ISCHOOL BRAZIL´S MEETING
University of São Paulo

GLOBAL iSCHOOLS MOVEMENT

Sam Gyun Oh
Francisco Carlos Paletta
Editors

School of Communication and Arts ECA
University of São Paulo

The School of Communication and Arts (ECA) of University of São Paulo, was created in 1966 and its first name was School of Cultural Communication. Due to the diversities of areas and careers offered, ECA´s first characteristic is that it is contemporary. It is a school linked to the innovations and the transformations of superior education. ECA is organized in eight departments and one technical school. There are 22 professional careers in undergraduate regular courses, from which 15 are devoted to Arts: Scenic Design, Theater Direction, Theater Acting, Theory of Theater, Sculpture, Engraving, Multimedia, Inter-media, Painting, Chant and Lyrical Art, Composition, Musical Instruments, Conducting and graduation in Art Education, Acting Performances, Fire Arts and Music. There are 4 qualifications in Social Communication: Journalism, Publishing, Advertising and Propaganda and Public Relations, besides the courses of Librarianship, Tourism and Audio-visual. Furthermore, ECA has inside its structure the School of Drama that is a traditional school of theater sponsored by the course of "Actor Performance". Besides the regular courses, ECA offers diverse activities which provide the community with social services. These are essential functions inside the University, such as Cultural Extension courses in different themes and Project of University Open to the Elderly. The research centers are a very active area at the school. Beside the work on scientific investigation, they have a straight relationship with the Community producing important works of public utility, which are frequently done in partnership with government agencies. The Graduate Program incentivates the cultural exchange and research and has agreements with the most prominent Universities worldwide. The most important cultural and pedagogical investment of ECA has been the constant recycling and actualization of methods and use of the new education technologies.

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SUMMARY OF CONTENTS

WELCOME ADRESS

Professor Sam Oh
Global iSchools Past Chair and Special Ambassador
Sungkyunkwan University iSchool: LIS and Data Science
Seoul, Korea

Dear Members of the iField Community in South America,

It was a delight to visit University of Sao Paulo to conduct 4-day workshop on the global iSchools movement and what it means to South America schools. As a past chair and special ambassador of global iSchools, I am honored to participate in the event. I hope that this will be a great beginning of USP and many schools in South America by forming the iSchool South American chapter.

Being the first person from the Asia-Pacific region elected to this position, I knew from the start that I wanted to do whatever I could to further promote and develop the iSchool movement on a global scale. My time as chair elect ended up centering around 14 visits to various universities in Malaysia, China, Taiwan, Sweden, Hong Kong, and Thailand. As chair, I was fortunate enough to go on 24 more of these trips, interacting firsthand with institutions in China, the U.K., Thailand, New Zealand, Australia, Malaysia.

The friendships and the intellectual exchange built around our broadening network will continue to enrich and enliven the iField as a whole.

As chair, I launched three iSchool Curricula Committees: 1) Data Science, 2) Digital Humanities, and 3) Data Curation. Each committee has a stand-out team of scholars and professionals hard at work on formulating a well-defined statement as to the distinctive approaches and responsibilities of the iSchools in these fields. The outputs from this committee are the main contents of this eBook.

I very much look forward to seeing what the future holds for us. It is my dearest wish that the iSchools will become truly international in every sense of the word.

In closing, I would like to express my gratitude to the University of Sao Paulo for supporting this workshop and a special and hearty thanks goes to Dr. Francisco Paletta for his meticulous preparation for my visit and also organizing my lecture materials into an eBook format so many can benefit from it. I sincerely hope that this book can be helpful to those who may consider joining global iSchools and also become active member of South American chapter.

ISCHOOL BRAZIL'S MEETING

FRANCISCO CARLOS PALETTA

iSchool Brazil's Meeting

Movement for South American Countries

iSchool South America Chapter

iSchool Vision

"The iSchools Organization seeks to maximize the visibility and influence of its member schools, and their interdisciplinary approaches to harnessing the power of information and technology and maximizing the potential of humans. We envision a future in which the iSchool Movement has spread around the world, and the information field is widely recognized for creating innovative systems and designing information solutions that benefit individuals, organizations, and society. iSchool graduates will fill the personnel and leadership needs of organizations of all types and sizes; and our areas of research and inquiry will attract strong support and have profound impacts on society and on the formulation of policy from local to international levels."

22 January 2020

Local: ESCOLA DE COMUNICAÇÕES E ARTES
Av Prof. Lúcio Martins Rodrigues 443
Auditório Freitas Nobre CJE ECA USP
Data: 22 janeiro, 2020
Horário: 10:00 as 12h00

21 January 2020

Local: ESCOLA DE COMUNICAÇÕES E ARTES
Av Prof. Lúcio Martins Rodrigues 443
Auditório Freitas Nobre CJE ECA USP
Data: 21 janeiro, 2020
Horário: 10:00 as 12:00

CONFERENCE

iSchool approach to Data Science and Digital Humanities
Keynote Speaker: Dr. Sam Oh
Professor, SKKU iSchool, LIS and Data Science
Chair, iSchools Consortium

Coordinator: Dr. Francisco Carlos Paletta - Professor, ECA USP
Chair, TOI - International Conference on Technology and Information Organization

22 January 2020

Local: ESCOLA DE COMUNICAÇÕES E ARTES
Av Prof. Lúcio Martins Rodrigues 443
Auditório Freitas Nobre CJE ECA USP
Data: 22 janeiro, 2020
Horário: 10:00 as 12h00

CONFERENCE

iSchool Movement for South American Countries: iSchool South America Chapter
Keynote Speaker: Dr. Sam Oh
Professor, SKKU iSchool, LIS and Data Science
Chair, iSchools Consortium

Coordinator: Dr. Francisco Carlos Paletta - Professor, ECA USP
Chair, TOI - International Conference on Technology and Information Organization

23 January 2020

Local: ESCOLA DE COMUNICAÇÕES E ARTES
Av Prof. Lúcio Martins Rodrigues 443
Auditório Freitas Nobre CJE ECA USP
Data: 23 janeiro, 2020
Horário: 10:00 as 12:00

CONFERENCE

iSchool Movement for SP Community
Introducing SKKU and SKKU iSchool

Keynote Speaker: Dr. Sam Oh
Professor, SKKU iSchool, LIS and Data Science
Chair, iSchools Consortium

Coordinator: Dr. Francisco Paletta - Professor, ECA USP
Chair, TOI - International Conference on Technology and Information Organization

THE ISCHOOL MOVEMENT

SAM OH

The iSchool Movement

Sam Oh

Professor, SKKU iSchool (LIS and Data Science), Seoul, KOREA
Affiliate Professor, University of Washington iSchool, Seattle, USA
Chair, iSchools Consortium (2018-2019)
Chair, Dublin Core Governing Board (2018-2019)
Chair, ISO/IEC JTC1/SC34 (2008-2017)
Chair, ISO TC46/SC9 (2008-2014)
Dean, SKKU Library (2015-2016)

iSchool Focus

Technology

People

iPerspective ('*Information*' discipline)

Brief History

The iSchools movement started in the US 3 decades ago with the initiatives of the Deans of innovative LIS Schools

iSchools as an organization formally got its name in 2003

Today iSchools is a global organization with over 100 member institutions: schools/colleges/departments of information from around the world

iSchool members represent a range of disciplines ranging from information science, computing, information management, data science, library studies, records & archival studies, business, and so on

MEMBERSHIP & ACTIVITIES

A global community

A global management team supported by regional management
The first regional chapter: Asia-Pacific (2014)

Annual iConference and regional Conferences
(AP, EU, and NA iSchools)

Common mission and shared values in a national and global context

Purpose of the iSchools

The iSchools assumes that expertise in all forms of information fuels progress in science, business, education, and culture.

This expertise must include an understanding of the uses and users of information, the nature of information, and information technologies and their applications.

The iSchools are dedicated to advancing information field (iField).

The iSchool Vision

Interdisciplinary approaches to harnessing the power of information and technology; and seeks to advance the potential of humans.

Widely recognized for creating innovative systems and designing information solutions.

iSchool graduates will meet the personnel and leadership needs and have a profound impact on society.

Should be inclusive and open-minded

iSchool Governance

iSchool Governance

Chairs Group

Sam Oh (Chair, Sungkyunkwan University, Korea): AP-Region
Gobinda Choudhury (Chair-Elect, Northumbria University, UK): EU-Region
Ron Larson (Past-Chair, University of Pittsburgh, USA): NA Region

Executive Director

Michael Seadle, Humboldt University, Germany

Executive Committee Members

Sam Oh (Chair), Sungkyunkwan University, Korea
Gobinda Choudhury (Chair-Elect), Northumbria University, UK
Ron Larson (Past-Chair), University of Pittsburgh, USA
Michael Seadle (Executive Director), Humboldt University, Germany
Eric Myer (Treasurer), University of Texas at Austin, USA
Miguel Nunes (AP-iSchools Chair), Sun-Yat Sen University, China
Peter Bath (EU-iSchools Chair), University of Sheffield, UK
Keith Marzullo (NA-iSchools Chair), University of Maryland, USA

iSchool Membership Dues

Regular Membership Level

iCaucus: US $5,000
Enabling: US $4,000
Sustaining: US $3,000
Supporting: US $2,000
Basic: US $1,000

Associate membership

Due: US $500 (no voting right)

When electing the 'Board of Directors':

iCaucus members exercise 5 votes,
Enabling members exercise 4 votes,
Sustaining members exercise 3 votes,
Supporting members exercise 2 votes,
Basic members exercise only 1 vote.

iSchool Board of Directors

Executive Committee Members (7)

Chair, Chair-Elect, Past-Chair (3)
AP-Chair, EU-Chair, NA-Chair (3)
Treasurer (1)

Additional Board Members (6)

4 from NA region
1 from EU region
1 from AP region
This proportion will be revised every 2 years based on due contribution

iSchool Member Listand Summary Stats

NA iSchools (iCaucus): 29

USA

- *University of Arizona: School of Information*
- *University of California at Berkeley: School of Information*
- *University of California at Irvine: School of Information and Computer Science*
- *University of California in Los Angeles: Graduate School of Education and Information Studies*
- *Carnegie Mellon University, Heinz College: School of Information Systems and Management, School of Public Policy and Management*
- *Cornell University: Faculty of Computing and Information Science*

USA

- *Drexel University: College of Computing and Informatics*
- *Florida State University: College of Communication and Information*
- *Georgia Tech: College of Computing*
- *University of Illinois at Urbana-Champaign: School of Information Science*
- *Indiana University: School of Informatics, Computing, and Engineering*
- *Kent State University: School of Information*

NA iSchools (iCaucus)

USA

- *University of Maryland: College of Information Studies*
- *University of Maryland, Baltimore County: Dept of Information Systems*
- *University of Michigan: School of Information*
- *University of Missouri: School of Information Science and Learning Technologies*
- *University of North Carolina, Chapel Hill: School of Information and Library Science*
- *University of North Texas: College of Information*

USA

- *The Pennsylvania State University: College of Information Science and Technology*
- *University of Pittsburgh: School of Computing and Information*
- *Rutgers, The State University of New Jersey: School of Communication and Information*
- *San Jose State University: School of Information*
- *Syracuse University: School of Information Studies*

NA iSchools (iCaucus)

USA

- *The University of Tennessee: School of Information Sciences*
- *University of Texas at Austin: School of Information*
- *University of Washington: The Information School*
- *University of Wisconsin-Milwaukee: School of Information Studies*
- *University of Kentucky: College of Communications and Information*

CANADA

- *29. University of British Columbia: The School of Library, Archival and Information Studies*

NA iSchools (Sustaining/Supporting): 3

USA

- *Indiana University – Purdue University Indianapolis: School of Informatics and Computing (Sustaining)*
- *Michigan State University: Dept of Media and Information (Supporting)*
- *University of South Carolina: School of Library and Information Science (Supporting)*

NA iSchools (Basic): 8

USA

- *University of Albany: College of Emergency Preparedness, Homeland Security and Cybersecurity*
- *Dominican University: School of Information Studies*
- *Long Island University: Palmer School of Library and Information Science*
- *Simmons, Boston: School of Library and Information Science*
- *University of Wisconsin: School of Library and Information Studies*

CANADA

- *McGill University, Montreal: School of Information Studies*
- *University of Montreal: Universite de Montreal Ecole de Bibliotheconomie et des Sciences de l'information*
- *University of Toronto: Faculty of Information*

NA: Associate Members

- *University of Colorado: Boulder: Dept of Information Science*
- *State University of New York at Buffalo: Dept of Information Science*
- *University of Oklahoma: School of Library and Information Studies*
- *Pratt Institute, School of Information*
- *University of South Florida: School of Information*
- *Texas A&M University – Kingsville: Dept of Electrical Engineering & Computing Science*
- *Wayne State University: School of Information Science*
- *University of Cincinnati. School of Information Technology.*

NA Region Summary (48)

- *40 Regular Members*
- *iCaucus Members (29)*
- *Sustaining Members (1)*
- *Supporting Members (2)*
- *Basic Members (8)*
- *8 Associate Members*

Growth Models of NA iSchools

Merged Models

- *Drexel University (College of Computing and Informatics)*
- *Indiana University (School of Informatics, Computing, and Engineering)*
- *University of Pittsburgh (School of Computing and Information)*
- *Rutgers (School of Communication and Information)*
- *UCLA (Graduate of Education and Information Studies)*
- *Florida State University (College of Communication and Information)*
- *University of North Texas (College of Information): IS, Learning Tech, and Linguistics*
- *University of Tennessee (College of Communication and Information: School of Information Sciences)*
- *University of Kentucky (College of Communications and Information)*

Growth Models of NA iSchools

Expansion Models (With LIS background)

- *University of Washington (Information School)*
- *Syracuse University (School of Information Studies)*
- *University of Texas at Austin (School of Information)*
- *University of Illinois at UC (School of Information Sciences)*
- *University of Maryland (College of Information Studies)*
- *University of North Carolina at Chapel Hill (School of Information and Library Science)*
- *University of Wisconsin-Milwaukee (School of Information Studies)*
- *University of California at Berkeley (School of Information)*
- *University of Michigan (School of Information)*

Growth Models of NA iSchools

iSchools without LIS background

- *Carnegie Mellon University (Heinz College of Information Systems and Public Policy)*
- *Cornell University (Faculty of Computing and Information Sciences)*
- *Penn State University (College of Information Science and Technology)*
- *University of California at Irvine (Donald Bren School of Information and Computer Sciences)*
- *Georgia Tech (College of Computing)*

AP iSchools

Australia (4)

- *Monash University: Faculty of Information Technology (iCaucus)*
- *University of Melbourne: Dept of Computing and Information Systems*
- *Charles Sturt University: School of Information Studies*
- *University of South Australia: School of Information Technology and Mathematical Science*

China iCaucus (7)

- *Wuhan University: School of Information Management*
- *Renmin University: School of Information Resource Management*
- *Peking University: Dept of Information Management*
- *Central China Normal University: School of Information Management*
- *Jilin University: School of Management*
- *Nanjing University of Science and Technology: School of Economics and Management*

AP iSchools

China iCaucus

- *University of Chinese Academy of Sciences. Department of Library, Information and Archives Management*

China Basic (3)

- *Shanghai University: Department of Library, Information, and Archives*
- *Nanjing University: School of Information Management*
- *Sun-Yat-Sen University: School of Information Management*

Hong Kong (1)

- *University of Tsukuba: Graduate School of LIS and Media Studies*
- *Kyushu University: Department of Library Science, Graduate School of Integrated Frontier Sciences*

Korea (4)

- *Sungkyunkwan University: LIS and Data Science (Supporting)*
- *Seoul National University: Graduate School of Convergence Science and Technology*
- *Yonsei University: LIS*
- *Kyungpook National University: LIS*

AP iSchools

Malaysia (1)

- *Universiti Teknologi Mara: Faculty of Information Management*

New Zealand (1)

- *University of Waikato: Faculty of Computing and Mathematical Sciences*

Taiwan (2)

- *National Taiwan University: Dept and Graduate Institute of LIS*
- *National Taiwan Normal University, Graduate Institute of LIS*

Thailand (1)

- *Khon Kaen University: Department of Info Science*

AP: Associate Members

- *National Chengchi University: Graduate Institute of Library Information and Archival Studies (LIAS). Taiwan*
- *University of Philippines: School of Library and Information Studies. Philippines*

AP Region Summary (28)

- *26 Regular Members*
- *iCaucus Members (8)*
- *Sustaining Members (0)*
- *Supporting Members (1)*
- *Basic Members (17)*
- *2 Associate Members*

Characteristics of AP iSchools

Australia and New Zealand

- *Information Studies (CSU)*
- *Information Technology (Monash)*
- *Computing and Information Systems (Melbourne)*
- *Information Technology and Mathematical Sciences (South Australia)*
- *Computing and Mathematical Sciences (Waikato, NZ)*

China

- *Information Management (Wuhan, Nanjing, SYSU, and Peking)*
- *Information Resource Management (Renmin)*
- *Management (Jilin)*
- *Economics and Management (NJUST)*

Korea

- *LIS and Data Science (SKKU)*
- *LIS (Yonsei and KNU)*
- *Convergence Science and Technology (SNU)*

Japan

- *Library, Information, and Media Studies (Tsukuba)*

EU iSchools

Czech Republic (1)

- *Charles University, Prague: Institute of Information Studies and Librarianship, Faculty of Arts*

Denmark (2)

- *University of Copenhagen: Dept of Information Science (Sustaining)*
- *Aalborg University: Dept of Communication and Psychology*

Finland (1)

- *University of Tampere: School of Information Science (Sustaining)*

France (1)

- *IMT Atlantique: Dept of Logic Uses, Social Sciences and Information*

Germany (2)

- *Humboldt-Universitat zu Berlin: School of Library and Information Science (iCaucus)*
- *University of Siegen: School of Media and Information*
- *University of Regensburg. Institute of Information and Media, Language and Culture.*

EU iSchools

Ireland (1)

- *University College, Dublin: School of Information and Communication Studies*

Netherland (1)

- *University of Amsterdam: Graduate School of Humanities, Archives and Information Studies*

Norway (1)

- *Oslo Metropolitan University: Dept of Archivistics, Library and Information Science (Sustaining)*

Sweden (2)

- *Linnaeus University: Information Institute (Sustaining)*
- *University of Boras: The Swedish School of Library and Information Science (Sustaining)*

EU iSchools

Spain (3)

- *Universidad Carlos III de Madrid: Departamento de Biblioteconomia y Documentacion, Facultad de Humanidades, Comunicacion y Documentacion*
- *Open University of Catalonia: Faculty of Computer Science, Multimedia and Telecommunication*
- *Polytechnic University of Valencia: School of Informatics*

Portugal (3)

- *Universidade Nova de Lisboa: Information Management School*
- *University of Minho: Center School of Engineering*
- *University of Porto: Faculty of Engineering, and Faculty of Arts*
- *Turkey (1)*
- *Hacettepe University: Dept of Information Management, Faculty of Letters*

EU iSchools

UK (8)

- *University of Sheffield: Information School (iCaucus)*
- *Northumbria University: Dept of Computing and Information Sciences (Supporting)*
- *University of Glasgow: Humanities Advanced Technology and Information Institute*
- *University College London: Dept of Information Studies*
- *Manchester Metropolitan University: Information and Communication*
- *Oxford Digital Information Group*
- *Robert Gordon University: Dept of Information, Management of Aberdeen Business School*
- *University of Strathclyde: Computer and Information Sciences*

Croatia (1)

- *University J.J. Strossmayer: Department of Information Science, Faculty of Humanities and Social Sciences*

EU Region Summary (29)

30 Regular Members

- *iCaucus Members (2)*
- *Sustaining Members (5)*
- *Supporting Members (1)*
- *Basic Members (21)*

LA iSchools (Latin America)

Brazil (1) NA

- *University of Sao Paulo: School of Communation and Arts.*

Columbia (1) NA

- *Pontificia Universidad Javeriana: Departmento de Ciencia de la Informacion*

AS iSchools (Africa & South Africa)

Uganda (1) EU

- *Makerere University: The College of Computing and Information Sciences*

EA iSchools (Middle East)

Israel (1) EU

- *Bar-Ilan University: Dept of Information Science*

Overall iSchool Stats

iCaucus Members (39)
- *NA Region (29)*
- *AP Region (8)*
- *EU Region (2)*

Sustaining Members (6)
- *EU Region (5)*
- *NA Region (1)*
- *AP Region (0)*

Supporting Members (4)
- *NA Region (2)*
- *EU Region (1)*
- *AP Region (1)*

Basic Members (51)
- *EU Region (21)*
- *AP Region (17)*
- *NA Region (8)*
- *Other Region (4)*

Regular Members (99)
- *NA Region (40)*
- *AP Region (26)*
- *EU Region (29)*
- *Other Region (4)*

Associate Members (10)
- *NA Region (8)*
- *AP Region (2)*
- *EU Region (0)*

Total Members (109)

Annual iConference

- *A great opportunity to building a network with heads of iSchools.*
- *Strengths of iConference: Networking*
- *Highlights of the iConference*
    - *Sharing Best Practices in Teaching and Research*
    - *Sharing Best Practices in Industry Collaborations and Capstone Projects*

Strengths of iSchool Approach

iSchool is an excellent brand for industry marketing

This brand is very well-established in North America

This brand is building momentum in AP and EU regions

Easy to collaborate if the anchor is on INFORMATION

Our expertise on Information, Information use, User behavior, and Design

Understanding of Relationships among Information, People, and Technology is crucial in solving complex problems.

Strengths of iSchool Approach

iSchool is an excellent brand for industry marketing

- *This brand is very well-established in North America*
- *This brand is building momentum in AP and EU regions*

Easy to collaborate if the anchor is on INFORMATION

- *Our expertise on Information, Information use, User behavior, and Design*
- *Understanding of Relationships among Information, People, and Technology is crucial in solving complex problems.*

What is Informatics?

The study and practice of creating, storing, finding, manipulating, and sharing information

- *Different from EU concept of informatics*

The strong technical background needed to develop solutions to the world's information challenges.

The Informatics is

- *conceptual and practical,*
- *academic and professional, and*
- *focused on the human and humanistic dimensions of the design and use of information systems*

Diverse Uses of Informatics

- *Medical Informatics*
- *Health Informatics*
- *Social Informatics*
- *Bio Informatics*
- *Visual Informatics*
- *Legal Informatics*
- *Humanity Informatics (Digital Humanities)*

Approach to iSchool Bachelor Program

iSchool BS Degrees in USA

BS in Informatics

- *University of Washington*
- *Indiana University*
- *Penn State University*

BS in Information Management & Technology

- *Syracuse University*

BS in Information Science

- *University of North Carolina at Chapel Hill*

BS in Information

- *Rutgers*
- *University of Michigan*

Essence for Successful BS Program

Excellent curriculum
Excellent and diverse teachers (theoretical and practical)
Excellent and passionate students
Excellent capstone projects
Excellent industry partnership

Excellent Curriculum

Think of 4 components

- *Liberal arts*
  - *Reading, Writing, and Presentation*
- *Core*
  - *Information organization, User behavior, Design thinking, Web and mobile technologies, Information systems and management, Information ethics*
- *Specialization or Concentration*
  - *Data analytics (4-5 courses)*
  - *HCI and design (UX) (4-5 courses)*
  - *Information security (4-5 courses)*
  - *Project management (4-5 courses)*
  - *Information architecture (4-5 courses)*
- *Integration*
  - *Capstone project 1: Project Planning*
  - *Capstone project 2: Project Implementation*

Excellent Teachers

Regular faculty

- *Focus on theoretical underpinnings of the field*

Clinical faculty

- *Recruiting stellar faculty of practice is essential*
- *iField needs to have strong clinical faculty that have in-depth experience of solving real and challenging problems.*

Excellent Capstones

Academic capstones

- *Research-oriented (strong research methods)*

Industry capstones

- *Allowing a team project composed of a member from each concentration*
- *Building a reputation of solving real and challenging problems.*

Excellent Industry Partnership

iBoard

- *A separate iSchool board who can be main advocates for your school or unit*

iAffiliates

- *Industry partners that can promote your school and hire your students.*

iFair

- *A showcase of all the capstone projects.*
- *Invite your board and iAffiliate members to this fair*
- *This can also be a job interview fair for your students*

Further on iAffiliates

Membership Fee

- *US $ 10,000 to 20,000 per year*

Member benefits

- *Can present their problems to iSchool students (recruiting capstone project teams)*
- *Can interview iSchool students before other companies.*

Approach to iSchool Master Program

iSchool MS Degrees in USA

Information Management (MSIM)

- *Washington*
- *Syracuse*
- *Most of China iSchools*

Information Science (MIS)

- *UNC at Chapel Hill*
- *Pittsburgh*

Information (MI)

- *Rutgers*
- *Michigan*

Essence for Successful MS Program

1. *Excellent curriculum*
2. *Excellent and diverse teachers (theoretical and practical)*
3. *Excellent and passionate students*
4. *Excellent capstone projects*
5. *Excellent industry partnership*

Excellent Curriculum (MSIM)

Think of 3 components

Core

- *Foundations: Information, Communication, Teamwork*
- *Policy and Ethics in Information Management*
- *Analytic Methods for Information Professional*
- *Management and Strategic Leadership*

Specialization

- *Business Intelligence*
- *Data Science*
- *User Experience*
- *Information Consulting*
- *Information Architecture*
- *Information Security*

Integration

- *Capstone project 1: Project Planning*
- *Capstone project 2: Project Implementation*

Approach to iSchool Doctoral Program

iSchool Doctoral Program

One Ph.D. with diverse topics

- *Knowledge organization*
- *User behavior and Social information seeking*
- *Information and Data literacy*
- *Data analytics and visualization*
- *Social, Bio, Health, and Medical Informatics*
- *Information and Data Ethics*
- *UX Design and Information Architecture*
- *Information Security*

Different Ph.D.(s)

- *Ph.D. in Information Science*
- *Ph.D. in Data Science*

Concluding Remarks

- *"iSchool" is an excellent and established brand.*
- *An Exciting undergraduate program that makes industry excited.*
- *iSchool should focus on Human-Centered Data Science*
- *An iSchool approach to Digital Humanities is important*
- *Must maintain iPerspective with open mind*
- *Sizable faculty and students matter*
- *Diverse faculty members are needed to succeed*
- *Faculty of One – no faction is crucial for success*
- *Diverse and strong board members are needed*
- *Innovative staff connect students with industry*
- *Global exchange programs open students' perspectives*

Why you should join the iSchool?

- *Most of innovative LIS schools and departments already joined iSchools International.*
- *Easier to establish exchange programs with other iSchools.*
- *Much easier to build an international network of iScholars.*
- *Participate in establishing 'Information' discipline with iSchool movement.*
- *Easier to build international industry partners for students' capstone projects and internships.*

iSchool Application

Membership Application (1)

Basic Info

- *University name*
- *School name*
- *Head-of-School including email*
- *Preferred contact name and email if different*
- *To whom does the Head report? (name and title)*
- *# of people with a 'professor' title (include British style senior lecturers, lecturers, and readers)*
- *Other salaried teaching staff*
- *# of adjuncts / lecturers (teachers paid per class)*
- *Size of the bachelor's program (fulltime equivalent)*
- *Size of the master's program (fulltime equivalent)*
- *Official address and phone (including country code)*
- *Finance contact (if different)*
- *Dues level: please pick one:*
- *iCaucus, Enabling, Sustaining, Supporting, Basic, Associate)*

Membership Application (2)

Research and Doctoral Program

- *Note: those applying for 'associate members' need not complete this information.*
- *Schools applying for membership are expected at a minimum to have substantial sponsored research activity, engagement in the training of future researchers through an active, research-oriented doctoral program, a good reputation, and a commitment to progress in the information field.*

Questions regarding Doctoral Programs

- *Size of doctoral program*
- *Date the program was established*
- *List the top 5 dissertation titles in the last 5 years including the year (in English please).*
- *If fewer than 5, please explain why.*
- *How much external (i.e., competitive) research money has the school received in US dollars equivalents in the last 3 years (by year) including the source.*
- *Top venues for faculty publications*
- *Top conference that faculty or doctoral students attend*

Membership Application (3)

Reasons for joining the iSchools

Please describe briefly:

Why you want to join the iSchools?

What unique contributions your institution can contribute to further the iSchools?

Questions

Why join? (200-300 words)

Unique contributions (200-300 words)

Q & A

Thank You !!!

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP
Chair, TOI - International Conference on Technology and Information Organization

ISCHOOL DATA SCIENCE

II-YEOL SONG
JAVED MOSTAFA
SAM OH
JOHN WALSH
MARCIA ZENG

iSchool data science Curriculum Committee Report

Co-Chairs

Professor Il-Yeol Song (Drexel)

Professor Javed Mostafa (UNC Chapel Hill)

Presented by Sam Oh (Chair of iSchools International)

Table of Contents

Reporting iDSCC Activities

The iDSCC: Charge, Members, and Activities
Existing Data Science Curricula
Some Considerations of iSchool DS Curriculum
Conclusion

Charge from iSchool Board of Directors (2019.03)

Gather information about data science programs and courses from all iSchools with bachelor's and master's level

Analyze the information to propose common elements for a model iSchool data science curriculum

Propose a model iSchool data science curriculum that could potentially be used by iSchools as they see fit

Charge from iSchool Board of Directors

Key Dates:

- *The Committee should report at each iConference*
- *The committee report should be completed for presentation to the Board of Directors at the 2021 iConference.*

The iDSCC Chairs

Co-Chairs

- *Il-Yeol Song (Drexel University, USA).*
- *Javed Mostafa (University of North Carolina at Chapel Hill, USA).*

The iDSCC Members

1. *Yin Zhang (Kent State University, USA)*
2. *Dan Wu (Wuhan University, China)*
3. *Frank Hopfgartner (University of Sheffield, UK)*
4. *Joseph Yi (Sangmyung University, Korea)*
5. *Kai Eckert (Stuttgart Media University, Germany)*
6. *Ying Ding (Univ of Texas at Austin, USA)*
7. *Lemen Chao (Renmin University, China)*
8. *Chirag Shah (University of Washington, USA)*
9. *Theresa Anderson (University of Technology Sydney, Australia)*
10. *Jeffrey Saltz (Syracuse University, USA)*
11. *Loni Hagen (University of South Florida, USA)*
12. *Lisa Federer (National Library of Medicine, USA)*

Current Plan of iDSCC

A survey on Job ADs

Employer, job functions, job skills

A Delphi study on unique characteristics of iSchools

A survey on existing DS programs of iSchools
BSDS, MSDS-Research, MSDS-Professional

A survey on existing DS programs of CS and Business Schools
BSDS, MSDS, MS in business analytics

Panel discussion and workshops
ASIST 2019
A Panel on Data Science Education in an iSchool Context
iConference 2020
iDSCC Curriculum Activity Report
Challenges of DS workshops

JASIST Special Issues on DS Education in iSchool Context

Existing DS Curricula

Computing-Oriented

EDISON (Education for Data Intensive Science to Open New Science Frontiers, 2016)
National Academies of Sciences, Engineering, and Medicine (DS for Undergraduates: Opportunities and Options, 2018)
ACM DS Model (2019): Standard Curriculum

Math-Oriented

Park City (Park City Math Institute, 2017)

Business-Oriented

INFORMS (Business Analytics, 2015)
BHEF-DSA (Business Higher Education Forum, 2016)

The EDISON Framework

5 Competency Areas

- *Data Science Data Analytics*
- *Data Science Data Management*
- *Data Science Engineering*
- *Data Science Research Methods*
- *Business Process Management*

DS for Undergraduates:
Opportunities and Options (2018)

A Consensus Study Report of

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

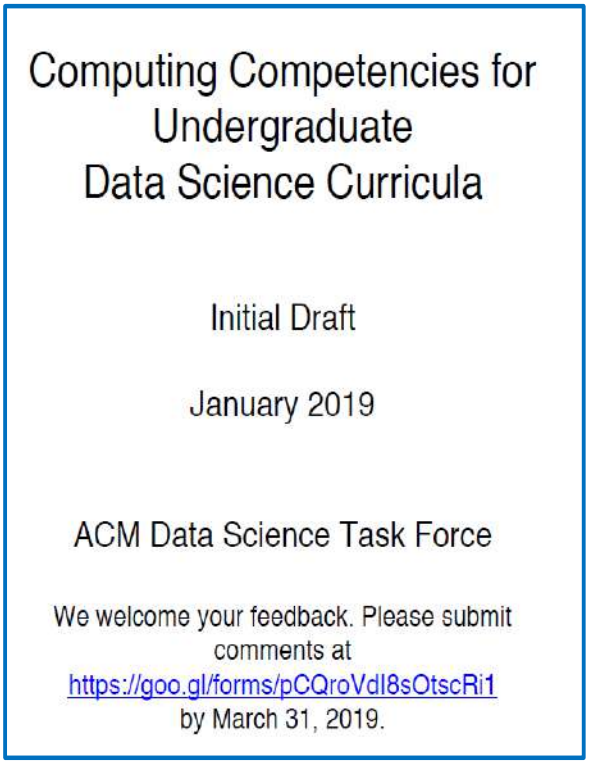
http://nap.edu/25104

DS for Undergraduates: Opportunities and Options (2018)
Key Elements

- Mathematical foundations,
- Computational foundations,
- Statistical foundations,
- Data management and curation,
- Data description and visualization,
- Data modeling and assessment,
- Workflow and reproducibility,
- Communication and teamwork,
- Domain-specific considerations, and
- Ethical problem solving.

http://nap.edu/25104

A Draft from ACM DS Model



Computing Competencies for Undergraduate Data Science Curricula

Initial Draft

January 2019

ACM Data Science Task Force

We welcome your feedback. Please submit comments at https://goo.gl/forms/pCQroVdI8sOtscRi1 by March 31, 2019.

http://www.cs.williams.edu/~andrea/DSReportInitialFull.pdf

A Draft from ACM DS Model

9 Knowledge Areas

The core computing discipline-specific Knowledge Areas for Data Science are:

- Computing Fundamentals, including Programming, Data Structures, Algorithms, and Software Engineering
- Data Acquirement and Governance
- Data Management, Storage, and Retrieval
- Data Privacy, Security, and Integrity
- Machine Learning
- Data Mining
- Big Data, including Complexity, Distributed Systems, Parallel Computing, and High Performance Computing
- Analysis and Presentation, including Human-Computer Interaction and Visualization
- Professionalism

http://www.cs.williams.edu/~andrea/DSReportInitialFull.pdf

Park City Model (2017)

Six Main Subject Areas of a Data Science Major

Data Description and Curation
Mathematical Foundations
Computational Thinking
Statistical Thinking
Data modeling
Communication, Reproducibility and Ethics

http://www.annualreviews.org/

INFORMS (2015)

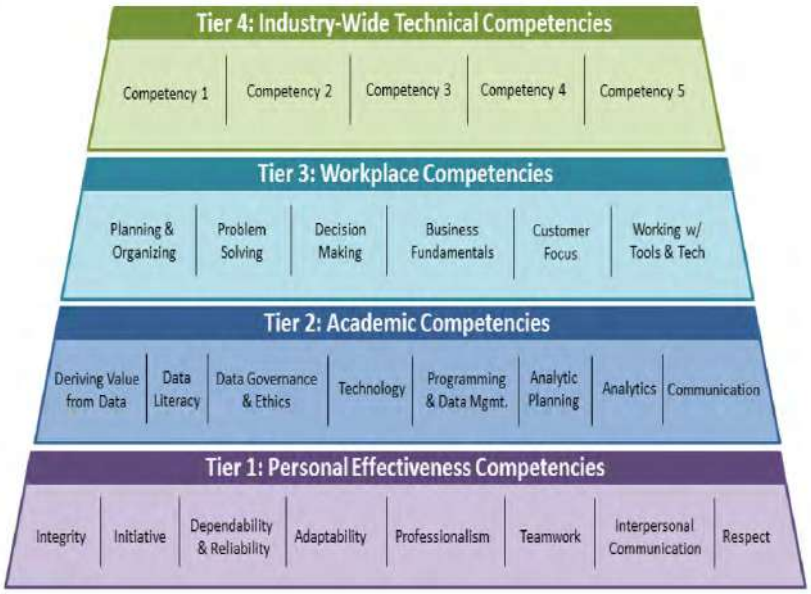
6 Courses:

Data Management
Descriptive Analytics
Data Visualization
Predictive Analytics
Prescriptive Analytics
Data Mining

Wilder and Ozgur: *Business Analytics Curriculum for Undergraduate Majors*
INFORMS Transactions on Education 15(2), pp. 180–187, © 2015 INFORMS

BHEF-DSA (2016)

Competency Map for a DSA-Enabled Graduate



A DS Framework for iSchools (JDIS2017)

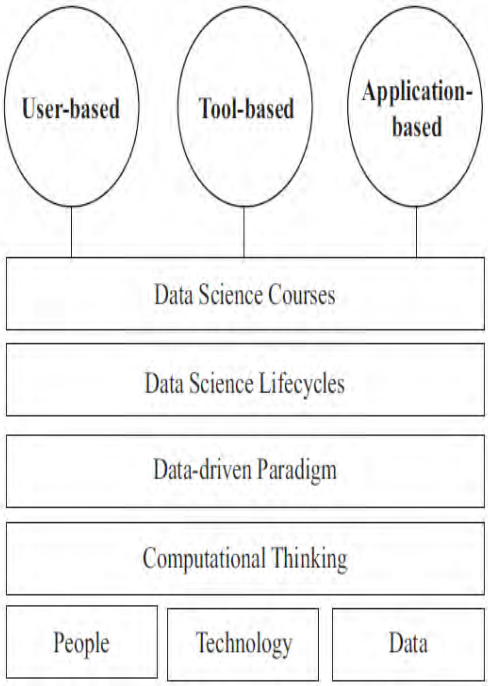


Figure 3. The proposed Data Science Education Framework (DSEF) for iSchools.

Il-Yeol Song & Yongjun Zhu (2017). "Big Data and Data Science: Opportunities and Challenges of iSchools". Journal of Data and Information Science, Vol. 2, No. 3, 2017; pp:1-18.

An *iSchool* Approach to*Data* Science

Professor Il-Yeol Song
Drexel University, USA
iDSCC Co-Chair

Keys to iSchool DS Education

- *Understand roles of big data and big data technologies*
- *Work with all the steps of a data science lifecycle – discover problems, solve problems, and communicate solutions*
- *Use a range of tools to solve big data problems*
- *Focus on 'Information Computing' (iComputing)*

Challenges for iSchool DS Education

- *How to seamlessly incorporate big data revolution in DS education?*
- *How to educate students to create values and knowledge from big data?*
- *How to incorporate newer topics to DS curriculum?*
- *How to put emerging data management topics into DS curriculum?*
- *How to create insight reports from data analyses?*

DS Lifecycle

1. *Business understanding: What is the question to solve? What metrics are to be evaluated? Generate hypothesis. Assess resources (people, data, and tools).*

2. *Data understanding: Identify data resources, data reuse and integration plan, datafication, and decision on tools.*

3. *Data preparation: Acquire data; Perform data profiling, Cleanse, and Transform; Explore data and verify quality.*

4. *Model planning: Determine the methods, techniques, and workflow; Select key variables and determine correlation between them.*

5. *Model building: Build models; Perform analysis and iterate.*

6. *Evaluation: Perform evaluation against metrics; Communicate results and recommendations.*

7. *Deployment: Integrate analytics procedures into management dashboards and operational systems.*

8. *Review and monitoring: Monitor performance; Identify parts that need to be improved.*

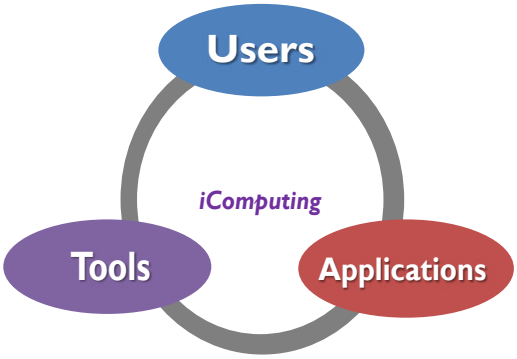
iComputing

The ability to:

solve problems and

create values and knowledge using tools in application domains

generate insights from data analyses



Il-Yeol Song & Yongjun Zhu (2017).

1. User-based DS Education

1. *Understanding requirement modeling,*
2. *Understanding the roles of metadata,*
3. *Creating human-centered design,*
4. *Understanding security and privacy of data,*
5. *Learning how to validate analysis outcomes,*

1. User-based DS Education

Writing insight reports for stakeholders,

Managing projects with keen insights on data lifecycles,

Learning how to protect data and generate insights,

Learning how to utilize data and outcome ethically, and

Learning how to set up strategies for data archiving and curation.

2. Tool-based DS Education

1. *Learning how to develop applications by utilizing existing libraries or Web services*
2. *Learning major data science tools.*
3. *Focusing on business problems, the nature of input data, strengths and weaknesses of the algorithms executed, interpreting the output, and validating the results.*

2. Tool-based DS Education

Utilizing automated tools such as data pre-processing, model-building, machine learning, validation, visualization, and report generation.

Empowering users with automated tools "citizen data science" Gartner (2016).

Citizen Data Scientists
End users who solve data science problems using automated tools without coding.

3. Application-based DS Education

1. Developing project-based education: students should experience several complete case studies with exposure to each step of a data science lifecycle using an automated tool in the very early stage of the degree program.

2. Developing the ability to work with domain experts: data scientists should frequently communicate with each other, try to understand each other's domain specific knowledge, work to make the data and data science methods understood by all parties, and try to visualize and present the results in a clear and jargon-free manner.

3. Developing the expertise in one application domain.

iSchool Strengths in DS Education

iSchools have strengths over other disciplines:

DS Project Management
Data Curation
Insights Generation from data analyses
Equipping students with capabilities to be future CDOs

iSchool students have an excellent potential to learn desired skills and characteristics of a Chief Data Officer (CDO)

IBM, 2014; IY Song, 2016

Human-Centered Data Science (HCDS)

Professor Javed Mostafa
University of North Carolina at Chapel Hill
iDSCC Co-Chair

How we should seek input from faculty about HCDS?

As this is a collaborative effort among a broad set of colleagues from LIS, IS, and the professionals.

It is critical that we learn from many colleagues in the information field: Especially, how they are contemplating incorporating HCDS in their curricula

HCDS Topical Areas I

Data models and standards for data sharing

Ontologies and methods for ontology development

Curation of data, software, systems, user profiles, work-flows, and practices

HCDS Topical Areas II

User behavior associated with data systems and systems that collect data

Safe, fair, and empowering use of data

HCDS Topical Areas III

Normative, legal, regulatory and ethical issues

Monitoring coverage and behavior of machines that collect data
Use of data by humans (user behavior, interpretation and applications, constraints, and empowering use)
Use of data by humans and machines in collaboration

Impact and implications of big data / data science services on users, cohorts/populations, communities, and society

Skills and practical knowledge of Human-Centered Data Systems I

Ethically-anchored design

Safety-anchored design

Health- and wellness-anchored design

Requirements analysis for ethical, safe, empowering, usable, and environmentally-friendly data systems

Skills and practical knowledge of Human-Centered Data Systems II

Innovation, translation, and deployment of socially- and environmentally-responsible and sustainable data systems

Change-management and supporting long-term use of big data systems

Evaluation of systems from legal, safety, empowerment, and usability perspectives

JASIST Special Issue: HCDS Education

Some key topics

- *Theories, principles, and conceptual frameworks associated with core HCDS*
- *Practices and skills relevant to HCDS*
- *Case studies and model educational practices of HCDS*
- *Data sets and software that support and promote HCDS*
- *Global perspectives of and achieving global impact with HCDS*

Faculty Survey on HCDS

- *Seek input*
- *Build consensus*
- *Recommend HCDS education curriculum and best practices from the faculty perspective*
- *Method: Delphi technique*

Multi-round Delphi Survey

Anonymity:
Participants' identities will not be revealed; their input and responses will remain anonymous before, during, and after the study;

Iteration:
The survey consists of several rounds for participants to reach consensus on the major and most critical topics and issues for HCDS education in iSchools.

Feedback:
Participants will have the opportunity to review their peers' contributions from previous round(s) while anonymously, independently, and objectively contributing their own.

Watch for the survey invitation and offer your insight!

Work in 2019

- *Survey on Job Ads (Yin Zhang)*
- *DS Curriculum survey (Dan Wu)*
- *DELPHI Survey in progress (Yin Zhang, Javed Mostafa)*
- *DS Workshop at ASIST (Sam Oh, Yin Zhang, Dan Wu, Javed Mostafa, Il-Yeol Song)*
- *Plan for DS Challenge workshop at iConf 2020*
- *GoogleDoc site as a repository:*

https://drive.google.com/drive/folders/14X0ejJd_2bnT_opYmlTpzDVmlA-j6UFgZ

Work in 2020

Create subgroups

- *(BSDS, MSDS-Professional, MSDS-Research, Repository, etc.)*

Identify core requirements for iSchool DS programs

Outcome

- *Model DS curriculums*
- *Pedagogy*
- *Teaching approaches*
- *Repository of teaching materials*
- *Study results*
- *Etc.*

The iSchool Characteristics

Covering DS Lifecycle

- *From requirements to evaluation, deployment, curation, and archiving*

Human-Centered Data Science (HCDS)

Application-focused: Problem-solving with tools in domains

Social-aspects of data science: Ethics, privacy, and legal implications

- *Project management*
- *Knowledge for Chief Data Officer (CDO)*
- *Story-telling, Presentations*

Working with domain experts

Generating insights from data and interpretation

Emphasis on requirements and evaluations

- *DS Analysis and design*

Big Issues for iDSCC

The identity of the iField DS curriculum

- *iField DS model vs CS DS Models vs. B-School Analytics Models*
- *ACM DS Model, EDISON, Park City, INFORMS, BHEA-DSA*

UG vs MS Curriculum

- *MS: Professional vs. Academic models*

Introducing soft DS skills: scope? should we?, how-to?

- *Human-centered, Requirements, Story-Telling, Ethics, Privacy, DS scenario designs, Project management, Intellectual curiosity, Team work, Communication skills, Digital curation*

Coping with IT trends

- *AI, Digital transformation (Industry Revolution 4.0), IOT, Cloud computing*

Job markets

- *Data scientists, Citizen Data Scientists, CDO, etc.*

iSchool Digital Humanities Curriculum Committee (iDHCC)Report

Professor John Walsh (Indiana University)Professor Marcia Zeng (Kent State University)

iSchool Digital Humanities Curriculum Committee (iDHCC)

Initiated Feb. 2019

Members from 7 countries
(in alpha. Order)

John A. Walsh, Indiana University, USA. Co-Chair

Marcia L. Zeng, Kent State University, USA. Co-Chair

Peter Cobb, University of Hong Kong, China (new)

Koraljka Golub, Linnaeus University, Sweden

Ying-Hsang Liu, Australian National University, Australia

Jeonghyun (Annie) Kim, University of North Texas, USA

Simon Mahony, University College London, UK

Heejin Park, Hansung University, South Korea

Chris Alen Sula, Pratt Institute, USA

Kulthida Tuamsuk, Khon Kaen University, Thailand

Ted Underwood, University of Illinois, USA

Xiaoguang Wang, Wuhan University, China

iDHCC Plan

1st year:
collect info, analyze what is out there, try to make sense out of it.

2nd year
an end-product includes curriculum frameworks from the iSchool perspective
everyone can decide if and how to adopt.

Stage 1. Preliminary fact-checking (before 2019-04)

Focus: DH education models

- *Program types, levels, components, hosts, collaborators, etc.*

Coverage: all over the world

- *reached each continent and collected data across countries, languages, types of institutions, and levels of programs.*

Data source: information available on the web

- *program websites and registries*

Outcome: findings were summarized and reported at iConference 19.

Major findings - DH and iSchools

DH researchers are among the faculty at many iSchools.

DH courses and/or programs are offered by iSchools (alone or in collaboration with other units).

Much or most of the research and teaching at iSchools is relevant to DH scholarship.

iSchools are well-situated to address the interdisciplinary, technical, methodological, and critical dimensions of DH.

DH education key points: Based on iDHCC collective studies and discussions

- *Collaborative*
- *Partnership*
- *Diversity*
- *Open-minded*
- *Interdisciplinary*
- *Reflective practice*

Opportunities for iSchools

- *Collaborate with other units on campus (humanities departments and DH centers).*
- *Collaborate across iSchools; international collaborations.*
- *Lead DH efforts on campus.*
- *Expose humanities students to iSchool research, teaching, and career opportunities.*
- *Develop courses focused on cultural and humanities data that may serve data science programs.*
- *Through DH, demonstrate the breadth and scope of iSchool research and teaching*

Opportunities

- *Leadership*
- *Collaboration*
- *International diversity*
- *Core areas/ expertise of ischools almost everything in DH research is tied to what ischools do*
- *Expose iSchool program through partnerships*

Stage 2. Investigations (in the context of iSchools)

DH education models

- *Types, levels, components, etc.*

DH courses (providers)

- *All available courses (e.g. from registry), any field*
- *All iSchools' offered courses*
- *Only the iSchool Consortium members' offered courses*
- *Courses offered by others*

3. DH curriculum (contents)

- *Research methodologies*
- *Digital technologies*
- *Context (types, ranges, levels)*
- *Humanities-theories*

4. DH-related careers

- *Job Ads Analysis*
- *Jobs Mapping to iSchools Courses*

5. DH education Management/ Administration

- *Challenges (in different categories) and approaches*
- *New-program-specific (e.g., approval, funding, human resources)*
- *Existing-program-specific [e.g., change title, adjust levels, relation with other related programs]*
- *Business management issue. Financial impacts*
- *Agreements between institutions*

6. DH Collaborative disciplines (related to program curriculum)

Committee plan (2019- 2021)

Collect and analyze data, conduct research;

Design and maintain a web for the iSchools members to register and report their programs;

Co-organize DH sessions or workshops at various conferences;

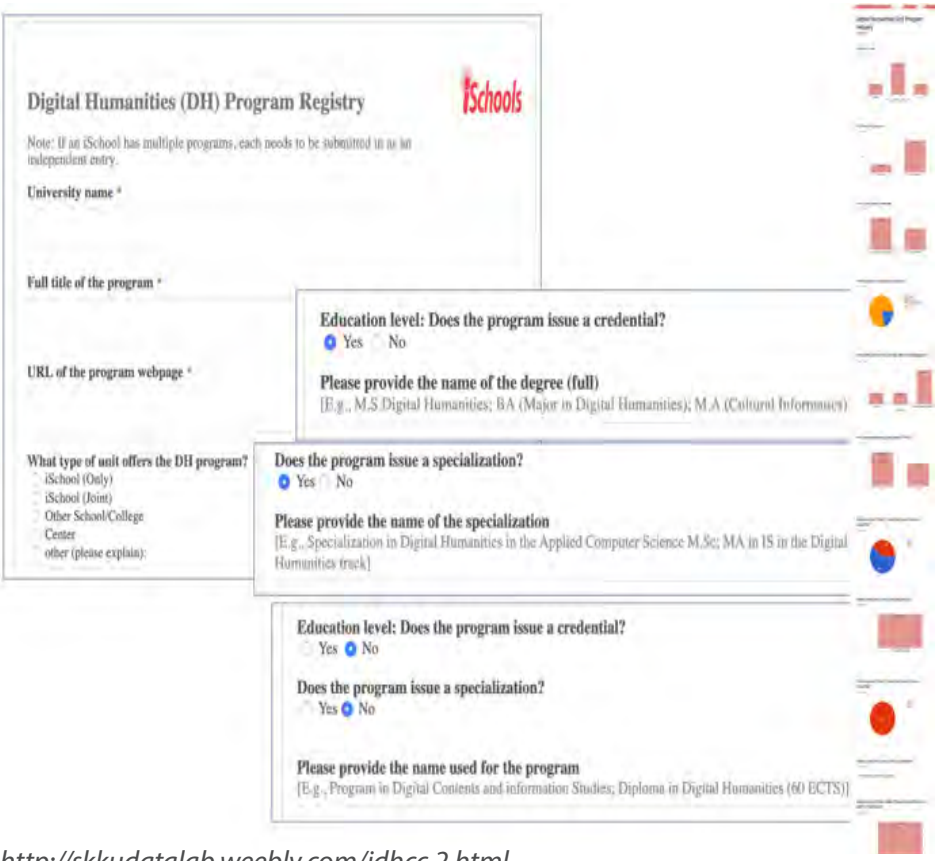
Prepare reports on:

- *Opportunities and challenges in DH for iSchools*
- *Models for iSchool DH programs*
- *Status for DH courses and curricula*
- *DH-related careers*
- *DH education management/administration*
- *DH collaborative disciplines (related to program curriculum)*

Outcomes

- *Report to iSchools*
- *Publications*
- *Conference presentations*
- *Possible grant applications (IMLS, HEH, etc.)*

A registry designed for iSchools members to use



http://skkudatalab.weebly.com/idhcc-2.html

Contributing to a JASIST Special Issue on DH

CFP and Paper-development 2020:

- *3/23-26/2020: Announce at iConference.*
- *7/20-24/2020: A special forum at Digital Humanities International Conference 2020, communicating with potential paper contributors.*
- *9/14-17/2020: A panel at Dublin Core 2020, communicating with potential paper contributors.*
- *10/23-28/2020: A panel or a paper-development-workshop at ASIST 2020, communicating with potential paper contributors.*

Submission Deadlines 2021:

- *Paper submission due: January 15, 2021*
- *First round review notification: April 2, 2021*
- *Revision due: June 1, 2021*
- *Final notification: August 15, 2021*

Main Theme (draft plan)
Infrastructures of Digital Humanities

- *[a state-of-the-art review]*
- *[research on the infrastructure]*

DH Infrastructures and their applications

- *[focus on the innovative researches across multiple domains]*

DH landscape (in the context of DH history)
H (humanities) to inform D (digital) research (in the context of DH)
DH education and training

Guest editors:
Marcia Lei Zeng [iDHCC]
Chris Alen Sula [iDHCC]
Eero Hyvönen

- *Director, Helsinki Centre for Digital Humanities (HELDIG), University of Helsinki;*
- *Professor, Department of Computer Science, Aalto University.*

iSchool Data Curation Curriculum Committee (iDCCC)Report

Dr. Ayoung Yoon (Indiana University Purdue University Indianapolis)
Dr. Kalpana Shankar (University College Dublin)

Purpose

The DCCC was convened by Sam Oh, chair of the iCaucus, to draft a report on the current state of data curation curriculum in the iSchools. The report will be presented to the iSchool leadership. The aims of the committee are:

- *To define data curation as a field of study, specifying our view and objectives in data curation education*
- *To provide a list of courses with English language descriptions*
- *To provide a mapping table which ties broader topics to specific courses*
- *To provide a list of links, literature, and existing curricula/recommendations that the committee has reviewed*
- *To provide a curriculum for a graduate-level data curation curriculum*

IDCCC Members

Co-Chairs:

- *Ayoung Yoon (Indiana University Purdue University Indianapolis)*
- *Kalpana Shankar (University College Dublin)*

Members:

- *Andrea Thomer (University of Michigan)*
- *Nicholas Weber (University of Washington)*
- *Wei Jeng (National Taiwan University)*

IDCCC Advisory Board Members

Christine Borgman

- *Distinguished Research Professor, UCLA (USA)*

Louise Corti

- *Associate Director of UK Data Archive and Director of Collections Development and Data Publishing at UK Data Service, UK Data Archive (UK)*

Dharma Akmon

- *Assistant Research Scientist and Director of Project Management and User Support, ICPSR (USA)*

Carole L. Palmer

- *Professor and Associate Dean for Research, Information School, University of Washington (USA)*

Michael Witt

- *Associate Professor, Distributed Data Curation Center (D2C2), Purdue University Libraries (USA)*

Natalie Harrower

- *Director Digital Repository of Ireland, ALLEA E-Humanities Working Group Digital Repository of Ireland, The Royal Irish Academy (Ireland)*

Bridget Almas

- *Lead software developer, Perseus Digital Library, Tufts University (USA)*

Matthew Mayernik

- *Project Scientist and Research Data Services Specialist, NCAR/UCAR Library (USA)*

Tasks completed

Preliminary annotated bibliography prepared and discussed

Terms of reference discussed/reconfigured in light of annotated bibliography

Findings

Curricula are well-established.

Data curation/digital curation is defined and taught differently by individual instructors, iSchools, and regions.

Annotated bibliographies already exist.

Curricula are separate from data science, digital humanities, and other areas, but have some overlap with them.

Next steps

To summarize existing definitions, frameworks, and curricula on the topic of data curation.

To describe the unique value proposition of educating data/digital curators in an iSchool context.

To enumerate the advantages of doing a digital/data curation education in an iSchool and how such an education will provide both complementary and different approaches to other academic homes for similar skills development (e.g., digital humanities, bioinformatics, business).

To articulate what the iSchools can prepare for critical engagement in the field and opportunities for growth.

To integrate sociotechnical perspectives, information ethics, critical thinking, transparency and accountability, national and international policy, open science, open government, etc. into digital/data curation curricula.

Q & A

Thank You !!!

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP
Chair, TOI - International Conference on Technology and Information Organization

SUNGKYUNKWAN UNIVERSITY

SAM OH

SUNG KYUN KWAN UNIVERSITY

Contents

Overview

History

Heritage

- Sungkyunkwan was founded in 1398 as a royal Confucian academy
- Jongyeonggak, the first library, established in 1475
- Reorganized into modern college in 1895

Modern Advancements

- Sungkyunkwan College established 1946
- Became comprehensive university 1953
- Natural Sciences campus opened in 1978
- Partnered with Samsung since 1996

Overview

Historic Legacy

Yi Hwang

1501 – 1570

- **President**
- Alumnus
- Confucian Scholar
- Statesman

Yi I

1536 – 1584

- **Alumnus**
- Confucian Scholar
- Statesman
- Philosopher

King Sejong

1397 – 1450

- **Chairman** of Board of Trustees
- Invented Korean Alphabet (Hangul)

Shin Saimdang

1504 – 1551

- **Yi I's Mother**
- Artist
- Calligraphist
- Poet

Overview

Rankings & Reputation

#1 Private University in Korea

(THE, U.S. News & JoongAng Ilbo)

National	Asia	World
#1 in Employment	10 (THE)	30 (Univ. Impact, THE)
#1 in NCSI & KS-SQI	16 (QS)	89 (THE)
2 (THE)	22 (U.S. News)	95 (QS)
4 (QS)		195 (U.S. News)
2 (U.S. News)		151-200 (ARWU)
2 (JoongAng Ilbo)		39 (Reuters Innovation)
		71-80 (Reputation, THE)

Overview

Vision & Mission

Vision

Student Success
Creating Future Value
Global Leading University

Mission

Offer world-class education, produce exemplary research, build reputation, and be global hub with the best knowledge and human resources network

Overview

Student Success Center

- Acts as a gateway and role model for student success
- Restructures student support programs
- Manages students using big data

Overview
Samsung Foundation

- Funds scholastic and research programs and construction of new facilities
- Provides expertise through guest lecturers
- $1 million in tech. transfer over last three years
- SKKU and Samsung manage 110 joint research projects with $10.7 million in annual funding

Overview

Facts & Figures

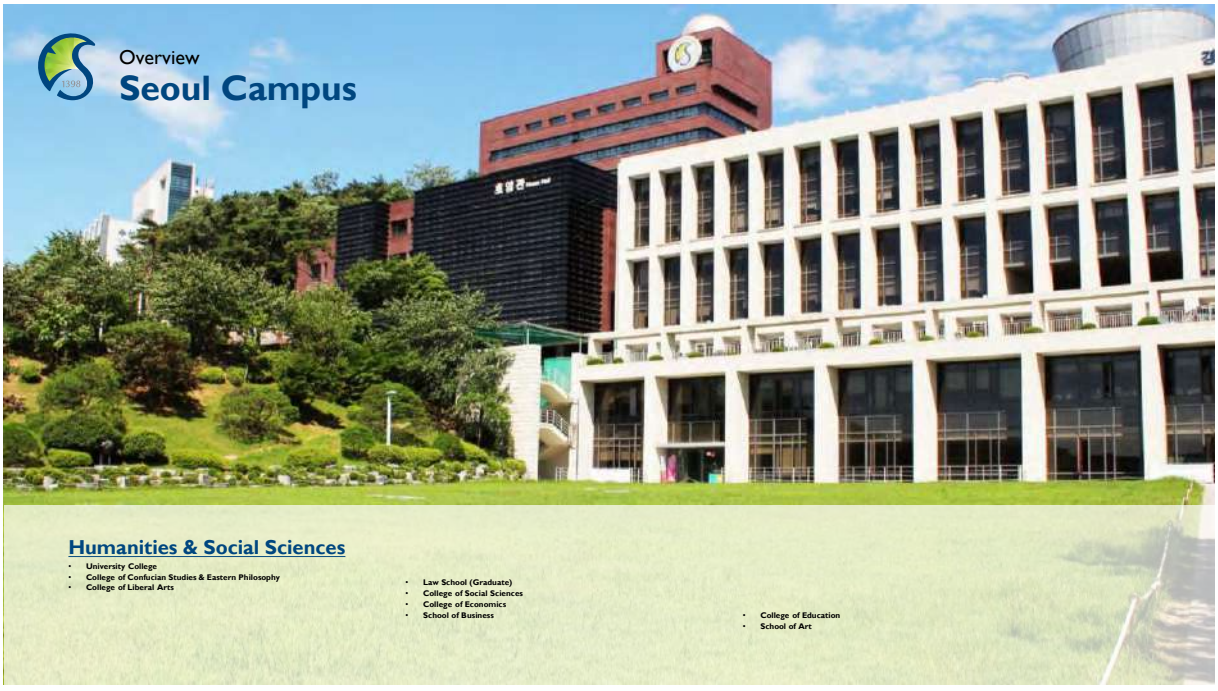
Core Principle - 修己治人 (Institution to improve society)
School Motto - 仁義禮智 (Benevolence, Righteousness, Propriety, Wisdom)

Full-time Faculty: 1,449

Students: 27,098 (7,299 Graduate)

Administrative Staff: 301

Colleges: 18
Departments: 130



Overview

Seoul Campus

Humanities & Social Sciences

- University College
- College of Confucian Studies & Eastern Philosophy
- College of Liberal Arts
- Law School (Graduate)
- College of Social Sciences
- College of Economics
- School of Business
- College of Education
- School of Art

Overview

Suwon Campus

Natural Sciences

- College of Science
- College of Information & Communication Engineering
- College of Software
- College of Engineering
- School of Pharmacy
- College of Biotechnology & Bioengineering
- College of Sport Science
- School of Medicine
- SKKU Institute of Convergence

Education

Education

Humanities & Social Sciences

Confucian Studies & Eastern Philosophy

- SKKU's foundation
- Proudly preserving and imparting Confucianism's two millennia history

Law

- JD Programs: Public Law, Tax Law, Criminal Law, Corp. Law, etc.
- Partnered with 19 int'l. universities, including the University of Edinburgh, and Nagoya University, among others

Liberal Arts

- 16 international partnerships
- Dual degrees with Univ. of Toulouse II and Nat. Chengchi Univ.

Social Sciences

- Published 68 and 57 research papers in 2018 and 2017
- Partnerships with Brown and Ludwig-Maximilians University München

Education

Humanities & Social Sciences

Business

- Most internationalized at SKKU
- Elite Global Business Administration program (0.5% KSAT, All English)
- GSB MBA ranked 42nd in the world and 1st in Korea (2018, Financial Times, MIT, Indiana, 30% Foreign students)

Economics

- Elite Global Economics program (0.5% KSAT, All English)
- Another Economics Program with Dual degrees with Indiana University, University of Essex, Erasmus University Rotterdam, and University of Birmingham (47.1% of courses taught in English)

LIS and Data Science

- SKKU LIS ranked 28th in the world by QS

Education

Natural Sciences

Engineering

- Largest Engineering Program in Korea
- Mechanical Engineering ranked 42nd in world by QS
- Chemical Engineering ranked 35th in world by QS
- Advance Materials ranked 31st in world by QS
- 53.8% of courses taught in English

Biotechnology and Bioengineering

- Strong research performance
- Partnered with 11 int'l. universities, including Thai Nguyen Univ., the Univ. of Iowa, Hanoi Univ. of Agriculture, Yanghzhou Univ., Linyi Univ., Kyoto Univ., Kobe Univ., Univ. of Dhaka Medical School, and SUP Biotech

Education

Natural Sciences

Information and Communication Engineering

- High graduate employment rate
- Partnered with 42 international universities
- 48.1% of courses taught in English

Software

- Shares CICE international partnerships
- Promotes interdisciplinary software education
- 68% of courses taught in English

Artificial Intelligence

- Newest program created with 11.7 billion KRW in funding
- 15 full-time professors and 15 adjunct professors
- Leads experts in creating new values in the AI field through creative thinking and a challenging spirit
- Generates leaders with global competencies to contribute to human society

Education

Natural Sciences

Pharmacy

- Published 322 papers, made 13 patents, and had 4.06 citations per paper last year
- Partnered with 12 int'l. universities, including USC, Tohoku Univ., King's College, Jilin Univ., and Univ. of Medicine and Pharmacy of Ho Chi Minh City

Medicine

- Works with top research hospital in Korea, Samsung Medical Center
- Partnered with 10 int'l. universities
- Ranked 37th in world (THE), #1 Private Medical School in Korea

Samsung Scholarship

Any student who gets KSAT below 0.5% receives
4-year tuition scholarship.

About 30% of SKKU students receive Samsung scholarship.

Education

Fourth Industrial Revolution

Differentiation & Convergence

Mandatory Software Education

- Subjects: Every sophomore (Regardless of their majors)
- Course: 17

ABEEK (Accreditation Board for Engineering Education of Korea)

- Subjects: Students in the School of Engineering
- ABEEK has been approved as a signatory of the Washington Accord

Convergence Education

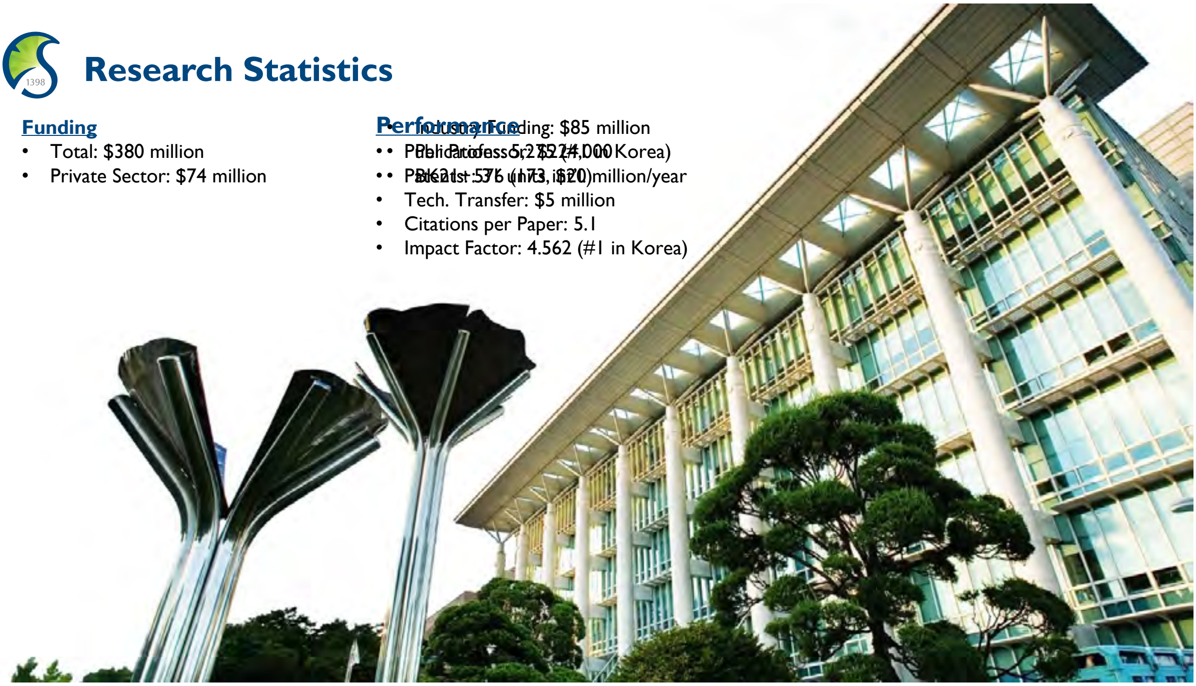
- Bachelor of Data Science, AI, Art & Tech

Research

Research Statistics

Funding
- Total: $380 million
- Private Sector: $74 million
- Industry Funding: $85 million
- Per Professor: $224,000
- BK21+: $20 million/year

Performance
- Publications: 5,275 (#4 in Korea)
- Patents: 576 units (173, int'l)
- Tech. Transfer: $5 million
- Citations per Paper: 5.1
- Impact Factor: 4.562 (#1 in Korea)



Research & Development

AEAS

Academy of East Asian Studies

- Partnered with **Harvard, UCLA, Stanford, U of Chicago, and Leiden**
- 4 core research institutes on Korean & East Asian Studies and established 16 interdisciplinary Research Clusters (RC)
- Published 2,395 papers in major journals last year

Research Centers

SKKU Advanced Institute of Nanotechnology (SAINT)

- Focused on every Nano field
- World top 5 in Nanotechnology

IBS (Institute for Basic Science)

- Center for Integrated Nanostructure Physics
- Center for Neuroscience Imaging Research

SAIHST (Samsung Advanced Institute for Health Science and Technology)

- Health Sciences and Technology research via educating convergent-creative professionals in medicine and health industry

BICS (Bio-medical Institute for Convergence and Science)

- Converges biomedical and health sciences with nanotechnology

Research
Centers

SCI-Cube (Convergence Institute for Intelligence and Information)

- Converges health, bio-medicine, manufacturing, and business to make new technologies

SKKU Convergence Institute for Culture, Arts, and Media (SCI-CAM)

- Utilizes humanistic imagination, artistic sensibility, social and communication skills and creative transmedia skills

Institute of Quantum Biophysics (IQB)

- Facilitate collaborative and interdisciplinary research efforts to establish quantum biology, quantum biophysics, and quantum biological ICs (QBICs) for 5P (Preventive, Predictive, Personalized, Participatory, and Precision) medicine

Industrial Collaboration

Collaboration

Industry

SAMSUNG

GM KOREA

LG

HYUNDAI

BASF We create chemistry

sabic

posco

kaneka

Benefits

- Valuable Resources
- Professional Expertise
- Outstanding Facilities
- Real-life Hands-on Training
- Career Opportunities for Students
- Developing Exciting New Products, Materials & Technologies

Collaboration

Samsung Programs

Education programs in all subjects, including planning, class management, job placement, etc.

Collaboration with Samsung Medical Center

13 Joint Programs with Samsung

- Semiconductor Systems / Semiconductor Display
- Software / IT Convergence
- Mobile Communications & Power Electronics
- Digital Media & Communications
- Global Construction Engineering
- Health Science and Technology
- Actuarial Science Medicine
- GSB MBA / Executive MBA
- China MBA

Collaboration

Entrepreneurship

Corporate Collaboration Center

- Facilities: Office space, conference rooms, research rooms, lounges, restaurants, and patent office
- Benefits: Technology consultation, management and accounting consultation, marketing support, intellectual property rights assistance, certification assistance, exhibition assistance, design and prototype manufacturing assistance, and textbooks
- Registered Companies: 41
- Sales: $13.4 million

Grand ICT Research Center

- Initiated by Korean Government
- Consulting small and medium-sized ICT companies about advanced technologies
- Educating professionals through our graduate program

Global Engagement

Global Engagement

Internationalization Strategy

Four Points

- Diversify global network
- Increase exchange with influential and prestigious institutions
- Build strategic partnerships with many types of valuable collaborations
- Utilize network to mutually benefit academic programs, research, and international reputation

International Figures

International Degree-seeking Students: 3,558 (13.9%)

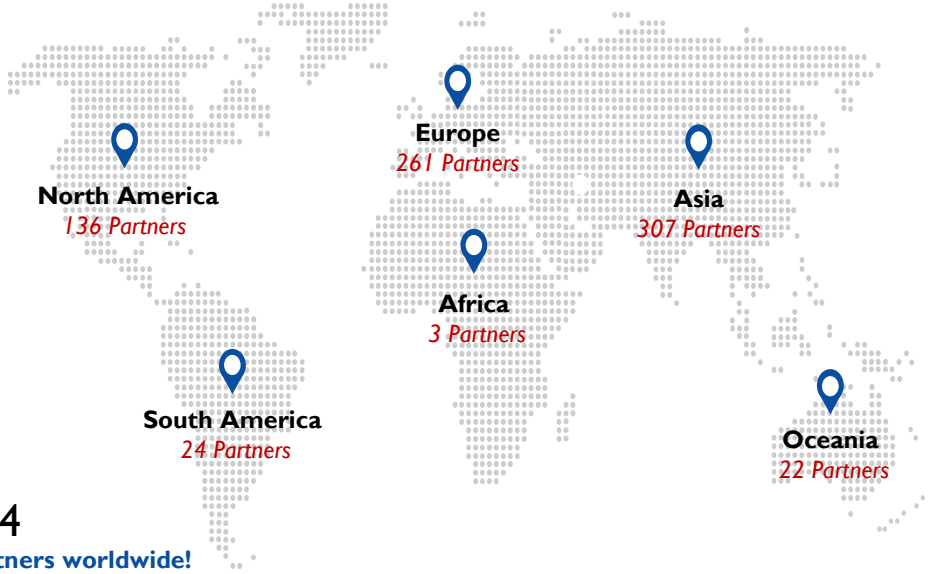
Inbound Exchange Students: 1,100

Outbound Exchange Students: 700

International Faculty: 247 (8.5%)

Courses in English: 45%

International Partners



754

Partners worldwide!

Global Engagement

International Programs

SKKU Writing Contest

Students throughout Europe and Asia may be awarded scholarships to SKKU

Past Contest Locations

Vietnam, Indonesia, Kazakhstan, Austria, Uzbekistan, China

Global Engagement
ISS & WISE

International Summer Semester

- Student: 1,400+ Students, 25+ Countries, 65+ Universities
- Courses : 70+ unique courses
- Faculty: 80% from Partner Universities

Winter International Student Experience

Duration: two weeks Courses: Korean Language, Korean Business, and K-Culture (media, entertainment, music, dance, fashion)

Global Engagement
SLI

Sungkyun Language Institute (SLI)

- Regular Korean Programs (RKP)
- 3-week Korean Program
- Six 8-week instructional sessions each year
- 6 levels from beginner to highly advanced
- Each session has regular classes, elective courses, and cultural activities (field trips)

Global Engagement

Social Networking

Facebook.com/skkuintl

Twitter.com/SKKUOIA
#skku

Instagram.com/sungkyunkwan.university.intl
#성균관대학교
#skku #성균관대 #성대
#sungkyunkwanuniversity

Student Success! Creating Future Value!

Q & A

Thank You !!!

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP

Chair, TOI - International Conference on Technology and Information Organization

DOING DATA SCIENCE PROGRAM IN AN ISCHOOL CONTEXT

WORKSIK "JEFF" SHIM

Doing Data Science Program in an iSchool Context

Professor Wonsik "Jeff" Shim

Sungkyunwan University (SKKU) iSchool

wonsikshim@skku.edu

SKKU at-a-glance

- *Founded in 1398, 621 Years!*
- *Based on Confucianism*
- *University Symbol: Gingko Leaf*
- *27,000+ Enrollment: Comprehensive University*
- *4,000+ Int'l Students (450+ Exchange/Visiting)*
- *600+ Global Partnership*
- *Strong Collaboration with SAMSUNG*
- *Ranked 89th @ THE World University Rankings 2020*

SKKU iSchool at-a-glance

- *Founded in 1964*
- *First program to offer LIS doctoral degree in Korea*
- *First school to join iSchools in Korea*
- *First school to offer Data Science undergraduate program in Korea and probably in the world*

Context

- *Disciplinary relevance and expansion*
- *Student expectation and job market (mis)alignment*
- *iSchool aspiration*

Delivery

- *Data Science double-major(minor) program in 2014-2018 (5 years)*
- *Enrollment(2018 Fall): 270 students from 37 departments*
- *Curriculum – 8 DS courses + many LIS courses + small number of cross-listed courses from allied majors(business, statistics, CS education, consumer economics, linguistics)*
- *Excellent external assessment – "A" grade for 5 years from the Ministry of Education*

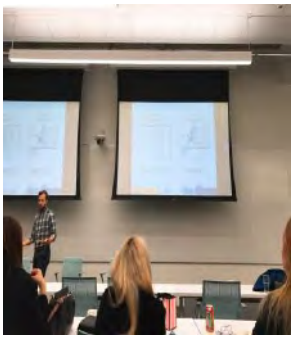
CSFs (Critical Success Factors):

- *Government funding: internal & external credibility*
- *Cultivated cooperation with other academic units*
- *Name! Novelty(niche)*
- *Well-balanced program combining curricular and extracurricular activities(boot camps, global camp, iSpeaker series, exchange programs,…)*
- *Strong leadership, dedicated full-time coordinator*
- *Advisory board: industry experts and entrepreneurs*

Student Exchange Program

Inbound exchange students

Global DS Camp @ UW iSchool



- *Program Details*
  - *6-8 Lectures by UW iSchool*
  - *5-7 site visits*
  - *Weekend cultural activities*

UW Summer Class @ SKKU iSchool

- *Program Details*
  - *Title: Information, Culture, and Technology in Modern Korea*
  - *Host: SKKU iSchool*
  - *Supervision: Dr. Matt Saxton (UW) and Dr. Sam Oh (SKKU)*
  - *More than 11 years in running. The 12th in 2020.*
  - *Three faculty and 14-18 students at a time from UW*
  - *1:1 buddy system (1 UW and 1 SKKU Partner)*
  - *One of the most successful abroad programs at UW*
- *Date*
  - *Starts in the middle of August for a month*
- *Contents*
  - *Lectures: Korean Economy, Korean Politics, Korean Culture, IT Trends, and Korean Language*
  - *Site Visits: Several big and small innovative companies in Korea*
  - *Group Work: Working as a team to finish a joint research project (UW and SKKU together)*
  - *Team Presentation: The final project on the last Friday*
- *Cultural activities*
  - *Spending a week in Busan including Haewoondae beach*
  - *Temple stay, Nanta, Baseball game, DMZ visit, and MT Hiking*

2019 Revamp

- *Converted into a full-blown academic major*
- *20+ DS courses + a smaller set of cross-listed courses from LIS and other academic programs*
- *Housed under the School of Convergence with two other majors (Informatics—now AI, Culture & Technology), but SKKU iSchool runs the program*
- *Recruited 3 new faculty members*

Rainbow Model

Fundamentals | Data Management | Data Analytics | Big Data

Informatics | Domain | Data Science Capstone

Year 2

Introduction to Data Science	Python for Data Science	Mathematics for Data Science I
Data Ethics	R for Data Science	Mathematics for Data Science II
	Computing for Data Science	Statistics for Data Science I
	Computing for Data Science II	Statistics for Data Science II

Year 3&4

Data Management	Data Analytics	Big Data
Relational Databases	Machine Learning	Distributed Computing (Hadoop)
Enterprise DB Mgt	Natural Language Processing	Cloud Computing
Semantic Web	Time Series Analysis	Deep Learning
Metadata	Network Analysis	Artificial Intelligence
Data Visualization	Social Data Analysis	Internet of Things

Informatics	Domain
Web Programming	Humanities
Human-Computer Interaction	Economics
Information Retrieval	Management
Health Informatics	Marketing
Information Behavior	Global Data Science Camp

Year 4

Data Science Capstone

Future

- *Changed landscape (now everybody is doing DS): Applied DS master's program, Applied Quant Economics, Fintech,…*
- *Our own DS master's program?*
- *How do we design and deliver an iSchool distinctive DS education?*
- *Job market alignment and penetration still a challenge*

Q & A

Thank You !!!

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP

Chair, TOI - International Conference on Technology and Information Organization

TECHNOLOGY TRENDS WITH EMERGING & INNOVATIONS

SAM OH
SEUNGYUN LEE


SUNGKYUNKWAN UNIVERSITY
1398
성균관대학교
ETRI
2020
Technology
Trends
with Emerging & Innovations
January 2020
Professor Sam Oh
Sungkyunkwan University
Chair, iSchools Caucus
<samoh@g.skku.edu>
Dr. Seungyun Lee
ETRI
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2020

Technology Trends with Emerging & Innovations

PART I. ICT Paradigm Changes

PART II. Key Future Emerging Technology

PART III. Open Source Innovations

PART IV. ICT Standard Innovations

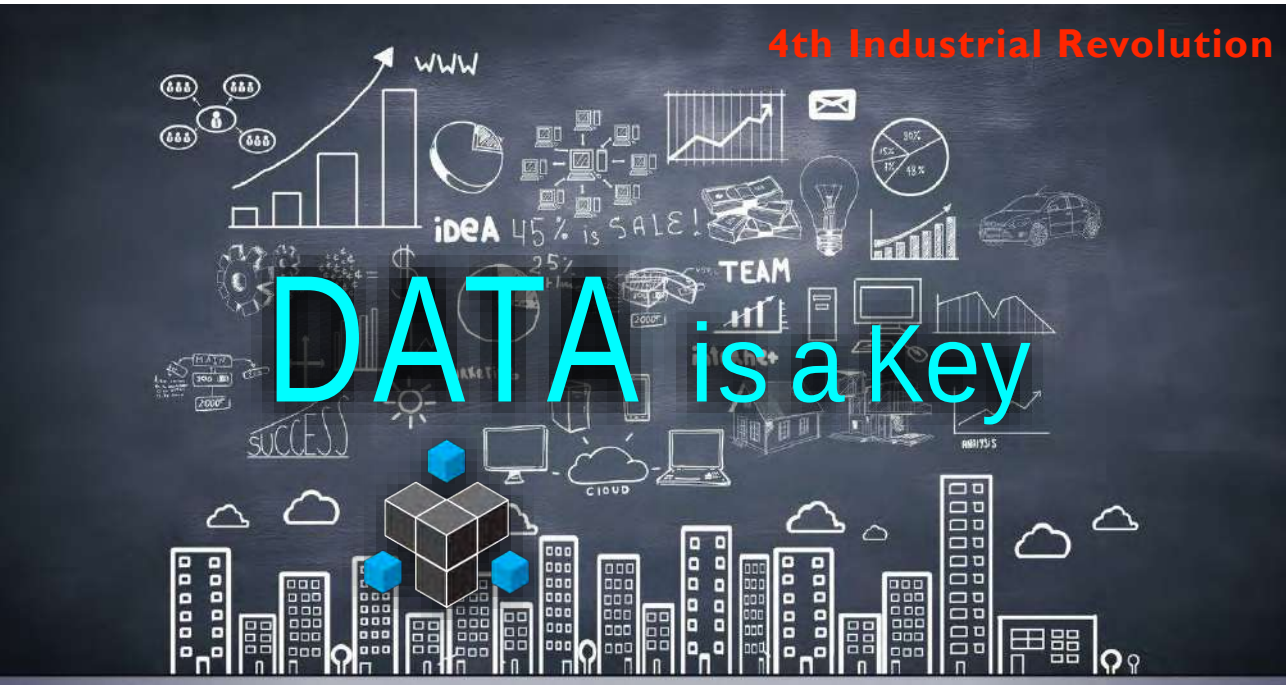
PART V. Conclusion & Future Considerations

PART I. ICT Paradigm Changes

Digital Transformation

4th Industrial Revolution


Digital Transformation
4th Industrial Revolution
Emerging & Innovations


4th Industrial Revolution
DATA is a Key

AI is a Driver

National Strategy for The 4th Industrial Revolution

Before talking about new technology itself …


The era of Zero-Growth
Is the Technology Revolution enough?


The era of Zero-Growth
Let's get over the limit !

The era of Zero-Growth

Resource depletion
Environmental destruction
Financial system collapse
…


The era of Zero-Growth
DEFORESTATION
RESOURCE DEPLETION
OVERFISHING
WATER CONSERVATION
THE ENERGY CRISIS
http://www.quotemaster.org/


Will it be possible only with Technological Innovation?

2020

Technology Trends with Emerging & Innovations

PART I. ICT Paradigm Changes

PART II. Key Future Emerging Technology

PART III. Open Source Innovations

PART IV. ICT Standard Innovations

PART II. Key Future Emerging Technology

Gartner®

Top 10 Strategic Technology Trends for 2020

△ People-centric

- Hyperautomation
- Multiexperience
- Democratization of Expertise
- Human Augmentation
- Transparency and Traceability

△ Smart spaces

- The Empowered Edge
- Distributed Cloud
- Autonomous Things
- Practical Blockchain
- AI Security

Gartner

2019

△Intelligent △Digital △Mesh

2020

△People-centric △Smart spaces

Driving Technologies for 4th Industrial Revolution

Artificial Intelligence

Big Data

Internet of Things

Blockchain

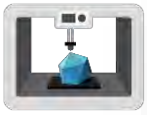
Cloud Computing

5th Generation Network (Mobile)

A new paradigm to support 4th Industrial Revolution

Open Source

Makers



3D Printer

Open H/W

The ultimate GOAL will be

Smart Factory

Smart Health

Smart CAR

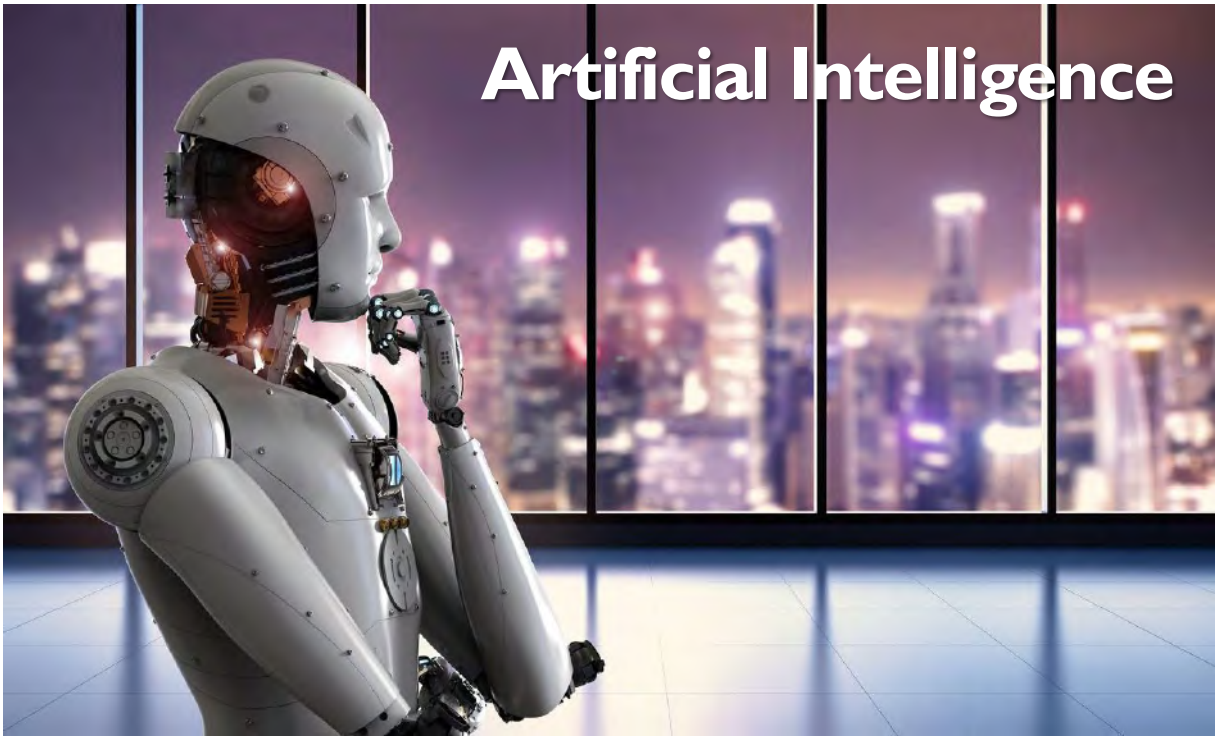
Smart Energy

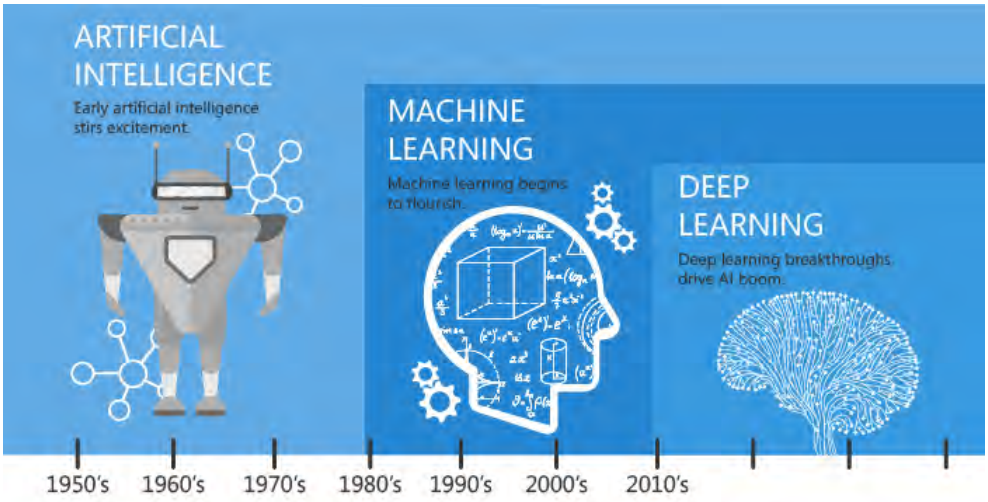
Smart City

Smart Farm


Everything Connected


Everything Connected
Smart Factory
Smart Farm
Smart CAR
Smart Health
Smart City
Smart Energy
BIG DATA
Artificial Intelligence
Big Data
Internet of Things
Blockchain
Cloud Computing
5G
5th Generation Network (Mobile)


Artificial Intelligence



Since an early flush of optimism in the 1950's, smaller subsets of artificial intelligence - first machine learning, then deep learning, a subset of machine learning - have created ever larger disruptions.

https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/


AI
What is the Key point in AI ?
Intelligence vs. Wisdom

Artificial Intelligence in 2016

"The development of full artificial intelligence could spell the end of the human race…"

Stephen Hawking

Artificial Intelligence is like **Summoning the Demon**

Elon Musk

What is the Key point in AI ?

Security & Privacy, Ethics

MORAL CODE:

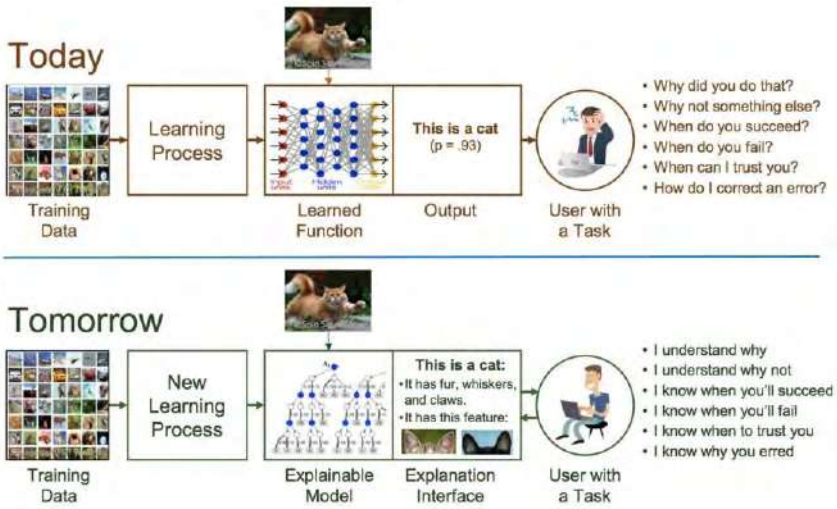
THE ETHICS OF AI

Issue on Artificial Intelligence

Next Generation Learning Technology
(e.g., XAI - Explainable AI)

Trustworthiness
(e.g., Ethics)

Explainable AI (XAI) Technology




DATA
Big Data Will Drive the 4th Industrial Revolution
https://datafloq.com/read/big-data-drive-fourth-industrial-revolution/317


BIG DATA
How to make the VALUE from the garbage?

DATA MANAGEMENT

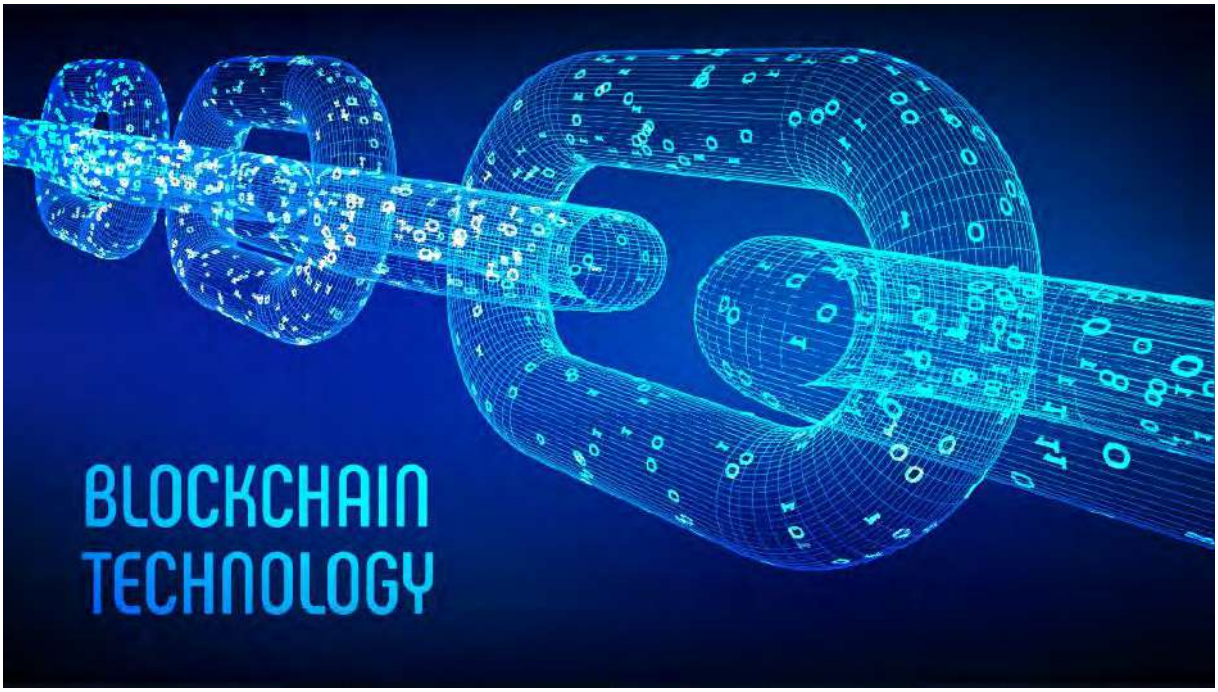
Acquisition, Storing, Processing, …

VS

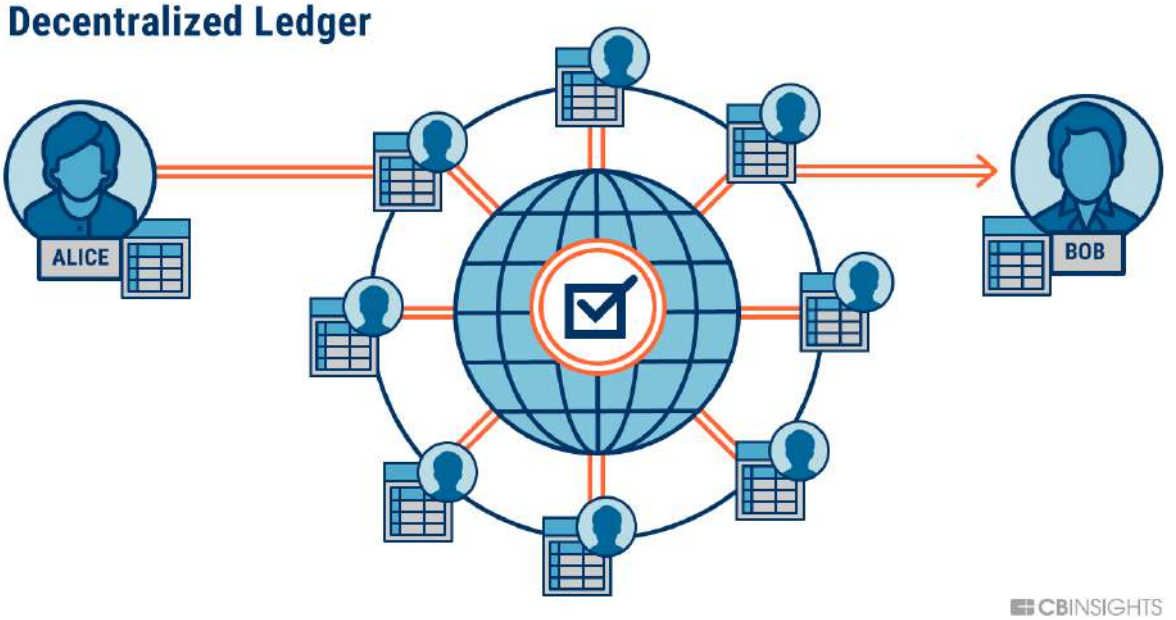
DATA ANALYTICS

Mining, Social Analysis, Visualization, …

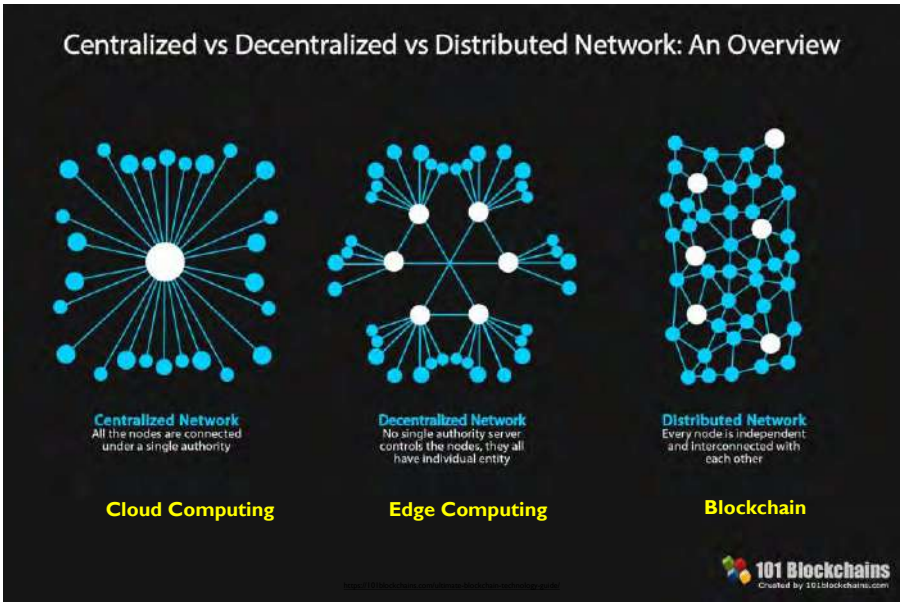

BIG DATA imply
Data Democratization
Promising Jobs:
Data Scientist vs. Data Developer

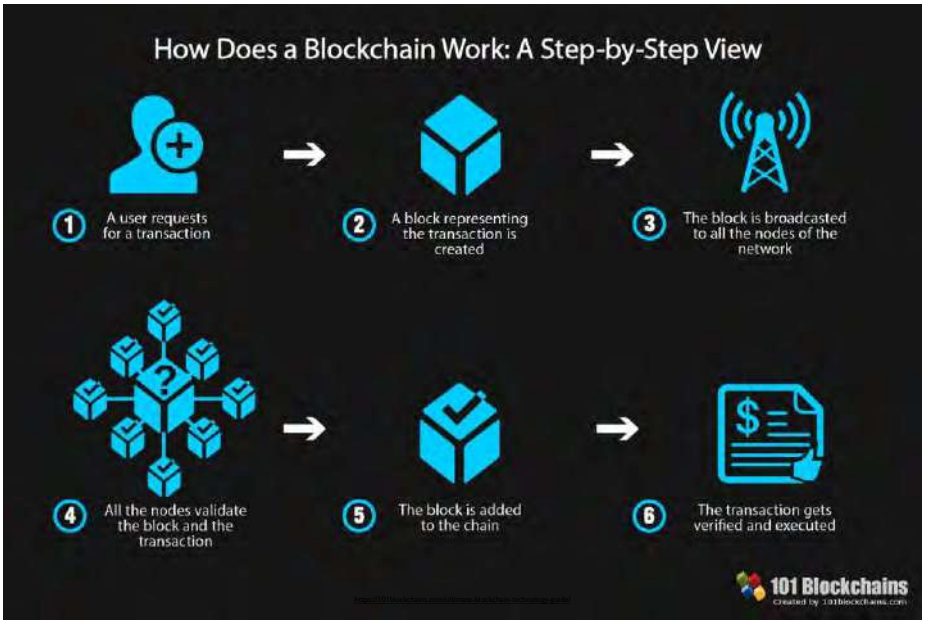

BLOCKCHAIN
TECHNOLOGY

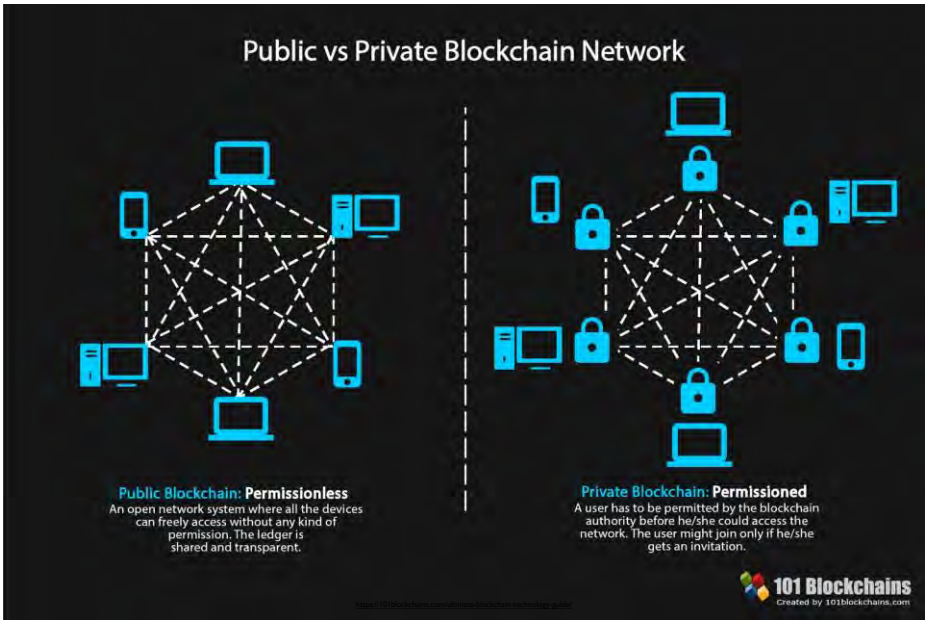
Decentralized Ledger



CBINSIGHTS


Centralized vs Decentralized vs Distributed Network: An Overview
Centralized Network
All the nodes are connected under a single authority
Decentralized Network
No single authority server controls the nodes, they all have individual entity
Distributed Network
Every node is independent and interconnected with each other
Cloud Computing
Edge Computing
Blockchain
101 Blockchains
Created by 101blockchains.com


How Does a Blockchain Work: A Step-by-Step View
1
A user requests for a transaction
2
A block representing the transaction is created
3
The block is broadcasted to all the nodes of the network
4
All the nodes validate the block and the transaction
5
The block is added to the chain
6
The transaction gets verified and executed
101 Blockchains

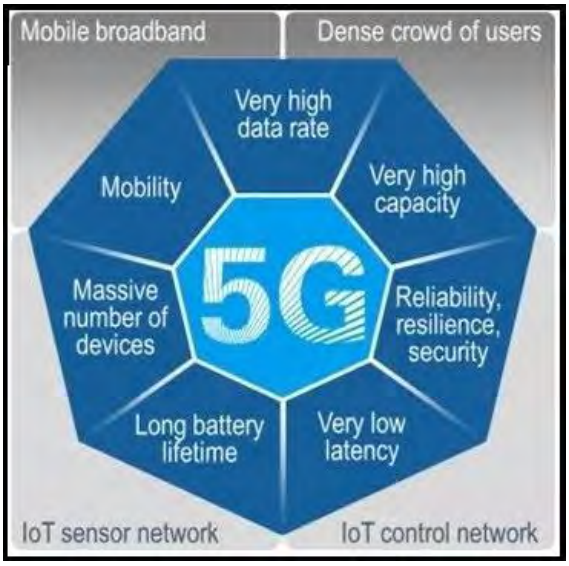

Public vs Private Blockchain Network
Public Blockchain: Permissionless
An open network system where all the devices can freely access without any kind of permission. The ledger is shared and transparent.
Private Blockchain: Permissioned
A user has to be permitted by the blockchain authority before he/she could access the network. The user might join only if he/she gets an invitation.
101 Blockchains
Created by 101blockchains.com


5th Generation Communication
5G


KT Launches World's First Commercial 5G Network
13 April 2019
kt
5G

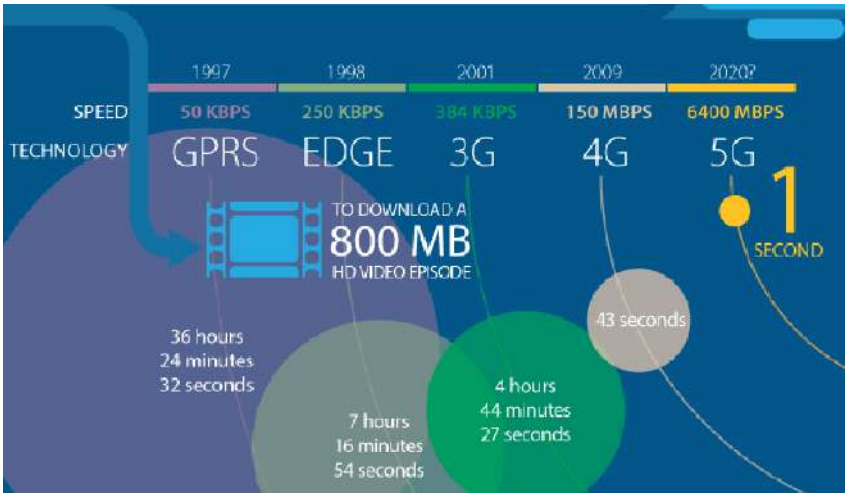
Features

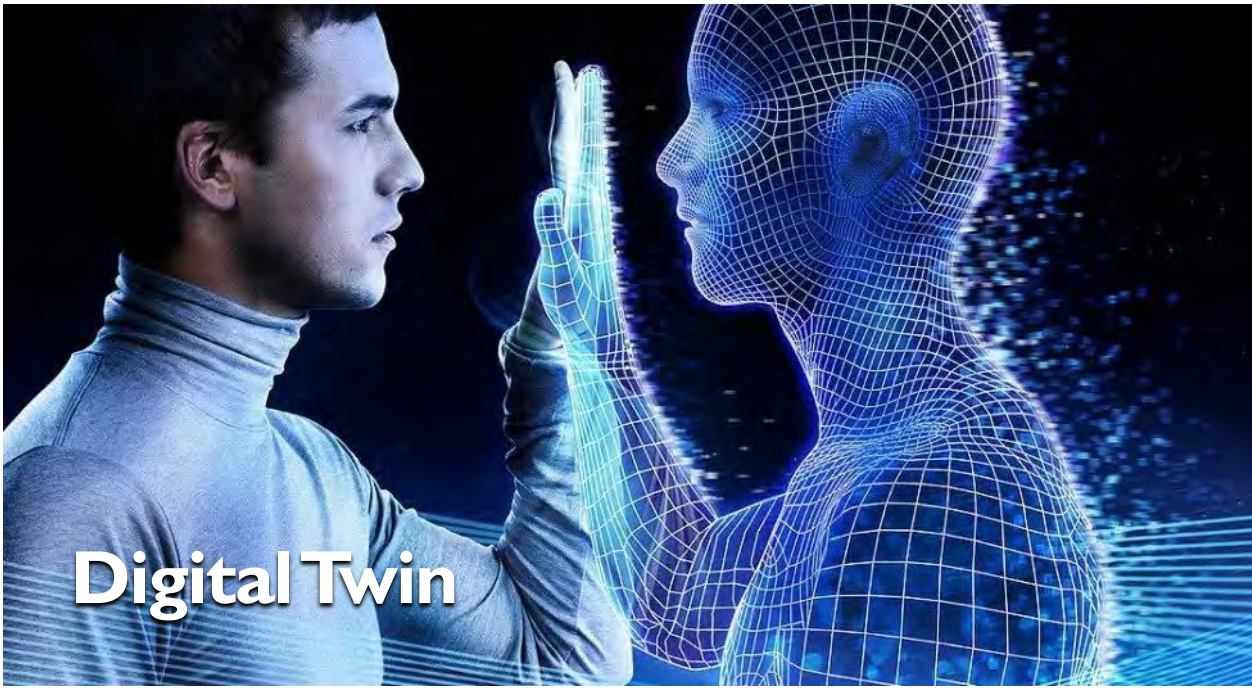
- **VR/AR Service**
- **Autonomous Car**
- **Real-time Services**
- **…**



What's the ISSUE on 5G?

Just faster?




Digital Twin

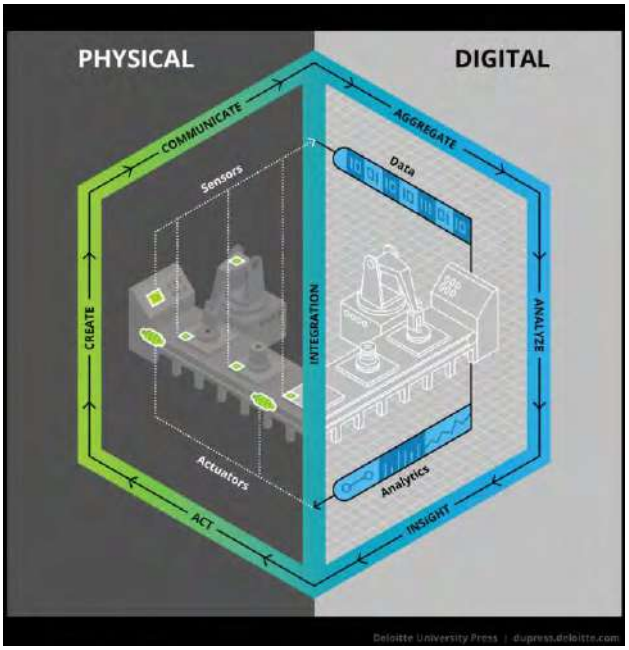
Digital TWIN

A **digital twin** is a digital replica of a living or non-living physical entity. By bridging the physical and the virtual world, data is transmitted seamlessly allowing the virtual entity to exist simultaneously with the physical entity. Digital twin refers to a digital replica of physical assets (physical twin), processes, people, places, systems and devices that can be used for various purposes.

Digital TWIN

As insightful as digital twins of specific deployed assets may be, the digital twin of the manufacturing process appears to offer an especially powerful and compelling application.

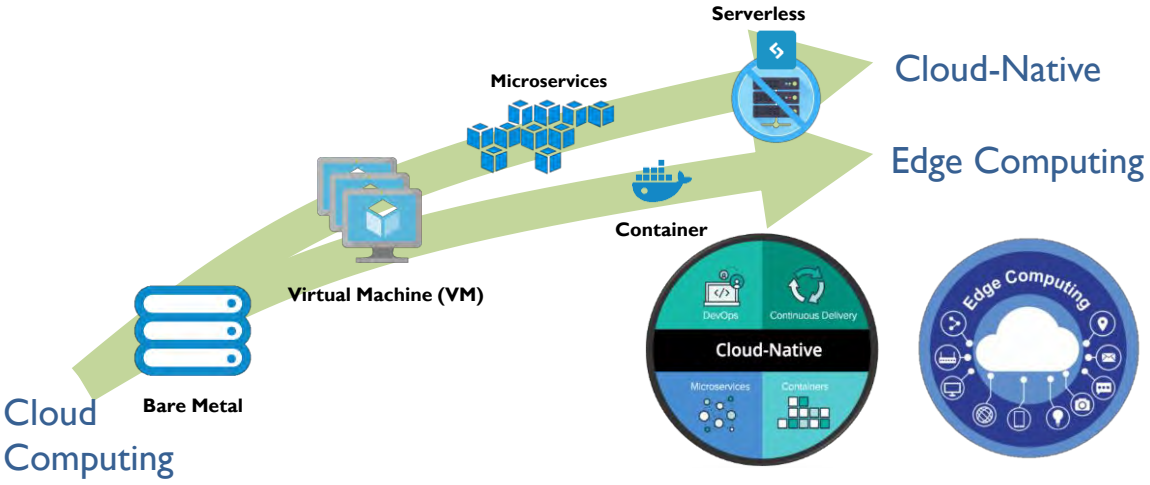
- **Manufacturing**
- **Energy**
- **City**
- **Transport**
- **…**



https://www2.deloitte.com/insights/us/en/focus/industry-4-0/digital-twin-technology-smart-factory.html

Cloud Computing
vs
Edge Computing

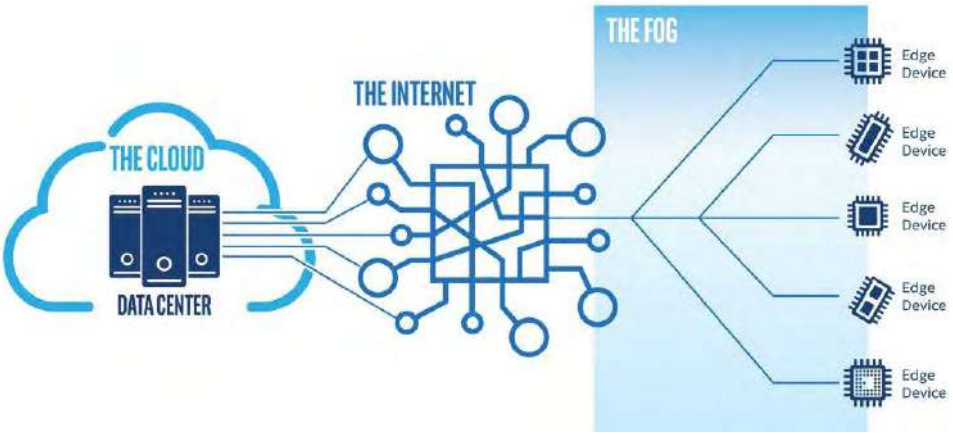
Cloud Computing, Age of new innovation



Edge Computing

Edge computing is a distributed computing paradigm which brings computer data storage closer to the location where it is needed. Computation is largely or completely performed on distributed device nodes. Edge computing pushes applications, data and computing power (services) away from centralized points to locations closer to the user.

Concept of Edge Computing

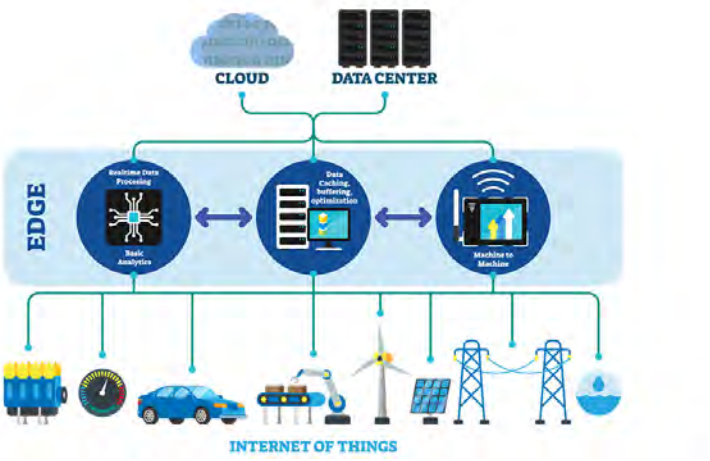


Edge Computing

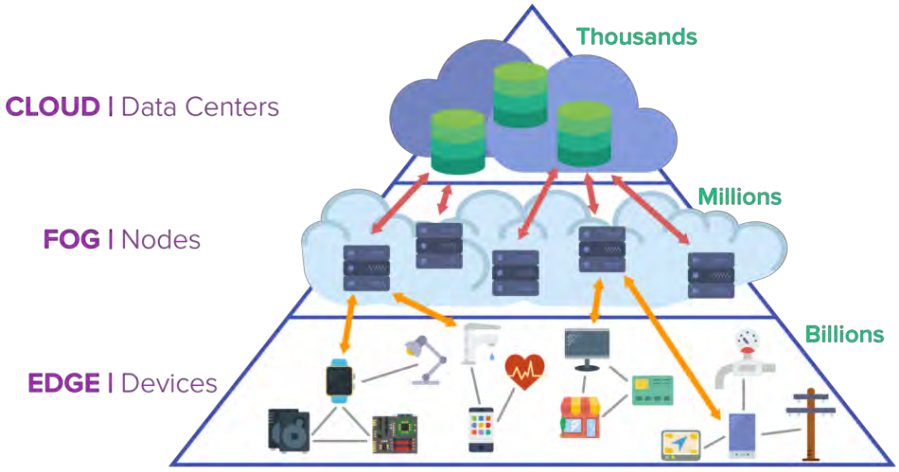
FOG Computing

MIST Computing

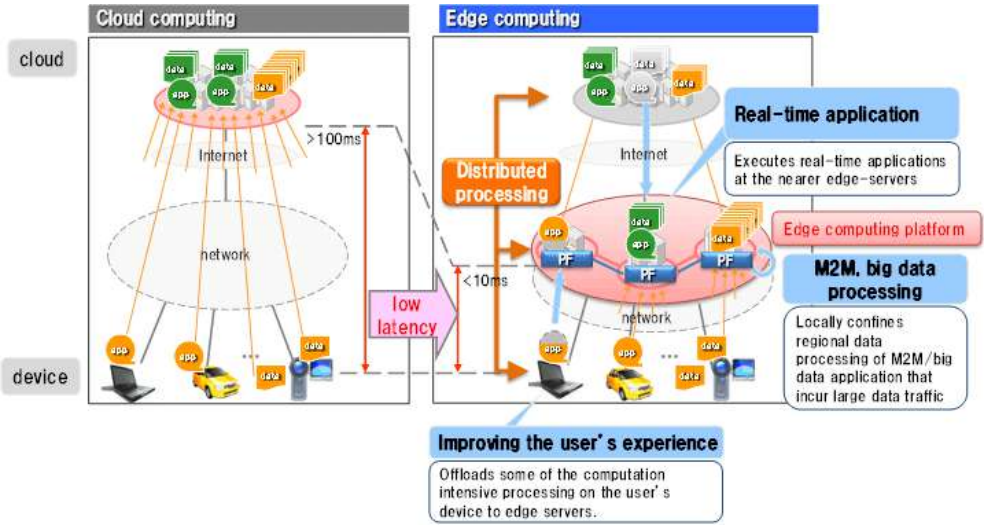
‘Edge Computing’ Real-time Applications Use Cases



Concept of Edge Computing



Cloud Computing vs. Edge Computing Platform



'Edge Computing' for where? (application areas)

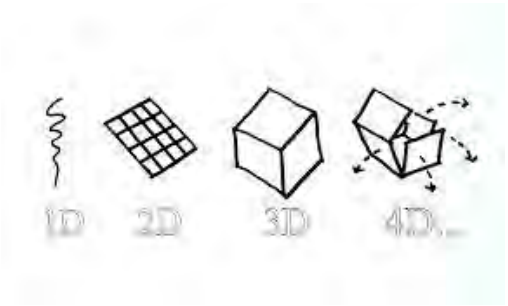
1. 5G/6G Mobile Communications
2. IoT based Services
3. High bandwidth Contents/Media distribution Services
4. Autonomous Vehicles
5. Smart Cities
6. Industrial Manufacturing
7. Financial Sector
8. Healthcare
9. Augmented Reality Devices & AI Virtual Assistants

Open Source activities for 'Edge Computing'

5G/Network applications

IoT Centered

4D Printing

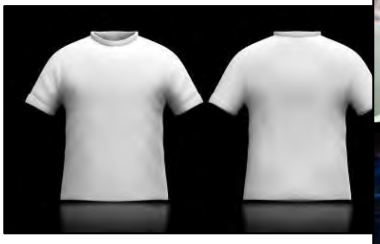


4D Printing

4-dimensional printing (**4D printing**; also known as **4D bioprinting**, **active origami**, or **shape-morphing systems**) uses the same techniques of 3D printing through computer-programmed deposition of material in successive layers to create a three-dimensional object. However, 4D printing adds the dimension of transformation over time.

4D Printing Applications

4D printing uses 3D printers to create live three-dimensional objects without wires or circuits. It does so by using intelligent materials, which can be programmed to change shape, colour or size when they receive an external stimulus.



Applications

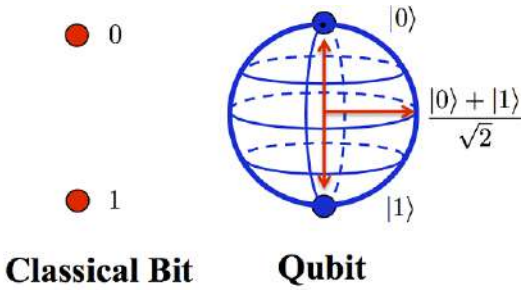

Quantum Computing

Quantum Computing

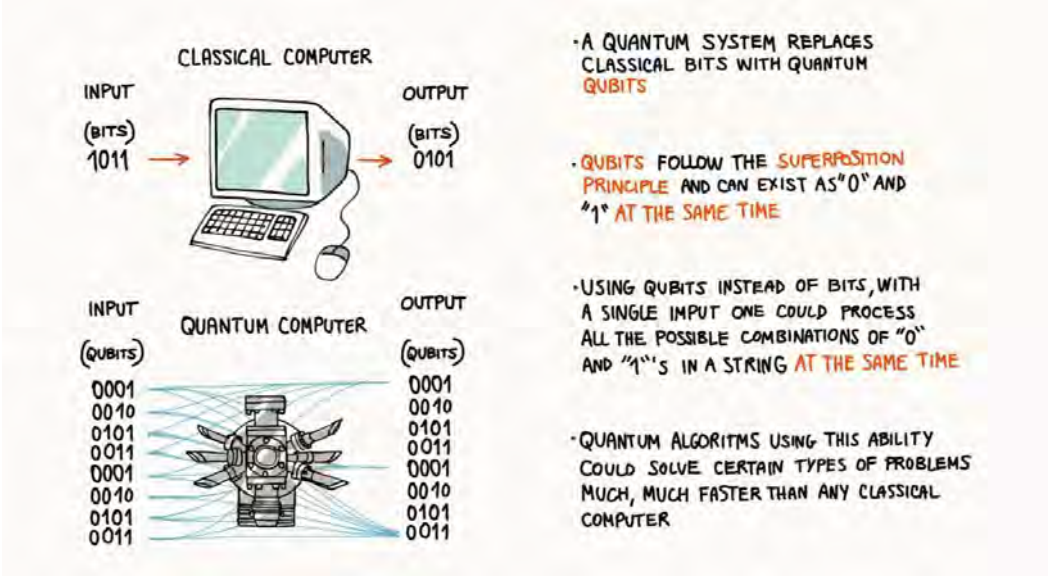
Quantum computing is the use of quantum-mechanical phenomena such as superposition and entanglement to perform computation. A **quantum computer** is used to perform such computation, which can be implemented theoretically or physically.

Concept of Quantum Computing & Applications

- **Machine Learning**
- **Optimization**
- **Biomedical Simulations**
- **Financial Services**
- **…**

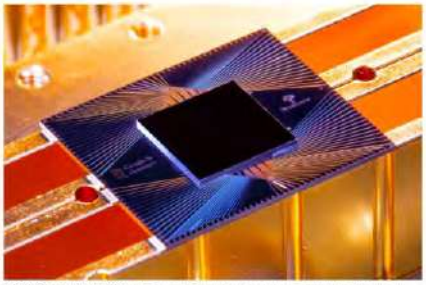


Concept of Quantum Computing



The 'Quantum Computing' Decade Is Coming—Here's Why You Should Care

By Chris Roberts • 12/18/19 2:00am



Google's Sycamore quantum processor. Erik Lucero, Research Scientist and Lead Production Quantum Hardware

Multiply 1,048,589 by 1,048,601, and you'll get 1,099,551,473,989. Does this blow your mind? It should, maybe! That 13-digit prime number is the largest-ever prime number to be factored by a quantum computer, one of a series of quantum computing-related breakthroughs (or at least claimed breakthroughs) achieved over the last few months of the decade.

https://observer.com/2019/12/quantum-computing-supremacy-fight-google-ibm/

5G Coverage Could Set Back Accurate Weather Forecasts By 30 Years

By Chris Roberts • 08/29/19 12:35pm

Do you want good phone service or good hurricane reports? NOAA via Getty Images

The approach of Labor Day means the approach of hurricanes in the southern and eastern United States. This year, 115 mile an hour winds from Hurricane Dorian will whip through the end-of-summer holiday in Florida, Georgia and South Carolina, according to the latest forecasts early Thursday.

https://observer.com/2019/08/weather-forecasts-hurricane-season-5g-technology/

2020

Technology Trends with Emerging & Innovations

PART I. ICT Paradigm Changes

PART II. Key Future Emerging Technology

PART III. Open Source Innovations

PART IV. ICT Standard Innovations

PART V. Conclusion & Future Considerations

PART III. Open Source Innovations

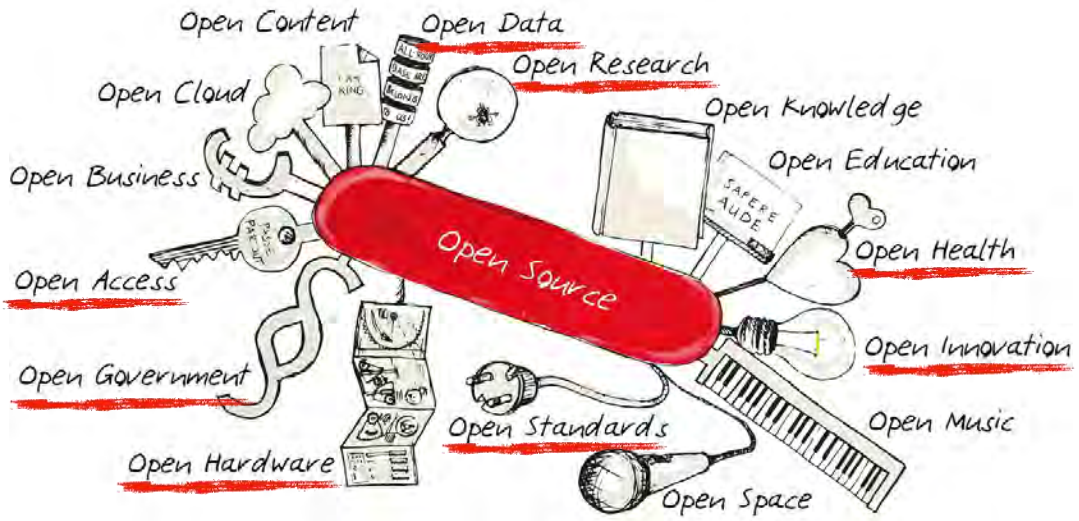
Era of Openness

OPEN

everything

OPEN SOURCE REVOLUTION

Everything is Open Source



*Source : https://www.wikiwand.com/en/Open-source_model

2006

Collective Intelligence, Long-Tail effect

Open Innovation

By Henry Chesbrough
April 2003

DEFINITION;

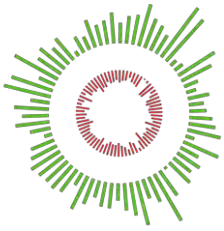
Open innovation is "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively."

Open innovation can be understood as the antithesis of the traditional vertical integration approach where internal R&D activities lead to internally developed products that are then distributed by the firm.

by Forbes (March 2011) - Everything You Need to Know About Open Innovation

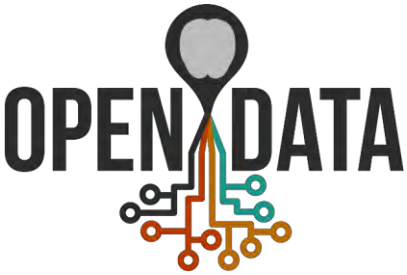
Open Data

DEFINITION;



“Open data and content can be freely used, modified, and shared by anyone for any purpose”[1][3][2]

*Source : http://opendatahandbook.org/



Government Open Data

https://www.data.gov/

*** Open Data Policy-Managing Information as an Asset (2013.5)**

https://www.data.go.kr/

***근거: 공공데이터의 제공 및 이용 활성화에 관한 법률 (2017.7.)**

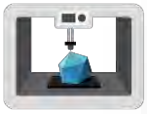

DATA-driven Innovation
010001000
BIG
DATA
101011010
by BigData Analysis

Open Source Trends

A new paradigm to support the 4th Industrial Revolution

Open Source

Makers



3D Printer

Open H/W

Based on the openness !

65%+

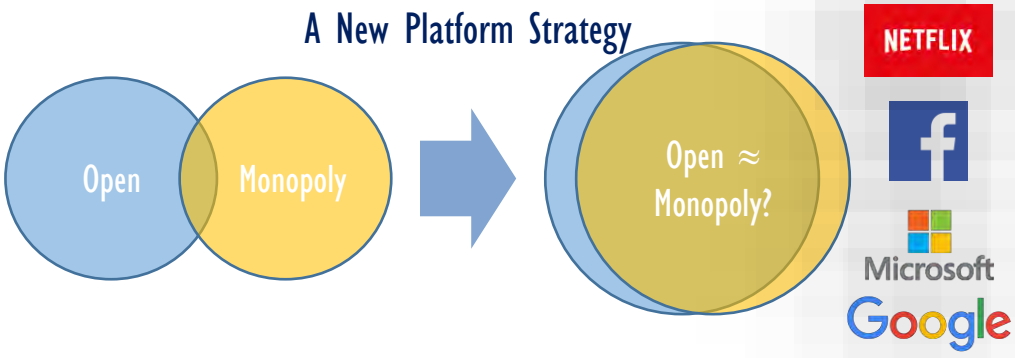
Usage of open source in company worldwide

GitHub Contribution (2018)

1. US , 2. China, 3. India, 4. UK
5. Germany, 6. Swiss, 7. Brazil,
8. Japan, 9. Russia, 10. France

Re-Thinking of OPEN

A New Platform Strategy



Open can make bigger ecosystem!

Open Source Software

FREE ?

NOT Free?

Open Source Software

The 4th Industrial Revolution

Artificial Intelligence | Big Data | Blockchain | Cloud Computing | Internet of Things | 5G/6G

OPEN SOURCE

Open Source is a sort of leverage to lead the 4th industrial revolution

DEFINITION;

Open Source Initiative

Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

① Free Redistribution
② Source Code Open
③ Derived Works
④ Integrity of The Author's Source Code
⑤ **No Discrimination Against Persons or Groups**
⑥ **No Discrimination Against Fields of Endeavor**
⑦ Distribution of License
⑧ License must not be specific to a product
⑨ License must not contaminate other software
⑩ License must be Technology-Neutral

*Source : https://opensource.org, https://www.oss.kr/

Why Open Source Software?

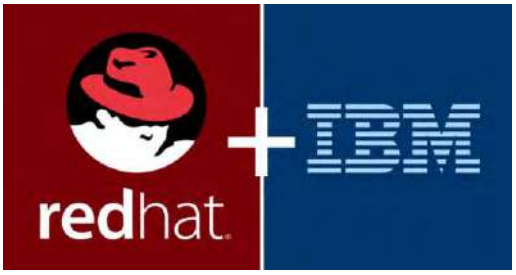
1. *Lower total cost of ownership*
2. *Better access to innovation*
3. *No vendor lock-in*
4. *Extensive customization*
5. *A culture of collaboration*
6. *Less Bug*
7. *Attractive better talent*
8. *Higher quality software*
9. *Greater Security*
10. *Easier to audit*

*Source : https://www.computerworld.com/article/3412269/what-are-the-advantages-of-open-source-software-in-the-enterprise-.html

Why Open Source Software?

For Company

For Individual

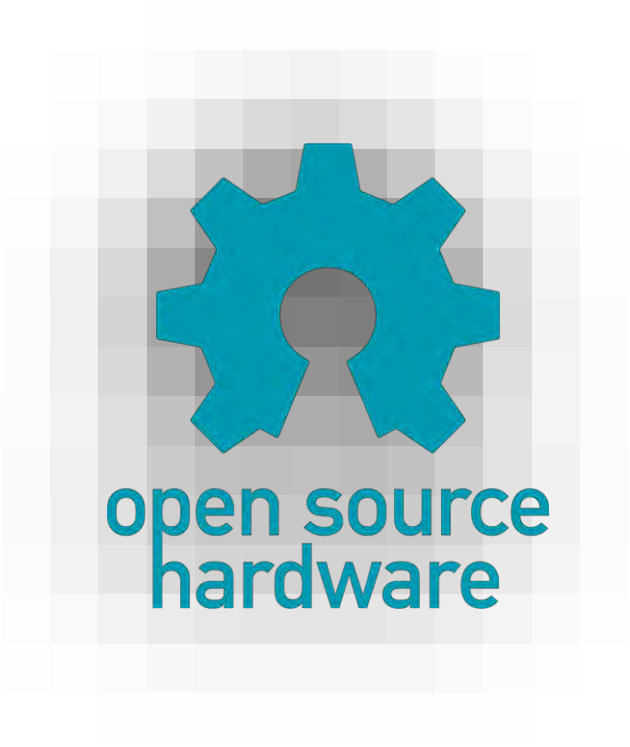


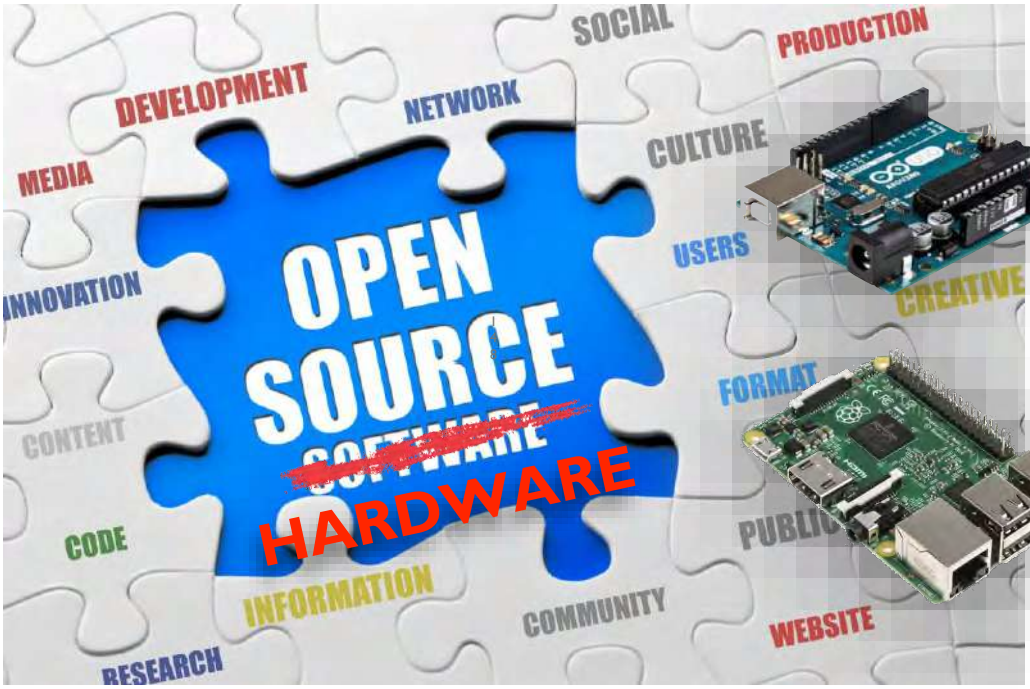
$34 billion

$7.5 billion

A new approach to Open Source

Business Strategy


open source
hardware


SOCIAL
PRODUCTION
DEVELOPMENT
NETWORK
MEDIA
CULTURE
OPEN
SOURCE
USERS
CREATIVE
FORMAT
CONTENT
HARDWARE
CODE
INFORMATION
COMMUNITY
WEBSITE
RESEARCH

Open Hardware

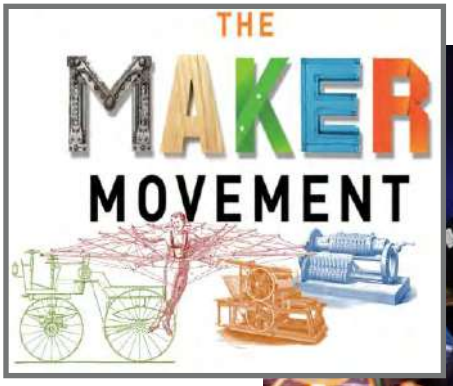
Arduino

Raspberry Pi

Intel Edison

Beaglebone Black

The 4th Industrial Revolution & Maker Movement



2020

Technology Trends with Emerging & Innovations

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- **PART IV. ICT Standard Innovations**
- PART V. Conclusion & Future Considerations

PART IV: ICT Standard Innovations


Future Standards
Paradigm Shift
Faster Market Growing;
Faster Technology Development;
Evolving of Customer Needs;
Industry Convergence;
Competition of SDOs…


Paradigm Shift
Converging & Emerging & Evolving
High Complexity for standards

Deep Convergence

High Complexity

System Approach !

“Standards Framework”

We may need to look at ecosystem first …

Ecosystem Modeling

Standard Gap Analysis

Strategic Standard Planning

Systems and sectoral approaches (2011~)

To address industry needs as they emerge

IEC's Systems Committee

① SyC AAL (Active Assisted Living)
② SyC LVDC (Low Voltage Direct Current)
③ SyC SM (Smart Manufacturing)
④ SyC Smart Cities
⑤ SyC Smart Energy

ITU-T Focus Group

To address industry needs as they emerge

Current Focus Groups

1. ITU-T Focus Group on **"Artificial Intelligence for Health"** (FG-AI4H)
2. ITU-T Focus Group on **"Vehicular Multimedia"** (FG-VM)
3. ITU-T Focus Group on **Technologies for Network 2030** (FG NET-2030)
4. ITU-T Focus Group on **Machine Learning for Future Networks including 5G** (FG-ML5G)
5. ITU-T Focus Group on **Application of Distributed Ledger Technology** (FG DLT)
6. ITU-T Focus Group on **Digital Currency including Digital Fiat Currency** (FG DFC)
7. ITU-T Focus Group on **Data Processing and Management to support IoT and Smart Cities & Communities** (FG-DPM)

ISO/IEC JTC 1

To address standards coordination with the system integration function

JTC 1's SC for System Integration

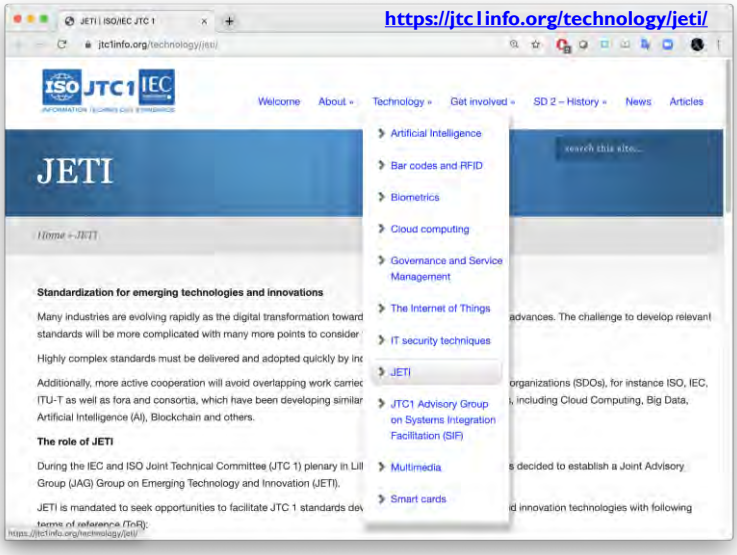
① Cloud Computing (SC 38)
② Internet of Things (IoT) (SC 41)
③ Artificial Intelligence (SC 42)
④ Security & Privacy (SC 27)

***JTC 1 Emerging Technology and Innovation (JETI) (2016~)**

ISO/IEC JTC 1 JETI

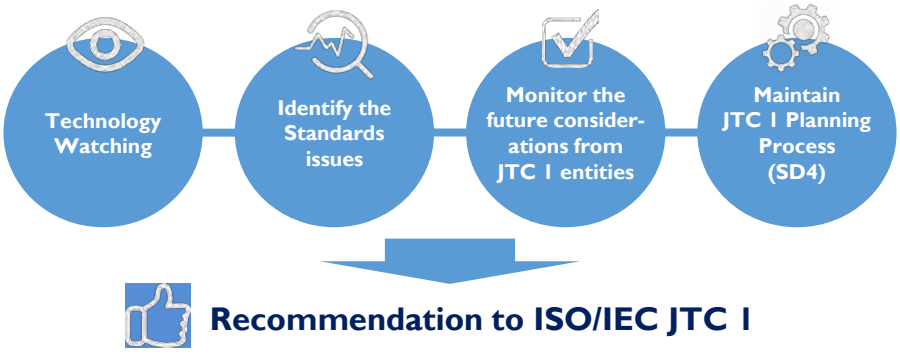
JETI (JTC 1 Emerging Technology and Innovation)

https://jtc1info.org/technology/jeti/



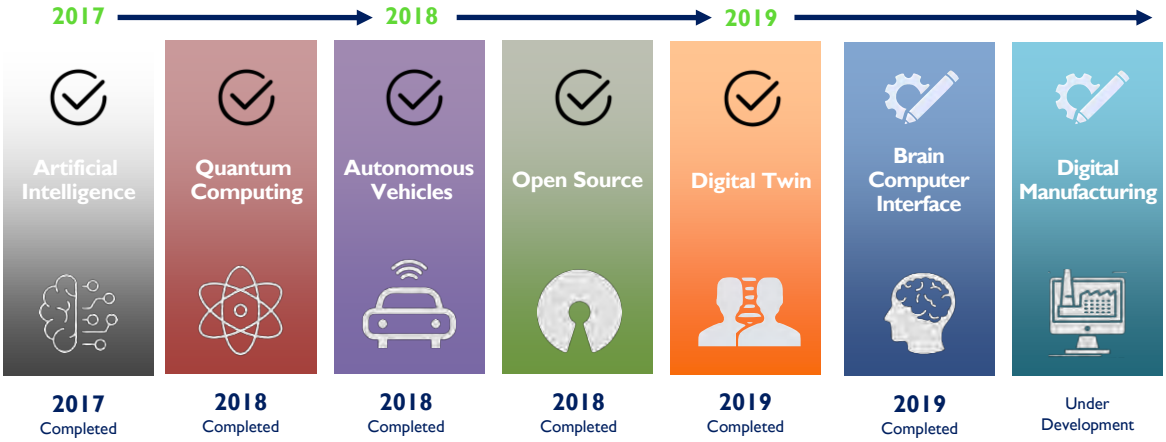
ISO/IEC JTC1 JETI

JTC1 Emerging Technology and Innovation (JETI)



ISO/IEC JTC1 JETI

History of TTR Development 2017-2019

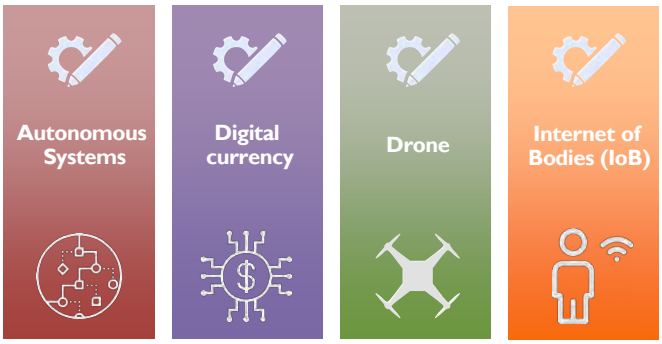


ISO/IEC JTC1 JETI

Plan for new TTR Development from 2019-2020

New Candidates (from Nov 2019)

2019 2021



ISO/IEC JTC 1 JETI

2019-2020 Top Priority Technology & Trends

implication

How to create value
based on existing technology
rather than new keywords ?

2020

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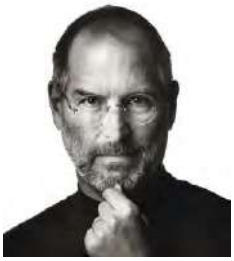
PART V. Conclusion & Future Considerations

INNOVATION



Innovation is the ability to see change as an opportunity - not a threat

- Steve Jobs

Openness

Open Data

Open Knowledge

Open Source (SW/HW)

…

Open Government

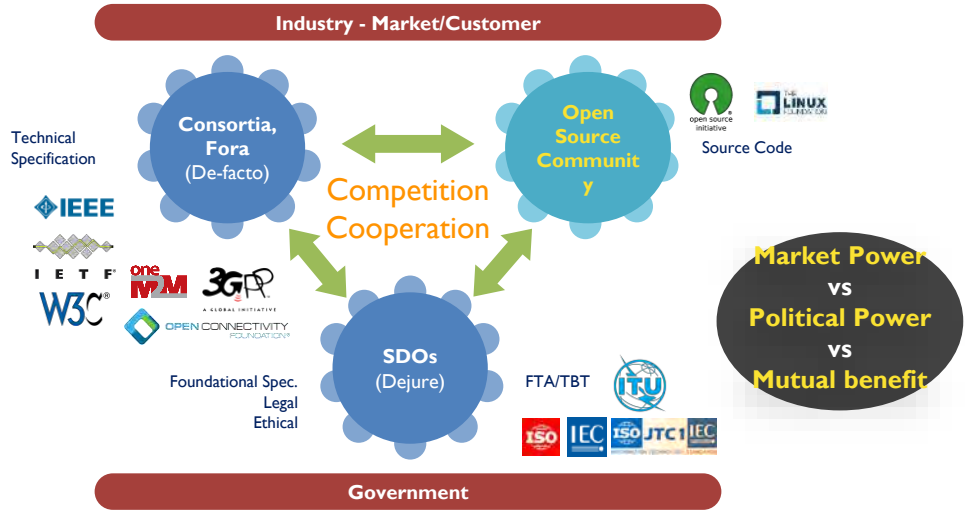
Open Education

Open Aids

…

Toward the 'Open Innovation'

Another Issue "A new standard ecosystem?"




OPEN Environments
Open Source Trends & Collaboration


Industrial Revolution vs. Information Revolution
DATA Revolutions


Era of convergence
RULES
Impossible to make a success only with
Technology

Era of FTA

TBT (Technical barriers to trade)

Standards is a key enabler !


Misuse of technology brings disaster!


Future Innovations should be
"Save the PLANET!"

Thank You

Professor Sam Oh
Sungkyunkwan University
Chair, iSchools Caucus
<samoh@g.skku.edu>

Dr. Seungyun Lee
ETRI
<syl@etri.re.kr>

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP

Chair, TOI - International Conference on Technology and Information Organization

THE COMPLEXITY OF THE GLOBAL LABOR MARKET

FRANCISCO CARLOS PALETTA
ARMANDO MANUEL BARREIROS MALHEIRO DA SILVA

THE COMPLEXITY OF THE GLOBAL LABOR MARKET
ECA USP ISCHOOL APPROACH

Francisco Carlos Paletta[1], Armando Manuel Barreiros Malheiro da Silva[2]

[1]Universidade de São Paulo, http://orcid.org/0000-0002-4112-5198, fcpaletta@usp.br,
[2]Universidade do Porto, http://orcid.org/0000-0003-0491-3758, malheiro@letras.up.pt

-

Major Areas of Interest and Research

- **INFORMATION AND KNOWLEDGE MANAGEMENT**
- **DIGITAL LIBRARY**
- **INFORMATION ETHICS**
- **DIGITAL CURATION**
- **DIGITAL HUMANITIES**
- **INFORMATION, SCIENCE AND TECHNOLGY**
- **USER STUDIES AND HUMAN INFORMATION BEHAVIOUR**
- **DATA SCIENCE AND ARTIFICIAL INTELLIGENGE**

The Complexity of the Global Labor Market

Objectives

The aim of this research is to lay out the **complexity of the global labor market in the field of Library and Information Science.**

Keywords

Library and Information Science; Digital Age; Global Labor Market; Technology Complexity; Knowledge Professional. iSchools

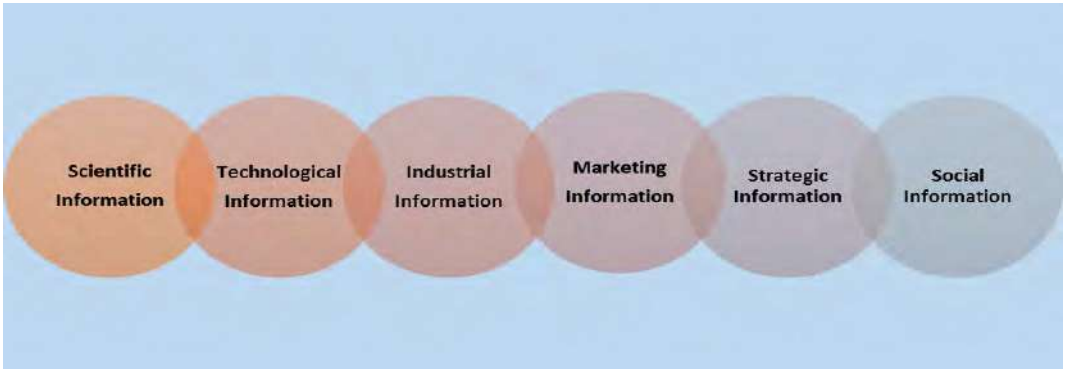
The Complexity of the Global Labor Market

Methodology

In this paper, we focus on strategic aspects of the new profile of knowledge organization professionals. First, we discuss the **dimensions of knowledge organization in a current globalized and competitive scenario** as an inherent characteristic in any organizational action, a vital element in the production of social reality. Secondly, we highlight the **skills of the knowledge organization professionals in the field of new technologies and knowledge distribution**. Thirdly, we approach the restructuring of the organizational environment considering the perspective of the **global labor market complexity**. Finally, we present our reflections on the **skills and competences of the knowledge organization professional with respect to the global labor market´s expectations and demands in the digital age**.

Information and Knowledge Dimensions

- The **network society** new configuration constitutes the object of study and research for professionals from various fields, especially information workers, who deal with the challenges of **information management** in their dimensions: scientific, technological, industrial, marketing, strategic and more recently, social.



Education and Professional Practice in the Digital Age

- In a world without barriers to knowledge production, "**mobility**" has become a key concept for every professional and for all organizations that compete in an increasingly globalized market.

- The Information Technology development followed the course of the industrialization process. In a first stage, the required competence was eminently **technical**. In a second moment, as the industry had diversified and became sophisticated, the **scientific** qualifications have become required. In the third step, the **managerial skills** have become required.

- Most **professional's dynamics in the next decade are not clearly established**. The professions will continue diversifying and **new professions** that do not exist yet, will be in great demand.

- To educate the information professional for the twenty-first century is to balance the binomial **expert** - in its technical dimension - versus **generalist** – a multidisciplinary approach.

Education and Professional Practice in the Digital Age

- A compilation of recent studies sums up the type of expertise and skills required today in a global professional:
  - performance in multidisciplinary teams;
  - identification, formulation and solution of knowledge management problems;
  - sense of ethics and professional responsibility;
  - recognition of the need for continuous training;
  - use of modern techniques and tools to have good search practices, access, ownership and use of information;
  - information socio-environmental responsibility;
  - understanding of ICT solutions impact in a global and social context.

The Complexity of the Global Labor Market

- The ability of an organization to act on a global market depends on a competitive positioning, as the creator and developer of technology-based products and solutions.

- Knowledge organization links three processes of strategic use of information - the creation of meanings, knowledge construction and decision taking – a continuous cycle of learning and adaptation that can be named knowledge cycle.

- We need to understand and appreciate **the complexity of the contemporary world** to face the challenges of education. In addition to specific **technical skills** - indispensable in Information Science, most new or renewed professions will require the practice of many **cultural abilities**

Conclusions

- The research brings together a variety of issues discussed under the broader umbrella of professional values in knowledge organization.

- Three areas are highlighted to stimulate discussion around challenges of the complexity of the global labor market in knowledge organization in the digital era. These are:

  - The role of education and professional practice in information science
  - The complexity of the global labor market
  - The core competencies of the information professional in the area of information management

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Reference Paper:

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Q & A

Thank You !!!

Debate Coordinator: Dr. Francisco Paletta - Professor, ECA USP

Chair, TOI - International Conference on Technology and Information Organization

AUTORS BIOGRAPHS

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Sam Oh is professor of LIS and Data Science at Sungkyunkwan University, Seoul Korea and affiliate professor at UW iSchool. Prior to joining SKKU, he taught at the UW iSchool for 4 years (1994-1998). His teaching and research interest include metadata and ontology design, data modeling, data analytics, and knowledge management. He served as the chair of ISO/IEC JTC1 SC34 (Document Description and Processing Languages) for 9 years and the chair of ISO TC46/SC9(Identification and Description) for 6 years. He is the current chair of iSchools International and also the chair for the governing board of DCMI (Dublin Core Metadata Initiative).

Ayoung Yoon is an Assistant Professor at Indiana University School of Informatics and Computing (IUPUI), Department of Library and Information Science. She was an RDA/US data share fellow for 2016-2017. She holds a Ph.D. from the University of North Carolina at Chapel Hill and M.S.I. from the University of Michigan. She is a founding member of Data to Action Lab in SoIC, IUPUI (http://data.soic.iupui.edu/) and serves as a director during the founding year, 2018-2019. Her research has been focusing on exploring how data curation can support equitable data reuse and how community's data reuse capacity can be enhanced through proper data curation support. Her research has been funded by Institute of Museum and Library Services (IMLS), Alfredo Sloan Foundation, Indiana University New Frontiers in the Arts & Humanities Program, and IUPUI Arts and Humanities Institute.

Javed Mostafa, Frances McCall Distinguished Term Professor at the UNC School of Information and Library Science (SILS), is the Director of the Carolina Health Informatics Program and the Director of the Laboratory of Applied Informatics Research. His research concentrates on information retrieval problems, particularly related to search and user-system interactions in large-scale document/data repositories. He also serves as the Deputy Director of the Biomedical Informatics Core at the NC Translational & Clinical Sciences Institute and has current research engagements in biomedical data mining, analysis, visualization, user interface design, and multi-modal human-computer interaction. He regularly serves on program and organizing committees for major conferences and participates as reviewer for major grant initiatives. Javed served as an associate editor for the ACM Transactions on Information Systems for eight years. He currently serves as editor-in-chief of the Journal of the Association for Information Science & Technology and also serves as an associate editor of the ACM Transactions on Internet Technology.

Translating scientific advances into health care improvements is a passion for Javed, and based on support from UNC's Translational & Clinical Sciences Institute, he co-founded a company concentrating on patient-centric decision support and streamlined care workflow called Keona Health. At UNC, Javed holds a joint faculty position in information science at SILS and in the Biomedical Research Imaging Center at the School of Medicine. Additionally, he holds the title of Adjunct Professor of Community and Family Medicine, School of Medicine, Duke University.

Marcia Lei Zeng is Professor of Library and Information Science at Kent State University. Her research interests include knowledge organization systems (taxonomy, thesaurus, ontology, etc.), Linked Data, metadata, smart data, database quality control, semantic technologies, and digital humanities, with over 100 research papers, 5 books. She has chaired or served on committees, working groups, and executive boards for IFLA, SLA, ASIS&T, NISO, ISO, DCMI, ISKO, iSchools, and W3C. Currently she is serving as an Executive Board Member of the International Society for Knowledge Organization (ISKO).

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Kalpana Shankar - After completing my Ph.D. in library and information science at UCLA, I conducted postdoctoral research in the Center for Embedded Networked Sensing at UCLA and completed an AAAS Science Policy Fellowship at the National Institutes of Health Office of Evaluation. I was an Assistant Professor at Indiana University-Bloomington's School of Informatics and Computing before joining the staff at UCD in the School of Information and Library Studies in July 2011.My research focuses on the uses of data and information (digital and otherwise) in the social sciences, open data, and data archives. I draw from theory and practice in archival and information studies and STS (science, technology, and society), as well as related fields such as computer supported cooperative work and human-computer interaction.

Seungyun Lee, currently a director of Open Source Center in Electronics and Telecommunications Research Institute (ETRI), has been working in the area of ICT research and development over 20 years. His major work is to develop the ICT standards for emerging technologies such as Next Generation Internet Protocol, Next Generation Web, Mobile Service, Cloud Computing, Big Data, AI, etc. In particular, he has experienced a broad span of ICT standardization activities with a number of international SDOs including ISO/IEC JTC 1, ITU-T, IETF, W3C, etc.as well as domestic standardization activities. He has also been involved in over twenty government ICT projects as a project leader so far.

Il-Yeol Sang is professor in the College of Computing and Informatics of Drexel University. He served as Deputy Director for NSF Research Center on Visual & Decision Informatics between 2012-2014. He is named an ACM Distinguished Scientist and an ER Fellow. He is the recipient of 2015 Peter P. Chen Award in Conceptual Modeling. He has won four teaching awards from Drexel University: Exemplary Teaching Award in 1992, Senior Faculty Teaching Excellence Award in 2000, the Christian R. and Mary Lindback Distinguished Teaching Award in 2001, and Outstanding Instructor Award in 2011.

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Armando Manuel Barreiros Malheiro Da Silva - Full Professor of the Department of Communication and Information Sciences, Faculty of Letters, University of Porto. He holds a PhD in Contemporary History of Portugal from the University of Minho, approved with distinction and praise, and a degree in History from the Faculty of Letters of the University of Porto and in Philosophy from the Faculty of Philosophy of Braga of the Portuguese Catholic University. He has a post-graduate degree in Librarianship and Archivology from the Faculty of Letters of the University of Coimbra. For the work developed in more than a decade of intense scientific cooperation practiced in the field of Information Science and Documentation, Archivology, Museology, Communication, Information Literacy and Digital Platforms stands out in Brazil as visiting professor, researcher-collaborator, advisor and ad hoc consultant in scientific projects and Master's, Doctorate and Post-doctoral programs of several universities.

Francisco Carlos Paletta - Professor of the Department of Library Science and Documentation - School of Communications and Arts of the University of São Paulo. PhD in Science from University of São Paulo. *Postdoctoral research in the Nuclear and Energy Research Institute. MCs in Production Engineering, MBA in Marketing, Post-Graduation in Materials Science, Post-Graduation in Strategy and Geopolitics. B.S. in Electronic Engineering. Master in Domótica y Hogar Digital – Universidad Politécnica de Madrid. Master Université Paul-Valéry Montpellier III. Domaine: Sciences Humaines et Sociales. Mention: Information et Communication Spécialité: Gestion de l 'Information et de la Connaissance. Postdoctoral research at the University of Porto in the field of Information Science. Former CEO at Novell do Brasil, a market leader in network software, web service and secure identity solutions. Before that, former Novell's Business Director, and Services Manager for Latin America. Former CEO of Attiris Inc subsidiary in Brazil, a company specialized in management solutions for IT assets throughout their lifecycle. Former Services Director for Sun Microsystems Brazil. Responsible for the business and application engineering areas of the Instrumentation and Industrial Process Control Division, as well as the Homes & Buildings Division at Honeywell do Brazil. Former Services Director for Manufacturing, Energy and Global Accounts at EDS, both for Brazil and Latin America. Former Dean of the Computer Science College and the Engineering College at Fundação Armando Alvares Penteado – São Paulo, Brazil.*

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