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10-2019

What's in a name? Industry 4.0 or Fourth Industrial Revolution or Digital Transformation

Gulcin CRIBB

Singapore Management University, cribb.gulcin@gmail.com

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Industry 4.0 or Fourth Industrial Revolution or DX

Gulcin Cribb
University Librarian

Presented at Access Dunia Conference 2019, October 23, Kuala Lumpur

Why Higher Education Will Change

| Innovation in higher education is not an option. It is essential

By **Steve Mintz**

// October 3, 2019

<https://www.insidehighered.com/blogs/higher-ed-gamma/why-higher-education-will-change>

Students

Parents

Governments

**Competition
and Rankings**

**Teaching and
Learning**

Economy

**Jobs and
employment**

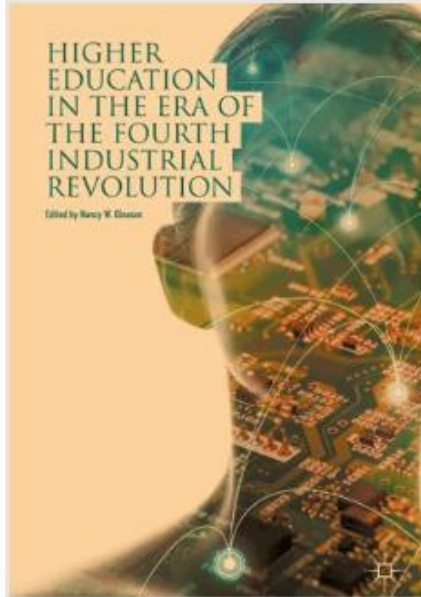
**Employers
and skills**

Asia-Pacific universities make progress on computer science

Institutions across the region have soared up a *Times Higher Education* ranking focused on the discipline

October 16, 2019





“Integration and compounding effects of multiple “exponential technologies,” such as artificial intelligence (AI), biotechnologies and nanomaterials.”

“Adaptability and in self-directed learning and thinking”

“Acceleration of workforce reskilling”

Higher education must prepare for the rise of the machines

Automation has the potential to replace or alter 35 million jobs worldwide, which means universities must adapt to survive, argues Nancy Gleason

March 30, 2017

By [Nancy Gleason](#)

Twitter: [@NWGleason](#)

In the year 2000, Goldman Sachs employed 600 stock traders, according to Marty Chavez, the investment bank's deputy chief financial officer. Now, Chavez told a [symposium](#) at the [Harvard University](#) Institute for Applied Computational Science in January, it employs just two. The other 598 have been replaced by 200 computers.



- arXiv, SSRN, RePEc, PubMed Central (**disciplinary repositories** that have become important discovery hubs);
- Google Scholar, Google Books, Amazon (ubiquitous **discovery** and fulfillment hubs);
- Mendeley, ResearchGate (services for **social discovery** and **scholarly reputation management**);
- Goodreads, LibraryThing (**social description/reading** sites);
- Wikipedia, Yahoo Answers, Khan Academy (hubs for open **research**, reference, and teaching materials).
- FigShare, OpenRefine (**data storage** and **manipulation** tools)
- Github (**software** management)



Dempsey & Malpas, 2018

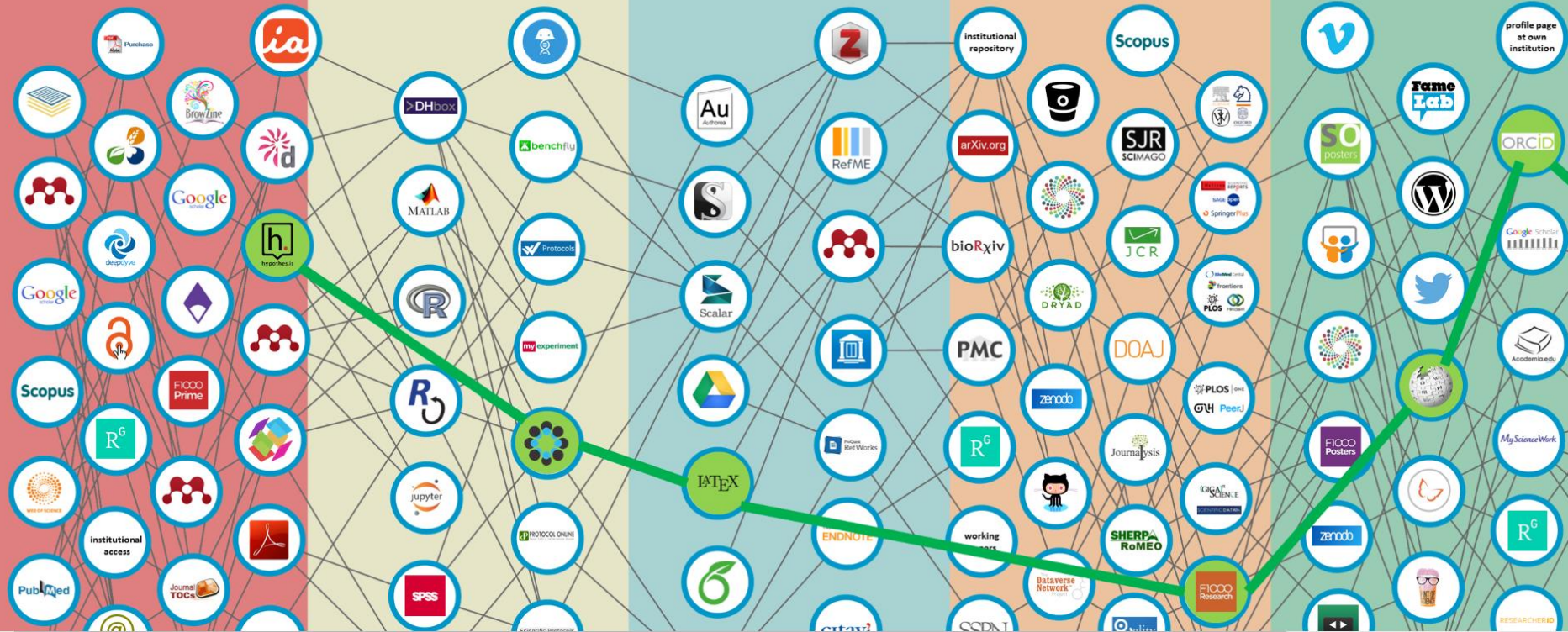
Discovery

Analysis

Writing

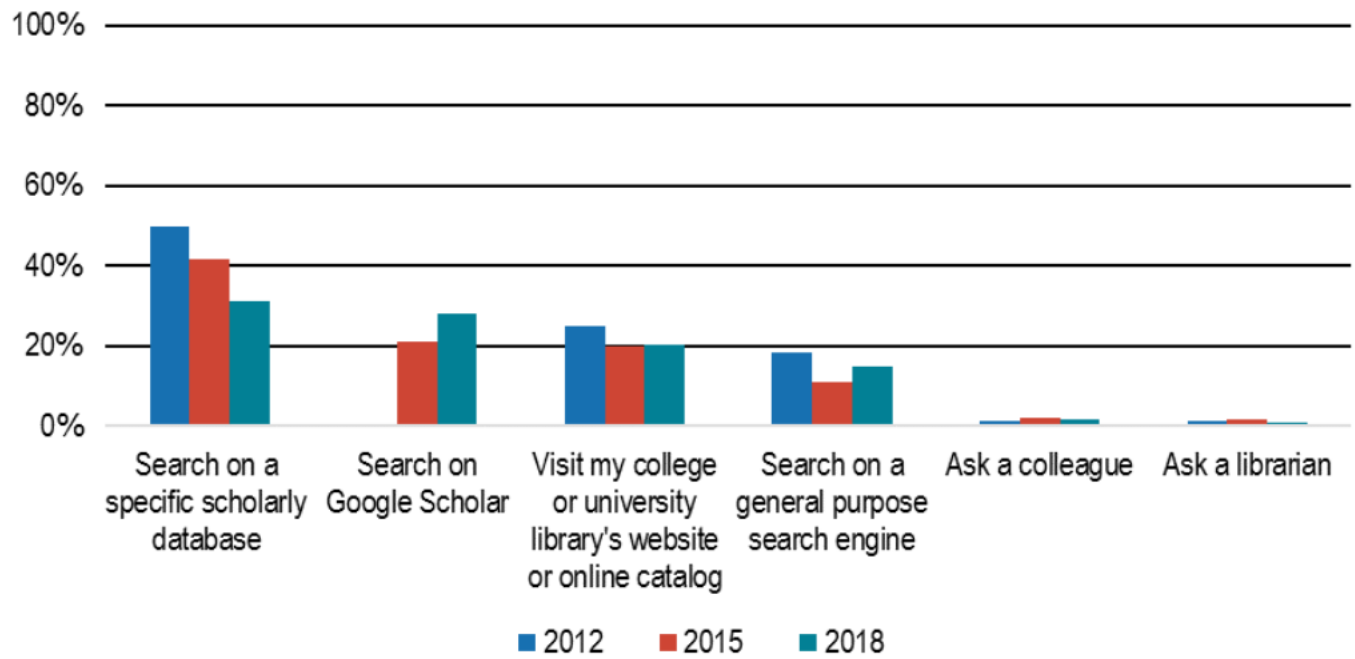
Publication

Outreach



https://101innovations.files.wordpress.com/2018/04/compliance-tools-workflow_cropped.png

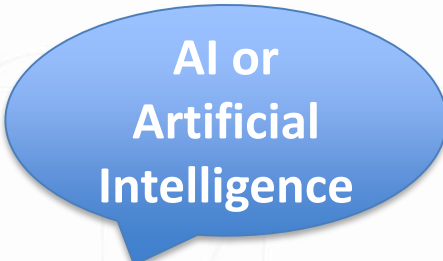
Figure 1: When you explore the scholarly literature to find new journal articles and monographs relevant to your research interests, how do you most often begin your process? Percent of respondents who indicated that each option is the starting point for their exploration.^[2]



<https://sr.ithaka.org/publications/2018-us-faculty-survey/>

Table 4.1 Changing functions of the library

<i>Term</i>	<i>Collections-based library</i>	<i>Services-based library</i>
Library	Defined by library operation metrics (collection, reference)	Defined by university needs (research support, student success and community engagement)
Organization	Bureaucracy: reproduction of their system of means is their main organizational goal	Enterprise: goals, and the change of goals, shape and endlessly reshape the structure of means
Expertise	Subject, process	Partner in research and learning, creation etc.
Systems	Back office	Workflow, digital scholarship and shared systems
Space	Configured around collections	Configured around user experiences
Collections	Just in case, central, institutional, consumption	Facilitated (just in time), one service among others, collective and creation



AI or
Artificial
Intelligence



Robotics



Big Data



Internet of Things
(IoT)



Mixed
Reality



Analytics



TGIF



FANG

Plan S

Gold Open
Access

Green
Open
Access

Research
Data
Management

Hybrid
Journals

Research
Performance
Metrics

Researchers and confusion

SMU in a glance

#11

among specialist universities worldwide

9,623

undergrad and postgrad students*

357

globally diverse faculty**



School of Accountancy



Lee Kong Chian School of Business



School of Economics



School of Social Sciences



School of Law



School of Information Systems



Rated 5 Stars
by Quacquarelli
Symonds (QS)
World University
Rankings (WUR)



Ashoka U
Changemaker
Campus



Korn Ferry Employee
Engagement Award

Interoperability

Virtualization

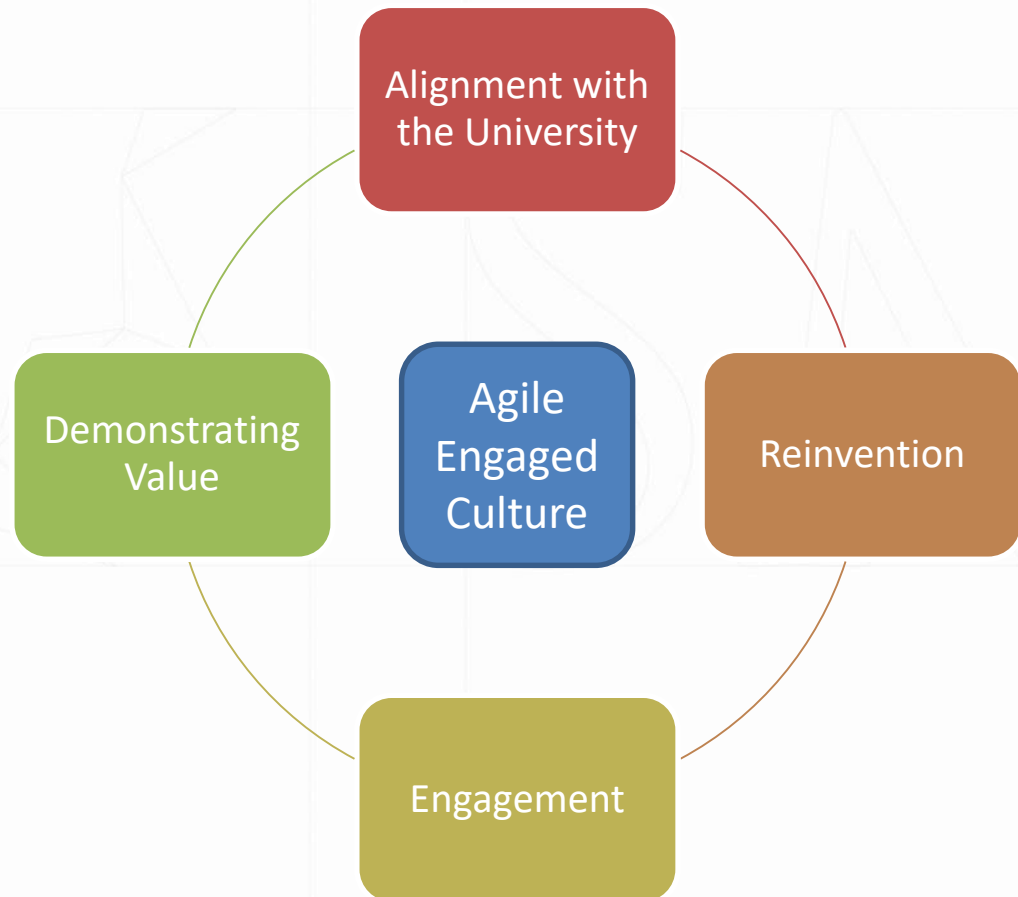
Decentralization

Real-Time Capability

Service Orientation

Modularity Flexibility

**How do we get from where we are
to where we want to be?**





Faculty
research
productivity



Faculty
teaching
impact



Student
experience
& learning



Reputation/
impact on
community

Innovation and Operational Excellence

“Our colleges and universities owe it to students and our future to develop more **interactive forms of pedagogy at all levels and to embrace a curriculum that **stresses perspectives from multiple disciplinary and cultural perspectives** over static swathes of disciplinary “content.”**

Penprase, Brian (2018). https://link.springer.com/chapter/10.1007/978-981-13-0194-0_9



Digital Transformation (Dx)

**Cultural
Workforce
Technological**



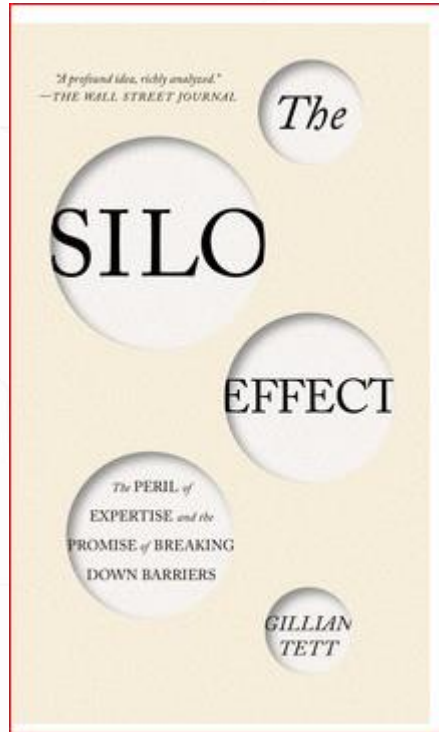
Innovation

- Avoid getting on the '*Tech is Sexy*' bandwagon
- Agility
- Flexibility
- Simplicity
- Sustainability
- **For the users**
- Just-in-time, not Just-in-case
- Evidence based



How does it work?

- Collaboration
- Not Silos
- Shared Commitment to change management
- Agility
- Flexibility



The Silo Effect

The Peril of Expertise and the Promise of Breaking Down Barriers

By Gillian Tett

The Silo Effect asks a basic question: why do humans working in modern institutions collectively act in ways that sometimes seem stupid? Why do normally clever people fail to see risks and opportunities that later seem blindingly obvious? Why, as Daniel Kahnemann, the psychologist put it, are we sometimes so “blind to our own blindness”?

New Librarians' Programme

- Career paths, growth, succession planning
- New or recent graduated librarians
- First cycle began in 2014
- Minimisation of silos
- Encourage collaboration across the organisation rather than single/focused area



First Year Experience (FYE) Team

- Talent pool increased from three to nine
- New roles and responsibilities
- Focus on First Year Students
- Rebranded as FYE Librarians
- Coaches and Mentors
- Customised CPD programme
- Delivering programmes across the campus



ET Journey: Voices

“For new librarians, the FYE journey increases exposure and offers learning opportunities in other library departments. I appreciate the team camaraderie and mutual support.”

“Since joining the FYE team, my work scope has expanded to include tasks at the service/reference desk, supporting orientation, tours, events, classes etc. It has been a fruitful experience, and the variance at work makes the journey a lot more interesting.”

“I enjoyed being part of the FYE team working with team members from different departments. The exposure is valuable to me.”

Use of API's

- Check Scopus for SMU papers published in 2017 & 2018 (N=1003)
- Extract citations listed in the papers (N = 42k)
- Check citation availability using
 - Primo API (Does library collection have it)
 - Unpaywall API, Google books API, Open Access button API (Is it free)
- Do accuracy test with 500 human checked citations & adjust results

Sample 500 random sample check in everything

Accuracy of all API (Primo+Unpaywall+OAB+Google books vs Human "everything" check

For every citation API says available = $1/355 * 352 = 99.15\%$ is available
For every citation API says unavailable = $1/145 * 95 = 65.52\%$ is available

	All API = Available	All API = Not available	Total	% Correct
Available (SMU collection + Free)	352	95	447	78.7%
Not available (SMU collection + Free)	3	50	53	94.3%
Total	355	145	500	
% correct	99.0%	34.4%		

Top Cited Journals by Publisher

Row Labels	Max of Count	% of total
American Psychological Association	567	10.9%
Springer Nature	473	9.1%
Academy of Management	370	7.1%
Institute of Electrical and Electronics Engineers	366	7.0%
Elsevier	342	6.6%
Wiley	310	6.0%
Econometric Society	269	5.2%
INFORMS	222	4.3%
SAGE Publications	202	3.9%
Association for Computing Machinery	197	3.8%
Journal of Machine Learning Research	170	3.3%
American Accounting Association	155	3.0%
American Economic Association	151	2.9%
Oxford University Press	137	2.6%
University of Chicago Press	137	2.6%
Massachusetts Institute of Technology Press	116	2.2%
Cambridge University Press	110	2.1%
American Sociological Association	102	2.0%

Top Cited Journals vs Top Published in Journals (2017 & 2018)

Top 10 by citing (2017 & 2018)	Top 10 by publishing (2017 & 2018)
American Psychological Association	Elsevier
Springer Nature	Institute of Electrical and Electronics Engineers
Academy of Management	SpringerNature
Institute of Electrical and Electronics Engineers	Association for Computing Machinery
Elsevier	Wiley
Wiley	Taylor and Francis
Econometric Society	SAGE
INFORMS	IEEE Computer Society
SAGE Publications	Cambridge University Press
Association for Computing Machinery	INFORMS



6 I's of Innovation

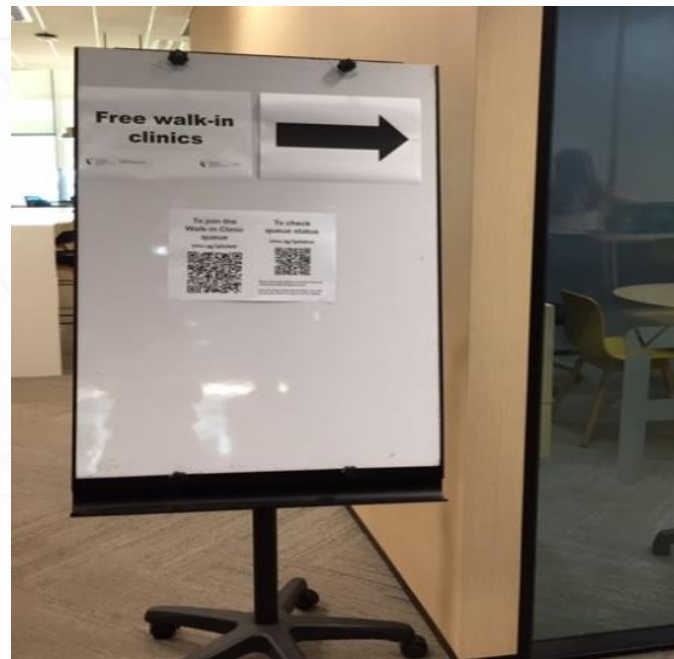
Identify
Ignite
Investigate
Invest
Implement

Courage

- **Empathy**
- **Curiosity**
- **Creativity**
- **Audacity**







Business librarians @ Business School – Embedded Librarianship



- **Open Education Week 2019.** SMU Libraries was a listed contributor to [#OEWeek](#) in March, contributing a 5 minute video '[Understanding OER](#)'.
- **OER Champions!** In an announcement to the SMU community, we celebrated our faculty champions already using Open Textbooks in their courses.
- In the past year, **225 SMU students saved approx. \$65 000**, based on the price of the last used commercial textbook. This was publicised on Instagram/Facebook to engage our community.
- **Partnered with the University's Centre for Teaching Excellence** to raise awareness.

[OER Research Guide](#) on how to find, review, and adopt OER.



Thomas Claeys @_ThomasClaeys · Mar 1
openeducationweek.org/resources/unde...
Ready for the [#OEWeek](#)



SMU Libraries @SMULibraries · 4m

A shout-out to our faculty using Open Textbooks that have saved SMU students over \$65,000 in the past year! @SMULibraries supports [#OEWeek](#) through raising awareness on Open Educational Resources and other initiatives that facilitate equitable access. [#SMULibraries](#) [#OEWeek](#)



1 student saves
\$294.70*



225 students save
over \$65,000



Tue 20/8/2019 4:12 PM

Library

Register! But Don't Chope! Free Bite-Sized Library Workshops

To Library



Bite-Sized Library Workshops

The [Bite-Sized Library Workshops](#) are here again.

Join the Librarians and other campus partners such as, CEC, IITS, ODOS, OLGA, and Faculty from 27 August to 13 September to learn more about working with data, writing persuasively, digital literacy, research skills and many other topics!

[Sign up for your workshops today!](#)



DIGITAL LITERACY SKILLS
(NEW TRACK)



WORKING WITH DATA & METRICS

o Doing data science with R

○ Bite-sized topics

- Research Skills (6 topics)
- Databases: Which Do I Use? (2 topics)
- Data Literacy Skills (6 topics)
- Working with Data & Metrics (7 topics)
- Present with Pizzazz & Other Enrichment Tips (9 topics)
- Citation with Management (1 topic)

○ Campus Partners

- CEC, IITS, ODOS and OLGA
- Faculty from SIS, LKCSB and a Post-Doctoral Fellow from Institute of Innovation & Entrepreneurship



Sessions in Pics





Challenge

**The most damaging phrase in the
language is
“We’ve always done it this way!”**

Why?

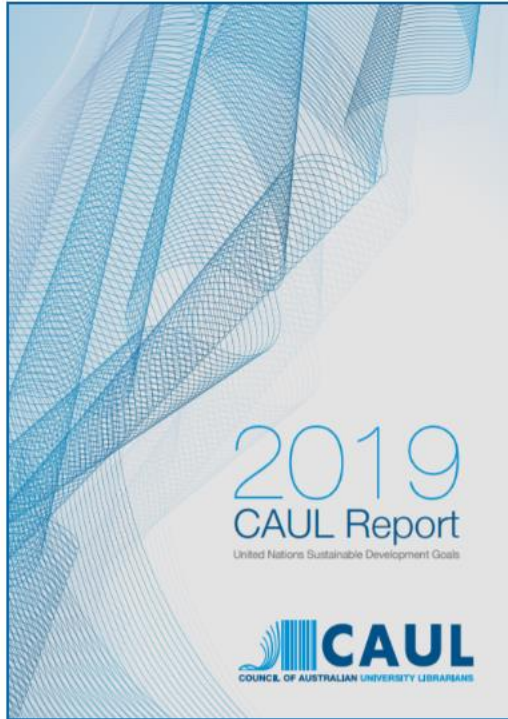
SAUL (Singapore Alliance of University Librarians)

- Facilitate sharing of knowledge and staff development
- Reduce duplication of work for common services – shared services
- Enable resource sharing of physical collections
- Negotiate with publishers for favourable agreements on access and use of electronic resources
- Promote joint activities such as Open Access, Research Data Management etc

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015

Sustainable Development Goals





Libraries support the Sustainable Development Goals

Promoting literacy, including digital, media and information literacy and skills.

Closing gaps in access to information and helping individuals ... understand information needs better.

Providing a network of delivery sites for **government programs and services**.

Communicating knowledge created in our universities.

Building global partnerships and collaborations that provide greater access to digital collections and **information capability programs**.

Preserving and providing access to the world's culture and heritage.



25 July 2019 | <http://www.iatui2019.org/>

<https://www.caul.edu.au/news/caul-libraries-transforming-lives-mapping-un-sdgs>



“The reason librarianship has existed in one form or another for 4 millennia is because it has changed to implement long held principles in light of the changing realities of those that the library serves”

David Lankes

Great exaggerations! Death of libraries

Gulcin CRIBB, *Singapore Management University*

Follow

Publication Type

Blog Post

Publication Date

1-2018

Abstract

Libraries these days are built digital brick by digital brick – brick being the metaphor for digital books, journals, articles, objects, media, digital infrastructure, networks, apps, data, and analytics. The growth of print collections has been declining considerably in recent times. Singapore Management University (SMU) Libraries spends over 90% of its funds on digital collections, 80% of its collections are digital.

https://ink.library.smu.edu.sg/library_research/107/

Cribb, Gulcin. (2018). *Great exaggerations! Death of libraries.*

https://ink.library.smu.edu.sg/library_research/107

Gleason, N. (2018) *Higher Education in the Era of the Fourth Industrial Revolution.*

<https://link.springer.com/book/10.1007/978-981-13-0194-0#about>

<https://sr.ithaka.org/publications/2018-us-faculty-survey/>

https://101innovations.files.wordpress.com/2018/04/compliance-tools-workflow_cropped.png

Lankes, R. D. (2011). *The Atlas of New Librarianship.* Cambridge, Ma: MIT Press.

Mintz, S. (2019). *Why Higher Education Will Change.* <https://www.insidehighered.com/blogs/higher-ed-gamma/why-higher-education-will-change>

Penprase, B.E. (2018). *The Fourth Industrial Revolution and Higher Education.*

https://link.springer.com/chapter/10.1007/978-981-13-0194-0_9