for initiating the decision to cancel. One could argue that if cancellations are a routine way of coping with the serials' crisis then librarians should be initiating the decision to cancel. Figure 26 shows that librarians (58.3%) are responsible for the final decision to cancel. However, an interesting open response was made by one (8.3%) university library, where it was maintained that the final decision depended on whoever controlled the funding for the journal title. So if the funding for a journal was controlled by an academic department the library would not be responsible for the final decision to cancel the journal title.

### **8.3.2 How does open access influence journal cancellations?**

In terms of OA, the important factors effecting whether inclusion in an aggregation product would play a part in determining if a journal was a candidate for cancellation were according to Table 17, in declining order, the length of embargo period (75%), the extent of the archive in the aggregation (75%) and the promptness with which

new material was added (41.7%), and the degree of functionality (41.7%). This finding shows that a majority of the university libraries considered the length of embargo period and the extent of the archive in the aggregation to be important factors. The promptness with which new material was added and the degree of functionality were also considered equally important by the university libraries. However, for the ALPSP study (Ware 2006) the degree of functionality of the product was considered relatively unimportant. It could be argued that university libraries do not regard aggregations as substitutes for journal subscriptions due to the lack of stability of the content and lack of access to previously removed content (Ware 2006).

As shown in Table 14, the availability of content via delayed open access was not an important factor in journal cancellations. However, as noted above in Table 17, a majority of the university libraries considered the length of embargo period an important factor in cancellation. From an examination of all kinds of embargoed content (whether from delayed open access, self-archiving or aggregations), it is clear that the embargo period has to be very short indeed to compete with a subscription. Figure 27 shows that for 58.3% it had to be three months or less, with 25% wanting no delay and only one (8.3%) library accepting a seven to 12 month delay period. This finding is in keeping with the findings of the ALPSP study (Ware 2006).

In terms of the factors influencing the delay period, Table 18 shows that the subject area for the journal was considered important in determining the appropriateness of the delay period by a vast majority of the libraries (91.7%). Only half the libraries (50%) considered the frequency of the journal a factor in determining the appropriateness of the delay period.

In terms of acceptable substitutes for a journal, 91.7% of the libraries viewed an archived copy of the publisher's final PDF as an acceptable substitute for the journal. This finding is consistent with that of the ALPSP study (Ware 2006). Journals in their postprint and preprint format were not considered acceptable substitutes since postprint were acceptable only for two (16.7%) libraries and preprints for one (8.3%) library.

In terms of how much of the journal's content would need to be immediately freely available in an open access archive before the library would consider that the free content provided an acceptable alternative to a published journal, Figure 28 reveals that for most libraries (58.3%), the archive would have to contain 100% of the journal's content and 33.3% wanted 80 to 89% before they would consider it as a potential substitute for a journal. In comparing this result with the ALPSP study, for most librarians (76%), the archive would have to contain over 90% of the journal's content, and 48% wanted 100% before they would see it as a potential substitute for a journal (Ware 2006).

In terms of the proportion of the South African university libraries' journal content that was freely available, Figure 29 shows that only one (8.3%) library's content was freely available in an open access archive in most areas of their collection. None of the university libraries which responded to the survey had content that was freely available in all areas of their journal collection. This finding suggests that most of the journal content that is available in South African university libraries is not freely available in open access archives. So the university libraries are dependent on maintaining their journal collections through paid-for subscriptions.

However, in terms of the overlap between the university journals and the freely available content, Figure 30 shows that more than half of the libraries (58.3%), did not have plans to put in place systems that would allow them to estimate the overlap between their journals and freely available online content. Only five (41.7%) had planned to put in place a system that would allow them to estimate the overlap. This would suggest that more than half the libraries had no plans to take advantage of any freely available content that overlapped with their journal content. When compared with the ALPSP study, 16% of US librarians had estimates of the overlap between their journals and archives, and only 31% had plans to introduce systems to measure this overlap (Ware 2006).

Therefore, it was not surprising to find that most of the university libraries (83.3%) were expecting their users to find and navigate to freely available content from a database such as Google Scholar, which was not administered or managed by the library. The libraries' own systems were considered as the next best option for users

to access freely available content. Subject or institutional repositories were considered as a means for accessing free content by only 25% of the libraries. This is not surprising since only half the institutions had repositories.

A key question for the present study and the ALPSP study (Ware 2006) was why libraries did not consider the free availability of content in an open access archive a good reason to cancel a journal. As in the ALPSP study (Ware 2006) the most frequently cited reasons in the present study were:

- Concerns about the long-term availability of the free archives (66.7%);
- Concerns about the completeness and integrity of the archives (50%); and
- Lack of additional functionality provided by the published version (50%).

However, in the ALPSP study (Ware 2006) librarians did consider academic staff demand for 'the real journal' a more important reason than lack of additional functionality.

Factors estimated as likely to be important to libraries in five years time for cancellations by the South African university were in declining order:

- Usage was seen as becoming a more important factor in the future and moved to the first ranked position: 75% said it would be very important and 25% said it would be important;
- Price was considered very important by eight (66.7%) of the libraries and important by four (33.3%) of the libraries; and
- Academic staff no longer requiring a particular journal title which was considered very important by seven (58.3%) libraries and important by four (33.3%) libraries.

When compared with the current factors, Table 14 showed that academic staff no longer requiring a title was ranked higher in importance than usage and price. Interestingly 33.3% of the libraries were each neutral in terms of the future influence of the availability of content in an open access archive and the free availability at the journal's website after an embargo period. In terms of the ALPSP study (Ware 2006) price was ranked higher than usage in terms of future factors.

### **8.3.3 Do parent institutions support open access repositories for institutional publications?**

The *Report on a strategic approach to research publishing in South Africa* (Academy of Science of South Africa 2006), which was discussed in detail in Chapter Four, recommends that open access repositories, particularly at higher education institutions, should be promoted to enhance the visibility of all South African research articles and to make them accessible to the entire international research community. The success rate for archiving articles in institutional repositories was extremely low and no local university at the time of the *Report* had an institutional repository for archiving locally produced articles as either pre or postprints (Page-Shipp and Hammes 2006).

Three (60%) of the Deputy Vice-Chancellors, Directors or Deans of Research confirmed that their institution had an eprint or open access repository for institutional publications, while the other two (40%) Deputy Vice-Chancellors, Directors or Deans of Research noted that there were initiatives to develop repositories for masters and doctoral dissertations at their institutions. Therefore, one could conclude that the establishment of institutional repositories is an important concern for universities in South Africa. The NRF has assisted universities in establishing repositories while one (20%) university was part of the DISA project funded by the Mellon Foundation.

Fortunately, the present study found that half (six or 50%), of the university libraries' parent institutions supported and contributed to an eprint or open access repository for institutional publications. All of these university libraries whose parent institutions had repositories were involved in the administration or management of these institutional repositories. The other six libraries therefore were not fulfilling their role of assisting in the transition to open access, internet-based scholarly communication by promoting open access to their institutional publications as was proposed by Nowick and Jenda (2004).

However, this finding shows that only half of the libraries were exploiting the opportunity to make their knowledge output more widely known and accessible by utilising the open access paradigm. This finding is in keeping with that of Van Deventer and Pienaar (2008) who established that in the South African context the benefits of open access repositories have not been realised. Thus only half of the university libraries have become a vehicle through which South African collections could be made accessible to the rest of Africa and the world. The issues of improved access through such open access repositories is important since Edwards and Shulenberger (2003) argue that open access repositories have the potential to curtail the journal publishers' ability to command the widespread use of large prices for journal subscriptions, as there is no need to subscribe in order to obtain easy access to articles.

Also, since libraries, in terms of Library 2.0 (Waaaijers 2002) have a responsibility to provide a more efficient and effective service to their users, the benefits of these open access repositories, such as speed of dissemination, increased access, usage and citations (Houghton and Sheehan 2006) for South African scholarship, are not being realised.

### **8.3.4 What is the status of university library budgets?**

All five of the Deputy Vice-Chancellors, Directors or Deans of Research surveyed considered their libraries very important for the research function of their institution. More importantly, one Deputy Vice-Chancellor, Director or Dean of Research pointed out that the quality of a university library is important in terms of accreditation for the institution as noted by (Hoon 2003). A majority of the Deputy Vice-Chancellors, Directors or Deans of Research acknowledged that their university library was insufficiently resourced to meet the research needs of their universities and the main reason for this was due to budget constraints. As a result of budget constraints a majority (80%) of the universities' libraries were experiencing difficulties in maintaining subscriptions to journals since the budget was not adequate for the acquisition needs of the libraries. Not only were the libraries experiencing budget constraints, they were also underfunded by their parent institutions. Furthermore, the

exchange rate and the weakening rand meant that the libraries had to pay higher prices than expected or budgeted for. Also, the university libraries were competing with other departments for funding at the universities. The interviews revealed that there were no strategies to improve the funding of university libraries in South Africa. Universities were relying on outside donors such as the Carnegie and Mellon Foundations to assist them with upgrading infrastructural needs and providing training for research librarians.

According to Willemse (2002) the increasing proportion of the university budget allocated to the library should be about 6% to 7% of the total budget. If an excellent service is required the university should allocate at least 6% to the libraries and 5% if normal, generally acceptable levels of service are required. This finding is in keeping with the literature reviewed. Martell (2003) argues that during the 1970s academic libraries were faced with two major challenges. The first of these was a deterioration of their funding and the second was the never-ending spiral of annual increases for library periodicals and other materials. As a result of these challenges many academic libraries by the late 1990s were receiving as little as 3% of their university's budget.

Table 23 shows that only two (16.7%) libraries were receiving more than the benchmark figure of 6%. A further two (16.7%) libraries were receiving 6% or close to 6% (5.59%). Unfortunately, the rest of the university libraries, who knew their institutional budget allocation (four or 33.3%), did not receive even the generally acceptable level of 5%, with two (16.7%) libraries receiving less than 3%. Table 23 shows that the library which received the most funding received an allocation of 20%. However, the interview with the Deputy Vice-Chancellor of the institution revealed that the library was allocated less than 5% of its institutional budget. This would suggest that the figure provided by the university librarian/periodical librarian was inaccurate.

University libraries in South Africa have also been affected by the two challenges highlighted by Martell (2003). Rosenberg (1997) noted in her benchmark review of university libraries in Africa that most university libraries were plagued by financial difficulties. The results of the present study shows that South African university

libraries like their African counterparts are also experiencing difficulties with their library budgets. This finding is supported by the literature relating to South African university libraries. Walker (2003) argues that the situation in one South African university was so bad that the university library's (multi-campus institution at the time) ability to meet the research objectives of the Department of Education's funding formula was seriously compromised. In addition, deterioration in the rand/sterling and rand/dollar exchange rates from 1984 onwards also had a detrimental effect on the library's materials budget since most South African academic libraries are largely dependent on imported books and journals (Buchanan 2008).

Considering that the serials' crisis is really a library costs crisis (Odlyzko 1998), an alarming finding of the study was the fact that four (33.3%) libraries were not sure what their institutional budget allocation was. One would expect the libraries to know what the allocation was in order to lobby for more funding or at least for the benchmark figure of 6% required for an efficient library service. The results of the interviews showed that all (80%) of the Deputy Vice-Chancellors, Directors or Deans of Research, except for one (20%), were unsure what percentage of their total institutional budget was allocated to the library. Having acknowledged that the library is important for the research function of the university and faced with budget constraints, one could argue that the Deputy Vice-Chancellors, Directors or Deans of Research should have known what percentage of the total institutional budget was allocated to the library. Given such ignorance of the state of their budgets, one wonders how these South African librarians, and their parent institutions are dealing with the annual inflationary price increases of periodicals and the added burden of the exchange rate.

Martell (2003) argues that loss in buying power caused by annual cost-price increases for library periodicals, ranging from 10 to 20% is still a major concern for most, if not all, academic libraries. More recently, van Orsdel and Born (2007) found that academic libraries in the US saw an overall journal price increase of just under 8% for a second year in a row, while in 2008 prices of subscription based journals increased by nine percent to 10% (Van Orsdel and Born 2008). As a result of these annual inflationary price increases university library budgets should therefore

increase annually. Also, these authors found that if the library was granted an annual increase it was not in keeping with inflation.

The interviews with the Deputy Vice-Chancellors, Directors or Deans of Research revealed that most (60%) library budgets had not increased over the last three years and in fact had been decreasing due to inflation and other institutional demands. Also, if the library was granted an annual increase it was not in keeping with inflation. The results of the questionnaire found that only five (41.7%) university libraries had received an increase in their institutional budget allocation over the last three years. As many as three (25%) libraries had not received an increase in their institutional allocation in the last three years. Coupled with this four (33.3%) libraries did not respond to this question. It can be inferred that the four (33.3%) libraries who were unsure of their budget also did not know whether they had received an increase in their institutional allocation for the last three years. Given that the price of journal titles is an important factor in determining cancellation one would assume that university libraries know what their institutional budget allocations are, as well as what the percentage increase to the budget allocation is so that they can make informed decisions when cancelling titles. Gultig (2000) commenting on university finances in post-apartheid South Africa, notes that increased inflation coupled with the declining value of the rand has resulted in dire consequences for library and other parts of university budgets. Also, as discussed earlier inflationary increases in the price of subscriptions were considered an important factor in cancelling, yet only five (41.7%) university libraries had received an increase in their institutional budget allocation.

It would appear from Table 24 that the reasons provided by the three (25%) libraries for not receiving an increase in their institutional budget allocation were that there is a lack of appreciation for the role of the university library in South Africa. University library budgets have not increased and this places an added financial burden on the libraries to cope with the inflationary price of titles. The interview results with the DVCs revealed that mergers had affected libraries by skewing the funding formula since more campus libraries had to be catered for with less funding. As a result many institutions were operating with deficit budgets and therefore libraries were unlikely to receive increases in their budget allocations.

The results of the questionnaire showed that more than half (seven or 58.3%) of the libraries had a separate budget for print and electronic resources. Walker (2003) noted that a problem with university library budgets was that books and journals were bought from a common budget. As a result book purchases had suffered in order to maintain periodical subscriptions. Therefore, the five (41.7%) libraries that did not have separate print and electronic budgets could be compromising the purchase of monographs in their libraries as they used one budget to maintain their electronic periodical subscriptions and purchase monographs.

The results also showed that less than half the university libraries (five or 41.7%), had reduced expenditure in other areas in order to provide electronic resources. Of these five (41.7%) libraries, only two (40%) were aware of the area in which they had reduced expenditure to provide electronic resources. These two (40%) libraries had reduced expenditure on monographs to provide electronic resources. This is in keeping with the literature where Edwards and Shulenburger (2003) find that to increase the budget for journal subscriptions, the average library in the US cuts back severely on monograph purchases by 17%, as well as on other services. In terms of the materials budget allocated to periodicals the results in Table 25 show that four (33.3%) libraries had a periodicals budget allocation within the range of 83 to 92%. This means that these libraries were only allocating between 8 to 17% of their materials budget to monograph purchases. In direct contrast to this, Table 26 shows that only one (8.3%) library had a monograph budget allocation of more than 60%. Both Table 25 and 26 are a clear indication that university libraries in South Africa allocate a greater percentage of their materials budget to periodicals than to monographs. This allocation would result in fewer monograph purchases.

In Figure 19 Gooden, Owen, Simon and Singlehurst (2002) show that the periodicals budget (26%) for US academic libraries at the time was more than double that of the monograph budget (11%) allocation. The Association of Research Libraries (2008) in Figure 20 shows that the increases in periodical subscriptions had impacted on monograph purchases to the extent that they had shown a negative growth of 9% from 1986 to 2004 in US research libraries. Buchanan (2008) found that at one South African university library, the ratio of journal to book expenditure had become unbalanced and fewer new book acquisitions were being made. Again two (16.7%)

libraries were unsure of both their periodicals' and monograph allocations and one (8.3%) library did not respond to the monograph allocation question. One can infer that these libraries would not be able to ascertain if the ratio between their periodical and monograph purchases was balanced. During the interviews one (20%) of the Deputy Vice-Chancellors noted that the needs of students were suffering because fewer books were purchased.

Table 27 shows that the university library with the most subscriptions, 51 349, had an institutional budget allocation of 6%. All of the libraries that had less than 10 000 subscriptions had an institutional budget allocation of less than the benchmark figure of 6% for an academic library or were unsure of their budget allocation. This would suggest that libraries with a 6% or more institutional budget allocation have greater buying power and can subscribe to more journals. However, an exception to this is the library that had the largest periodical budget allocation of 20% which only had 2 000 subscriptions. A possible explanation for this is that the university library was not sure of their actual institutional budget allocation, or the figure they provided was calculated incorrectly. As noted earlier the results of the interview with the Deputy Vice-Chancellor of the university revealed that the library allocation was less than 5%. This explanation could also be applied to the library that had an 11% periodicals' budget allocation but only had 30 000 subscriptions.

## **8.4 Summary**

This chapter discussed the existence of the crisis in scholarly communication and the characteristics of such a crisis. The extent to which university libraries in South Africa are affected by the crisis in terms of journal cancellations, open access and library budget considerations is elaborated upon in terms of the findings of the study. The crisis is characterised by the different sociological and economic values held by the key role players in the system, particularly the scholars and commercial publishers. The publish or perish paradigm has created a well-established source of scholars who have an equally well-established pattern of consumption and this has led to commercial publishers exploiting the scholarly communication system for financial gain. The crisis has severely impacted on the university library's ability to

maintain its collection to meet the needs of its users. Academic libraries have cancelled their journal subscriptions to cope with the crisis. South African university libraries, as a result of budget constraints and exchange rates, experienced difficulties in maintaining their journal subscriptions and have resorted to cancellations to cope with the crisis. Most university libraries in South Africa generally do not consider the availability of open access content to be a viable substitute for the journal. Only some universities have institutional repositories and are utilising the open access paradigm to make their knowledge output more widely known and accessible. Since the journal crisis is really a library costs crisis university libraries' knowledge of their budget allocation is essential. Most university libraries in South Africa do not receive the benchmark 6% of the total university budget while some university libraries are not even aware of their institutional budget allocation.

## **Chapter 9**

# **Summary of findings and recommendations**

### **9.1 Introduction**

On the basis of the data presented and interpreted in the previous chapters, and the research experience gained during the research process, this chapter provides a summary of the findings, conclusions and recommendations of the study. The purpose of this study was to investigate the crisis in scholarly communication and its effect on university libraries in South Africa. The previous chapter described and explained the findings uncovered by the research. As with the previous chapter, the order of the discussion in this chapter follows that of the order of the research questions of the study.

### **9.2 Summary of findings**

The following conclusions are drawn from the findings of the study that relate to the crisis in scholarly communication and its characteristics and the extent to which university libraries in South Africa have been effected by the crisis.

#### **9.2.1 The crisis in scholarly communication and its characteristics**

The review of the literature revealed that there is a crisis in scholarly communication. From a scholar's perspective the crisis is characterised by scholars publishing more to secure tenure and promotion at their institutions. As a result of the publish or perish paradigm, scholars have ceded their copyright to commercial publishers and their institutions have lost the accompanying intellectual property rights to the work

created by the scholars. Therefore, the principle of fair use has been compromised and the doctrine which initially was intended to protect the creators of the information (that is the scholars and their institutions) now protects the rights of commercial publishers. Although scholars may argue that they create new knowledge because of the free exchange of ideas, which was the original reason why scholars communicated, the information they create is now not freely accessible to other scholars and library users.

A few commercial publishers who control the market have turned commercial publishing into a multibillion dollar business. An economic examination of the scholarly communication system has shown that although 90% of the costs of creation lay with the scholars and their institutions it is the commercial publishers who have a monopoly control of the system. This monopoly control is characterised by the ability to raise journal subscriptions at rates that are above inflation to the detriment of academic and research libraries. Again, this ability has a negative effect of restricting the free flow of ideas since libraries cannot afford the high subscription costs and are forced to cancel these overpriced subscriptions. This monopoly control means that library users, particularly the scholars who require the library's information sources to create content, have access to less. Since the market is an inelastic one with academic institutions supplying the product and their libraries demanding it, commercial publishers have no competitors for librarians to turn to.

In library circles the crisis has thus been called the serials crisis. Librarians who have to deal with ever shrinking library budgets simply cannot afford to maintain their journal subscriptions. In an attempt to maintain their journal subscriptions libraries have been forced to cut their materials budget spending on books. Therefore, as a result of the crisis libraries have been forced to alter their collection development policies in terms of monograph purchases thus compromising the needs of certain library users who use monographs heavily. Alternative publishing models such as e-publishing and open access initiatives which were originally conceived to provide solutions to the crisis for scholars and libraries have not been fully utilised by scholars and their institutional libraries. As a result the benefits of open access for scholars and libraries have not yet been fully realised. Even with the shift to e-publishing commercial publishers still control the scholarly communication system.

## **9.2.2 The extent to which university libraries in South Africa have been affected by the crisis**

The extent to which university libraries in South Africa have been affected by the crisis is discussed in terms of the factors that influence journal cancellations, how open access influences journal cancellations, the support of open access repositories by universities and the status of library budgets.

### **9.2.2.1 Factors that influence journal cancellations in South African university libraries**

All 12 university libraries which responded to the questionnaire had cancelled journals in the last five years. Thus no university library in South Africa was exempt from journal cancellations. University libraries in South Africa have been forced to undertake journal cancellations as a result of budget cuts and journal pricing issues. Journal cancellation projects have become a routine part of university library collection management activities. Also, university libraries like other academic and research libraries throughout the world have succumbed to the consequences of the 'big deal'. 'Big deal' packages are an added burden for the university libraries since they are not able to get out of these deals which they sign with commercial publishers and therefore cannot readily cancel titles that are part of the package even if such titles are not required by the library.

All 12 libraries, except one, had cancelled print in favour of electronic subscriptions. As a result the role of South African university librarians has changed from keeper of information to facilitator of access to information. This move from ownership to leasing of information has created new administrative duties for South African university librarians. The chief function for the libraries is now to facilitate access to electronic resources. The libraries' move from print to electronic journal subscriptions has however increased accessibility for library users in some regards. South African university libraries are still subscribing to new journal titles. However, libraries are imposing restrictions on new title subscriptions and a new journal title is generally only subscribed to when a journal of equal price is cancelled. Therefore, libraries are

not increasing the size of their collections with the new titles purchased. South African journal titles which are cheaper than international titles can still be subscribed to as a more affordable option. However, it must be noted that by reducing their subscriptions to lower tier journals South African university libraries may in a way be restricting access to the research of developing researchers.

The process of journal cancellation varies but typically entails a consultative process involving both librarians and academics. More academics than librarians are primarily responsible for initiating the decision to cancel journals at South African universities. However, more librarians than academics are responsible for the final decision to cancel a journal.

### **9.2.2.2 How open access influences journal cancellations in South African university libraries**

University libraries in South Africa considered the promptness with which new material was added and the degree of functionality as equally important factors effecting whether inclusion in an aggregation product would play a part in determining if a journal was a candidate for cancellation. The promptness with which material is added to the aggregated product and the degree of functionality are also considered equally important by university libraries when determining whether or not a journal is a candidate for cancellation. Also, South African university libraries do not regard aggregations as substitutes for journal subscriptions due to the lack of stability of the content and lack of access to previously removed content.

In terms of delayed open access the university libraries do not consider the availability of content via delayed open access an important factor in journal cancellations. However, the libraries do consider the length of the embargo period an important factor in determining cancellation. Whether from delayed open access, self-archiving or aggregations university libraries want the embargo period to be very short if these options are to compete with a subscription. Most university libraries want the embargo period to be three months or less. However, only a few libraries

want a no delay period. The subject area for the journal is considered an important factor by university libraries in determining the appropriateness of the delay period.

In terms of an acceptable substitute for the journal, South African university libraries view an archived copy of the publisher's final PDF as an acceptable substitute for the journal. However, journals in their postprint and preprint format were not considered acceptable substitutes. It is significant that pre and postprints are not considered acceptable substitutes, revealing that South African university libraries have not considered or realised the benefits of open access.

Therefore, university libraries in South Africa want the open access archive to contain 100% of the journal's content which should be immediately freely available before they consider it a potential substitute for a journal. With regard to the proportion of the South African university libraries' journal content that was freely available, none of the university libraries have content that was freely available in all areas of their collection. Therefore, university libraries in South Africa are dependent on paid-for subscriptions to maintain their journal collections. Most libraries in South Africa do not have existing plans to take advantage of the freely available content that overlaps with their journal content. Thus South Africa university libraries are not taking advantage of the freely available content.

Most university libraries in South Africa therefore expect their users to find and navigate to freely available content from a database such as Google Scholar, which is not administered or managed by the libraries. Only a few libraries considered subject or institutional repositories as a means to accessing free content since only half the institutions had repositories. South African university libraries are not cancelling content that is freely available in an open access archive because of the concerns about the long-term availability of the free archives, the completeness and integrity of the archives and the lack of additional functionality provided by the published version. Usage is considered as a more important factor for future journal cancellations than price is by the university libraries as shown by Table 22 in Chapter Seven.

### **9.2.2.3 The support of open access repositories for institutional publications by universities in South Africa**

As mentioned earlier, only half the institutions contributed to an institutional e-print or open access repositories. Therefore, university libraries in South Africa and their parent institutions have not realised the benefits of such open access initiatives. Also, some university libraries are not fulfilling their role of assisting in the transition to open access since they are not involved in the administration or management of their institutional repositories. Thus very few university libraries are fully exploiting the opportunity to make knowledge more accessible by utilising open access initiatives. Users of South African university services therefore are not generally benefitting from the advantages of open access repositories, such as speed of dissemination, increased access, increased usage and citation. This finding is surprising in view of the status of university library budgets which is addressed in the next section.

### **9.2.2.4 The status of university library budgets in South Africa**

Although university libraries in South Africa are considered important for their research function they are underfunded by their parent institutions and are therefore faced with budget constraints. As a result of these budget constraints university libraries in South Africa experience difficulties in maintaining their subscriptions to journals. Unlike their counterparts in other countries, South African university libraries are further affected by the exchange rate and the generally weakening rand. South Africa university libraries therefore have to pay higher prices for journal subscriptions than expected or budgeted for. Consequently, most university libraries in South Africa are insufficiently resourced to meet the research needs of their universities.

Most university libraries in South Africa are underfunded to the extent that they do not receive more than 6% of the institutional budget which is the benchmark for a normal generally acceptable level of funding. Alarming, some university librarians are not aware of what percentage of their total institutional budget is allocated to the

library. Given that most university libraries in South Africa are faced with budget constraints, librarians who are unaware of their percentage allocation cannot lobby for more funding or deal adequately with the annual inflationary price increase of journals and the added burden of the exchange rate. Also, such libraries cannot make informed decisions when cancelling journal titles. University library budgets in South Africa have decreased due to inflation and institutional demands even though some libraries still receive annual budget increases. University libraries which received an institutional allocation of 6% or more have greater buying power and can subscribe to more journals. As a result these libraries are better able to support the research needs of their institutions in addition to providing a more efficient and effective service to their users.

Although most university libraries in South Africa have a separate budget for print and electronic resources, those that do not are compromising the purchasing of monographs in their libraries as they use one budget to maintain their journal subscriptions and purchase monographs. As mentioned earlier, university libraries in South Africa, like their counterparts in other countries, allocate a greater percentage of their materials budget to periodicals than to monographs. This allocation results in fewer monograph purchases. Therefore, one could argue that the collections of most university libraries in South Africa are becoming unbalanced and skewed towards maintaining journal subscriptions at the expense of a well-resourced monograph collection.

In conclusion, South African university libraries, like most academic and research libraries world wide, have been adversely effected by the crisis in scholarly communication. As mentioned earlier, most university libraries in South Africa are underfunded to the extent that they do not receive more than 6% of the institutional budget which is the benchmark for a normal generally acceptable level of funding. On an annual basis university librarians are faced with hard choices in terms of deciding which journal to cancel. In South Africa, open access initiatives are in their early stages of development and university librarians have not embraced such initiatives so their benefits are not being realised. Thus university libraries in South Africa are dependent on paid-for journal subscriptions. Maintaining these subscriptions will be more and more difficult as a result of the high cost of such

subscriptions and the fluctuating rand. To mitigate some of these difficulties, university librarians should make a concerted effort to facilitate access to local research by way of institutional repositories and free content available via open access initiatives.

## **9.3 Recommendations**

Although it can be argued that the cause for the crisis lies with the scholars as a result of the publish or perish paradigm, as well as with commercial publishers, the focus of this study was the effect the crisis in scholarly communication has on university libraries in South Africa. Chapter Four of the study has already highlighted alternative approaches to the tenure and promotion of scholars in terms of the publish or perish paradigm as well as suggesting alternatives to commercial publishing such as e-publishing and open access initiatives. Therefore, the recommendations that follow will relate to the policy and practice of university libraries in South Africa. The following recommendations could be viewed as strategies that university libraries could adopt to cope with the crisis.

### **9.3.1 Know your budget**

University libraries have to know what percentage of their total institutional budget is allocated to the library. Regardless of how the library budget is made up, that is the percentage allocated from student fees, government subsidy and outside donations or funding, librarians must know the actual percentage allocated to the library. Without this knowledge librarians are operating in a knowledge vacuum with regard to these critical issues and therefore cannot make informed decisions on journal cancellations and the operation of the library.

### **9.3.2 Lobby for 6% or more**

Since university libraries are crucial in terms of the research function of a university, university librarians must lobby their parent institutions to provide them with an

institutional allocation of 6% or more to ensure that they can maintain an effective and efficient library service.

### **9.3.3 Lobby for increases to combat inflation**

University librarians should lobby and motivate not only for a minimum of a 6% institutional budget allocation, but should also ensure that the allocation made to the library takes inflation into account.

### **9.3.4 Separate budgets for journal subscriptions and monograph purchases**

University libraries should have separate budgets for journal subscriptions and monograph purchases. In this way the purchasing of monographs is not compromised by a joint budget that is used only to maintain journal subscriptions.

### **9.3.5 Know your collection**

South African university libraries must know what percentage of their university libraries' journal content is freely available. University libraries must put in place plans to take advantage of the freely available content that overlaps with their collection. At the consortium level university libraries should be aware of what content is available in other university libraries to prevent unnecessary duplication.

### **9.3.6 Administer and maintain institutional repositories**

An important and vital function for university libraries in South Africa is to facilitate the access to research produced by local scholars. University libraries need to take advantage of the funding opportunities provided by organisations such as the NRF to establish such institutional repositories. Also, university libraries must ensure that their staff are adequately trained and have the necessary knowledge and skills to administer and maintain their institutions repository.

### **9.3.7 Facilitate access to open access content**

University libraries in South Africa need to embrace open access initiatives by facilitating access to open access content for their users. South African university librarians need to start considering journals in their preprint form and particularly in their postprint, as acceptable substitutes for the journal. University librarians should encourage local scholars to make use of open access initiatives by alerting scholars of such initiatives.

## **9.4 Implications for theory**

As mentioned earlier in Chapter Six, the implications of a study for theory largely depend on the extent that the results have external validity and generalisability. Confirmability which is generally associated with qualitative studies also needs to be considered. Confirmability refers to the extent to which the results of a study are supported by evidence rather than the personal bias of the researcher (Babbie and Mouton 2001: 278). Meltzoff (1998: 282) defined external validity as: “The degree to which the results of a research study can be generalized to persons, places, settings, or procedures beyond the study”. External validity depends on the intent and claims of the study (Meltzoff 1998: 45). It is evident from the statement of the research problem in section 1.2 of Chapter One that the purpose of the research was to investigate the crisis in scholarly communication and its effect on university libraries in South Africa. The intention was thus to generalise the results to South Africa.

According to Meltzoff (1998: 48) the key to generalisability is whether or not the study can be reproduced since replication makes claims to generality more credible. According to Meltzoff (1998:46) some aspects of generality are:

- Would the same results be obtained with a different researcher or data collector?
- Would the same results be obtained if the study were conducted in a different environment, place, or setting?
- Can the results be generalised to other geographical locations?

- Would one get the same answer to the research problem under different conditions and with different procedures and apparatus or with different methods of measurement?

Another researcher carrying out a repeat study on the subject of the current research may get the same results under different conditions and using different procedures and apparatus if the research is conducted in the immediate future in the same context. The results could thus for example, be generalised to university libraries in other countries who are faced with the crisis in scholarly communication and which have the same approach to journal cancellations.

While the study did not make a contribution to theory per se, in terms of the conceptual framework used the findings of the study endorse the revised UNISIST model of scholarly communication by Fjørdbæk Søndergaard, Andersen and Hjørland (2003) which adequately accommodates the internet-based scholarly communication.

## **9.5 Implications for policy and practice**

The findings of this study may go a long way in influencing policy and practice. If the recommendations of the present study are taken into consideration they could help in the formulation of funding, collection development and journal cancellation policies for university libraries in South Africa. The study might give university libraries in South Africa the strategic direction they require to deal with the crisis in scholarly communication and the effect it has had on these libraries.

The knowledge generated by the current study forms an important component in the decision making process. It is evident that there is very little research-based information in South Africa on the crisis in scholarly communication and its effect on university libraries. University librarians, who are the chief policy makers in their libraries, could use this research information to make decisions that could assist them. Thus, the recommendations given in the study are likely to inform the decision

making process regarding funding and the maintenance of their periodical subscriptions.

## **9.6 Future research**

Future studies that are similar or relate to this study include the funding of South African university libraries and the use of open access initiatives by South African scholars.

### **9.6.1 The funding of South African university libraries**

A comprehensive study of the funding of South African university libraries needs to be undertaken. The study should include both traditional and comprehensive universities. Such studies should be similar to those conducted by Rosenberg (1997) and Willemse (2002) and should examine the current state of South African universities particularly with regard to funding and whether South African university libraries are adequately supported by their parent institutions.

### **9.6.2 The use of open access initiatives by South African scholars**

A study of the use of open access initiatives by South African scholars should be undertaken. Such a study should examine the extent to which South African scholars are using both local and international open access initiatives to communicate the findings of their research.

## **9.7 Summary**

This final chapter provided a summary of the findings, conclusions and recommendations of the study that examined the effect of the crisis in scholarly communication on university libraries in South Africa. The implications for theory and for policy and practice are discussed. Areas of future research were also highlighted. The purpose of the study was to investigate the crisis in scholarly communication and its effect on university libraries in South Africa. The UNISIST model for scientific

and technical communication provided an appropriate conceptual framework for the study. The literature review described the characteristics of the crisis and the effect on academic libraries. The use of both quantitative and qualitative research methodology guided the investigation of the study. The analysis and interpretation of the data found that university libraries are generally underfunded by their parent organisations. Faced with dwindling budgets and ever increasing journal subscription costs libraries are forced to engage in annual journal cancellation exercises. Open access initiatives which could assist with the crisis are generally not being embraced by South African university libraries. Finally, the study does propose strategies in the form of recommendations which university libraries could adopt to assist them in dealing with the crisis in scholarly communication.

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# Appendices

**Appendix 1: Covering letter for University Librarian or Library Director questionnaire**

08 August 2008

Dear University Librarian or Library Director

The crisis in scholarly communication or the 'serials' crisis as it is better known to us librarians has affected many academic libraries worldwide. The monopoly commercial publishers have on the academic serial/journal market has resulted in high priced subscriptions and many libraries have simply cancelled subscriptions or limited the purchase of monographs (books) to pay for ongoing journal subscriptions.

The survey below is for a PhD study which will investigate the effect of the crisis in scholarly communication on university libraries in South Africa. You are invited to participate as a member of the study's population.

The questionnaire is anonymous and all responses will be regarded as confidential. You may need to consult with your Serials/periodicals Librarian when completing the questionnaire. Attached is a PDF version of the questionnaire which you can examine before you complete the questionnaire online.

For more information on the crisis in scholarly communication see the following link:  
[http://en.wikipedia.org/wiki/Scholarly\\_communication](http://en.wikipedia.org/wiki/Scholarly_communication)

To access the survey use the following link:  
[http://www.surveymonkey.com/s.aspx?sm=9hy\\_2b2exDaCEJpEOHw2Tluw\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=9hy_2b2exDaCEJpEOHw2Tluw_3d_3d)

The deadline for the survey is the 31 August. Any general comments about the online questionnaire or the study can be sent to the researcher at: [hoskinsr@ukzn.ac.za](mailto:hoskinsr@ukzn.ac.za)

Your participation in the survey would be greatly appreciated and will assist in understanding how university libraries in South Africa have been affected by the crisis.

Many thanks



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## **Appendix 2: Questionnaire for University Librarian or Library Director**

# Journal cancellations and South African university libraries

## 1. Library collection

This sections contains questions that relate to the library's collection.

### 1. What subject areas are represented in your library? (Select all that apply)

- Science and technology
- Medicine and healthcare
- Humanities and social sciences
- Business and management
- Law
- Other (please specify)

### 2. Approximately how many current journal subscriptions are accessible to your library users? (Include both individual licenses or subscriptions and multi-journal/'big deals')

## 2. Journal cancellations

This section contains questions that relate to journal cancellations.

### 3. Have you cancelled any journals in the last 5 years?

- Yes
- No

### 4. If "Yes", please explain why? (Select all that apply)

- Cuts in periodicals/serials budget
- Price increases
- High price
- High costs per page
- Other (please specify)

## Journal cancellations and South African university libraries

**5. Have you cancelled any print journals in favour of electronic journals in the last 5 years?**

Yes

No

**6. If "Yes", please explain why.**

**7. Is your library still subscribing to new journals?**

Yes

No

**8. If "Yes" please indicate any restrictions you are imposing (e.g. new journals may be subscribed to only if journals of equal price are cancelled).**

**9. If "No", please explain why? (Select all that apply)**

Cuts in the periodicals/serials budgets

Price increases

Other (please specify)

**10. Who is primarily responsible at your library for initiating the decision to cancel a journal? (Select one only)**

Librarian

Academic staff

Other (please specify)

## Journal cancellations and South African university libraries

**11. Who is involved in, or has input to, the decision to cancel a journal? (Select all that apply)**

Librarian

Academic staff

Other (please specify)

**12. Who is ultimately responsible for the final decision to cancel a journal? (Select one only)**

Librarian

Academic staff

Other (please specify)

**13. What is the process for deciding which journal(s) to cancel?**

## Journal cancellations and South African university libraries

### 14. How important are the following factors in the process currently used to make a decision to cancel a journal at your library?

	Very important	Important	Neutral	Unimportant	Not at all important
Price	<input type="radio"/>				
Usage	<input type="radio"/>				
Availability of content in aggregated databases (e.g. EBSCOhost, ProQuest, etc.)	<input type="radio"/>				
Free availability at the journal's website after an embargo period ('delayed open access')	<input type="radio"/>				
Free availability of content in an open access archive	<input type="radio"/>				
Academic staff no longer require it	<input type="radio"/>				
Impact factor or impact factor rankings	<input type="radio"/>				

Other (please specify)

### 15. How important are the following aspects of price in order to determine cancellation?

	Very important	Important	Neutral	Unimportant	Not at all important
Absolute price	<input type="radio"/>				
Percentage increase on previous year	<input type="radio"/>				
Price per page	<input type="radio"/>				
Price per article	<input type="radio"/>				
Price per use	<input type="radio"/>				
Price of overall package (if purchased as part of a bundle such as a 'big deal' or subject collection)	<input type="radio"/>				

Other (please specify)

## Journal cancellations and South African university libraries

### 16. How important are the following in evaluating usage in order to determine cancellation?

	Very important	Important	Neutral	Unimportant	Not at all important
Online usage statistics from publisher or intermediary	<input type="radio"/>				
Online usage statistics collected by the institution	<input type="radio"/>				
Estimated print usage (e.g. reshelving, 'dust test' etc.)	<input type="radio"/>				

Other (please specify)

### 3. Open access

This section contains questions that relate to open access and how it influences journal cancellations.

### 17. What factors determine whether a journal in an aggregation product (such as those offered by EBSCOHost, ProQuest, etc.) is canceled? (Select all that apply)

- Length of embargo period after which content is included in aggregation
- Extent of archive included in aggregation
- Promptness with which new material is added
- Amount of functionality (e.g. export records to RefWorks etc.) included in aggregation
- Other (please specify)

### 18. Assuming that a journal's content is available in its entirety after a period (perhaps via the publisher's own website 'delayed open access', via an open archive, or via an aggregation service) how short does the delay period have to be for you to feel that a separate subscription to the journal is unnecessary?

- No delay
- 1 month
- 2-3 months
- 4-6 months
- 7-12 months
- 13-24 months
- over 24 months

## Journal cancellations and South African university libraries

**19. What factors influence your decision on how short the delay period has to be for you to feel that a separate subscription to the journal is unnecessary? (Select all that apply)**

- Subject area
- Frequency of the journal
- Other (please specify)

**20. What freely available versions would you consider acceptable substitutes for a published journal? (Select all that apply)**

- Final journal PDF
- Postprint (i.e. author's final version incorporating changes from peer review process, but not final editing)
- Preprint (i.e. author's version prior to peer review)

**21. How much of a journal's content would need to be immediately freely available on an open access archive before you would consider that the free content provided an acceptable alternative to a published journal? (Assume for the purpose of this question that these data are easily available to your institution)**

- Up to 50%
- 50-59%
- 60-69%
- 70-79%
- 80-89%
- 90-99%
- 100%

**22. In practice, what proportion of your journal content is freely available online?**

- In all areas
- In most areas
- In some areas
- In no areas

**23. Do you have current plans to put in place systems that would allow you to estimate the overlap between your journals and freely available online content?**

- Yes
- No

## Journal cancellations and South African university libraries

**24. How would you expect users to find and navigate to this freely available content if the journal were cancelled? (Select all that apply)**

- Library system
- Google Scholar
- Yahoo! Open Archive Content Archive
- Scirus
- OAIster
- Going directly to subject or institutional repositories
- Other (please specify)

**25. If you do NOT consider the immediate free availability of content in open access archives a good reason in itself to cancel a journal, why not? (Select all that apply)**

- Preprints/postprints are not an adequate substitute for the final journal article
- Concerns about the completeness and integrity of the free archives
- Concerns about the long-term availability of free archives
- Academic staff demand for the print edition
- Academic staff demand for 'the real journal' i.e the official version
- Lack of additional functionality provided by the published version
- Lack of integration with library cataloguing systems
- Lack of adequate metadata
- Lack of reference linking (to & from)
- Other (please specify)

## Journal cancellations and South African university libraries

**26. Please estimate how important each of the various decision factors is likely to be in 5 years' time.**

	Very important	Important	Neutral	Unimportant	Not at all important
Price	<input type="radio"/>				
Usage	<input type="radio"/>				
Availability of content in aggregated databases (e.g. EBSCOHost, ProQuest, etc.)	<input type="radio"/>				
Free availability at the journal's website after an embargo period ('delayed open access')	<input type="radio"/>				
Free availability of content in an open access archive	<input type="radio"/>				
Academic staff no longer require it	<input type="radio"/>				
Impact factor or impact factor rankings	<input type="radio"/>				
Other (please specify)	<input type="text"/>				

### 4. Institutional repositories

This section contains questions that relate to institutional repositories.

**27. Does your institution support and contribute to an e-print or open access repository for institutional publications?**

- Yes  
 No

**28. If "Yes", is your library involved in the administration or management of the institutional repository?**

- Yes  
 No

### 5. Library budget

This section contains questions that relate to the university libraries budget.

**\* 29. What percentage of the institutions budget is allocated to your library?**

**30. Has this allocation increased over the last three years?**

- Yes  
 No

## Journal cancellations and South African university libraries

**31. If "No", please explain why not?**

**32. Do you have separate budgets for print and electronic resources?**

Yes

No

**33. Has your library reduced expenditure in any areas in order to provide electronic resources?**

Yes

No

**34. If "Yes", in which areas has expenditure been reduced. (Select all that apply)**

Capital expenditure

Supplies and services

Monographs (books)

Staff

Other (please specify)

**35. What percentage of your materials budget is allocated to periodical/serial subscriptions?**

**36. What percentage of your materials budget is allocated to monograph (book) purchases?**

### 6. Comments

General comments relating to library cancellations or the survey.

**37. Please add any additional comments about journal cancellations in the space provided below.**

### 7. The end

## Journal cancellations and South African university libraries

Thank you for your participation.

**Appendix 3: Covering letter for Deputy Vice-Chancellor, Director or Dean of Research interview schedule**

23 February 2009

Dear Deputy Vice-Chancellor, Director or Dean of Research

I am examining the effect of the crisis in scholarly communication on university libraries in South Africa for my PhD. The crisis in scholarly communication or the 'serials' crisis as it is better known to us librarians has affected many academic libraries worldwide. The monopoly commercial publishers have on the academic serial/journal market has resulted in high priced subscriptions and many libraries have simply cancelled subscriptions or limited the purchase of monographs (books) to pay for ongoing journal subscriptions.

A questionnaire was sent to the 17 university libraries in South Africa, 12 responded. I would like to interview the DVC/Deans/Director of Research for the 6 universities whose libraries received an institutional allocation of either more or less than the benchmark allocation of 6% for an academic library.

The interview will be conducted telephonically and will not be more than 15 minutes. You will note that the interview focuses mainly on library funding issues. The data from the interview will be used to support the findings of the questionnaire sent to the librarians.

Please let me know if you are available to be interviewed and when I can contact you. If not, please can you suggest someone else in your department I could interview? I have attached the interview schedule.

Your assistance would be greatly appreciated.

Many thanks



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**Appendix 4: Interview schedule for Deputy Vice-Chancellor,  
Director or Dean of Research**

**Crisis in scholarly communication and its effect on university libraries in South Africa**

**Interview schedule Deputy Vice-Chancellor, Director or Dean of Research**

**A. Importance of the university library**

1. In terms of supporting research how would you rate the importance of the library?

- Very important
- Important
- Unimportant
- Not at all important

Please explain your answer

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2. Is your university library sufficiently resourced to meet the research needs of the university?

- Yes
- No
- Unsure

Please explain your answer

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3. Is your library experiencing difficulties in maintaining its journal subscriptions?

- Yes
- No
- Unsure

Please explain your answer

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**B. Funding**

4. What percentage of your institutional budget is allocated to the library?  
\_\_\_\_\_ %

Unsure

5. Has this allocation increased over the last three years?

Yes

No

Unsure

Please explain your answer.

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6. Is the current library budget allocation sufficient?

Yes

No

Unsure

Please explain your answer.

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7. Are there any initiatives or strategies in place to improve library funding at your institution?

Yes

No

Please explain your answer.

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**C. Institutional repositories**

8. Does your institution support and contribute to an eprint or open access repository for institutional publications?

Yes

No

Unsure

**D. General**

9. Is there anything you would like to add regarding the library or its funding?

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