Thank you

The Evolved NREN Landscape

RedIRIS Technical Conference 2016
Valencia, Spain
16 Nov 2016

Steve Cotter
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In which ways will NRENs need to evolve?

- Compute, data, and networking organisations are coming closer together
  - Some will fall under single governance structure
- Will have to work hard to remain relevant as the blurring of lines between what's R&E and what's commercial accelerates
  - Pressure to differentiate / deliver unique value
- Service portfolios will change significantly - reduced fragmentation / better integration, more specialised services, professional services
  - Back to our engineering / innovation roots
  - CIO outsourcing trend is an opportunity we can't pass up
- Organisational structures will change - new skills added, others shrink / disappear
  - Automation lead to smaller operations teams
  - Stop thinking in terms of 'network hardware' and start thinking of 'network software'
  - Bigger software development & CISO teams
  - Specialised outreach teams
  - New skills: data analytics, product management
- Work to address service challenges as a global community, not as a bunch of NRENs that 'interoperate' and 'co-operate'

Globalisation

Changes in supply and demand of R&E services

- Research collaborations becoming increasingly global in their reach
- More performance-based and competitive allocation of funds
- Institutions seeing increased competition for research funding and the most talented students
- Asian higher education gaining in influence
- Security threats come from anywhere / everywhere, much is economic & research data focused espionage
- The move towards a knowledge economy is giving rise to an explosion of data
- Economic factors resulting in increased pressure from governments to show tangible economic benefits and/or support for policy objectives

Business Model Innovation

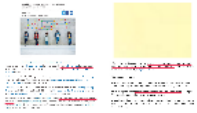
Changes in the structure of R&E

- Competition not only between institutions, but at the level of each individual component.
- Combine this with the advances in technology and we're seeing the 'un(re)bundling of IT' in order to yield economies of scale and increase the value of 'supply chain'
- Increased importance of 'open science' and broader community access to data, scientific instruments, cloud services, etc.
- Research institutions and universities as 'start-up incubators' with closer linkages to small / medium size enterprises
- Rise of new business models in higher education
  - Product innovation
  - Foreign presence becoming increasingly important
  - Commercial research / education hybrids
  - Increasing value given to 'experience over degrees'

Market Response

Changes in the organisation of NRENs

- Need to support the 'business of R&E' as well as R&E means 'Above the Net' increasingly important
- Moving 'up the services stack' to deliver value - means connectivity has become commoditised
- Less of a national focus, global reach valued more
- Funding uncertainty drives need to diversify revenue streams
- Need to put more resources toward the 'commercialisation' of R&E services & business development - means different skills mix than in years past
- Increasingly innovation needs to have a business purpose - can no longer afford 'let a thousand flowers bloom' approach (smart investment)



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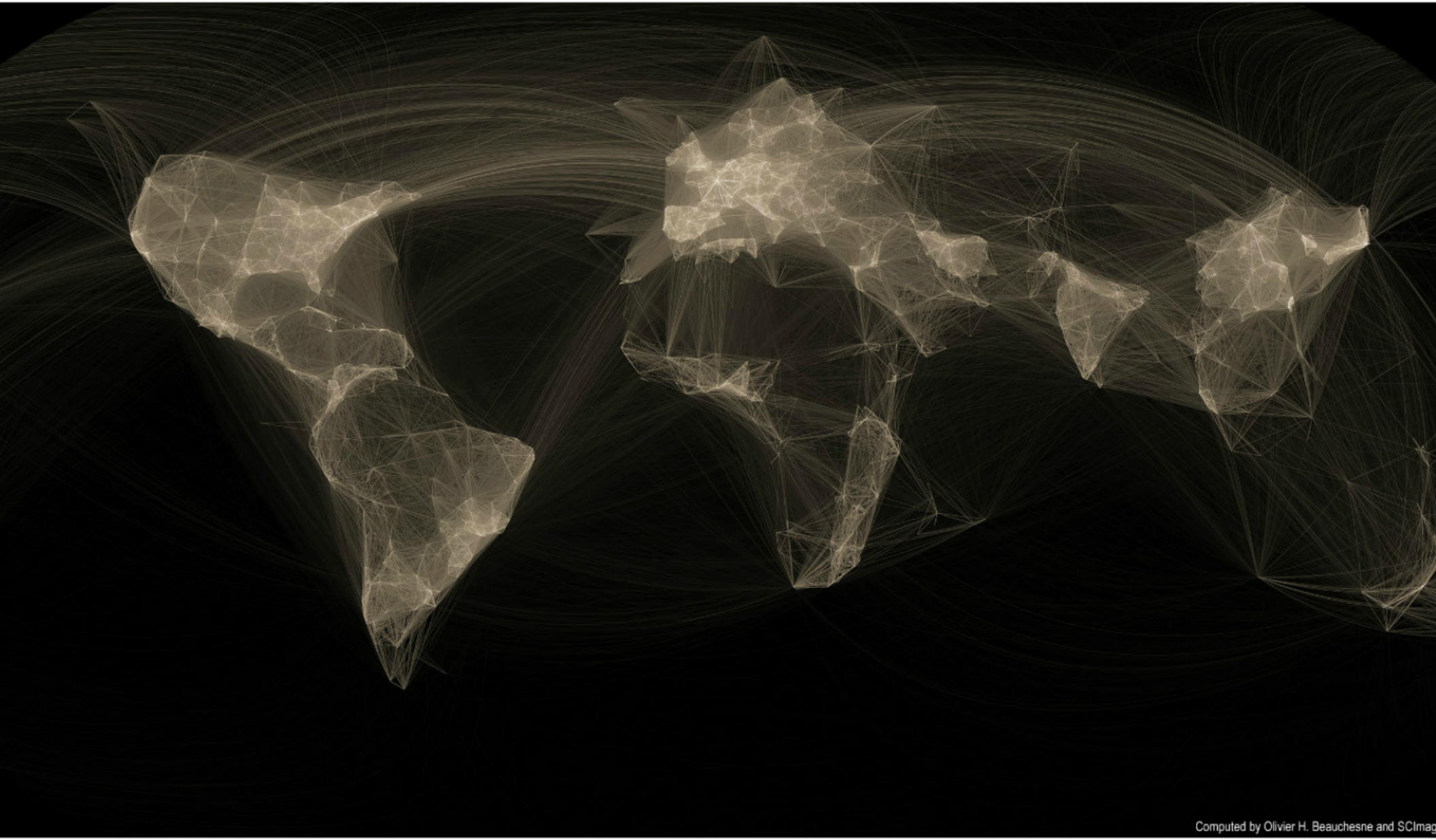
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World Reputation Rankings 2016: winning recognition worldwide

Outside the Anglo-American 'superbrands', new names are establishing a presence

May 4, 2016

By Ellie Bothwell Twitter: @elliebothwell

Source: Getty

View *Times Higher Education*'s full list of the world's most prestigious universities

However, while these European nations have lost ground, many Asian nations have improved their standing, building on their increasing presence in the flagship *THE* World University Rankings in recent years.

South Korea has two top 100 representatives, up from one last year. Seoul National University is in joint 45th place (up from the 51-60 band) and Korea Advanced Institute of Science and Technology (KAIST) debuts in the 81-90 band.

Hong Kong has also gained one representative to take its total to three: the University of Hong Kong is in joint 45th place (up from 51-60) and the Chinese University of Hong Kong has joined the Hong Kong University of Science and Technology in the 71-80 band.

But setting the pace in Asia are China and Japan, with five universities each, up from two each last year. China's Tsinghua University makes the top 20 for the first time in 18th place, while Peking University climbs 11 places to 21st. The top Asian institution is Japan's University of Tokyo, which remains in 12th place.

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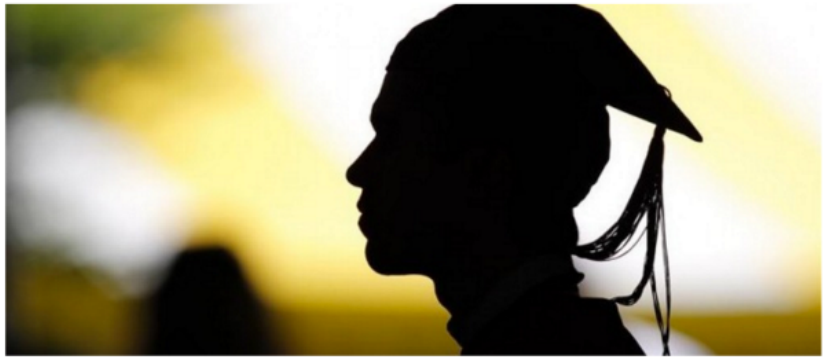
Global Agenda › Education

These are the world's top universities



One US university scores full marks in this year's QS ranking Image: REUTERS/Brian Snyder

"Some Western European nations making or proposing cuts to public research spending are losing ground to their US and Asian counterparts," said Ben Sowter, head of research at QS, in a press release.

The rest of the world

Asia's highest ranked institution remains the National University of Singapore, in 12th, followed by the Nanyang Technological University, Singapore in 13th.

QS also highlights the continued progression of Chinese institutions – Tsinghua University has risen to its highest-ever position of 24th.

Australia and Canada also increased their representation in the top 100, while a Latin American university features for the first time. Universidad de Buenos Aires takes 85th place.

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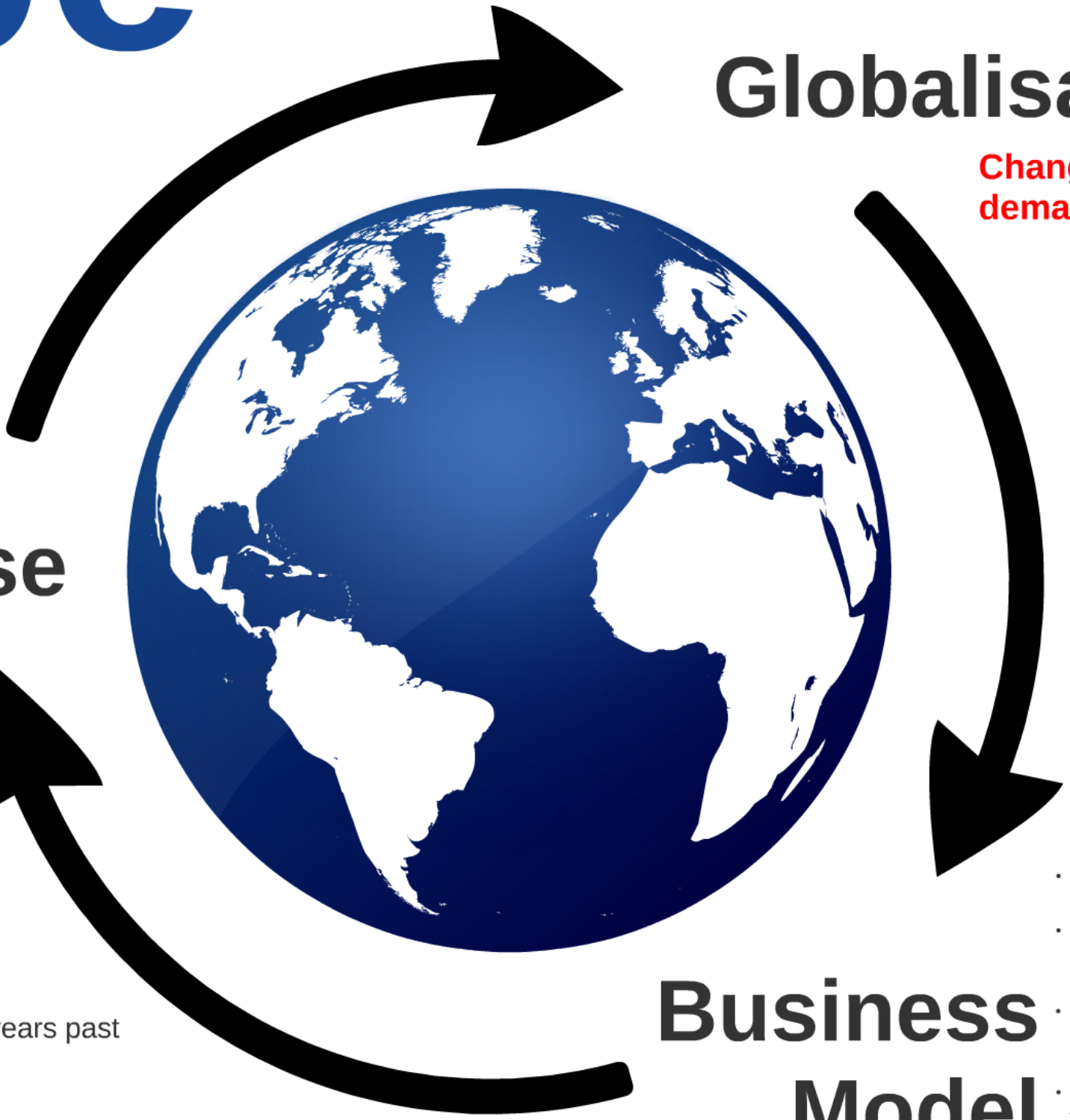

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