CHEITA

BENCHMARKING IT

A GLOBAL APPROACH

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INTRODUCTION

The Coalition of Higher Education Information Technology Associations (CHEITA) comprises representatives from associations throughout the world that promote the use of information technology in higher education. CHEITA was established in 2011 to share best practices across member associations and, by extension, the individual institutions that make up those associations. It is clear that higher education is now a global business; although individual institutions may be in competition with each other, the operation of IT services within institutions is rarely a differentiator. Consequently, sharing best practices at both an association and individual-institution level to develop more effective and efficient IT services offers real benefits.

Benchmarking is part of sharing—by comparing ourselves with our peers we can start to have a conversation about how services are provisioned, identify areas where we are not performing as effectively as other institutions, and consequently address those issues. Most, if not all, of the CHEITA member associations carry out some form of benchmarking, but the outputs from those initiatives vary. CHEITA recognized that in order to facilitate cross-border comparisons appropriate for the global higher education business, it would be necessary to establish a way of comparing individual institutions. Therefore, at the beginning of 2014 CHEITA began discussing the possibility of comparing different IT benchmarking initiatives around the globe, with the goal of identifying a single model that would enable the international higher education IT community to use consistent and relevant information for institutional decision making. The CHEITA Benchmarking Working Group was created to explore the viability of benchmarking IT in higher education on a global scale and identify a way to undertake such an initiative. The result of those efforts was the development of the CHEITA Global Complexity Index described in this paper.

Benchmarking IT internationally benefits institutions as well as communities of institutions. For individual institutions, benchmarking IT against institutions from other countries serves to broaden peer groups. This is especially useful for institutions in countries with smaller sectors or for institutions that have few comparators within their own country. In a global higher education market, institutions may have more similarity with institutions in other countries than in their own. International benchmarking allows comparisons beyond borders and promotes the sharing of good practice on a global scale.

On an association level, international benchmarking allows for an integrated comparison approach with existing national benchmarking efforts. The standardization of institutional types through the CHEITA Global Complexity Index democratizes work across the global higher education community by giving a voice to international institutions represented in association research and benchmarking activities. The CHEITA Global Complexity Index also opens the door for developing more meaningful international higher education IT research collaborations, partnerships, and communities of practice.

Benchmarking internationally may also reveal systemic differences in the overall cost of IT in different countries. These systemic differences could, for example, be due to the pricing strategies of vendors in different countries, and surfacing those differences could serve to prompt discussion about how to gain procurement and other efficiencies at a national level.

NATIONAL AND REGIONAL BENCHMARKING MODELS

As a first step, the CHEITA Benchmarking Working Group looked at existing benchmarking efforts being undertaken by each of the group's members and leveraged this work to develop an approach that would permit robust benchmarking across international borders. The following descriptions provide some insight into the current benchmarking approaches various CHEITA members take, unique characteristics that play into those models (e.g., institution type and funding models), and limitations that these local efforts may have in working on an international basis.

AUSTRALIA AND NEW ZEALAND

The Australian higher education sector is made up of 39 universities, all doctoral granting and all but one publicly funded. Just under half (47%) of total operating revenue is received from federal, state, or local government funding; a third is from student fees; and the remaining revenue is primarily from consultancy and investments. In 2013, a total of 1,221,409 individual students were enrolled, for a total 877,920 equivalent full-time student load (EFTSL). Excluding casual staff, these 39 universities employed a total of 115,801 persons in 2013, for a total of 100,517 FTE staff.

The New Zealand higher education sector comprises eight universities. New Zealand universities receive approximately 40% of their annual funding from government grants, with the remaining revenue split evenly between student fees and other sources, including research contracts. In 2013, 173,744 individual students enrolled, for an equivalent of 131,553 full-time students (EFTS) in New Zealand universities. Also in 2013, these universities employed a total of 19,807 FTE staff.

The Council of Australian University Directors of Information Technology (CAUDIT),[1] which includes Australia and New Zealand, began collecting IT benchmarking data and comparative profile information in 2004. CAUDIT has developed an online system to capture these data and, in addition to providing online analysis tools, also produces an annual benchmarking report for its members.

In 2007, CAUDIT realized that the diversity in the Australian and New Zealand higher education sector made the comparison of these benchmarks across all universities difficult. Paul Sherlock, CIO of the University of South Australia, proposed that this difficulty could be overcome by calculating a "complexity" index for each university. Universities with a similar "complexity" could be expected to have a similar IT cost profile and resourcing, thus enabling a more meaningful comparison to be made.

Sherlock determined that in a typical university in the Australian and New Zealand higher education sector, the key determinants of complexity are the number of staff, the number of students, the level of research activity, and the institutional geography (number and size of campuses), and he developed an algorithm to combine these four factors into a single complexity index.

The algorithm combines these four factors (using a weighting of 35% for staff numbers, 35% for student numbers, 25% for research activity, and 5% for geography) to produce a value between 1 and 10 for each university in Australia and New Zealand. Universities with similar complexity share a similar index number.

The CAUDIT complexity index can be used to compare universities on a range of dimensions, such as total IT expenditure and total IT staff. CAUDIT's experience has shown that once the index value is known for a particular university, then the expected IT expenditure can be "predicted" for that university by comparing it with its complexity peers. This ability of the CAUDIT complexity index to predict IT expenditure is especially important because it helps highlight data-quality issues resulting from less robust collection processes at the institutional level and provides a valuable starting point for more in-depth investigation and discussion.

CAUDIT's benchmarking activities are overseen by the Benchmarking Advisory Committee (BMAC), which has membership from Australian and New Zealand universities and includes an annual collection of high-level data across the full scope of IT in an organization, along with reporting to all participants via an annual report and online tool.

FINLAND, NORWAY, SWEDEN, DENMARK, AND GERMANY

With a change in legislation in 2010, Finnish universities began operating separately from the state. Consequently, the traditional state-led benchmarking effort was ended. In addition, at this time, universities of applied science were seeking ways to improve the efficiency of their IT services. As a result, the BencHEIT (Benchmarking Higher Education IT) initiative was started in 2010 to enable the comparison of IT services among Finnish higher education institutions.[2] BencHEIT aims to provide current and relevant comparison data for both financial and technical viewpoints.

It was decided that less focus would be placed on assessing processes, customer satisfaction, and other similar topics where organization-specific viewpoints would make the comparison more difficult. In addition, a number of rules were established to ensure the usability of the BencHEIT benchmarking results. For example, it was agreed that all benchmarking data are available to all participants in order to ensure that relevant comparisons between individual institutions can be carried out. This comparison work is further facilitated by a Microsoft Excel tool with a number of preconfigured charts where users can make their own choices of institutions to compare. This differentiates the BencHEIT activity from some other (often commercial) approaches where data visibility is limited in one way or another.

Once the work was started in Finland, it soon became clear that other countries had similar needs. Consequently, the activity was turned into a European University Information Systems (EUNIS) task force, allowing all European institutions to join. There are a lot of similarities in the higher education systems in Europe, and, consequently, a number of institutions from Sweden, Norway, Denmark, and Germany have decided to join the activity. The BencHEIT 2013 round conducted in 2014 included 44 institutions from 5 countries.

A yearly clock organizes the BencHEIT work—much like in other national and regional benchmarking initiatives. However, BencHEIT has included two additional elements in the process: peer-to-peer discussions and yearly workshops.

There are two kinds of peer-to-peer discussions. One type are discussions in which participants compare their data-collection processes to ensure that the collected data can be meaningfully correlated. In the second kind, once the results are available, additional discussions are carried out to analyze the results together to understand the differences between the institutions. Both discussions are carried out in informal teams where a small group of similar institutions are present. Currently, discussions have taken place between technical universities, midsized universities, multidisciplinary large universities, and national working groups. There is no structured approach for forming the teams, and the discussions typically emerge from the needs of individual institutions to understand why their results are different from those of other institutions. Technical universities in Finland have been conducting such discussions for several years, and this has led to an excellent mutual understanding of the similarities and differences between these institutions' IT practices.

Once the BencHEIT activity was recognized as a EUNIS task force, yearly workshops have taken place for developing the process and for bringing in additional viewpoints and institutions. So far, three workshops have been held: Munich (2012), Paris (2013), and Bologna (2014). The plan is to organize the next workshop in Barcelona in November/December 2015.

Since publishing the 2013 results, the BencHEIT data set now also contains the CHEITA Global Complexity Index calculated for the participating research-intensive institutions (currently 16). The purpose of this change is to allow institutions to compare their figures (in a limited way) beyond the current set of institutions participating in the BencHEIT survey. A clear need exists to be able to engage in benchmarking beyond the current group of participants. In addition, it is possible for the institutions to compare their total IT costs against the relative complexity.

CANADA

With the exception of a small number of private institutions, Canadian universities remain largely public, receiving funding from the provincial and federal levels of government, with provincial funding normally aimed at supporting teaching and learning activities and federal funding aimed at supporting research. Provincial funding has recently been challenging, seeing little or no growth. Compounding the issue are legislative restrictions on tuition or fee increases. Institutions across Canada are being asked to look at strategies to address the increasing

discrepancy between revenues and costs. Benchmarking data are increasingly required to help inform these discussions. Benchmarking data are being used to ask and answer questions relating to the total spend on IT, to comparative analyses among peer groups, and to the amount being spent on specific functions.

The Canadian University Council of Chief Information Officers (CUCCIO) represents 57 Canadian universities, ranging in size from 747 to over 80,000 student FTEs. CUCCIO members are varied, including large, comprehensive research-intensive institutions, small liberal arts schools, institutions with a strong focus on undergraduate teaching and learning, and institutions with a focus on graduate studies and research. Although research funding is somewhat concentrated within a smaller group of universities in Canada (known as the U15, not all of which are members of CUCCIO), most—if not all—Canadian universities do some level of research at their institution. As in other countries, Canadian universities are also looking to extend their reach internationally.

Building on the success of its counterparts in the United States and Australia, CUCCIO adopted a strategy to leverage both CAUDIT's benchmarking program and the EDUCAUSE Core Data Service (CDS, discussed below). Using the aggregate data collected by CAUDIT and the more granular data available in CDS, CUCCIO members will have access to the data they need to answer a wide variety of questions.

As a relative newcomer to benchmarking at a national level, CUCCIO will continue to encourage its members to participate in both the CUCCIO adoption of CAUDIT's program as well as CDS.

SOUTH AFRICA

South Africa has 26 public universities subsidized by the government, 5 of which are universities of technology. In 2011 the total state subsidy for universities was R 20.9 billion ($4.4 billion USD), and R 5 billion ($1 billion USD) was spent on student scholarships. The state also spent R 3.8 billion ($800 million USD) on infrastructure. In the same year there were 47,565 permanent staff members employed by these universities—22,761 were involved with teaching and research, and the rest were administration or service staff. A total of 936,837 students enrolled, of which 556,694 were contact students and 381,506 were distance learners; 159,115 students graduated in 2011. In 2012 South African universities had a total of 2,456 researchers.

The Association of South African University Directors of Information Technology (ASAUDIT), which represents all 26 public universities, has been working to collect benchmark data since 2011, based on the Australian benchmarking system, which ASAUDIT leases from CAUDIT for an annual fee. To date, primary data for 23 universities, about 45% of all geographical data, and benchmarking data from 8 universities has been collected. South Africa will be renewing the effort to collect data based on the belief that there is considerable value in benchmarking both locally and internationally.

UNITED KINGDOM

Responsibility for higher education has been devolved to the constituent countries of the United Kingdom. This means that the proportion of funding that institutions receive from the public purse varies depending on where the institution is located, but in all cases, the contribution from the public purse has declined, with a shift from direct public funding for teaching to students making a larger, direct contribution to institutional income. The sector is hugely varied, and it is not always possible to easily compare institutions, even within mission groups. There are large, research-intensive universities and equally large institutions that have a stronger focus on teaching. There are few specialist institutions; almost all institutions will provide a wide range of courses. In spite of the bulk of public research funding being concentrated within a small number of the research-intensive universities, most universities carry out some research. U.K. institutions have sought to extend their reach, both internationally through overseas campuses and domestically through engagement with further education colleges (similar to community colleges in the United States) and the commercial sector.

The United Kingdom remains attractive to international students, but competition for such students has increased from both English-speaking countries and from institutions in non-English speaking countries delivering programs in English. There is a growing emphasis on collaborative research within the United Kingdom and internationally. The higher education sector in the United Kingdom is very much part of a global higher education system and market. Consequently, those institutions with strong international connections are interested in benchmarking internationally.

The Universities and Colleges Information Systems Association (UCISA) has been collecting benchmarking statistics since 1996. The initial statistics largely focused on the cost and scale of IT provision and were used to derive a number of key performance indicators defined by the funding bodies in the United Kingdom, with the intention of demonstrating value for money. The statistics were used in a variety of ways by members—to inform institutional funding discussions (to demonstrate underfunding or efficiency, depending on the pressures), to identify areas where other institutions were providing more advanced services (and so build the case for investment), and to provide input to quality assessments at the departmental or institutional level.

The core data remained largely static until 2010. Although some elements of both the financial and service-provision data persisted (to facilitate longitudinal comparison), a number of service provision elements were dropped as innovative solutions became mainstream. The remit of the IT department had, in many cases, expanded significantly, but that expansion had taken place in different ways and at different rates. Similarly, institutional missions changed with the advent of overseas campuses and engagement, distance learning, and collaborative teaching and research. As a result, the focus of the core data was altered to provide both high-level financial information but also contextual data identifying the scope and delivery methods of services and the position of the IT service within the institution.

The service provision aspects of the survey were still valued by members, and so more detailed questions were included in a second tier of survey data. UCISA has encouraged a "benchsharing" approach, highlighting that statistics are just the start of the conversation—there is more to be learned from talking to other institutions and understanding their service delivery model and approaches. The benchsharing approach is largely applied where institutions are at similar levels of maturity in the application of a given technology. In these instances, the comparator institutions are generally identified through informal surveys. This is an approach that can be readily extended to international comparators. The benchsharing approach contrasts with the way comparisons are made at a higher generic level. The complex nature of the U.K. higher education sector means that each institution will have a range of *known* comparator peer institutions. An institution's comparator group will be a mix of institutions with similar missions nationally and of institutions in the region, regardless of their mission. This is indicative of the different facets of competition in the United Kingdom—students are as likely to apply to a range of institutions in a region as they are to consider similar courses across a range of institutions nationally.

UNITED STATES

Since 2002, the EDUCAUSE Core Data Service (CDS) has been providing higher education CIOs and senior IT leaders with benchmarks to make strategic decisions about IT at their institutions. On average, more than 800 institutions (both within and outside the United States) participate in the annual CDS survey about IT financials, staffing, and services. Participating institutions range in type from small (800 students) to large (75,000 students), privately to publicly funded, and community colleges to doctoral-granting, research-intensive institutions. Survey participants have access to CDS reporting, a self-service tool that enables institutions to benchmark their IT organizations against their peers.

Finding peer institutions within the United States is simplified with the use of the Carnegie Classification system, a standardized scale that has been developed to categorize institutions based on degree offering. This system provides an effective means of finding peer institutions within the United States. However, it is not applicable to non-U.S. institutions and therefore does not facilitate international benchmarking. While EDUCAUSE has international representation in its membership, the EDUCAUSE research products have traditionally offered a U.S.-centric perspective of current issues and practices in higher education IT. Though the association gathers responses from both U.S. and non-U.S. institutions in the CDS survey, the U.S. data are disaggregated by Carnegie Classification and control (public versus private), and non-U.S. institutions are aggregated into one "non-U.S." category. This containerized analysis allowed for a comparison between U.S. and non-U.S.-based institutions, but the value was limited for both groups. Integrating international benchmarking and institutional complexity comparisons into analysis and reporting functions will allow more meaningful and influential use of non-U.S.-based institutional data in EDUCAUSE research products.

THE CHEITA GLOBAL COMPLEXITY INDEX

After reviewing the approaches used to find peers described above, CHEITA resolved to adopt the methodology of indexing institutional complexity, developed for CAUDIT, as the basis of its CHEITA Global Complexity Index. As described above, the CAUDIT methodology uses staff numbers, student numbers, research income, and geography (number and size of sites) as the basis of its algorithm. These factors are included on the following basis:

- University staff make demands on IT costs through software licensing, telecommunications charges, applications development (human resources, finance, student administration systems, etc.), identity management, Internet access, networking, and hardware (desktop, laptop, tablet), as well as through direct IT support and service desk calls. Staff are therefore effectively a proxy for the cost of common IT services and administrative IT services.
- Students make demands on IT costs through software licensing and hardware costs (student labs), networking costs (to support student labs and provide wireless access), identity management, applications development (e.g., online services, virtual learning environments, portals), printing, Internet access, direct support, and service desk calls. Students therefore effectively represent the cost of IT services related to teaching and learning.
- Research activity makes demands on IT costs for high-performance computing, research data repositories, software licensing, specialist support and integration with central IT services, support of nonstandard IT activities arising from research activities, networking, federated identity management, and e-research services. The level of research activity is an indicator of the cost of research-related IT services. Research income is a proxy measure for research activity.
- The number and size of the different locations over which a university operates will naturally affect the cost and complexity of IT.

When CHEITA considered what data were available from each member country, the only data of these four elements that was not consistently available was geography. A small modification therefore had to be made to calculate the CHEITA Global Complexity Index. The geography component was removed and the weighting for research was increased to compensate. The calculation the CHEITA Global Complexity Index uses is a weighting of 35% for staff, 35% for students, and 30% for research activity. Because geography was only a small component (5% weighting) in the original CAUDIT model, this modification to the methodology was not considered to be significant from the perspective of doing some initial international benchmarking.

One of the difficulties in making benchmarking comparisons across international boundaries is dealing with currency conversions. Because the CHEITA Global Complexity Index includes a monetary variable (research income), this difficulty must be addressed to calculate an index that can be used in any country (currency). CAUDIT's experience suggested that doing a simple currency conversion (in their case between Australia and New Zealand) would not be sufficient to make robust comparisons across different countries (currencies). CHEITA therefore resolved to use purchasing power parity (PPP) to overcome this difficulty and convert all monetary values to

USD. Purchasing power parity is an economic theory that estimates the amount of adjustment needed on the exchange rate between countries for the exchange to be equivalent to each currency's purchasing power. [3]

Additionally, the CAUDIT Complexity Index scales institutional complexity by assigning a value of 10 to the most complex institution on any axis. To create a generalizable complexity index that could be used worldwide, CHEITA decided to scale institutional complexity by a set of maximum values. Any institution having a value equal to or greater than those maximum values would be assigned a value of 10 on any axis. The maximum values (see table 1) are based on the 95th percentile in the proof-of-concept data set (see Proof of Concept section in this paper).

Table 1. Maximum values

Element	Maximum
Number of students (EFTSL)	45,000
Number of staff (FTE)	18,000
Research income (USD)	$750,000,000

Thus, the final equations for calculating the CHEITA Global Complexity Index are:

Index for number of students (eftsl_ind)	=	min(10,1+9*(student FTE/45,000))
Index for number of staff (fte_ind)	=	min(10,1+9*(staff FTE/18,000))
Index for research income (res_ind)	=	min(10,1+9*(research income/750,000,000))
Final CHEITA Global Complexity Index	=	eftsl_ind*0.35 + fte_ind*0.35 + res_ind*0.30

Some key benefits of the CHEITA Global Complexity Index are:

- The index is based on the CAUDIT index, which already has international reach resulting from its use in Australia and New Zealand, Canada, and South Africa.
- The calculation and use of the index is a relatively simple and straightforward.
- For most participating countries, the index can be calculated from publicly available data, which gives it a degree of robustness and independence from data collection at the institutional level.
- It is based on stable institutional measures rather than technology measures (e.g., number of servers), which will vary over time based on technology change and adoption rates.
- It can readily identify members of peer groups that can undertake deeper benchmarking. This is especially relevant for smaller sectors that need to expand their peer group.
- It can be used in parallel with other classification approaches to further refine large peer groups.

- It can be used to identify outliers in data by plotting predicted values against actual values. Outliers above an expected range can be investigated for poor data quality due to over counting, higher complexity than expected, or a deliberate strategy that would cause higher values. Outliers under an expected range can be investigated for inverse causes. (More information about the investigation of outliers is in the Future Steps section below.)

ASSUMPTIONS

The methodology used to develop the CHEITA Global Complexity Index is based on several assumptions.

SEPARATE INHERENT FROM INTRODUCED COMPLEXITY

The CHEITA Global Complexity Index measures inherent complexity resulting from the number of students and staff and from research activity of the institution. It deliberately does not try to capture introduced complexity such as the degree of centralization of IT service delivery or the proliferation of systems with similar capabilities (e.g., multiple finance or teaching and learning systems).

The difference between inherent and introduced complexity is important. Inherent complexity is essentially based on the broad parameters of the university itself. Introduced complexity, on the other hand, results from a management decision. The level of introduced complexity can be changed (relatively) easily, whereas the inherent complexity cannot be. It is vitally important that introduced complexity be excluded from the index because it is very likely that introduced complexity results in increased IT expenditure. If the index were adjusted to take account of the introduced complexity, this inefficiency would be masked rather than illuminated.

For example, if two universities share a similar complexity index value (based on inherent complexity) but one spends 10% more on IT than the other, then the reasons for that difference are due to management decision making (quality of service provision, broad IT strategy, centralization, standardization, etc.). The primary purpose of benchmarking is to highlight these differences and determine which of them represent the best or most appropriate practice.

THE INDEX ACCOUNTS FOR MOST INSTITUTIONAL COMPLEXITY

By using research income, student EFTSL, and staff FTE, much of the complexity of the institution is accounted for in the CHEITA Global Complexity Index model. While additional factors—such as discipline spread (e.g., the presence of medical school or engineering faculty), federally funded ICT services, and multiple campuses or sites—may also contribute to institutional complexity, they are not considered significant enough to prevent the complexity index from being used to make meaningful international comparisons. Indeed, use of the index is expected to help quantify the significance of these other drivers (see the Future Steps section).

ALL COUNTRIES HAVE ACCESS TO SIMILAR DATA

In countries that do not have publicly available data on research income, student EFTSL, and staff FTE, CHEITA participants are either able to collect these data through existing surveys or can find suitable approximations. In some countries, publicly available figures for research expenditures and an estimate of staff FTE based on staff headcount were used as proxy variables for research income and staff FTE.

PPP SERVES AS AN APPROPRIATE CURRENCY CONVERSION

The complexity index calculation methodology uses the World Bank's purchasing power parity to make comparisons between expenditures in different currencies. The PPP is updated every two years. The CHEITA Benchmarking Working Group believes that fluctuations in the PPP between different countries is relatively slow and therefore any lag between when the PPP is updated and when the CHEITA Global Complexity Index is calculated is not significant.

PROOF OF CONCEPT

As a proof of concept, the CHEITA Global Complexity Index has been used to compare IT expenditure data from 235 universities in 11 countries across the globe (figure 1).

Figure 1. CHEITA Global Complexity Index proof-of-concept participation

Anonymized data sets from each CHEITA benchmarking working group member organization were first normalized to USD using PPP. The normalized data sets were then used to calculate the CHEITA Global Complexity Index for each institution. As a test of the viability of the index, IT expenditure (in USD) for each institution was then graphed against the CHEITA Global Complexity Index. As can be seen from figures 2 and 3, there is a strong correlation between institutional IT expenditure and the CHEITA Global Complexity Index. Whereas figures 2 and 3 demonstrate how the CHEITA Global Complexity Index can be used to compare institutional IT expenditure, it can of course be used to compare other variables, such as the number of IT staff employed within an institution or the cost of employing those staff.

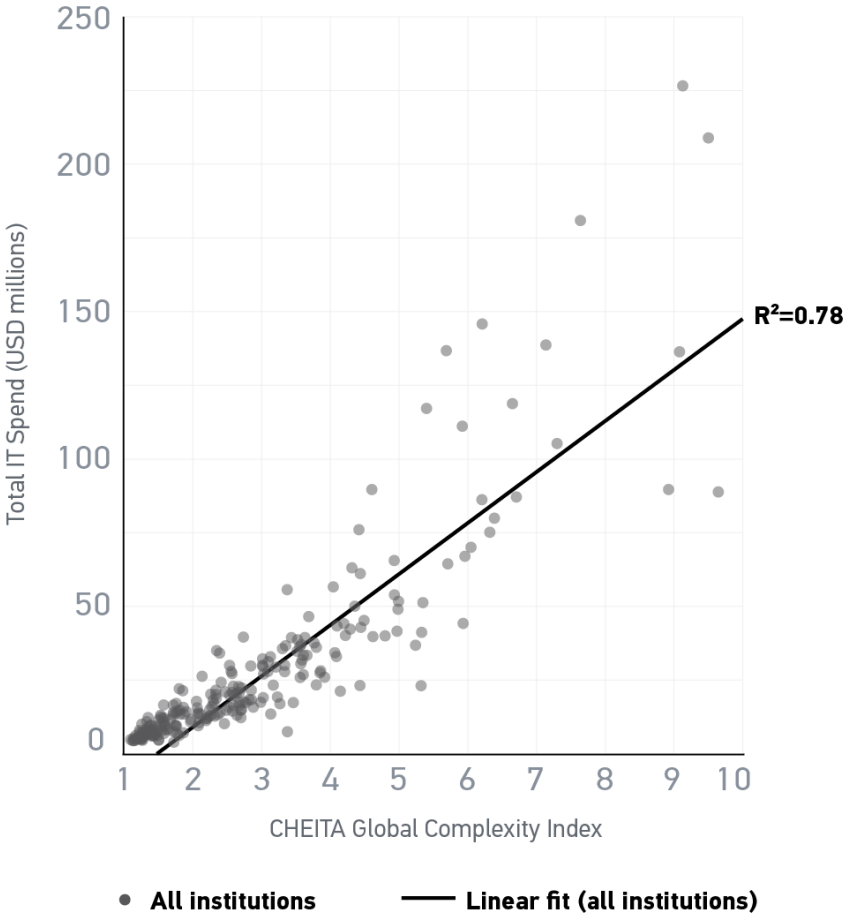

Figure 2. CHEITA Global Complexity Index by total IT spend (USD millions)

In the overall sample (figure 2), four-fifths (78%) of the variability in IT spending can be explained by the CHEITA Global Complexity Index. For individual countries (or for a group of countries, in the case of BencHEIT), figure 3 shows that the index explains between 74% (BencHEIT institutions) and 95% (New Zealand institutions) of the variability in IT spending. CHEITA Global Complexity Index by total IT spend graphs for individual countries can be found in appendix A. The graphs in appendix A may be used to predict IT spend and identify outliers for further analysis.

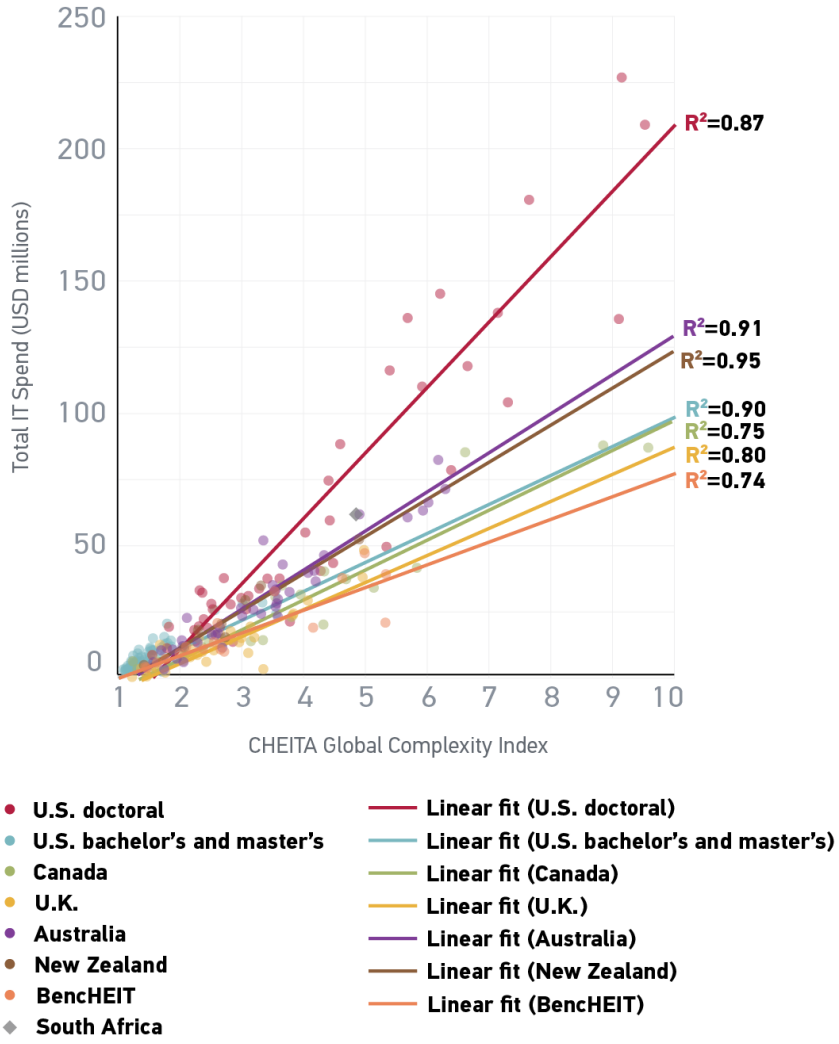

Figure 3. CHEITA Global Complexity Index by total IT spend (USD millions), by country

The difference in the slopes of the linear fit lines in figure 3 clearly shows that for the same institutional complexity, IT expenditure is greatest in the United States (for doctoral institutions), followed by Australia, New Zealand, U.S. bachelor's and master's institutions, Canada, the United Kingdom, and the BencHEIT countries. On closer analysis, IT expenditure levels appear to fall into three "categories." One contains U.S. doctoral institutions, another category encompasses Australia and New Zealand, and the third category contains U.S. bachelor's and master's institutions, Canada, the United Kingdom, and the BencHEIT countries. Clearly, further analysis is needed to understand what is driving the difference in expenditure levels in each of these categories, and the CHEITA Global Complexity Index will be able to facilitate this analysis by identifying a group of universities (e.g., with similar complexity from 11 different countries) whose expenditures can be studied in more depth.

These impressive initial results confirm that the CHEITA Global Complexity Index is a viable methodology for comparing institutions of similar complexity internationally.

FUTURE STEPS

INVESTIGATE DATA QUALITY AND APPROPRIATENESS OF THE MODEL

To confirm that the CHEITA Global Complexity Index is an appropriate method for benchmarking IT spending on a global basis, the CHEITA benchmarking working group would like to identify and analyze outliers in each country's data set. Outlying data likely result from issues with data quality or data collection, and in those cases the complexity index will help institutions identify and rectify these issues. If outliers are due to unexpected or unaccounted for complexity, we will look to CHEITA to refine the complexity index to account for additional complexity.

REFINE THE METHODOLOGY

Some potential refinements to the complexity index include:

- Introduce site data into the index. If site data could be collected on an international basis, then the CHEITA Global Complexity Index could be modified to include these data. This would better represent the complexity of more distributed organizations including, for example, those with hospitals and or regional/remote/international teaching locations.
- Introduce a component based on the breadth and nature of course/discipline offerings.
- Subdivide students into more granular cohorts (e.g., undergraduate versus postgraduate, on campus versus off campus, local versus international, etc.).
- Subdivide staff into categories (e.g., academic, research only, administrative, etc.).
- Take into account campus locality (metropolitan, regional, international, etc.).

Introducing these refinements will depend on the availability in each country of a richer set of data.

ENCOURAGE PARTICIPATION

To fully test the complexity index and to expand its use, CHEITA would like to encourage more institutions within our test countries to participate in benchmarking exercises using peer institutions from other countries. We would also like to encourage more countries to participate in the use of the CHEITA Global Complexity Index and international benchmarking activities. To start, we plan to promote participation in our existing benchmarking programs, as well as integrate the complexity index into these programs to facilitate the identification of peer institutions using this new index. To learn about the benchmarking programs available for your institution and/or the complexity index calculation for your institution, please visit the CHEITA website.

DEVELOP A SMALL SET OF METRICS FOR INTERNATIONAL BENCHMARKING

As our ultimate goal, CHEITA would like to establish a small set of metrics that can be used to benchmark internationally. Once the complexity index is accepted and used as a basis for making international comparisons, our focus will turn to developing a common set of metrics with which to compare our environments. We would also like to develop a tool or data set that can be used for this purpose.

EXPAND THE ROLE OF CHEITA

As the use of the complexity index expands, CHEITA plans to present this work globally to provide overviews on finding international peer institutions. At this time, CHEITA would be uniquely positioned to facilitate contacts between international institutions defined as peers and could potentially offer that service.

NOTES

1. Council of Australian University Directors of Information Technology (CAUDIT) represents universities and other major publicly funded research organizations from the following countries: Australia, Fiji, New Zealand, Papua New Guinea, and Timor-Leste (East Timor). Other organizations from these countries include the Commonwealth Scientific & Industrial Research Organisation (CSIRO), Defence Science and Technology Organisation (DSTO), and the Australian Institute of Marine Science.
2. See BencHEIT.
3. PPP is calculated on a biennial basis. For the purposes of the complexity index, institutions should use the most recent data available. For more, see the OECD's Prices and Purchasing Power Parities (PPP).

APPENDIX A: CHEITA Global Complexity Index—Proof of Concept by Country

The figures contained within this appendix highlight the linear fit lines of the CHEITA Global Complexity Index against total IT spend (USD, millions) for each participating country. Data points for all 11 countries are presented in each figure. Data points highlighted in a color represent the country of focus; data points in grey represent all other participating countries and are included to provide context. These graphs can be used to predict IT spend and to identify outliers for further analysis.

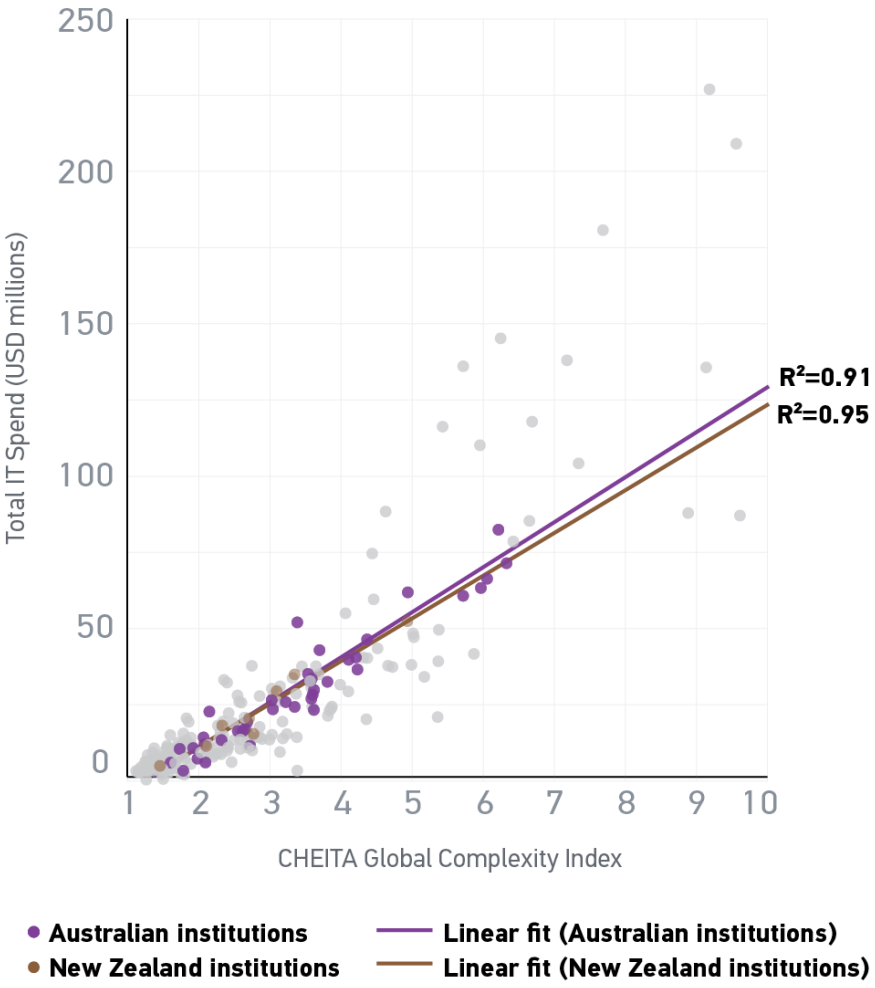

Figure A1. CHEITA Global Complexity Index by total IT spend (USD millions), Australia and New Zealand

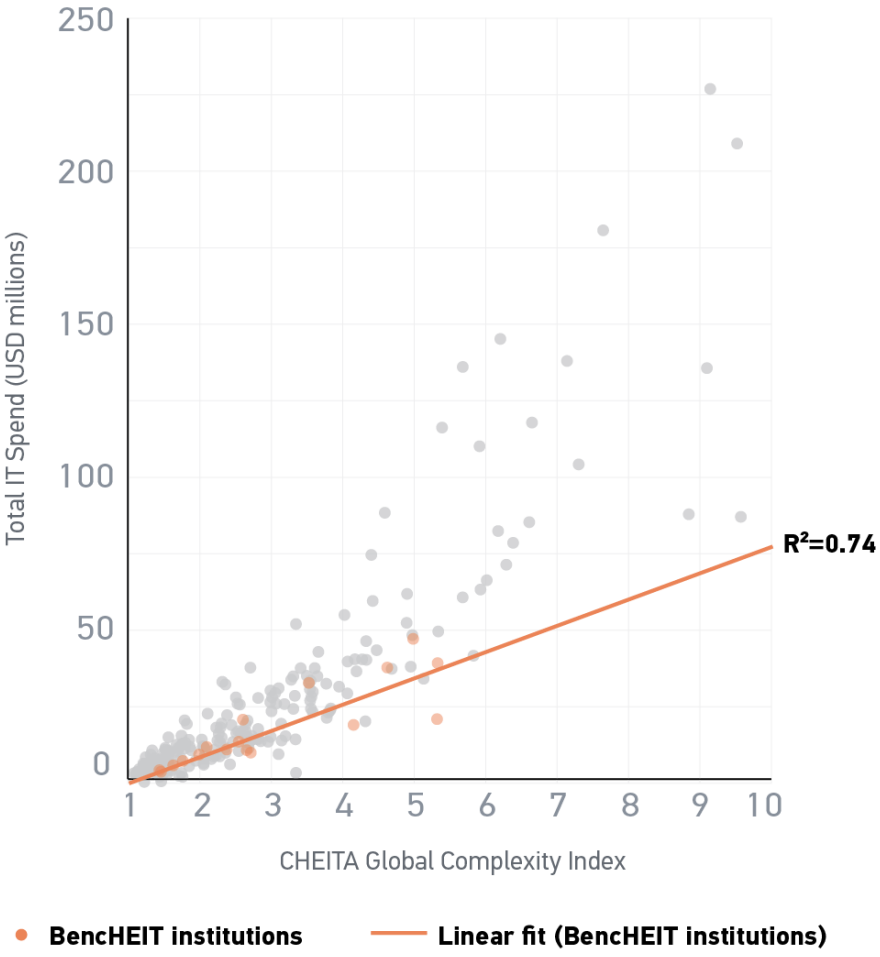

Figure A2. CHEITA Global Complexity Index by total IT spend (USD millions), Finland, Norway, Sweden, Denmark, and Germany

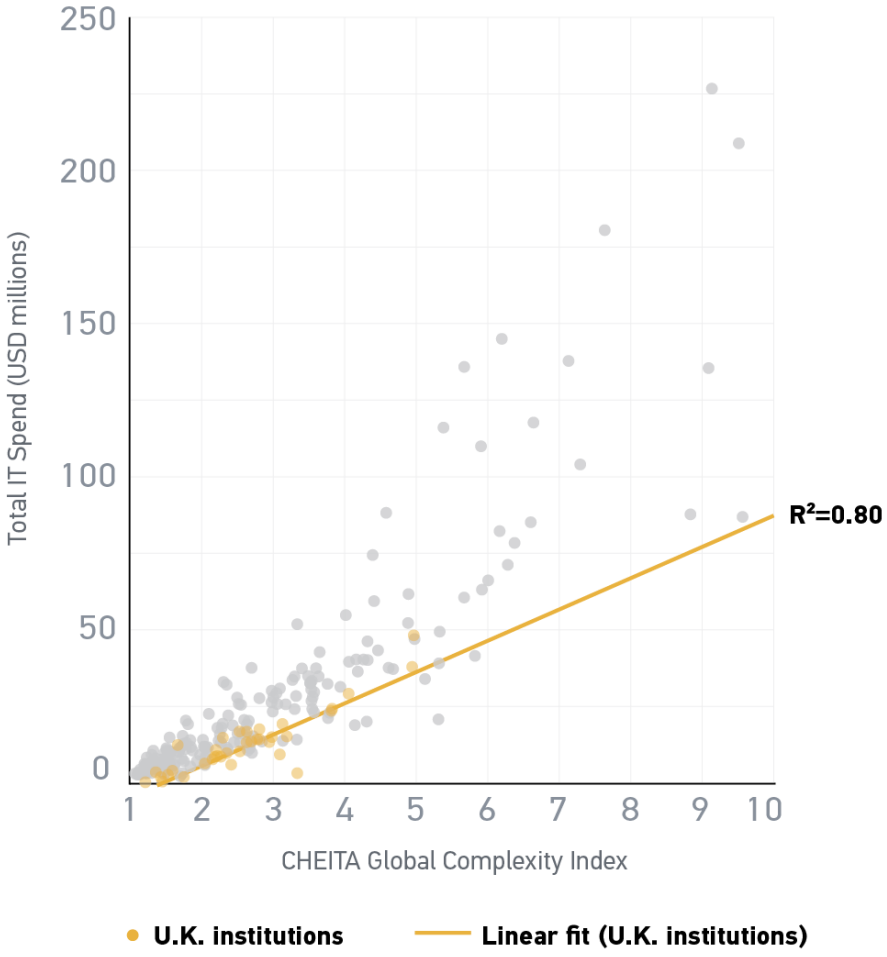

Figure A3. CHEITA Global Complexity Index by total IT spend (USD millions), United Kingdom

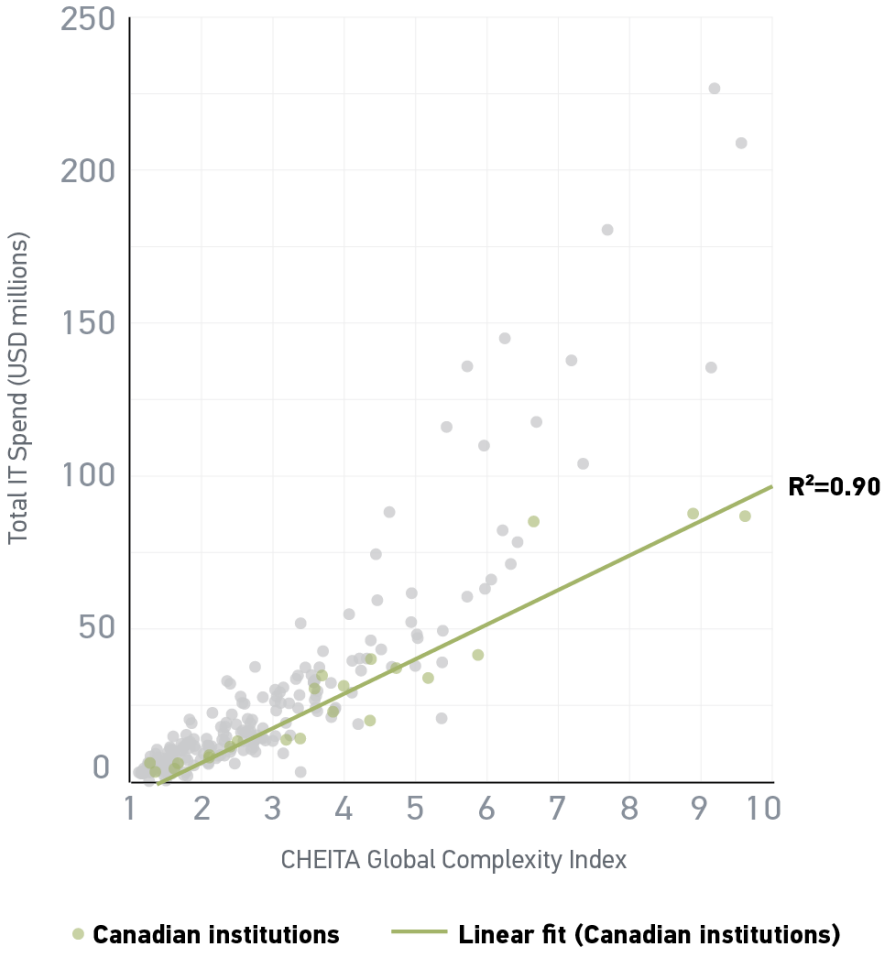

Figure A4. CHEITA Global Complexity Index by total IT spend (USD millions), Canada

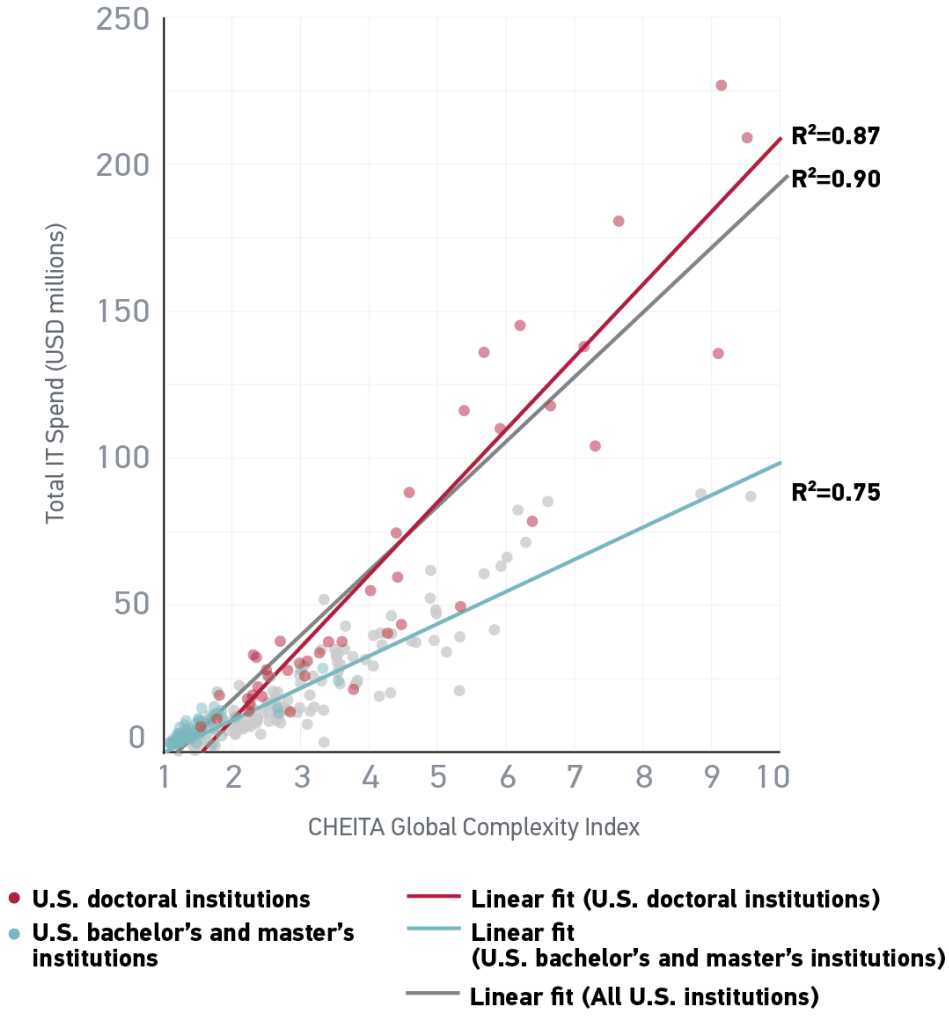

Figure A5. CHEITA Global Complexity Index by total IT spend (USD millions), United States