CHEITA Benchmarking Project

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Why is the Complexity Index needed?
How does the Complexity Index facilitate comparisons?
Total IT Spend (USD) vs. Complexity Index

$R^2 = 0.74091$
How can the Complexity Index be used to identify outliers?
Predicted vs. Actual IT Spend

-60% -50% -40% -30% -20% -10% 0% 10% 20% 30% 40% 50% 60%

-60%-50%-40%-30%-20%-10%0%10%20%30%40%50%60%

-60%-50%-40%-30%-20%-10%0%10%20%30%40%50%60%

Germany1 Finland9 Denmark1 Finland11 Finland6 Finland10 Finland8 Finland4 Finland3 Finland2 Norway3 Finland7 Finland5 Norway2 Sweden1 Norway1 Finland1
Predicted vs. Actual IT Spend

Germany1, Denmark9, Finland1, Finland11, Finland6, Finland10, Finland8, Finland4, Finland3, Finland2, Norway3, Finland7, Finland5, Norway2, Sweden1, Norway1, Finland1.
1. Over counting (data quality)
2. More complex than expected
3. Effect of others undercounting
4. Deliberate strategy

Predicted vs. Actual IT Spend

1. Under counting (data quality)
2. Less complex than expected
3. Effect of others over counting
4. Deliberate strategy
How is the Complexity Index calculated?
The complexity index has three components based on the following data:

1. Number of students (EFTSL)
2. Number of staff (FTE)
3. Research income ($)
The complexity index is calculated by:

1. Obtaining the raw measurement
2. Scaling the raw measurement (using a linear algorithm) between 1 and 10 based on the max and min values for the sector
3. Applying a weighting to the scaled measurement based on the relative importance of the underlying measure (35% for students, 35% for staff, and 30% for research income).
4. Adding up the 3 weighted measurements to get the final result
An Example (University R)

1. Student EFT=21,378

2. Using max = 40,429 (University N) and min = 402 (University B) University R’s scaled student measurement becomes 5.61. University N = 10 and University B = 1.

3. Weighted student measurement is 35% of 5.61 = 1.97.

4. Adding this to the weighted measurements for research (0.86) and staff (1.41) gives a total of 4.24.
What is the CHEITA Benchmarking Project?
<table>
<thead>
<tr>
<th>Organization</th>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Council of Australian University Directors of Information Technology (CAUDIT)</td>
<td>Paul Sherlock</td>
<td>CIO, University of South Australia</td>
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<td>Cineca</td>
<td>Michele Mennielli</td>
<td>External Relations and International Affairs Manager</td>
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<td>Canadian University Council of Chief Information Officers (CUCCIO)</td>
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<td>Executive Director</td>
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<td>Eden Dahlstrom</td>
<td>Director of Research</td>
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<td>Johan Bergström</td>
<td>Head of International Cooperation</td>
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<td>Ilkka Siissalo</td>
<td>CIO and Director of Information Technology, University of Helsinki</td>
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<td>Teemu Seesto</td>
<td>IT secretary of FUCIO Network of Finnish Universities' Chief IT Officers</td>
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<td>EUNIS</td>
<td>Peter Tinson</td>
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<td>UCISA</td>
<td>Reiner Schmidt</td>
<td>CIO, Hochschule Ansbach</td>
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<td>Zentren fur Kommunikation und Informationsverarbeitung e.V. (ZKI)</td>
<td>Markus von der Heyde</td>
<td>Management Representative</td>
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Goals of the CHEITA Benchmarking Project

- Determine a way to find international peer institutions.
  - Explore whether the Complexity Index can help compare institutions internationally (In progress).
  - Develop international Complexity Index for benchmarking.
- Develop a small set of metrics which can be used to benchmark internationally.
235 data points from 11 countries

- Australia
- Canada
- Denmark
- Finland
- Germany
- Norway
- New Zealand
- Sweden
- South Africa
- UK
- US

Normalized financial data to USD using Purchasing Power Parity
Calculating the CHEITA Complexity Index

<table>
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<th>Min</th>
<th>Max</th>
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<tbody>
<tr>
<td>Number of students (EFTSL)</td>
<td>0</td>
<td>45,000</td>
</tr>
<tr>
<td>Number of staff (FTE)</td>
<td>0</td>
<td>18,000</td>
</tr>
<tr>
<td>Research income ($)</td>
<td>0</td>
<td>$750,000,000</td>
</tr>
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\[
eftsl\_ind = \min(10, 1 + 9 \times \text{student FTE}/45,000) \\

tfe\_ind = \min(10, 1 + 9 \times \text{staff FTE}/18,000) \\
\res\_ind = \min(10, 1 + 9 \times \text{research income}/750,000,000) \\
comp\_ind = eftsl\_ind* .35 + tfe\_ind* .35 + res\_ind* .30
\]
$50,000,000$

$100,000,000$

$150,000,000$

$200,000,000$

$250,000,000$

Total IT Spend (USD)

Complexity Index

Australia

New Zealand

Linjär (Australia)

Linjär (New Zealand)

$R^2 = 0.91026$

$R^2 = 0.94806$
Total IT Spend (USD)

Complexity Index

- $250,000,000
- $200,000,000
- $150,000,000
- $100,000,000
- $50,000,000
- $-/-

$50,000,000
$100,000,000
$150,000,000
$200,000,000
$250,000,000

$50,000,000
$100,000,000
$150,000,000
$200,000,000
$250,000,000

R² = 0.74091

BENCHEIT

Linjär (BENCHEIT)
$R^2 = 0.90362$

Canada

Lijnjär (Canada)

Complexity Index

Total IT Spend (USD)
Limitations

- Acquiring data may be difficult
- Complexity Index may not account for all institutional complexity (medical school, federal funding/programs, etc.)
- Inconsistencies in the definition of IT
- US data:
  - Total staff, not staff FTE
  - Research expenditures, not income
  - Estimates of central IT expenditures are more reliable than total IT expenditures
Next Steps:

- Identify and analyze outliers by country
- Refine model
- Draft a short white paper on the Complexity Index
- Develop a small set of metrics which can be used to benchmark internationally
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