

International Higher Education Student Flows

Final Report

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Project funder



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For further information, please visit the website www.internationaleducation.gov.au or www.education.gov.au

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International data agencies

The following global international education agencies have provided access to data and information to support the project:

- Department of Education, Australia
- Statistics Canada
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- Higher Education Statistics Agency, UK
- German Centre for Higher Education Research and Science Studies
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1 Introduction

This report has been prepared as part of the project 'International Higher Education Student Flows via Global Data Integration'. The project is supported by the 'Enabling Growth and Innovation' programme under the *National Strategy for International Education 2025*.

The project has focused on integrating disparate sources of international higher education data to better understand the macro-trends in global student mobility from source countries to major destination countries and gain greater insight on the trends in the global higher education sector.

The importance of data in the international education and training sector has also been raised in many contexts. Multiple sector-specific reports, including Australian Trade and Investment Commission's **Australian International Education 2025** emphasise the importance of harnessing the power of data in improving education offerings. The same report reflects on the growing competition and the need for Australia to understand its competitors and craft longer-term growth strategies.

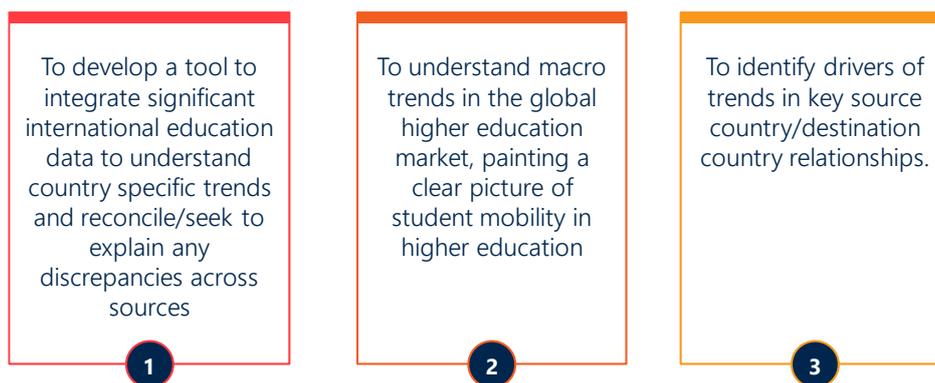
This document represents the Final Report for the project. It outlines the process adopted through the project, outlines limitations in the approach and draws out key insights from the project. The report also outlines key considerations moving forward for the sector to improve upon and better utilise existing global enrolment data.

Project objectives

Student mobility data, which includes enrolment data and visa data, is valuable to understand the dynamics of the global international education sector. It provides insights for universities and other higher education providers in planning and driving market and recruitment efforts. It also supports governments in determining the most appropriate policy settings and promoting countries as destinations for international students. The project aimed to better understand this data and draw out insights that would be valuable for stakeholders within the sector.

Specifically, the project had three key objectives – assessing and integrating discrete data sets, understanding key macro-trends based on this data and identifying drivers of source country and destination country relationships. The three project objectives are included in Figure 1.

Figure 1 | Three project objectives



Project approach

The project was delivered from October 2018 to May 2019, across three stages.

- 1. Data collection and integration** – focused on undertaking a stock-take of existing global data sources and engaging with global data agencies to access comparable enrolment data from a range of key destination countries and integrating these data sets for key destination countries.

2. **Identify macro-trends and case studies** – reconciling existing public data sets and undertaking analysis on overall volume of international students, student flows between key source countries and destination countries and initial assessment of market position for key destination countries – including Australia.
3. **Refine analysis and determine implications for policy** – through three case studies focused on different elements of the global international education system and drawing out lessons for the Australian international education sector.

Project partners and funder

The project is being delivered through a collaboration between Navitas, Nous Group and Austrade. Further information on each partner is included in Figure 2.

Figure 2 | Project partners



Navitas is a world leader in developing and providing educational services and learning solutions with locations throughout Australia, North America, Europe, Africa and Asia.



Nous Group is an award-winning management consulting firm with over 350 people across eight locations in Australia and the UK. Nous is an expert in higher education and international education.



Austrade is the Australian Government's trade, investment and education promotion agency. It supports Australian education providers market intelligence, in-market support and thought and policy leadership.

This project has been facilitated by the Australian Government through the Department of Education. The 'Enabling Growth and Innovation' grant supports the National Strategy for International Education 2025, through \$3 million per year to deliver big picture projects that develop Australia's role as a global leader in education, training and research.

Purpose and structure of this document

This document represents the final deliverable for the project. It has been structured in three sections:

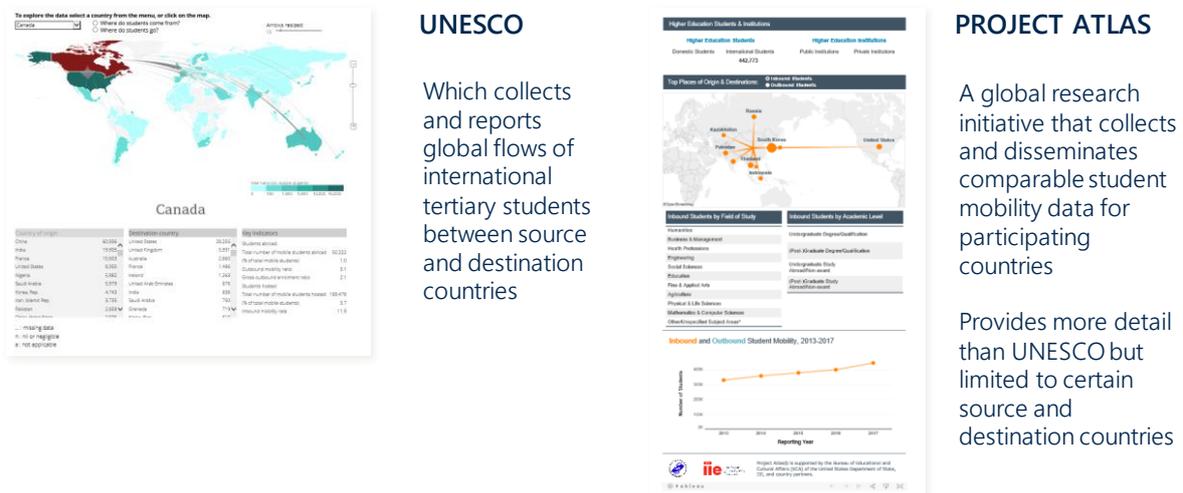
- **Section 2 – Existing Data available**, which provides an overview of existing resources
- **Section 3 – Insights on global student flows**, which outlines the key macro-trends and presents high-level insights from the three case studies undertaken.
- **Section 4 – Approach and methodology**, which presents the projects conceptual approach to the reconciliation of the discrete data and the methods used.
- **Section 5 – Insights on global data available**, which outlines limitations in the data available and lessons that have been drawn from the EGI grant process

The document is supplemented by three separate deep-dive case studies on topics aimed at better understanding the nature of the international education sector and key trends, and an interactive tool which is publicly available for use by the sector.

2 Existing data available

The project builds on existing work and research in this area. A range of existing data and resources are available publicly which provide insight on global student flows. This includes at a global level with resources such as UNESCO and Project Atlas – which are outlined in further detail in Figure 3.

Figure 3 | Resources available to understand global student flows



At the national level, more detailed information is also available on the inbound flows which is captured and reported by several key destination countries. This includes:

- **Australia** – where resources are available through **Austrade’s Market Information Package** for subscribers, including through a regularly updated pivot table and interactive visualisations, as well as through the **Department of Education’s International Student Data**.
- **The United Kingdom** – where data on international education inbound mobility is available through the **Higher Education Statistics Agency (HESA)** as part a broader national collection of higher education data in table and interactive formats.
- **The United States** – where information on international student mobility is captured from universities and higher education providers through the **Open Doors** survey, conducted by the Institute for International Education (IIE) and supported by the U.S. Department of State.
- **Netherlands** – where information on inbound mobility (amongst other things) is publicly available in dashboard format through **Nuffic** – the Dutch organisation for international education.

Despite these resources there are current limitations faced by the sector to get a more fulsome picture of the worldwide market for international education. While detailed information is available for Australia as a destination country, there is clear limitation in the information used by government, providers and the industry more broadly to make important decisions. Similarly, relatively limited work appears to have been undertaken to reconcile inbound flows for key destination countries to understand the macro-picture.

This project builds upon these resources and attempts to utilise these and other resources to provide further consistency and granularity, improve the quality of data available and better understand the macro-flows of students globally.

3 Insights on global student flows

This project has enabled a comprehensive assessment of the key trends in global student mobility based on integration of discrete sources of student mobility data. This has allowed an assessment of the scale of international student mobility, the share and growth for source and destination countries and the scale of flows and how these have changed over time.

Analysis of the macro-level flows have focused on two key elements:

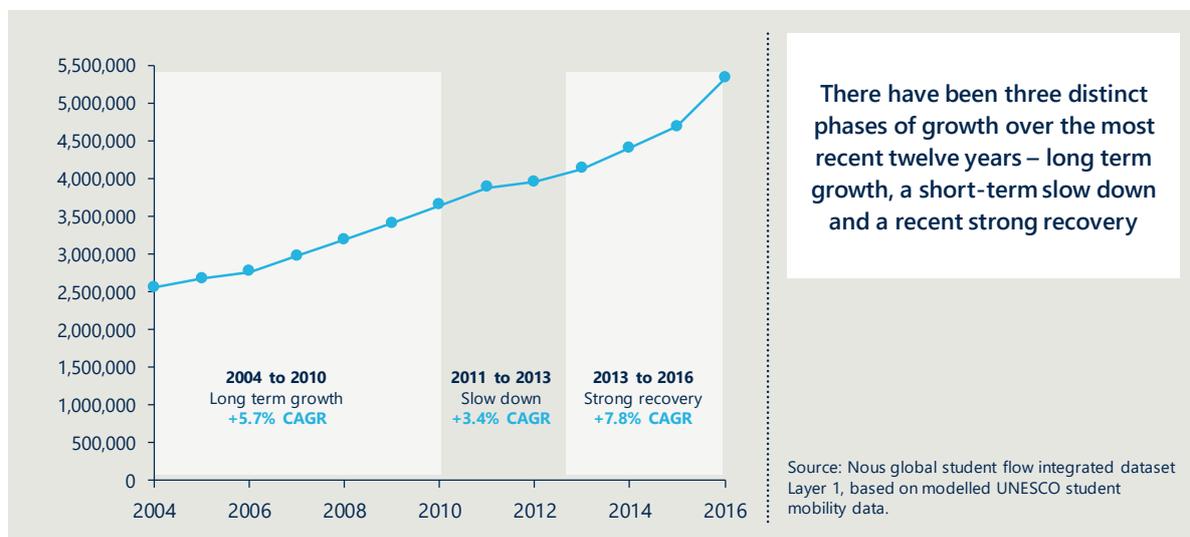
- **Key question 1** – what is the global flow of international higher education students across countries?
- **Key question 2** – what are the key drivers of global student mobility in higher education? (with a focus on destinations, source countries and policy settings).

A series of key insights from analysis of the macro-trends are presented in this section based on the macro-analysis of student mobility, before insights are presented from the three case studies on specific areas of the global international education sector.

3.1 International student mobility has enjoyed a period of sustained growth

Our modelled figures have identified that in 2016 total global student mobility comprised almost 5.5 million students studying in tertiary programs in countries outside their home country. This has built on a period of growth from 2004 comprised of three distinct phases – as shown in Figure 4.

Figure 4 | Three phases of student mobility growth

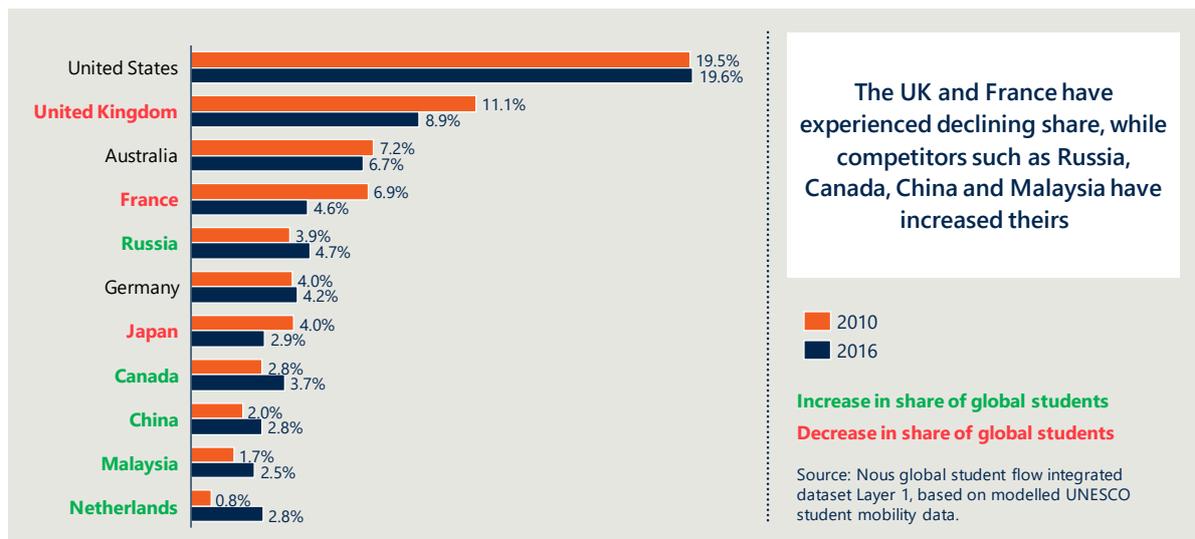


Despite a slowing of growth between 2010 to 2013, strong recovery from 2013 has indicated year-on-year growth of almost 8 percent in more recent years.

3.2 US, UK and Australia are dominant destination countries, but new countries are emerging

Australia is the third largest destination for international students – behind the United States and the United Kingdom. These three players have retained their market position but are increasingly being challenged by new players in recent years. The strongest relative growth has come from emerging destinations – such as Malaysia, China, Netherlands, Russia and Canada. This is shown in Figure 5 below.

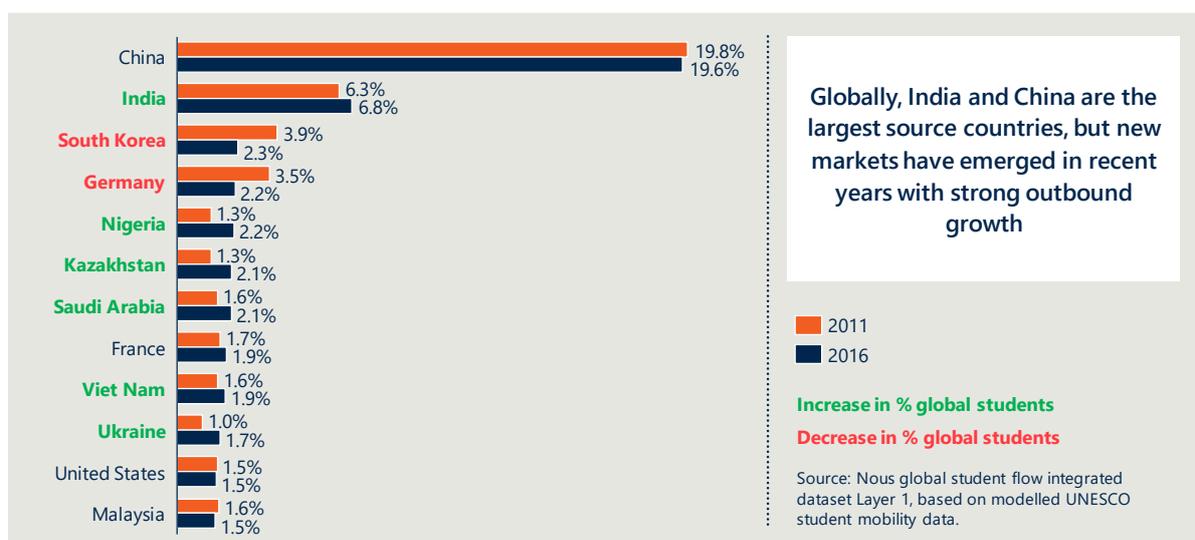
Figure 5 | Share of inbound tertiary student flows, by destination country, 2011 and 2016



3.3 China is the key source country globally, but India and Nigeria have both grown

China is the largest source country for international students globally – sending 20% of all students studying overseas. Growth and decline have characterised other key countries – as shown in Figure 6.

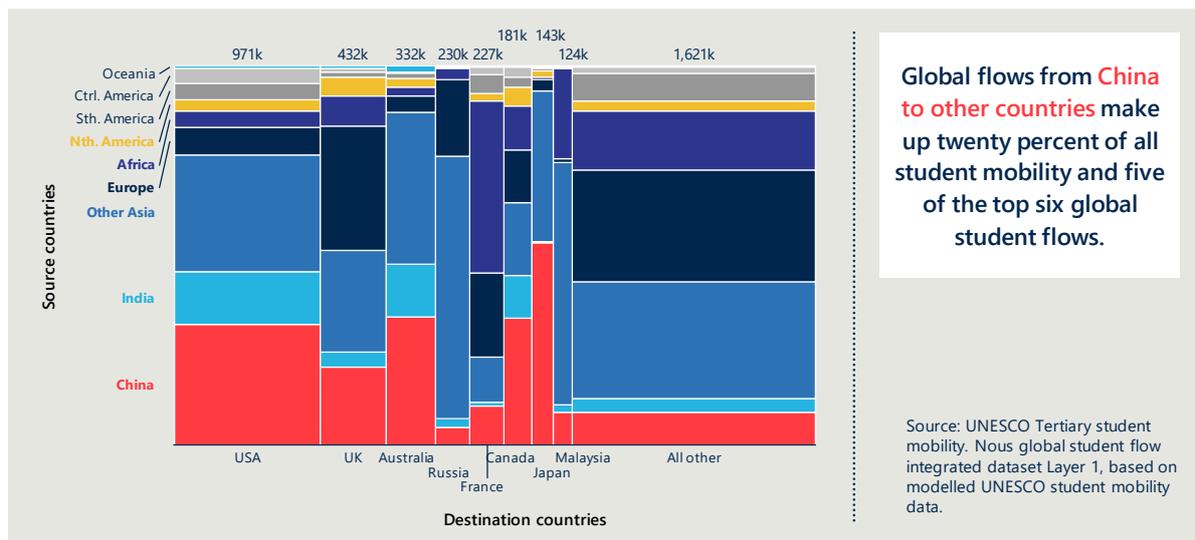
Figure 6 | Share of outbound tertiary student flows, by source countries, 2011 and 2016



3.4 Key source country to key destination country flows make up a large share of all global student mobility

The relationship between source country and destination country demonstrates the key global flows of students. Analysis of country-to-country flows for the most recent available year (2016) shows the volume of flows between key source and key destination countries – as shown in Figure 7.

Figure 7 | Number of tertiary students, by source country and destination country, 2016



Key insights that can be drawn from the country-to-country flows include:

- The largest source countries contribute substantially to overall student numbers, with Asian enrolments significant globally.
- Asian enrolments in the top three destination countries (UK, US and Australia) make up almost a third of all international student mobility.
- Global flows from China to other countries make up 20 per cent of all enrolments and five of the top six student flows – including to the United States, Australia, the UK, Japan and Canada.

3.5 Three standalone case studies have provided further depth of insight

The project has also delivered three standalone case studies on the drivers for global student mobility. Potential topics were assessed against four principles, as shown in Figure 8, to ensure they would be valuable for the sectors and utilises the data that was collected through the project.

Figure 8 | Considerations for selection of case study 'deep dive' topics



The three topics focus on the breadth of the international education sector – one focused on destination countries and where students are choosing to study, one focused on source countries and where students are coming from, and one focused on how policy settings can influence this.

The full case studies are available as separate documents with a summary of high-level findings and avenues for further exploration presented below.

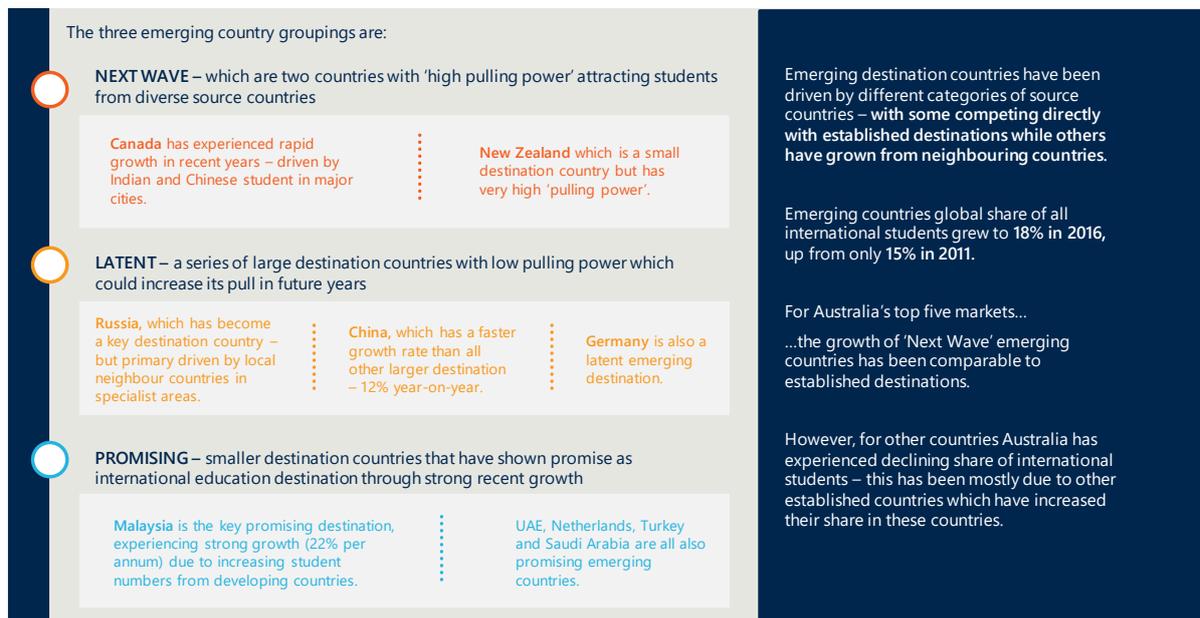
Case study 1 focused on emerging destination countries

The first case study focuses on emerging destination countries in the international education system, providing insight on destination country trends in global higher education and the implications for Australia as a destination country.

Detailed cluster analysis found that there were five key groups of destination countries – established countries (United States, the United Kingdom and Australia), mature destination countries, and three types of emerging destination country groups. Analysis found that while Australia is increasingly competing with both emerging and established destination countries, lost share was most commonly to other established destination countries.

A summary of the key findings from case study 1 are presented in Figure 9.

Figure 9 | Summary of findings for case study 1



Avenue for further research

There are several avenues for further research coming out of this case study:

- Deep dive on domestic drivers of declining outbound growth** – there is an opportunity for further research to explore the domestic drivers of outbound growth – as countries transition from international student 'exporters' to international student 'importers'. This includes increasingly available and high-quality domestic institutions. Data was not captured on domestic student numbers for key source countries (such as China or South Korea) where domestic institutions may have an impact on future outbound mobility trends.
- Alternatives for geographic distance** – our definition of 'Pulling Power' considered the 'geographical distance', calculated as the straight-line distance based on countries' centre latitudes and longitudes. While our approach has used geographical distance, flights times or other measures could provide a more accurate assessment of distance.

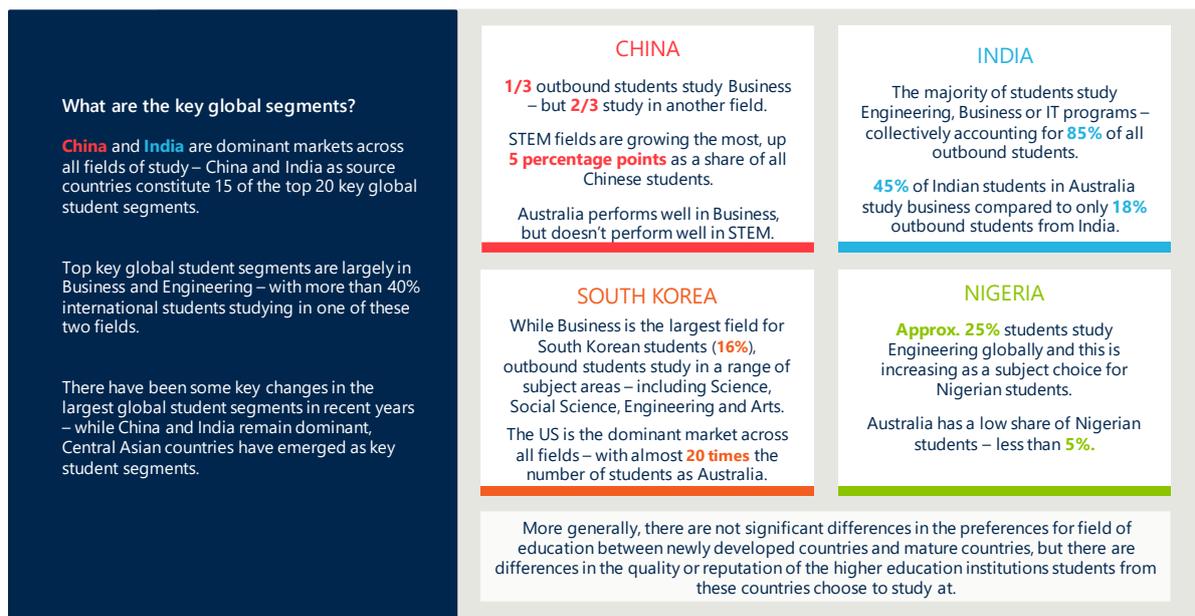
Case study 2 considered the product preferences of key source countries

The second case study focuses on the global product preferences of key source countries. It identifies key Higher Education global student segments and explores the product and other decision drivers that impact their global mobility and choice of destination.

Key global student segments were identified based on field of study and source country, before the drivers for these key student segments were explored in further detail considering factors such as study level, institution and destination. The case study found that key global product preferences also differ across the top four global source countries and do not align with Australian inbound trends

A summary of the key findings from case study 2 are presented in Figure 10.

Figure 10 | Summary of findings for case study 2



Avenue for further research

There was one key avenue for further research coming out of this case study:

1. **Understanding alignment to domestic study preferences for key source countries** – this case study focused on understanding whether the areas of study for students studying in Australia aligned to what students study elsewhere. It would be valuable to understand if these trends align with more general subject preferences for students from key countries – such as China or India. This has not been considered as domestic student data was not been captured as part of this project, however understanding the alignment of these product preferences would be valuable.

Case study 3 identified the impact of policy settings on global student flows

The final case study sought to understand the impacts of policy settings and policy changes on student mobility between a selection of source countries and destination countries. Four destination countries were considered – Australia, the United Kingdom, Canada and the United States – and four source countries were included – India, South Korea, Nigeria and Vietnam.

A summary of the key lessons drawn from case study 3 are presented in Figure 11.

Figure 11 | Summary of findings for case study 3



Avenue for further research

Others could build on this work to:

- 1. Consider impacts on other countries** – by broadening out the source countries the analysis considered. It would be valuable in particular to understand the impact policy settings and policy changes have on mobility flows from China given it is the largest source country globally. Inclusion of New Zealand may also be considered as a destination country given its alignment to the other four countries selected.
- 2. Undertake further primary research to understand impacts on agent and student behaviour** – while some discussions occurred to understand the impact of policy settings, further primary research could build on project findings to fully understand the impact policy changes have on the behaviours and preferences of agents, parents and students.

3.6 A public tool has also been developed to allow users to explore global student flows

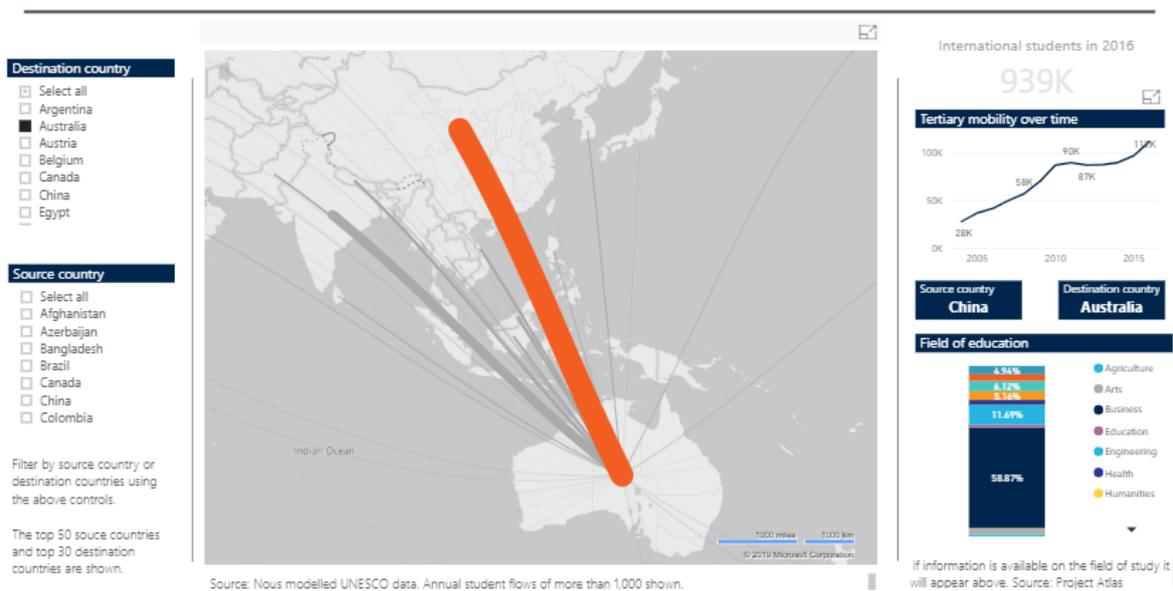
The project has also delivered an interactive data visualisation tool that allows users to explore:

- Inbound flows to destination countries
- Outbound flows from key source countries
- Long term enrolment trends between a source country to a destination country
- Fields of study for higher education students from key source countries studying in certain destination countries.

A screenshot of the global student flow tool is shown in Figure 12.

Figure 12 | Global student flows tool

Understanding global student mobility flows



Avenue for further development

There is an opportunity for the Australian Government to invest in maintaining the tool through:

- **Continued updating of the tool** – by updating the tool as new data becomes available through key international data sources – such as UNESCO and Project Atlas. This will need to account for the data gaps that have been identified through this project. Consistent data for 2017 tertiary student mobility will be available in late 2019.

4 Approach and methodology

This section outlines our approach to delivering the project, our data integration method and challenges faced during the data collection and integration process.

4.1 Approach adopted

The proposed approach for the project comprised of three key elements.

Focusing efforts on inbound flows to key destination countries

The project intentionally focused its efforts to capture information on the inbound flows for key destination countries. It did so for two reasons:

1. The quality of data captured on inbound flows – i.e. information on students coming into a country to study – was likely to be more comprehensive than information captured by the source country as they choose to study overseas.
2. Collectively, inbound student mobility for the top ten international education destination countries accounts for approximately two-thirds of all global student mobility.

Therefore, focusing on key destination countries provided the most effective approach to capture additional data that may be available. UNESCO student mobility data was used to identify and priorities the key global destinations.

Stocktake of data publicly available to the sector

The second step was to identify the existing resources that were publicly available and aggregate existing information that existed on global student mobility. This included:

- Identification and cleaning of macro-level data sets – such as UNESCO and Project Atlas.
- Desktop review to identify information that was publicly available for inbound national data sets on student mobility for key identified destination countries.
- Engagement with Austrade in-market representatives for all key destination countries to request data currently held and information on key contacts for the data.

A full summary of the stock-take and data available publicly for each destination country is included in Appendix A.

The data collection process sought to identify information on student mobility for the purposes of **Higher Education** study. Some resources available, including the data collected by UNESCO, refers to **tertiary education** – which includes both higher education and vocational education. Where the broader term is used in project outputs, this has been specified.

Targeted discussions with key data agencies to better understand and access non-public data

Finally, targeted discussions were undertaken with data custodians from a number of key destination countries to both understand the limitations of the data that was available and to seek access to data that may exist, but that was not publicly reported. From these discussions data was received based on tailored requests from Ireland Higher Education Authority, German Centre for Higher Education Research and Science Studies (DAAD), Council on Higher Education (South Africa) and the Higher Education Statistics Agency (HESA).

4.2 Data integration methodology

This section outlines the data integration methodology that was adopted, as well limitations and challenges with the initial methodological approach.

4.2.1 Proposed integration approach

The project initially intended to develop a comprehensive data set based on reconciliation across a number of data sets. It intended to do this through undertaking a detailed 'bottom up' approach which integrated detailed source level data at the national level to 'stitch together' a data set that provided granularity on mobility flows (and the nature of those flows) globally. A summary on what was intended from this approach is outlined in Table 1.

Table 1 | Desired benefits from data integration

Improvement type	What the project aimed to do
Granularity	The project sought to consistently provide detailed information beyond number of students moving from source country to destination country (including information on the level of study, field of education and campus location).
Currency	The project sought to address the lag that existed in data availability – aiming to ensure no more than a 12-month delay for enrolment data.
Resolution	The project sought to ensure consistency across definitions to ensure accurate matching of data across different jurisdictional systems.

Challenges in the quality and comparability of enrolment and/or student mobility data by each destination country has meant that it was not possible to adopt a fully bottom up approach and an alternative approach was required.

4.2.2 Challenges with approach

There were two key challenges with implementing the proposed methodology.

Challenges in accessing data or data not being available

Firstly, access to the unit level (or flat file format) data in a number of instances was hindered by the availability of that data. This was due to either there being restrictions in sharing this data for privacy reasons, or alternatively the data simply was not being collected to the level of detail by the agency.

In other instances, agencies were able and willing to share data in the format requested. These discussions with global international education and/or data agencies resulted in a number of different responses – as outlined in Figure 13.

Figure 13 | Typical responses to data requests from global agencies



As an example, while Australian inbound data can be accessed by providers which provides granularity on inbound student flows across a number of variables (such as source country, field of education, level of study and provider), most international data sets only collected, reported or provided access to more aggregated forms of student data.

This included:

- The United States – where the information Open Doors collected from US. universities was at a far higher level than that collected by Australia (through the HEIMS system).
- Canada – where granular enrolment intelligence was not collected at all, with available data limited to high-level study permit data (and therefore not offering provider level insights).

As a result, the 'bottom up' matching initially planned by the project was not possible to undertake.

Inconsistent definitions or form of data making consistent comparison challenging

In addition to the availability of data (either due to restrictions of access or collection limitations), inconsistencies in definitions adopted or the form of the data available also created challenges for a bottom-up matching approach. A summary of the implications of this are outlined in Figure 14.

Figure 14 | Challenges with global data integration

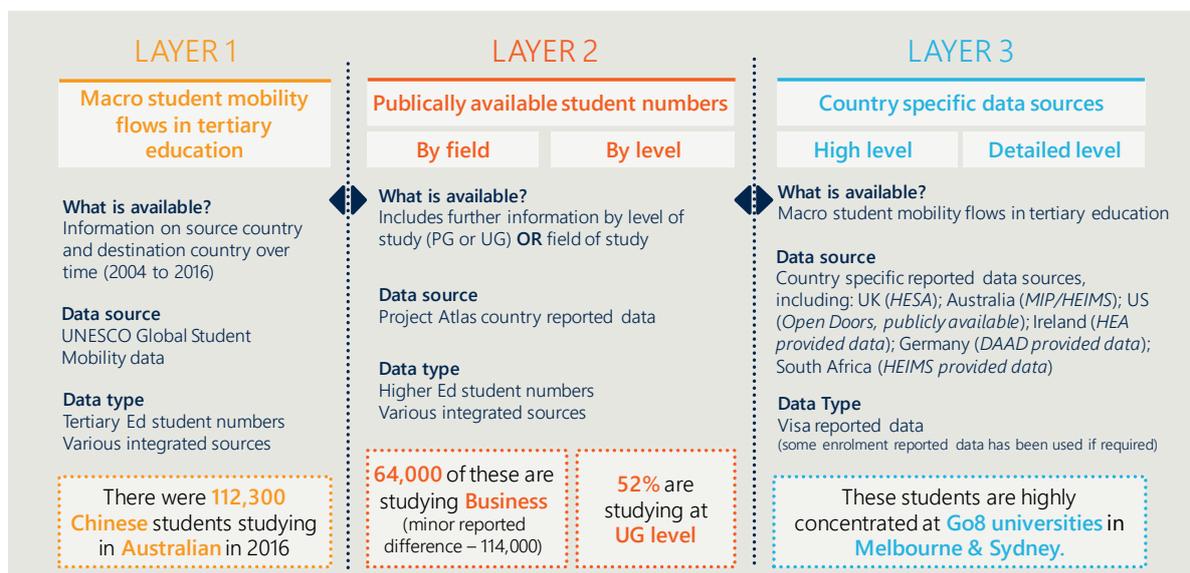
	GRANULARITY	CURRENCY	RESOLUTION
What we were trying to improve...	More detailed information on students than current to country flows.	Providing more recent data reducing the lag in understanding trends.	Clarification of discrepancies across key data sets.
What we were able to do...	Information on the variables listed are not consistently available for all (major) destination countries.	Up to date data is not possible. Not all key destination countries have internal access to information within 12 months.	Inconsistencies and discrepancies across data sets occur due to different definitions. These are being identified and recorded through the course of the project.

This required an alternate methodological approach to be adopted that leveraged existing integrated global data sets.

4.2.3 Revised integration methodology

The approach the project adopted instead built distinct layers of data using diverse sources. This enabled the project to build as complete a picture as possible with the data that is available. A summary of the three layers, including an example of a potential use case is presented in Figure 15.

Figure 15 | Approach to data integration (with example insight)



This approach has enabled the project to:

- Build on a strong base of information on student mobility that was available through UNESCO and Project Atlas – and address gaps in these where they exist.
- Incorporate more detailed country level data where it was available for key destination countries (such as for Australia and the United Kingdom).
- Incorporate more recent data where it was available to provide more contemporary insights on sector trends in global student mobility.

For each piece of project analysis, the most appropriate 'layer' to support the analysis was identified. Deeper layers have only been used where the granularity or currency was required for the purposes of the analysis. Constant cross-checking has been undertaken to identify differences and ensure appropriate resolution.

5 Insights on global data available

This section outlines the key insights drawn from the process of integrating the data, including the inconsistencies that exist and limitations in key data sources.

5.1 There are limitations with the accuracy of the UNESCO global student mobility data

The initial integration process identified and addressed gaps that existed in UNESCO's reported global flows and identified challenges with information reported through the system. A number of key data limitations were identified during the course of the project. These included:

- **Delay in reporting by countries for most recent years** – which meant that the macro-level information was not reliable and recent data could not be used on face value. Despite some countries having reported data up to 2018, only mobility data from 2016 are consistently reported.
- **Inconsistency in reporting practices** – resulting in significant gaps in country-to-country reported flows (even prior to 2016). As an example, some countries only reported their information every second year, while for other source countries unreported data by key destination countries for some years meant the total outbound student numbers from that country was underestimated.
- **Inconsistent granularity of reported information for students studying certain countries** – these destination countries, including China, report the total numbers of inbound students studying in the country to UNESCO each year, but do not provide further information on the country that they are coming from.

Through detailed modelling, Nous has reassigned 360,000 students studying overseas in 2016 to close the country-to-country gaps in UNESCO data. Over the period from 2003 to 2016 it is estimated that this represented a 25% underreporting in UNESCO data.

How we filled the gaps

The gap that resulted from unreported country-to-country flows was filled through:

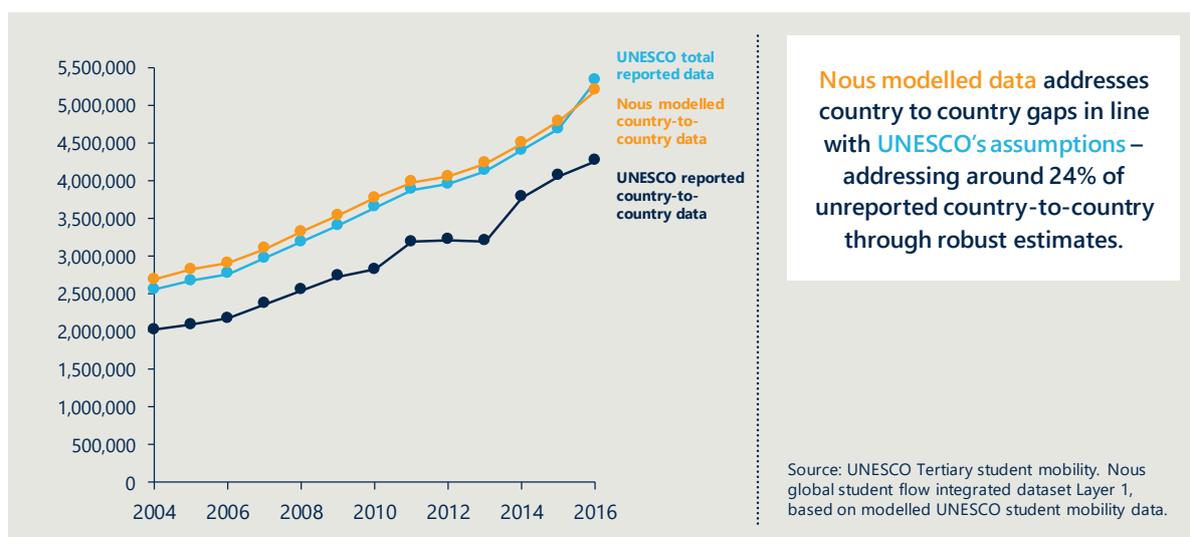
- Assuming consistent growth where gaps existed between reported data points across multiple years
- For more recent gaps, applying a conservative forecast growth rate (calculated as half of the forward compound annual growth rate (CAGR) from the previous four years).

As shown in Figure 16, these assumptions produced absolute values that were very similar to UNESCO's own estimated figures. The methodology for UNESCO's estimates is not available and the country-to-country granularity on the estimates is not available.

This revised data sets represents layer 1 of the Nous student mobility integrated data set and is used in the student flow tool available.

Full information on the nature of the country-to-country gaps in UNESCO reported data is presented in Appendix B.

Figure 16 | Total number of tertiary students studying overseas, 2004 to 2016



Key lessons

Several key lessons can be identified based on the project's experiences interrogating and integrating the UNESCO global student mobility data:

- There is a significant delay as to when the reported data is sufficiently complete to allow for use. In October 2019, international student mobility data from 2017 will be mostly reported and reconciled.
- Some countries report data at different times which makes it difficult to assess the status of country-to-country flow data.
- UNESCO's student mobility data refers to 'tertiary students' and includes students that have been enrolled with an offshore institution for more than 12 months for a qualification (i.e. it does not include study abroad and non-award students).

5.2 Definitional differences exist across key global sources that can make comparison difficult

There are significant differences in the data definition practices that exist across available global data sets, as well as across the different national data collections. There are not consistent and agreed practices in place which can make it challenging to compare trends across different sources of data to draw out insights. Broadly, definitional differences exist across four key areas:

1. what an 'international' student is
2. what the 'higher education' sector is
3. what the unit of measurement is
4. differences across level of study and field of study.

Each is discussed in further detail below.

There are different definitions on what an 'international student' is

The definition of 'international student' varies significantly across available data sources. These differences can result from a number of different elements – for example the citizenship of the student, the length of time they are studying and the visa category of a student.

While these differences exist across national data sets (for example between definitions used in Australia and Canada), there are also differences in how students studying overseas are reported in global data sets. As an example, there are differences between how student studying overseas are typically reported by the OECD and UNESCO. OECD data refers to foreign students, while UNESCO reports on international students. The differences between the two are:

- **Foreign students**, which refers to students that do not have citizenship of the country in which they are studying.
- **International students**, which refers to students that have moved to another country for the purpose of study.

As a result, there can be significant differences in the reported absolute mobility flows between sources. In 2005, UNESCO reported a total of 2.8 million 'international' students in 2005, while OECD reports 3.0 million 'foreign' students in 2005.

Where possible project outputs refer to 'international students' and where this is not possible, the specific definition used by the source itself is specified. Further information on this is presented on the implications of this for OECD modelling assumptions in Appendix A.

There are differences in how 'higher education' is conceptualised across different sources

Based on the Australia definition 'higher education' refers to qualification programs from Diploma to PhD level. These programs may be delivered by a university or alternatively by a non-university higher education provider (NUHEP). Australia's definition does not include programs delivered through the Vocational Education and Training (VET) sector – including programs that are delivered by TAFE providers. This definition can differ from other countries where alternate tertiary education systems have emerged.

In some other jurisdictions the separation between higher education and VET is less clear. For example, in some European countries, Institutes of Technology or Technical Colleges are classified as part of the country's higher education sector. This is the case for Germany and Ireland and is reflected in the data that was provided by agencies from these countries.

Existing global data sources report different numbers based on the level, sector and qualification type:

- **UNESCO global mobility data** – which reports 'tertiary students' based on reported information, which for inbound students to Australia includes VET students. Non-award students, those that are not studying for a qualification are also not included in the reported data.
- **Project Atlas student data** – where student numbers are presented for 'higher education' students, and some includes some information on non-award students (study abroad only).

Project outputs use both definitions – 'tertiary education' and 'higher education', but do not include non-award students. High level analysis typically refers to 'tertiary students' based on modelled UNESCO data, while more detailed analysis is specifically 'higher education' students.

The key unit of measurement for global international mobility can vary between sources – and may refer to either student numbers, enrolments or EFTSL

There are a range of different units to describe international student mobility. These are not consistent across different key global sources and national data sets. Typically, the measures used are:

- **Student numbers** – which refers to the annual number of students studying in a country – which may include across multiple courses. This measure is adopted by both UNESCO global mobility data and Project Atlas data.
- **Enrolments** – which refers to the number of students enrolled in a relevant course. This may mean that a single student represents multiple enrolments if they study more than one course in a year. Most national data sets, including Austrade's Market Information Package, adopt this definition.

- **Equivalent Full Time Student Load (EFTSL)** – which refers to the student load, with one EFTSL equivalent to a full-time study load for one year. Many national data collection agencies use this unit – including HESA in the United Kingdom and the HEIMS system in Australia.

Due to data availability, the project has accessed a range of data sources that utilise all three of the above measures. To ensure consistent comparison, data sources that utilise the same units have been used for individual pieces of comparison. Where other data has been utilised, for example, to provide greater detail on certain variables, this has been noted.

The nature of data collection can also differ across sources. Some sources report information through the visa system (through a visa being awarded), while others refer to university reported student data. Differences also exist across annual period reported. While for Australia the calendar year and academic year generally closely align, Northern hemisphere countries (Europe, US and Canada) may report on the calendar year or academic year (typically September to August) depending on the specific data set.

Taxonomy for fields of education also differs across countries

Each country has their own way of categorising which subjects' students are studying. There are significant differences across these definitions which can make it challenging to gain a full understanding of student mobility in more detailed fields – such as economics or law. Project Atlas collects information from different countries through a consistent framework which includes high-level fields, but some reporting differences still exist. As an example, while information is available on field of education through data reported by participating countries on the field of education students are studying, Australia does not report any enrolments for 'Humanities' which is a category used by other destination countries and instead reports enrolments under the 'Arts' category. This is likely to result from different interpretations of 'Arts' across different countries but can make consistent understanding challenging.

Insights and implications

- There are numerous definitional differences that exist across the data sets used for this project – including global data collections and national data sets. This includes in defining 'higher education' and 'international students', the unit used and definitions for level and field.
- The project has attempted to integrate these where possible, however this has not always been possible due to the differences that exist.
- There would be value in working towards a more consistent approach to enable comparison across different data sets.

5.3 Project Atlas is a valuable resource but there are some limitations

Project Atlas is a partnership of public and private national level higher education data collection agencies. The United States' Institute of International Education serves as its Secretariat. Country partners of Project Atlas include national data agencies which share data with Project Atlas on student mobility to allow comparison. Information is published online and is publicly available.

There are a number of benefits from the Project Atlas collection compared to other available sources on global student mobility. These include:

- **Increased currency** – with the reported data typically more current than mobility data reported through the UNESCO Institute of Statistics data.
- **More granular insights** – with information reported on either field of education or level of study (UG and PG) which is not available through the less detailed UNESCO Institute of Statistics data.

- **Some level of consistency** – allowing comparison across inbound and outbound flows for key countries.

While Project Atlas does provide more granular information than other resources available, there are also a number of limitations:

- **Limited source country scope** – reported information on inbound mobility in Project Atlas only includes information for the top 10 source countries. While this means high level trends can be identified it can be challenging to see the full global picture.
- **Interaction across variables** – while information is presented on level and field, information is not presented on both – for example the number of PG Business students.
- **Some missing data** – there are some inconsistencies in the data reported to Project Atlas. This means that for some countries, information may only be reported every second year while for others information is not reported on supplementary variables such as field and level.

Insights and implications

- Project Atlas is a valuable resource that provides a greater level of detail than is available through UNESCO on some elements.
- There are limitations in what is collected and reported by Project Atlas – with some gaps and inconsistencies.
- Increasing the number of source countries data is reported by participating countries, as well as the consistency of reporting, would greatly improve the value of the resource.

5.4 There is limited understanding of when data is current

As outlined, there is a significant delay as to when information can be attained regarding mobility flows of international students globally. The primary data set, UNESCO global mobility data, has a significant delay with reliable data available in October for two years prior (i.e. reliable data for 2017 will be available around October 2019). Further, this information is reported to the UNESCO collection at different times by different participating countries. This can make it difficult to assess the currency of the data, with reported outbound flows dependent on which source countries have reported their inbound flows.

Appendix A Assessment of national data available globally

Through the course of the project, Nous engaged with multiple international data agencies to attempt to access robust, detailed and comparable data on inbound student mobility flows to key destination countries. Through this process a 'stocktake' was able to be completed which has identified which data is available globally and how this compares to Australia's own collection(s). It should be noted that there are significant differences in the quality of the data available for major international education destination countries and that the quality of the information available for Australia is typically of a higher quality (more detailed, current and accessible) than most if not all major education destinations.

Nous was able to access resources from several key destination countries. Full integration was prioritised to ensure that resources were used effectively, and information gathered and integrated would provide insight. This has meant that data integration has been prioritised for the major destination countries – in particular Australia, the United Kingdom, the United States.

A high-level summary is included below:

- Despite some limitations in data elements for key **English-speaking countries** and inconsistency with Australian collections – the data the project was able to access has provided relatively strong granularity.
- Detailed data for **Asian destination countries** is relatively limited, which means the project has relied on publicly available data sources.
- Information for **European markets** has been relatively mixed. While more detailed data was available for the Netherlands and Germany, the project has otherwise had to rely on aggregated publicly available information.
- Information for smaller destination countries is minimal with the project primarily relying on reported UNESCO data. Data accessed through South Africa is an exception to this.

Full detail on the 'data stocktake' by destination country is presented in Table 2 below. Information is presented for the top 15 destination countries by size, with information also presented for select other destination countries. **Detailed data** refers to inclusion of all relevant variables – such as field of study, level, provider, destination, and source country – with the ability to analyse across multiple dimensions. **Summary data** refers to information on inbound country to country flows with information on the source country. Priority was assessed based on the size of inbound flows and the similarity to Australia as a destination country.

Table 2 | Assessment of available data, by destination country (hyperlinks included where applicable)

Inbound destination country (priority)	% total inbound mobility (2016)	Detailed data	Summary data	Commentary	Source	Project access
English speaking markets						
United States HIGH	18.2%	✓	✓	Some limitations – with high level data available for the United States through Open Doors. More detailed information is available, but university-reported data collection survey does not allow for full understanding of multiple dimensions – i.e. provider, field and source country.	IIE – Open Doors	NOT PURCHASED Costs for a tailored request were deemed as high given level of likely insight from data.
United Kingdom HIGH	8.3%	✓	✓	Comprehensive data was available for the UK through university reported enrolment data . Includes information on provider, level, field and source country. Data has some limitations with rounded totals presented due to privacy.	HESA	ACCESSED Detailed file received through paid tailored request.
Australia HIGH	6.3%	✓	✓	Some limitations – information through PRISMS (visa data) available does not include information on Provider and Campus Location. Older HEIMS data (university reported) has been used to supplement this but has a delay in availability.	Austrade MIP	ACCESSED Explore access to more granular data (incl. provider).
Canada HIGH	3.6%	✓	✓	Some limitations – information on Provider enrolments and Field of Study are not available through information collected by the Canadian Government (study permit data) and are therefore not reported to Project Atlas. Data on destination available.	Stats-Canada, IRCC data	PUBLIC Education Canada provided information available internally.
New Zealand HIGH	1.0%	✓	✓	Comprehensive data is collected by Education NZ, but this was not able to be accessed by the project, with access restricted to NZ education providers only. Some publicly available information has been used which includes field, level and destination within NZ.	ENZ IntelliLab	PUBLIC Data used restricted to publicly available information.
Ireland MEDIUM	0.3%	✓	✓	Some limitations – but information provided from the agency on commencements/enrolments by level, field for study and provider. Limited interaction across variables.	HEA Ireland	ACCESSED HEA provided information available internally to the agency.

Inbound destination country (priority)	% total inbound mobility (2016)	Detailed data	Summary data	Commentary	Source	Project access
Key Asian destination countries						
China MEDIUM/ HIGH	2.6%	X	✓	Significant limitations – summary enrolment data is available on key source markets for China from 2011 to 2015 through Project Atlas. The source country of inbound students is not reported to UNESCO. No detailed information is available for inbound or outbound students.	Project Atlas (via Chinese Ministry of Education).	PUBLIC None. Will rely on Project Atlas data that is publicly reported for high level trend analysis.
Japan MEDIUM	2.7%	✓	✓	Comprehensive summary data is available through Project Atlas. Additional information is available through JASSO for countries outside the top 10, but this could not be accessed by the project.	JASSO / Project Atlas	PUBLIC Relied on publicly available data as tailored request not accessed.
Malaysia MEDIUM	2.3%	X	✓	Significant limitations – summary enrolment data is available through Project Atlas – with discreet information on FOE and level of study for key source countries.	Project Atlas	PUBLIC Relied on data available through Project Atlas data set.
Singapore MEDIUM	1.0%	X	X	No data available – Austrade representatives have advised that the Singapore Ministry of Education and the Dept. Statistics Singapore do not share any data relating to international students.	None (UNESCO)	PUBLIC Have relied on data reported to UNESCO.
Republic of Korea MEDIUM	1.2%	X	✓	Significant limitations – Detailed enrolment data available in Korean only, including field, level and provider. Information is not provided to Project Atlas at all.	Korean Government	ACCESSED Data received on student mobility was accessed but has not been used.
Taiwan LOW	-	X	X	Significant limitations – Very limited data available with no data reported through Project Atlas.	Ministry of Education	PUBLIC Public high-level information available for case studies. UNESCO data to be used also.

Inbound destination country (priority)	% total inbound mobility (2016)	Detailed data	Summary data	Commentary	Source	Project access
European destinations						
France MEDIUM	4.6%	✓	✓	Significant limitations – summary information reported by Project Atlas only has high level source country information over time. High level overall FOE information also reported for most recent year.	Campus France	PUBLIC Some additional information available through Campus France publication.
Russia MEDIUM	4.6%	✓	✓	Comprehensive summary data is available through Project Atlas.	Project Atlas / Center for Social Research	PUBLIC None. Project Atlas reported data provides sufficient granularity.
Germany MEDIUM	4.6%	✓	✓	Comprehensive summary data is available through Project Atlas. Detailed information is available through DAAD annual publication and tailored request. Flat-file not available due to data limitations.	Project Atlas / DAAD	ACCESSED Additional information accessed to support case studies.
Netherlands MEDIUM	1.7%	✓	✓	Some limitations – in data available through Project Atlas. More detailed data across all requested variables is also available through Nuffic in the form of a publicly available dashboard and through tailored requests.	Nuffic	PUBLIC Data available as an interactive tool.
Italy MEDIUM/ LOW	1.7%	✗	✗	No data available – Austrade representatives have advised that there is no official source available on inbound and outbound data.	n/a	PUBLIC No additional data available, so utilised UNESCO data set.
Turkey MEDIUM/ LOW	1.6%	✓	✗	No information available through Project Atlas. Summary information on total international student numbers provided through self-service website portal.	The Higher Education Council of Turkey	ACCESSED Information available from self-serve website.

Inbound destination country (priority)	% total inbound mobility (2016)	Detailed data	Summary data	Commentary	Source	Project access
Other identified source countries						
United Arab Emirates MEDIUM/LOW	1.5%	X	✓	Significant limitations – with Project Atlas data only available for most recent year for limited variables. Austrade post reports that additional information is not available.	Project Atlas	PUBLIC None. Limited Project Atlas data UNESCO is primary source.
Saudi Arabia MEDIUM/LOW	1.5%	X	X	Austrade representatives have not yet provided information on data available for inbound student to Saudi Arabia.	n/a	
South Africa MEDIUM/LOW	0.8%	✓	✓	Some limitations – data not available as a flat file due to privacy protocols. Does provide detailed information on provider, level and field of study by nationality.	Council on Higher Education	ACCESSED Custom request provided by CHE South Africa.
Mexico LOW	0.2%	X	✓	Significant limitations – Minimal additional information reported through Project Atlas. Level and FOE reported for 2016.	Project Atlas	
Chile LOW	0.1%	X	✓	Some limitations – however most recent year reports full breakdown by level and FOE.	Project Atlas	PUBLIC None. Limited Project Atlas data UNESCO is primary source.
India LOW	0.8%	X	✓	Significant limitations – Minimal additional information reported through Project Atlas. Level and FOE reported for 2016.	Project Atlas	

Appendix B Gaps in UNESCO country-to-country reporting

The project has identified that there are gaps in the country-to-country information that is reported by UNESCO. While overall estimates are provided by UNESCO in addition these country-to-country figures, information is not available on the underpinning method for these estimates or where the gaps in country-to-country reported flows exist. This makes use of the country-to-country flows challenging due to these inconsistencies.

Full information on which countries are under or unreported is outlined in the two sections below. These represent 'gaps' that have been filled by Nous through its modelling approach.

Origin countries with a significant underreport (2004 to 2016)

A total of 138 origin countries were backfilled using our model. The most significant underreports were:

1. **China**, 308,300 (4%)
2. **Nigeria**, 165,800 (29%)
3. **United States**, 114,500 (18%)

Table 3 | Overview of origin countries with >1% backfill

Source country	Difference between modelled and reported	% difference (compared to total modelled)
Total	4,815,785	
China	308,352	6%
Nigeria	165,802	3%
United States	114,476	2%
Malaysia	109,092	2%
Russia	107,070	2%
India	105,256	2%
Cyprus	83,787	2%
Azerbaijan	80,353	2%
Poland	76,554	2%
Ukraine	75,287	2%
Turkey	74,559	2%
Kazakhstan	74,435	2%
Congo	73,286	2%

Destination countries with a significant underreport (2004 to 2016)

A total of 75 destination countries were backfilled using our model. The most significant underreports were:

1. **Germany**, 1.3m (229%) [no reported date pre-2012]
2. **Russia**, 435,600 (32%) [significant years with reporting gaps]
3. **Singapore**, 308,000 (105%) [no reported data 2013 to 2015]

Table 4 | Overview of origin countries with >1% backfill

Source country	Difference between modelled and reported	% difference (compared to total modelled)
Total	4,815,785	
Germany	1,362,108	28%
Russia	435,631	9%
Singapore	307,901	6%
United Arab Emirates	259,978	5%
Ukraine	220,010	5%
Congo	122,665	3%
Egypt	117,073	2%
Yemen	114,928	2%
Cuba	107,547	2%
Fiji	94,608	2%
South Africa	91,997	2%
Netherlands	90,558	2%
Greece	89,213	2%
Spain	87,745	2%
Malaysia	85,541	2%
Dominican Republic	80,768	2%
Lebanon	75,472	2%

Appendix C Definitional differences between UNESCO and OECD

Further information is presented in this section on the differential differences that are used by UNESCO and the OECD.

Definitional differences exist between OECD and UNESCO student data

Both organisations used different definitions of what constitutes a student. OECD combines foreign student enrolment data for OECD countries with international student enrolment data for non-OECD countries (from UNESCO) in its analysis.

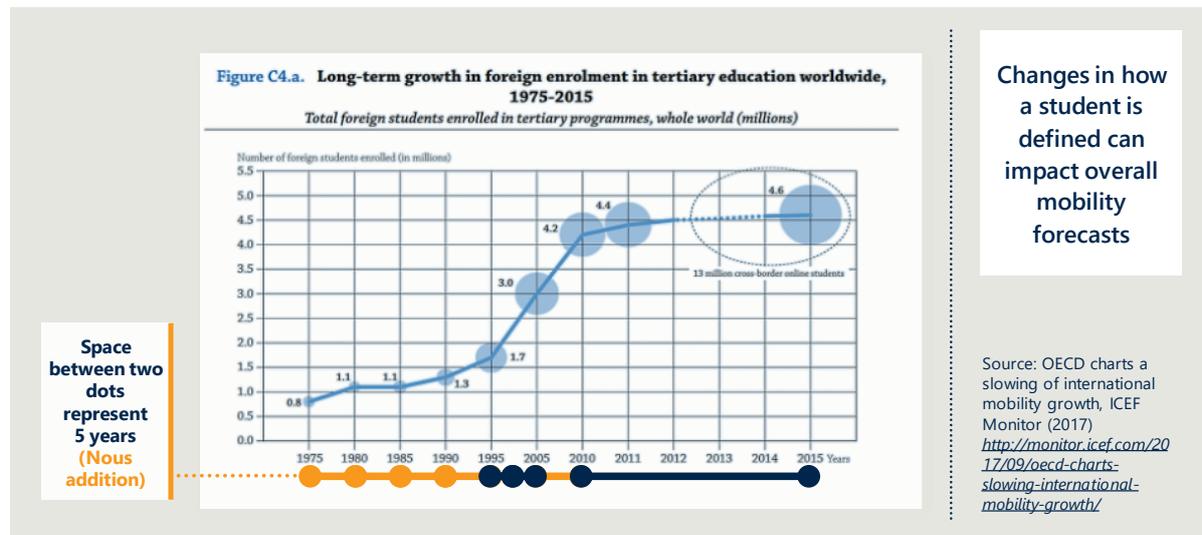
- **Foreign students:** do not have citizenship of the country in which they studied (e.g. studying on working visa)
- **International students:** moved to another country for the purpose of study. (i.e. student visa)

For example, UNESCO reports a total of 2.8 million international students in 2005, while OECD reports 3.0 million students in 2005.

These different definitions can impact forecasts for the global education sector

Different definitions can have significant impacts on student mobility flows and forecasts – as outlined by the annotated OECD graph in Figure 17. Understanding these differences is important.

Figure 17 | OECD growth forecasts (Nous annotated)¹



There are several issues with the figure:

- **Change in scale** – the OECD graph is misleading, as the data is plotted on a distorted scale that with an exaggerated difference between the two time periods (pre-2010 and 2010-2015) which accentuates the slowing growth pattern to indicate decline.
- **Change in student definition - foreign** OECD student data ceased to be available post-2012, so **international** OECD student data was used as a proxy. This change has contributed to the reduced numbers (4.6 million) and ‘flattened’ growth in 2015.

¹ ICEF Monitor (2017) “OECD charts a slowing of international mobility growth” Available at: <http://monitor.icef.com/2017/09/oecd-charts-slowing-international-mobility-growth/>; OECD (2017) Education at a glance

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