Carnegie Mellon University

Leading Technical Services in the Future

Hosted by ALCTS, the Association for Library Collections and Technical Services

1 February 2017

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Director of Emerging and Integrative Media Initiatives

@cmkeithw

www.libraryofthefuture.org
Technical Services: an obsolete term used to describe the largest component of most library staffs in the twentieth century. That component of the staff was entirely devoted to arcane and mysterious processes involved in selecting, acquiring, cataloging, processing, and otherwise making available to library users physical material containing information content pieces (incops). The processes were complicated, expensive, and time-consuming, and generally served to severely limit direct service to users both by producing records that were difficult to understand and interpret, even by other library staff, and by consuming from 75–80 percent of the library’s financial and personnel resources.

In the twenty-first century, the advent of new forms of publication and new techniques for providing universal records and universal access to information content made the organizational structure obsolete. That change in organizational structure, more than any other single factor, is generally credited as being responsible for the dramatic improvement in the quality of library service that has occurred in the first decade of the twenty-first century.

Collection-centric - 1st generation
Client-focused - 2nd generation
Experience-centered - 3rd generation
Collaborative knowledge, media and fabrication facilities - 5th generation
Students crowd libraries - without using libraries
The success of e-journals has driven the researcher from the library.
What is happening in the world is bypassing university libraries

Peter Murray-Rust
The scientist’s view
JISC Libraries of the future debate, April 2009
Researchers and discovery services

Behaviour, perceptions and needs

A study commissioned by the Research Information Network

November 2006

“…contact with librarians and information professionals is rare”

“…researchers are generally confident in their [self-taught] abilities.., librarians see them as..relatively unsophisticated”

“…librarians see it as a problem that they are not reaching all researchers with formal training, whereas most researchers don’t think they need it”
Percent of respondents agreeing strongly with each statement, over time.

- Because faculty have easy access to academic content online, the role librarians play at this institution is becoming much less important
- Because scholarly material is available electronically, colleges and universities should redirect the money spent on library buildings and staff to other needs

2006 2009 2012

Faculty study 2012: key insights for libraries and publishers, Ithaka
Generational model

Print collections
CD-ROM
Electronic journals
Online databases/indexes
Cloud-based digital archives
E-books

Generation 1
Generation 5
• Each generation is additive, not a substitute

• As libraries have added new formats, these have often not led to disposal of old materials

• Libraries have introduced valuable new services without necessarily discontinuing other activity

• Libraries are increasingly pursuing important - but niche - technology projects
Open Science
Growth of web-based knowledge and research tools - often outside the institution
Open access has shaped policy agenda
Library budgets under pressure

New research conducted by Ipsos MORI on behalf of JISC, SCONUL and UCISA shows that, although university library and information technology (IT) services may not yet be feeling the ‘punch’ of the recession, given the threat of deeper financial cuts being imposed in 2010/2011, it is clear that they will be impacted unavoidably in a number of ways, such as reduced opening hours, decreased opportunity for developing staff skills, and limitations in procuring and providing resources. Such impacts, certainly for libraries, are likely to be compounded by the decreasing value of sterling in an international market for acquisitions, and the over-changing demands of students and academic staff on their services.

The impact of any cuts is likely to have wide implications on institutions’ delivery of their overall strategic aims, such as enhancing the student experience. However, it is not what impact this will have on these services and resources in the longer term. For now, we know that a number of libraries are considering the following:

**Methodology**

A total of 76 interviews were undertaken in 36 higher education institutions in the United Kingdom. All were conducted with heads of libraries and directors of IT services in their universities. In addition, we have included two key informants from two relevant UK bodies. All together, a total of around 200 interviews were conducted.

**Table 1: Number of interviews achieved**

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Shareholders and VCs expect ROI

TOTAL SHAREHOLDER RETURN

S&P 500: 128%
S&P Chemicals: 184%
Proxy Peers: 111%
DuPont: 214%
Customer pressure

Investor pressure
1. Researcher workflows
101 Innovative tools and sites in 6 research workflow phases
(<2000 - 2015)
Traditional workflow

All of these tools licensed by institution
Open Science

All of these tools accessible by researcher
2. Researchers & communication
The growth of global scientific output in the last 35 years

USA  UK  China

Web of Science, 31 Jan 2017

Global scientific output doubles every nine years
Ever talk with citizens about science, research

Ever talk with reporters about research findings

Ever use social media to discuss or follow science

Ever blog about science and research

% of AAAS scientists who ever do each of the activities

How scientists engage the public
http://www.pewinternet.org/files/2015/02/PI_PublicEngagementbyScientists_021515.pdf
The University of Sydney’s Simon Chapman is finding a bigger audience for his research papers through social media

**Twitterati flocks to researcher’s posts**

**JULIE HARE**

“I JUST can’t see the point of doing research if no one is going to read it,” says Simon Chapman, professor of public health and director of research at the University of Sydney.

A prolific researcher and writer — Chapman has published 406 articles in peer-reviewed journals and 17 books and key reports during his career — he has become something of a chart topper on the university's research e-repository, with three items in the most recent list.

What’s behind Chapman’s new-found popularity? He has joined the world’s 200 million strong army of twitters.

“What’s the point of research if no one reads it? So it’s sensible to do what you can to let people know about it,” he says.

Chapman first signed up to a Twitter account about a year ago and managed only five tweets or messages, in the first nine months. But following conversations with journalist friends who regaled him with tales of their stories receiving enormous spikes in online hits if the link had been tweeted, he decided to embrace the new social media in his research. He has since employed some clever tricks. It worked. Chapman chose three items to push through Twitter: a downloadable book on screening for prostate cancer (don’t do it); a paper on how many times researchers refused offers to peer review (one in three); and a third survey on university policies and practices towards staff working in consultancies and positions outside the university (if they even exist, variable).

“There are over 6000 items on the e-repository and for quite a while my book on prostate cancer was the No 1 item downloaded on the list. When I started tweeting the book, its position on the list did quite well. All three have been in the top 10 since,” he says.

Since it was released last October, Let Sleeping Dogs Lie: What Men Should Know Before Getting Tested for Prostate Cancer has sold 200 hard copies, but has been downloaded 7000 times. And while Chapman doesn’t ascribe all that success to Twitter, he says it has undoubtedly played a role.

“While Chapman doesn’t ascribe all that success to Twitter, he says it has undoubtedly played a role.

“We have a certain reserve among academics who see doing things like Twitter as pushy and self-promoting,” he says.

“But what is the point of doing research if no one is going to read it? I’m in a middle-sized department and I’m not aware of anyone else using Twitter. Academics have been slow coming to it, but having been a journal editor for 17 years I have long been appreciative of the relationship between publicity and interest.

“Every time we would put out a press release promoting a certain paper, hits would spike. The same is true on Twitter.”

Of the 5999 other items in the e-repository Chapman says it appears most researchers simply put their work in and wait for people to find it on Google.

Simon Chapman’s Twitter name is @ProfChapman.
Mendeley reader counts offer early evidence of the scholarly impact of academic articles

Although the use of citation counts as indicators of scholarly impact has well-documented limitations, it does offer insight into what articles are read and valued. However, one major disadvantage of citation counts is that they are slow to accumulate. Mike Thelwall has examined reader counts from Mendeley, the academic reference manager, and found them to be a useful source of early impact information. Mendeley reader data can be recorded from the moment an article appears online and so avoids the publication cycle delays that so slow down the visibility of citations.

Counts of citations to academic articles are widely used as evidence to inform estimates of the impact of academic publications. This is based on the belief that scientists often cite works that have influenced their thinking and therefore that citation counts are indicators of influence on future scholarship. In the UK’s REF2014 research assessment exercise, 11 of the 36 subject panels drew upon
The Practice of Reproducible Research
Case Studies and Lessons from the Data-Intensive Sciences

JUSTIN KITZES, DANIEL TUREK, FATMA DENG (Eds.)

This is the open, online version of the book The Practice of Reproducible Research, to be published in print form by the University of California Press in 2017.

This book contains a collection of 31 case studies of reproducible research workflows, written by academic researchers in the data-intensive sciences. Each case study describes how the author combined specific tools, ideas, and practices in order to complete a real-world research project. Emphasis is placed on the practical aspects of how the author organized his or her research to make it as reproducible as possible.

The Introduction and Part I of the book present general information about working reproducibly and synthesizes common themes from across the case studies. This summary section can be read as a stand-alone introduction for beginners wishing to learn more about the general practices of reproducible research. Parts II and III of the book contain the 31 case study chapters themselves.
3. Open access

- Researchers in developing countries can see your work
- More exposure for your work
- Practitioners can apply your findings
- Taxpayers get value for money
- Higher citation rates
- Compliant with grant rules
- The public can access your findings
- Your research can influence policy
An Impacts Framework

**RESEARCH**
Access for all, research participation based on merit, not means.

*Potential benefits:*
Speeding up discovery.
Reduction of duplicative research.
Fewer blind alleys.
New research possibilities.
Better educational outcomes & enhanced research capabilities.

**SOCIETY**
Access as needed, informed consumers (e.g. health and education).

*Potential benefits:*
Contribution to the 'informed citizen' and 'informed consumer', with implications for better use of health and education services, better consumption choices, etc. leading to greater welfare benefits, which in turn may lead to productivity improvements.

**INDUSTRY**
(1) Access as needed, more informed producers & policy.
(2) New businesses add value to content (e.g. Weather Derivatives).

*Potential benefits:*
Accelerate and widen opportunities for collaboration, commercialisation & adoption.
The potential for much wider access for GPs/nurses, teachers/students, and small firms in consulting, engineering, ICT, nanotechnology, biotechnology, etc.
The potential for the emergence of new industries based upon the open access content.

**OPEN ACCESS**
Potentially serves all

**SUBSCRIPTION PUBLISHING**
Current reach

**CONSUMERS/SOCIETY**
Few served

**INDUSTRY/GOVERNMENT**
Part served, but not all

Willetts' open access reforms: what will it mean for academics? - open thread

How will plans to make all publicly funded research freely available by 2014 impact on academic freedom and diversity?

Open Access
Fifth Report of Session 2013–14

Volume I: Report, together with formal minutes, oral and written evidence

Additional written evidence is contained in Volume II, available on the Committee website at www.parliament.uk/bis

Ordered by the House of Commons to be printed 3 September 2013

RCUK announces block grants for universities to aid drives to open access to research outputs

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<td>Expected % of papers in Gold OA</td>
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<td>53%</td>
<td>60%</td>
<td>67%</td>
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Compliance Cost of the RCUK Open Access Policy
A Snapshot of Costs to UK Research Organisations in 2013/14

£9.2 MILLION

- Other support and advocacy: £0.4m
- Systems and software: £1.3m
- Green route: £0.1m
- Gold route: £0.8m
- Overheads: £2.2m
- Academic managers: £1.2m
- Administrators: £3.2m

Research Consulting
www.researchconsulting.co.uk

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Ensuring that UK institutions pay just once for research output

Posted in Discover the Future of Research on Jan 5, 2015 3:00:07 AM

Natasha White
Associate Marketing Director Author Engagement, Wiley

Since April 2013, when RCUK and the Wellcome Trust introduced policies and_funcs for open access, concern has risen that the UK will end up paying twice for research, and even footing the bill for larger contributors of research output such as the US and China. In an op-ed for The Guardian David Willetts, Minister of State for Universities and Science, argued that publicly-funded research findings should not be published “behind paywalls that individuals and small companies cannot afford, even though they have paid for the research through their taxes”. So instead of paying for journal subscriptions, which make research accessible mainly to their staff and students only, universities will pay to make the research they have supported publicly accessible to everybody. Willetts goes on to say: “[The cost of gold open access] will be partly met by the research councils and also institutions, which should gradually see their library costs reduce in return.” This last point is only possible if everyone does the same thing at the same time (i.e. pays for open access). The total cost of publishing research does not change. Whether the author pays at the beginning of the process or the reader pays at the end, the total costs are the same. However, as more content is published
President Obama is making the biggest bet on science and technology in history. We look at the colossal numbers.

NEVER has so much money been pumped into science so quickly and with so much hanging on a successful outcome. The full scope of President Barack Obama's agenda to revitalise the ailing US economy has now been revealed, and it is arguably the biggest bet on science and technology in history.

The Obama administration's bonus for science and technology: $120 billion

Of the $787 billion stimulus package, about $120 billion goes to research and technology ventures.

Current annual budget shown in blue

- NASA ($17.2bn)
- National Science Foundation ($6.1bn)
- Other Science Agencies: $11bn
- Energy Efficiency:
  - Department of Energy: $5.5bn
  - IT infrastructure: $24.6bn
- Clean Energy Support: $46.8bn
- Electricity grid upgrade: $7.2bn
- Environmental clean-up: $11bn

Source: The New Scientist, Volume 201, Issue 2698, 4 March 2009, Pages 8-9
Chemical Research & Development Powers the U.S. Innovation Engine

Macroeconomic Implications of Public and Private R&D Investments in Chemical Sciences

INVESTMENT IN CHEMICAL SCIENCE R&D

- $1 Billion Federal Funding
- $8 Billion Taxes
- $5 Billion Industry Funding

CHEMICAL INDUSTRY

- $1B to $1B + $5 Billion Funding
- $10 Billion Chemical Industry Operating Income
- $40 Billion Growth in GNP + 600,000 Jobs Created

TIMELINE FROM CONCEPTION TO COMMERCIALIZATION

- 6-5 Years Foundational Research
- 9-11 Years Invention Development
- 5 Years Technology Commercialization
- 20 Years

U.S. ECONOMY
Library Expenditure as % of Total University Expenditure
(Average of 40 US Institutions Reporting Since 1982)
IS COLLEGE WORTH THE COST?

"ENDLESSLY STIMULATING AND PROVOKING."
— PRODUCER, THE HOLLIDAY REPORTER

"HARRURING, YET HOPEFUL."
— THE EDITOR, THE TIMES PROFESSIONAL

"A SEARING TAKEDOWN... NO PUNCHES PULLED... A MUST."
— TOM HOLL, BACKSTAGEWORLD.COM

IVORY TOWER

Participants: [Producers]

In Theaters June 2014

 Participant Films
Illinois Governor Seeking To Raid Higher Education Budget A Month After Being Sworn In

Scott Walker To Cut $300 Million From Universities, Spend $500 Million On A Pro Basketball Stadium

Bobby Jindal Says America Needs Educated Population, Slashes Education Budget
Trump has said relatively little throughout his campaign about the student debt crisis and tuition costs. (AP Photo/Evan Vucci)

Trump: Congress should force colleges to reduce tuition costs
Science funding

• Ever-increasing expenditure on healthcare in most nations will support continued expansion of the medical subsegment of the STM market

• Publishers will look to offset the decline in print revenues through new solutions - eg workflow, performance measurement and cool ‘toys’

• R&D growth in Asia and the US will continue to underpin the STM market
On its own merits

Reed Elsevier: an underrated asset with best-in-class organic growth

Reed Elsevier NV:
Reed Elsevier PLC:

Outperform (Target price: EUR 11.5)
Outperform (Target price: 650p)

Scientific publishing: A business model with growth dynamics and high margins

Science is the company’s most important single business, generating close to 20% of sales and over one quarter of its EBITA. The business model relies on authors exchanging their content for publication in a specialised journal in which the content is quality checked and peer reviewed. This gives the author the opportunity to acquire further funding for research, especially if the work is widely cited by others in the field. The research is disseminated primarily via a paid subscription basis.

The global STM market

The global (Scientific and Medical) STM market is worth c. USD 18bn (based on data from STM companies and our own estimates) with the S&T market specifically worth c. USD 13bn. This value for STM compares with a value given by Elsevier in 2005 of USD 15bn for the English-language STM market, which suggests 5-6% growth p.a. The overall market includes science and medical journals, databases and software, print books, clinical reference, nursing and pharma promotion.

Fig. 1: Global STM market (USD bn)
WHERE ARE WE GOING?
No Brief Candle:
Reconceiving Research
Libraries for the 21st Century
August 2008

Redefining the Academic Library
Managing the Migration to Digital Information Services
New Roles for New Times:
Transforming Liaison Roles in Research Libraries

August 2013

Janice W. Bojarszewski
Karen Williams

LEVERAGING THE LIAISON MODEL
FROM DEFINING 21ST CENTURY RESEARCH LIBRARIES TO IMPLEMENTING 21ST CENTURY RESEARCH UNIVERSE
ANNE R. KENNEY
ONLINE RESEARCH LIBRARIANSHIP CENTER UNIVERSITY

Collection Engagement

RLUK Research Libraries UK

Re-skilling for Research
An investigation into the role and skills of subject and liaison librarians required to effectively support the evolving information needs of researchers

Conducted for RLUK by Mary Asdal and GHD Management plc
January 2013
Current directions in academic libraries

1. Continue the migration from print to electronic and realign service operations
2. Review location of lesser-used collections
3. Continue to repurpose library as primary learning space
4. Reposition library expertise and resources to be more closely embedded in research and teaching enterprise outside library
5. Extend focus of collection development from external purchase to local curation

After Lewis, 2010; Webster 2010; Webster 2012
WHITHER TECHNICAL SERVICES?
Thinking about technical services

“Those services involved in the acquisition, recording, and preserving of materials”

Tauber, Technical services in libraries, 1954
1. Library collections
The 'owned' collection

The 'borrowed' collection

The 'licensed' collection

The 'demand-driven' collection

The 'facilitated' collection

The 'shared print' collection

- Purchased and physically stored
- Pointing people at Google Scholar
- Including freely available e-books in the catalog
- Creating resource guides for web resources

Figure: A collections spectrum. OCLC Research, 2015.
2. The scholarly record
3. Researcher analytics
Citation Analysis of Education Dissertations for Collection Development

A Review of Citation Analysis Methodologies for Collection Management

Citation Analysis: A Method for Collection Development for a Rapidly Developing Field
Overview:

The assessment framework

Overall quality

- Outputs: 65%
- Impact: 20%
- Environment: 15%

Standard Evaluation Protocol
2015 – 2021

Protocol for Research Assessments in the Netherlands

ERA 2015 Excellence in Research for Australia
ERA uses a number of bibliometric tools for the citation analysis indicators. Two broad types of citation analysis are used in ERA: Relative Citation Impact (RCI) and the distribution of publications based on comparisons with field-specific benchmarks.

REF will assess universities on the basis of the quality of research outputs, the vitality of the research environment and the wider impact of research.
Measuring Your Research Impact: Home

Citation services and research quality measurement tools for the university

Table of Contents
- Alternative Metrics
- Available APIs
- Citation Databases
- Journal Rankings
- Research Unit Analysis
- Researcher Metrics
- Services

General Introduction to Research Metrics
- Measuring Your Research Impact
  This tutorial provides a basic introduction to the topic for the scholarly researcher.
- Helpful Worksheets
  Short focused guides on helpful topics from the MyRI website.

Key Recent Documents
- DORA (San Francisco Declaration on Research Assessment)
  "Initiated by the American Society for Cell Biology (ASCB) together with a group of editors and publishers of scholarly journals, recognizes the need to improve the ways in which the outputs of scientific research are evaluated. The group met in December 2012 during the ASCB Annual Meeting in San Francisco and subsequently circulated a draft declaration among various stakeholders." - DORA official website.
- Meise Iide
- The Leiden Manifesto for Research Metrics
  A "distillation of best practice in metrics-based research assessment so that researchers can hold evaluators to account, and evaluators can hold their indicators to account."

Purpose of This Guide
This guide introduces the Carnegie Mellon University community to available research metrics resources and the often baffling measures that academia encounters.
Training & Education

CWTS offers a range of courses on using bibliometric analyses for research management and research evaluation. Courses are regularly held in Leiden and we are also pleased to organize tailor-made on-site training courses. This training provides users of bibliometric analyses with the knowledge and skills they need to interpret bibliometric statistics properly and usefully.

**CWTS Course 'Measuring Science and Research Performance'**

This course is for everyone who wants to build a solid and comprehensive foundation in bibliometrics and research evaluation. This popular course was established ten years ago and is given by highly experienced scientists who have in-depth and up-to-date knowledge of all the latest developments in the field. The course provides a solid understanding of the role played by quantitative analyses in research evaluation. The core of the course is devoted to bibliometric analysis approaches and examines their rationales, methodology and limitations. The programme offers both lectures and hands-on interactive modules.

» Read more

**Advanced Citation Analysis**

The Advanced Citation Analysis course deals with all ins and outs of professional citation analysis and its use in research assessment contexts. The course can be seen as a follow up on
4. Data analysis
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5. Service initiatives
Technical Services Librarians

• Have adapted to:
  • Next Gen catalogs
  • Electronic journals and books
  • Powerful online indexes
  • Locally digitized collections
  • Locally created digital objects
Some thoughts

- E-book approval plans
- Mobile platforms
- Metadata/image description
- Solve discovery
- Solve e-books!
- Respond to shifting patterns of demand
PUTTING IT INTO PLACE
Today’s environment

• We operate in a networked world - local collections in themselves make learning and research incomplete

• We should no longer focus on acquiring the products of scholarship; we must be embedded within scholarship and be part of the scholar’s workflow

• New methods of research - open science, digital humanities, etc. - reshape researchers’ needs and demands

• How do we get there?
Some Bold Assertions

There is a collective wealth held hostage by redundant operations and collections in academic libraries.

Many of the things we compete over don’t make our institutions more competitive.

Our history of collaboration may ironically make it more difficult to do radical collaboration.

Our staff would rather do more work than give up doing some things.
• We’ve seen from various studies that the catalog is rarely the first - and often the last - point for information discovery. How sustainable are the costs of local cataloging?

• Budgets - and especially staffing levels - are under pressure across most libraries. Which roles have the biggest impact on the university?

• How can we demonstrate the efficiency gains (and financial gains) from the shift from print to digital?
Desired position

• Create an organizational culture that supports and drives strategic innovation

• Establish critical capabilities tuned to the evolving academic and scholarly communications landscapes

• Evaluate innovation efforts to ensure both sensible investment and gains in organizational learning and improvement

• Demonstrate impact on institutional mission and priorities

• Inform resource allocation
Some reflections for us all

How do our clients (students, teachers, researchers) see your work?

How does your department impact on the university's biggest goals - student recruitment, progress and achievement; attracting research funding; improving research outcomes? Do you have evidence to share?

Where do you want to go? Who do you benchmark against?

What are the biggest problems our clients face and how can you solve them?
Some reflections for us all

How can you add value?

How can you maintain and extend excellence - consistency, reliability - and how can you perfect execution?

How do you balance near-term pressures (today’s workload and fixes) and long-term needs (opportunity to innovate and improve)?
Old metrics in a new environment?

- Number of items in collection
- Number of items loaned
- Number of questions answered
- Number of serial subscriptions
- Anything that moves and can be counted
- Anything that doesn’t move - just in case
Possible new metrics

- Impact on student recruitment and retention
- Impact on student learning outcomes
- Contribution to research excellence
- Impact on broader economic, social and health outcomes
- Return on investment
The role of librarians

Current state

Many libraries retain large numbers of librarians to catalogue and count.

Even more librarians wait at service desks ‘just in case’.

Few librarians leave the library building.

Future state

Librarians embedded in research and teaching activities.

Librarians become campus specialists in areas such as e-science, academic technology and research evaluation.

Librarians have meaningful impact.

Current barriers

Many librarians lack skills and useful qualifications.

Many librarians are resistant to change.

Academics do not believe librarians are useful or credible partners.
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