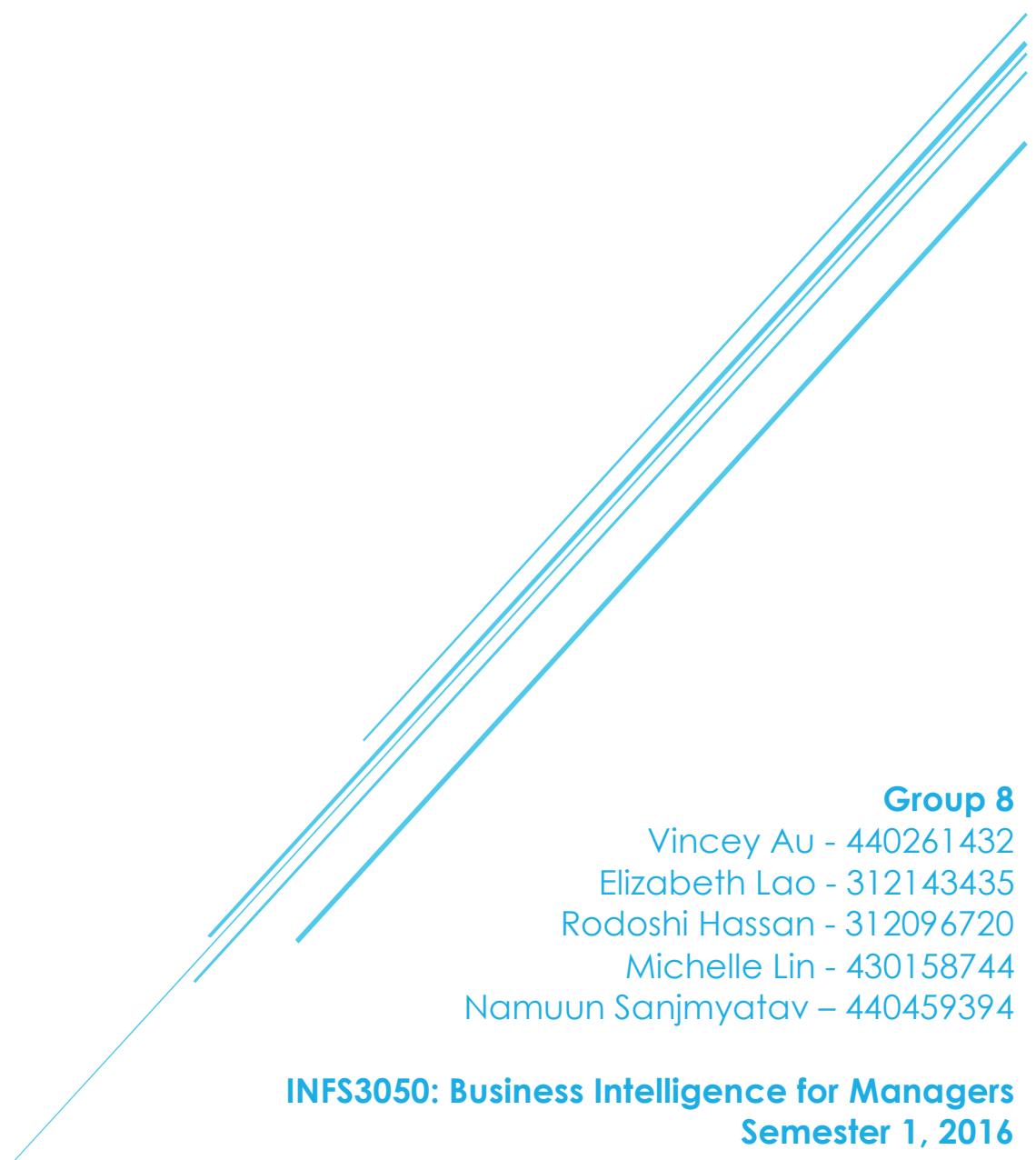


AUSTRALIA'S TOP 100 GRADUATE EMPLOYERS

AUSTRALIA'S TOP 100 GRADUATE EMPLOYERS

A DATA VISUALISATION EFFORT



INTRODUCTION

'Australia's Top 100 Graduate Employers' is a guide published by GradAustralia (2016) which encapsulates information about Australia's top graduate employers, as determined by a survey conducted on graduates and interviews with graduates and employers. The guide enables students to discover information about relevant job opportunities and gain an understanding of the current job market. Additionally, the guide provides insights into job expectations and provides employment seeking tips. An effort has been made to visualise the data within the 2016 edition of the guide in order to gain further insights.

The data visualisation effort was based on a desire to answer questions that would relate to the key demographics of users of the source; this was important to ensure that the data visualisations were relevant. This was enabled by the development of three personas, Lecturer Olivera, Careers Advisor Don and INFS3050 Student Lee, that were perceived to reflect each key user group. After understanding the context of work that these personas undertake, their key activities and investigating their interests, two key questions that could be answered for each persona were formed. The first step towards visualising 'Australia's Top 100 Graduate Employers' data set was to create a multi-dimensional model that reflected the dimensions of data that were gathered (some of the dimensions were supported by external data). Using the multi-dimensional model, a spreadsheet with the same structure was created and the data was entered accordingly. The resulting data set allowed for data visualisations to be created using Tableau.

PERSONAS

Three personas were developed, Lecturer Olivera, Careers Advisor Don and INFS3050 Student Lee that reflect the key user groups of the 'Australia's Top 100 Graduate Employers' data set.

LECTURER OLIVERA

Role	University Professor
Context of their work	<ul style="list-style-type: none"> - University of Sydney (G8) - Business School - Industry Links
Key activities	<ul style="list-style-type: none"> - Teaches BIS Units - Teaches final year students looking for graduate employment - Mentors students and ex-students - Works with students on industry projects
Data Visualisation Questions	<p>[Q1] Where are the jobs in BIS?</p> <p>[Q2] What state and sectors do I recommend a student to work in for the greatest starting salary based on their degree?</p>

Justifications

[Q1] Lecturers often direct their students in finding suitable employment or connect their students with potential employers in their particular industry.

[Q2] For some students, salary and location may be significant deciding factors in finding employment, and lecturers who have knowledge of the wider industry across Australia from past students, can help students narrow down their choices.

CAREER ADVISOR DON

Role	University Careers Advisor
Context of their work	<ul style="list-style-type: none"> - University of Sydney (G8) - Business School
Key activities	<ul style="list-style-type: none"> - Runs careers workshops - Assists students in improving skills for finding suitable employment - Assists students in choosing the right career path for them
Data Visualisation Questions	<p>[Q1] What are the most important skills for students to have during the employment selection process?</p> <p>[Q2] How effective is social media in contributing to the students perception of organisations?</p>

Justifications

[Q1] Career advisors run workshops on particular skills e.g. interview tips and resume writing, so they should be aware of what skills are most important.

[Q2] Career advisors often use social media in their own jobs and therefore it is important to understand which channels are more effective.

INFS3050 STUDENT LEE

Role	Undergraduate University Student
Context of their work	<ul style="list-style-type: none"> - University of Sydney (G8) - Studying Business Information Systems - Final year (or close)
Key activities	<ul style="list-style-type: none"> - Studies - Seeking internship and graduate employment opportunities - Working part-time or casually - Participates in the social-life at university e.g. clubs and societies
Data Visualisation Questions	<p>[Q1] Which sector, the business or technical sectors, pays the higher salaries?</p> <p>[Q2] What culture do the top employers value and how does this contribute to starting salary?</p>

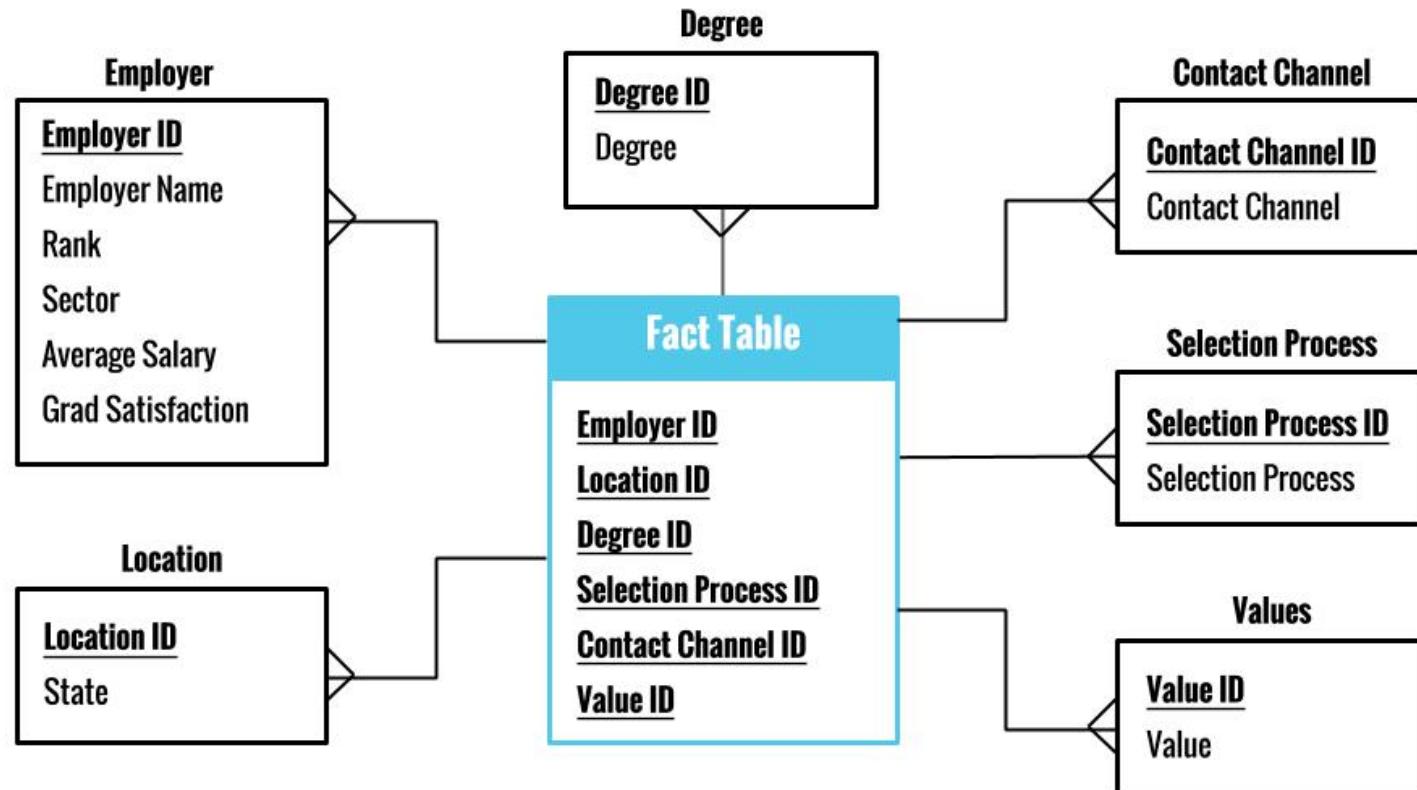
Justifications

[Q1] BIS students have the choice between pursuing non-technical (business) or technical roles.

[Q2] The work environment and culture is a significant factor for students when deciding where to pursue a job.

MULTI-DIMENSIONAL MODEL

The first step towards visualising 'Australia's Top 100 Graduate Employers' data set was to create a multi-dimensional model:



Employer	Contains all the relevant attributes pertaining to the individual employers.
Location	All the locations of employers.
Degree	All the degrees that employers hire from.
Contact Channel	All the channels available to contact the employers.
Selection Process	All the steps in the selection process for employers.
Values	All values that employers have stated they look for in candidates.

Note:

Average Salary data obtained from external sources (GradAustralia, Glassdoor)
Values data obtained from individual company websites

DATA SET

Using the multi-dimensional model, a spreadsheet with the same structure was created and the data was entered accordingly:

Google Sheets: <https://docs.google.com/spreadsheets/d/1ogYTBC75CiB3VkyLaXi2MkCe83jDLYjoB3KgJNw7-2g/edit?usp=sharing>

factTable

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Employer ID	Location ID	Degree ID	Contact Channel ID	Selection Process ID	Value ID							
2	E01	L02	D02	CC01	SP25	V01							
3	E01	L08	D02	CC01	SP25	V01							
4	E01	L04	D02	CC01	SP25	V01							
5	E01	L07	D02	CC01	SP25	V01							
6	E01	L07	D02	CC02	SP25	V01							
7	E01	L04	D02	CC02	SP25	V01							
8	E01	L08	D02	CC02	SP25	V01							
9	E01	L02	D02	CC02	SP25	V01							
10	E01	L07	D02	CC03	SP25	V01							
11	E01	L04	D02	CC03	SP25	V01							
12	E01	L08	D02	CC03	SP25	V01							
13	E01	L02	D02	CC03	SP25	V01							
14	E01	L07	D02	CC04	SP25	V01							
15	E01	L04	D02	CC04	SP25	V01							
16	E01	L08	D02	CC04	SP25	V01							
17	E01	L02	D02	CC04	SP25	V01							
18	E01	L02	D02	CC05	SP25	V01							
19	E01	L07	D02	CC05	SP25	V01							
20	E01	L08	D02	CC05	SP25	V01							
21	E01	L04	D02	CC05	SP25	V01							
22	E01	L02	D02	CC01	SP25	V11							
23	E01	L08	D02	CC01	SP25	V11							
24	E01	L04	D02	CC01	SP25	V11							
25	E01	L07	D02	CC01	SP25	V11							
26	E01	L07	D02	CC02	SP25	V11							
27	E01	L04	D02	CC02	SP25	V11							
28	E01	L08	D02	CC02	SP25	V11							
29	E01	L02	D02	CC02	SP25	V11							
30	E01	L07	D02	CC03	SP25	V11							
31	E01	L04	D02	CC03	SP25	V11							
32	E01	L08	D02	CC03	SP25	V11							
33	E01	L02	D02	CC03	SP25	V11							
34	E01	L07	D02	CC04	SP25	V11							
35	E01	L04	D02	CC04	SP25	V11							
36	E01	L08	D02	CC04	SP25	V11							
37	E01	L02	D02	CC04	SP25	V11							

Employer

	A	B	C	D	E	F	G	H	I
1	Employer ID	Employer Name	Rank	Sector	Average Salary	Grad Satisfaction			
2	E01	Accenture	10	Consulting	53000				
3	E02	AECOM	30	Civil engineering, building services and construction	64000	3.9			
4	E03	Aldi	62	Retail, management and human resources	83000	4			
5	E04	Allens	35	Law	66500	4			
6	E05	AMP	73	Banking, financial services and investment	65000				
7	E06	ANZ	13	Banking, financial services and investment	67000				
8	E07	Apple	70	IT, technology and communications	63000				
9	E08	Arup	26	Consulting	67000				
10	E09	Ashurst	66	Law	62000	4			
11	E10	Atlassian	51	IT, technology and communications	77000				
12	E11	Aurecon	28	Engineering, R&D, manufacturing and science	102000				
13	E12	Australia Post	87	Public services and utilities	50000				
14	E13	Australian Bureau of Statistics	76	Public services and utilities	59500				
15	E14	Australian Federal Police	50	Public services and utilities	64054				
16	E15	Australian Nuclear Science and Technology Organisation	59	Engineering, R&D, manufacturing and science	69000				
17	E16	Australian Secret Intelligence Service	20	Public services and utilities	71743				
18	E17	Australian Security Intelligence Organisation	29	Public services and utilities	64429				
19	E18	Australian Taxation Office	41	Public services and utilities	60000				
20	E19	BAE Systems	61	Engineering, R&D, manufacturing and science	79000				
21	E20	Bain & Company	34	Consulting	75000				
22	E21	BDO	81	Accountancy and financial management	51500	4			
23	E22	BHP Billiton	9	Mining, energy, oil and gas	85000				
24	E23	Bloomberg	84	Banking, financial services and investment	63500				
25	E24	Boeing Defence Australia	32	Engineering, R&D, manufacturing and science	72000				
26	E25	Boston Consulting Group	18	Consulting	75000	3.9			
27	E26	BP	56	Mining, energy, oil and gas	70000				
28	E27	Brookfield Multiplex	80	Civil engineering, building services and construction	63500				
29	E28	Bureau of Meteorology	90	Public services and utilities	64255.5				
30	E29	Chevron Australia	46	Mining, energy, oil and gas	100000				
31	E30	Cisco	44	IT, technology and communications	70000	4.6			
32	E31	Citigroup	75	Banking, financial services and investment	73500				
33	E32	Clayton Utz	52	Law	60000				
34	E33	Clemenger Group	74	Retail, management and human resources	39000				
35	E34	Coca-Cola Amatil	55	Engineering, R&D, manufacturing and science	61500				
36	E35	Cochlear Limited	21	Engineering, R&D, manufacturing and science	67500				
37	E36	Colas	60	Retail, management and human resources	80000	4.1			

Location

	A	B	C	D	E	F	G
1	Location ID	State					
2	L01	ACT					
3	L02	NSW					
4	L03	NT					
5	L04	QLD					
6	L05	SA					
7	L06	TAS					
8	L07	VIC					
9	L08	WA					
10							
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◀ ▶ factTable Employer **Location** Degree Contact Channel Selection Process Values

Degree

	A	B	C	D	E	F
1	Degree ID	Degree				
2	D01	All Disciplines				
3	D02	Accounting				
4	D03	Commerce/Economics & Business Administration				
5	D04	Engineering				
6	D05	Finance				
7	D06	Humanities/Arts & Social Sciences				
8	D07	IT & Computer Sciences				
9	D08	Law				
10	D09	Marketing				
11	D10	Maths				
12	D11	Medical Sciences & Health				
13	D12	Postgraduate				
14	D13	Property & Built Environment				
15	D14	Sciences				
16	D15	Teaching/Education & Human Welfare				
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◀ ▶ factTable Employer Location **Degree** Contact Channel Selection Process Values

Contact Channel

A	B	C	D	E	F	G
1	Contact Channel ID	Contact Channel				
2	CC01	Website				
3	CC02	Email				
4	CC03	Facebook				
5	CC04	LinkedIn				
6	CC05	Twitter				
7	CC06	YouTube				
8	CC07	Telephone				
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◀ ▶ factTable Employer Location Degree Contact Channel Selection Process Values

Selection Process

A	B	C	D	E	F
1	Selection Process ID	Selection Process			
2	SP01	Aptitude Testing			
3	SP02	Assessment Centre			
4	SP03	Background Check			
5	SP04	Case Study Interview			
6	SP05	Cognitive Testing			
7	SP06	Face-to-Face Interview			
8	SP07	Group Exercises			
9	SP08	Health and Fitness Assessment			
10	SP09	Information Evening			
11	SP10	Keep in Touch			
12	SP11	Networking			
13	SP12	Numerical Test			
14	SP13	Offer			
15	SP14	Online Application			
16	SP15	Online Testing			
17	SP16	Panel Interview			
18	SP17	Phone Interview			
19	SP18	Placement			
20	SP19	Presentation			
21	SP20	Psychometric Testing			
22	SP21	Reasoning Test			
23	SP22	Recruitment Workshop			
24	SP23	Referee Check			
25	SP24	Screening			
26	SP25	Video Interview			
27	SP26	Video Submission			
28	SP27	Written Application			
29					
30					
31					
32					
33					
34					
35					
36					
27					

◀ ▶ factTable Employer Location Degree Contact Channel Selection Process Values

Values

A	B	C	D	E	F	G
Value ID	Value					
1 V01	Clients/Customers/Service					
2 V02	Collaboration/Teamwork					
3 V03	Commitment/Loyalty					
4 V04	Communication					
5 V05	Courage/Bold					
6 V06	Diversity					
8 V07	Entrepreneurism					
9 V08	Excellence/Performance					
10 V09	Honest/Open					
11 V10	Innovation/Solution-Oriented					
12 V11	Integrity/Ethical					
13 V12	Leadership					
14 V13	Learn/Grow/Improve					
15 V14	Objective/Impartial					
16 V15	Other/NA					
17 V16	People/Relationships					
18 V17	Positive/Fun					
19 V18	Responsibility/Accountability					
20 V19	Safety					
21 V20	SocialImpact/Community					
22 V21	Sustainability					
23 V22	Trust/Respect					
24 V23	World/International/GlobalPerspective					
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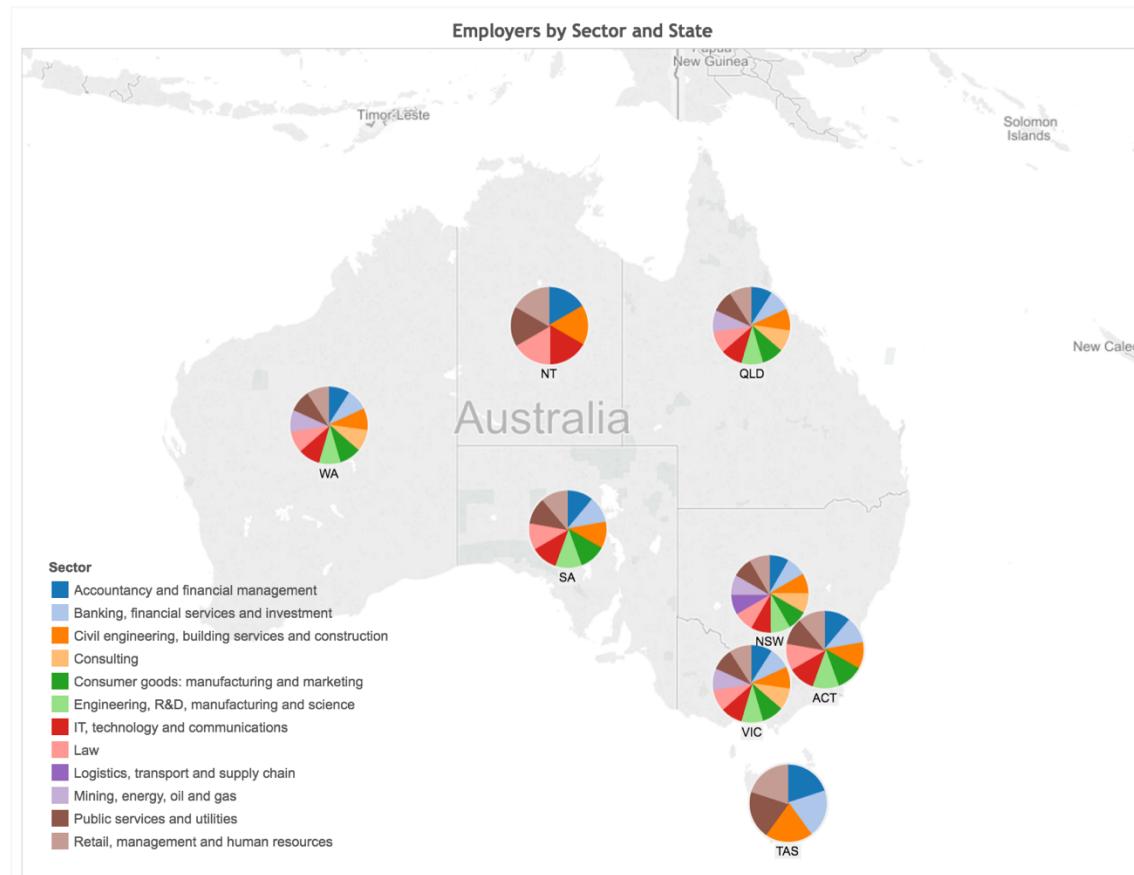
◀ ▶ factTable Employer Location Degree Contact Channel Selection Process **Values** +

VISUALISATIONS

LECTURER OLIVERA

[Q1] WHERE ARE THE JOBS IN BIS?

Tableau Public: <https://public.tableau.com/profile/group8.infs3050 - !/vizhome/LecturerQ1a/Dashboard3>



Key Insights

Most states other than Tasmania and the Northern territory offer employment in all sectors.

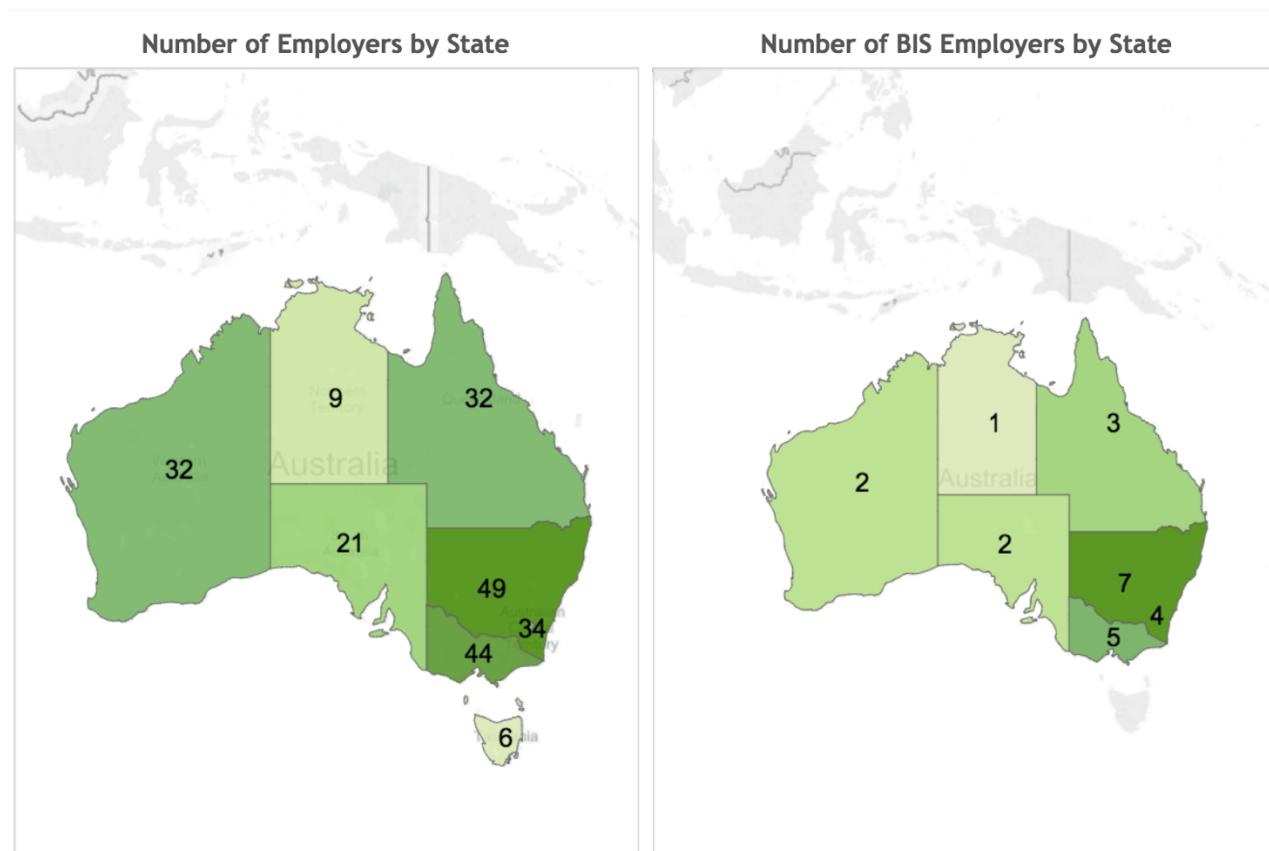
Tasmania is the only state which does not offer any employment in the BIS sectors.

Northern Territory offers more proportionate employment in the BIS sectors in comparison to other states.

We assumed that the BIS Sectors were from the following sectors:

- Consulting
 - IT, technology & communications

Tableau Public:

<https://public.tableau.com/profile/group8.inf3050 - !/vizhome/LecturerQ1b/LecturerQ1>

Key Insights

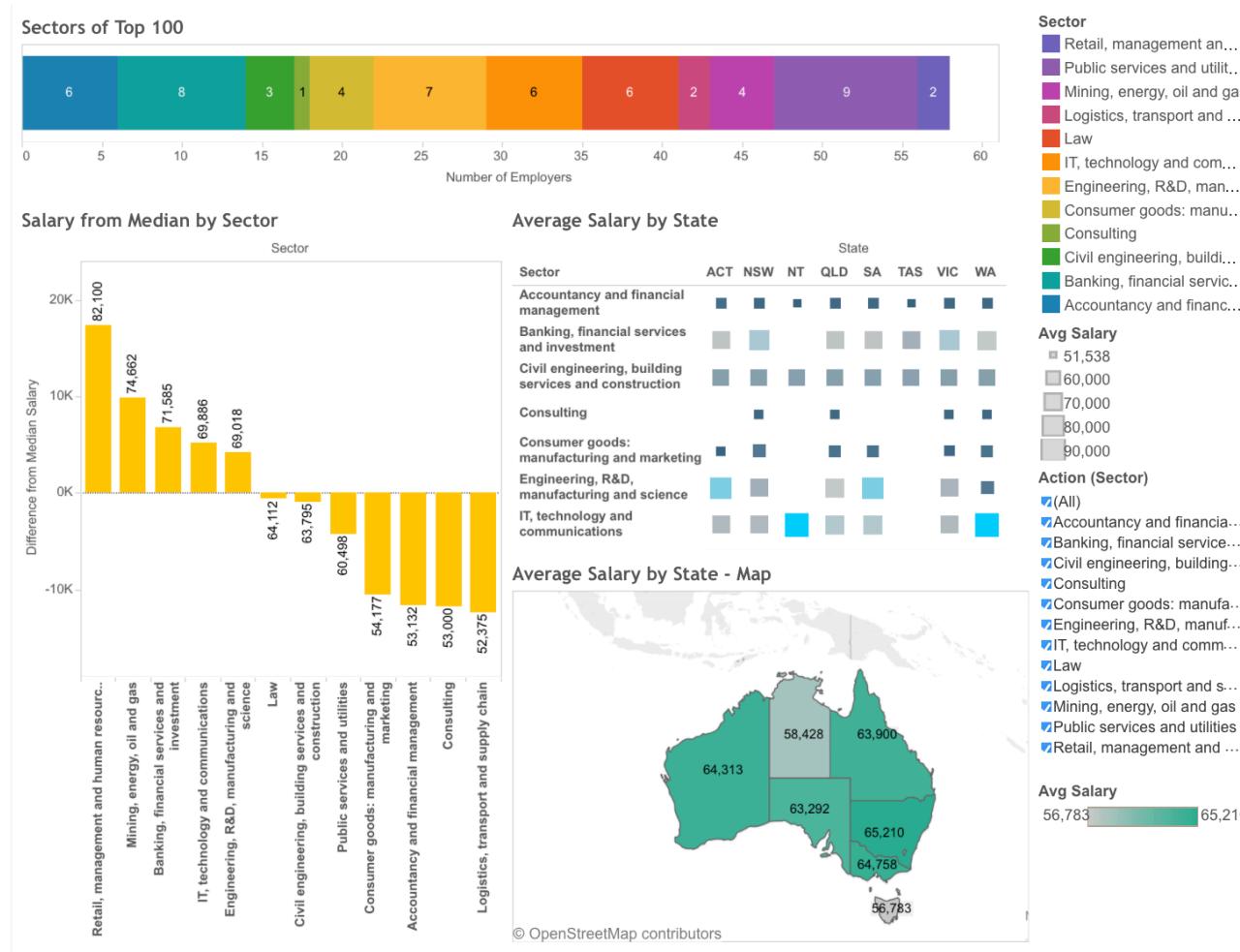
Most employers are concentrated on the East coast, primarily in NSW.

BIS employers are concentrated in NSW and Victoria.

There are no BIS employers in Tasmania.

[Q2] WHAT STATE AND SECTORS DO I RECOMMEND A STUDENT TO WORK IN FOR THE GREATEST STARTING SALARY BASED ON THEIR DEGREE?

Tableau Public: <https://public.tableau.com/profile/group8.inf3050#!/vizhome/LecturerQ2/Lecturer-2>



Key Insights

The highest represented sectors of employers in the Top 100 are:

- Public Services & Utilities
- Banking, financial services and investment
- Engineering, R&D, manufacturing and science

The sectors that pay the most above the median are:

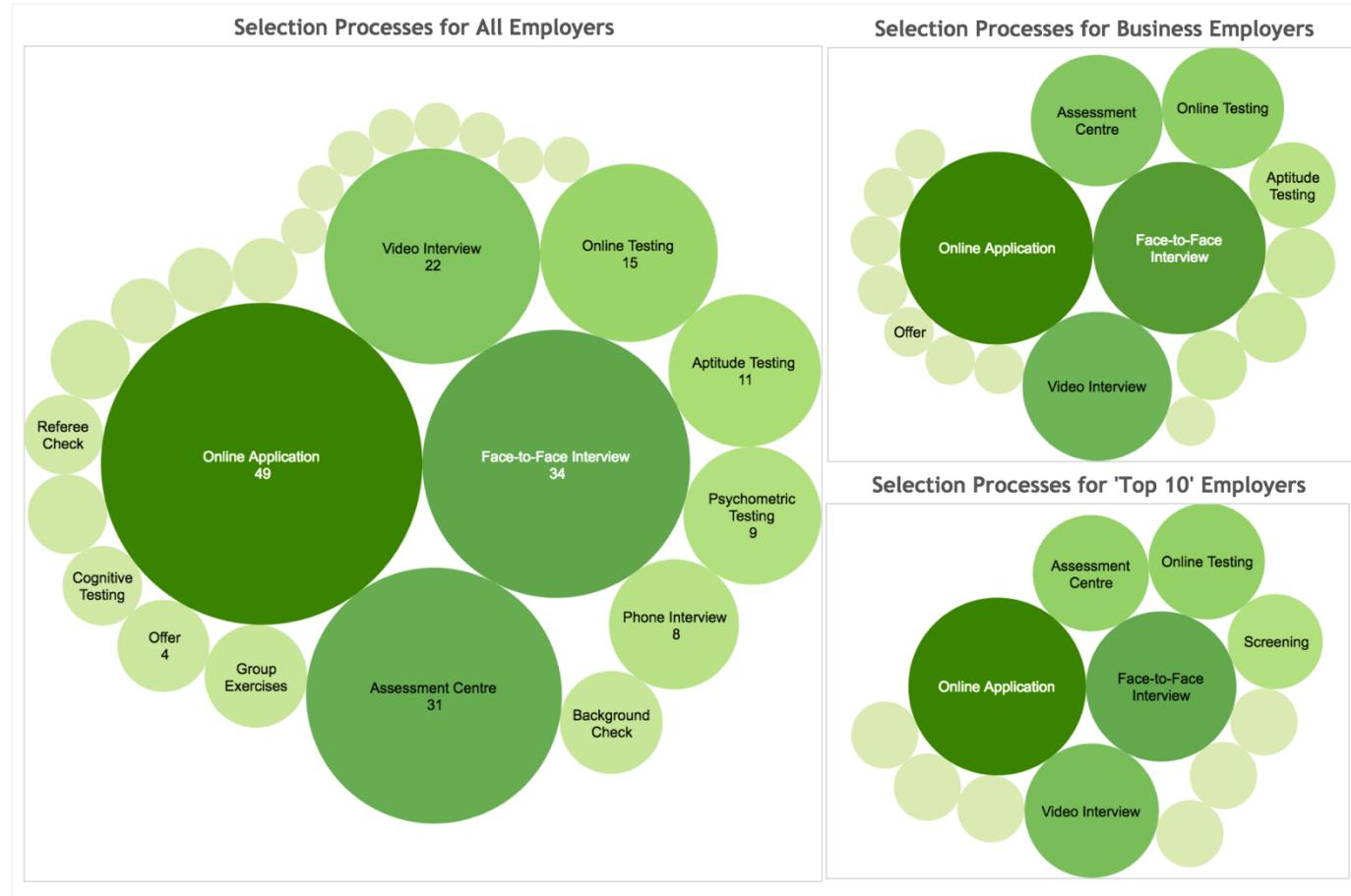
- Retail, management and HR
- Mining, energy, oil and gas

IT, technology and communications pays significantly more in NT in WA than other states.

CAREERS ADVISOR DON

[Q1] WHAT ARE THE MOST IMPORTANT SKILLS FOR STUDENTS TO HAVE DURING THE EMPLOYMENT SELECTION PROCESS?

Tableau Public: <https://public.tableau.com/profile/group8.inf3050 - !/vizhome/CareerAdvisorQ1/CareerAdvisorQ1>

**Key Insights**

Online applications are by far the most common steps for the employment selection process, therefore cover letter writing and resume writing skills are very important.

Video interview skills are especially important for the business sectors and the 'Top 10' employers.

The 'Top 10' employers have a tendency to screen their candidates.

Referee checks are rarely made by employers.

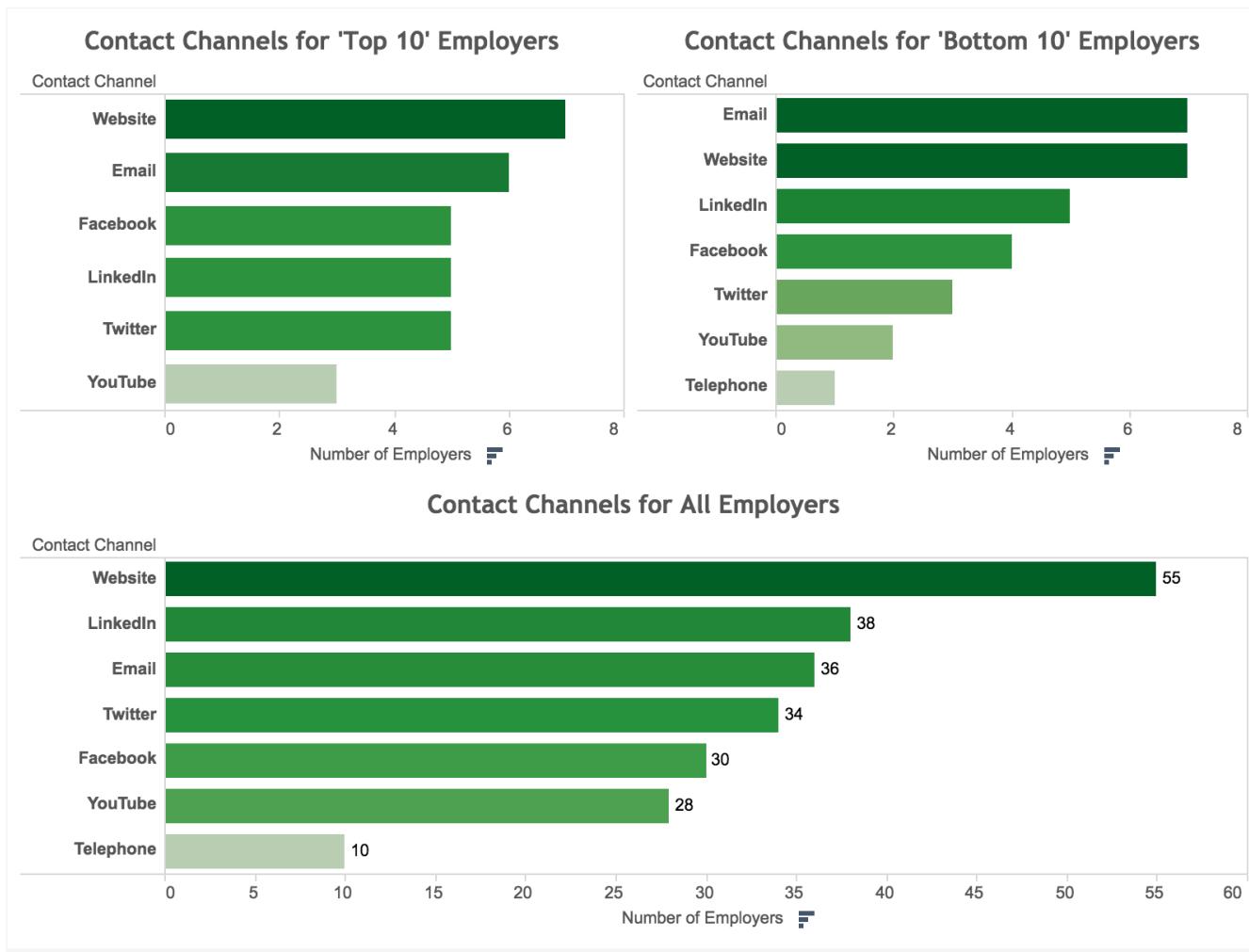
It was assumed that the business sectors include:

- Accountancy & financial management
- Banking, financial services & investment
- Consulting
- Retail, management & human resources

[Q2] HOW EFFECTIVE IS SOCIAL MEDIA IN CONTRIBUTING TO THE STUDENTS PERCEPTION OF ORGANISATIONS?

Tableau Public:

<https://public.tableau.com/profile/group8.inf3050 - !/vizhome/CareerAdvisorQ2/Dashboard3>



Key Insights

Websites are the most popular means of contacting employers, followed by LinkedIn accounts, therefore it may be useful to encourage students to use LinkedIn.

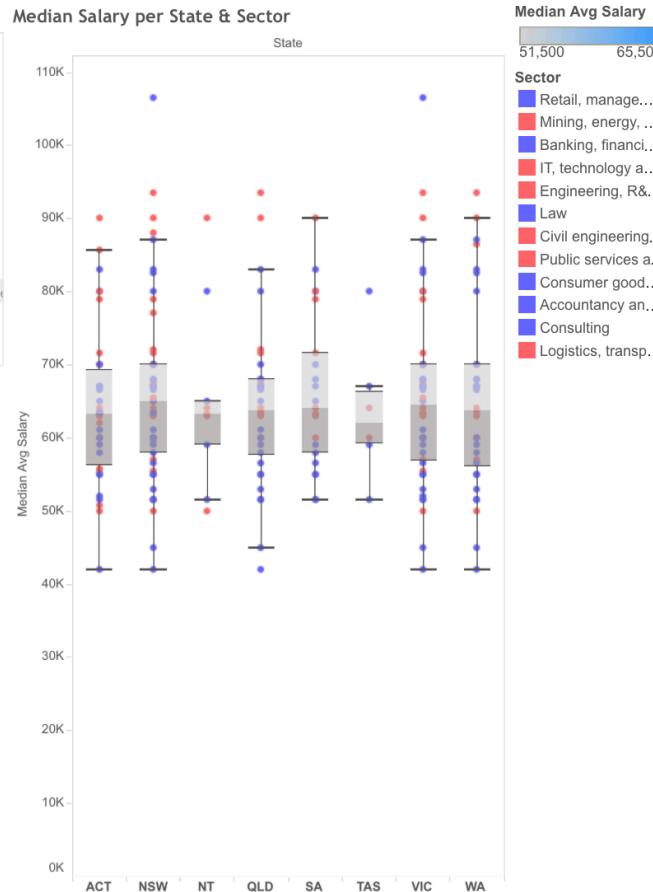
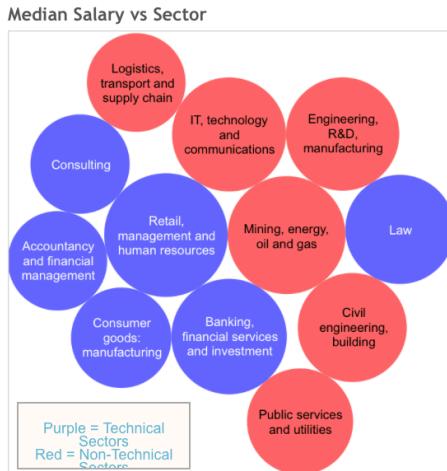
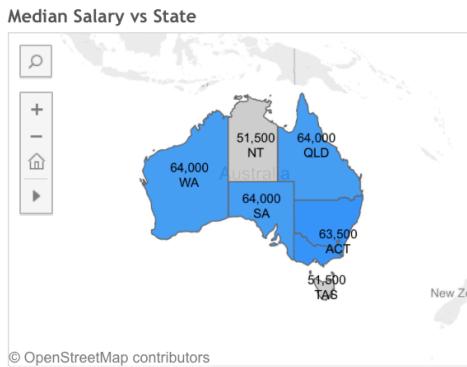
The 'Top 10' employers are very competitive as they are almost identical in the social media channels used (Facebook, LinkedIn & Twitter), this is unlike the 'Bottom 10'.

The 'Top 10' employers place more emphasis on emails compared to all employers, which can indicate that personalised communication has contributed to their success.

In contradiction to this is that 'Bottom 10' Employers place the most emphasis on emails, which can be reflective of more effort made to improve their rankings.

[Q1] WHICH SECTOR, THE BUSINESS OR TECHNICAL SECTORS, PAYS THE HIGHER SALARIES?

Tableau Public: <https://public.tableau.com/profile/group8.infs3050#!/vizhome/SalaryVisualisations/StartingSalaryVisualisations>

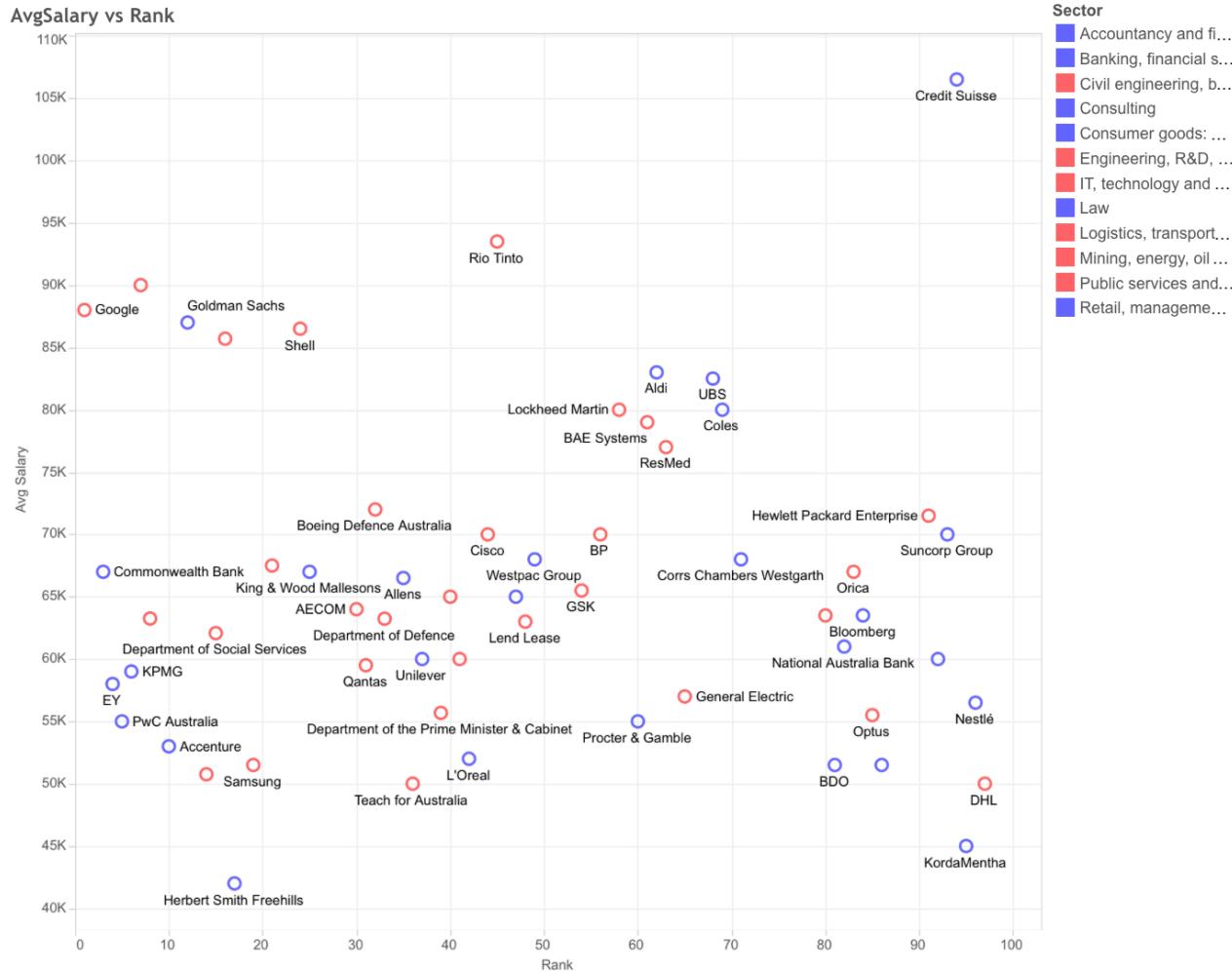


Key Insights

Median starting salaries across the board were quite similar, with the exception of the Northern Territory and Tasmania being \$10,000 less.

There is marginal difference in median starting salary per sector, although the technical sectors cluster towards the higher end and the non-technical towards lower end of median starting salaries when ordered.

The spread of starting salaries for each state/territory is shown. The technical starting salaries are distributed amongst the upper quartiles for each state, whilst the non-technical starting salaries are clustered closely in the lower quartiles.

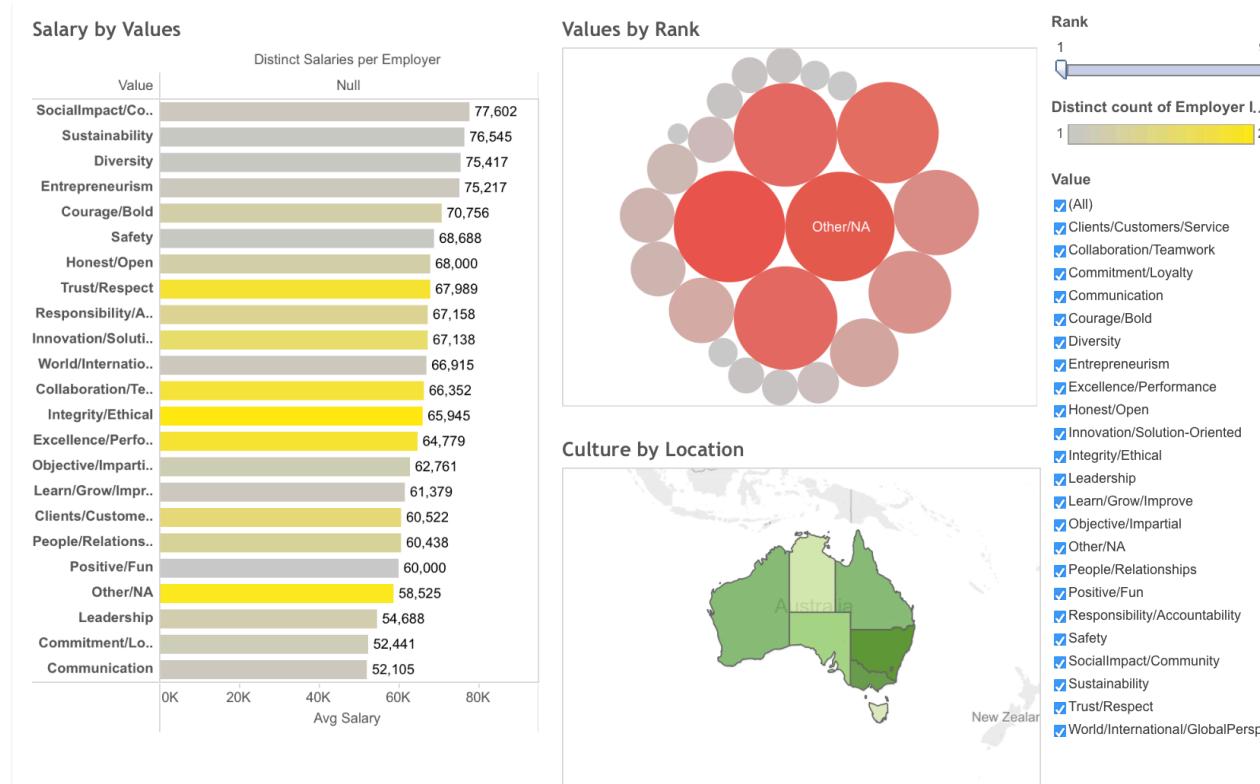


Key Insights

A large number of the higher ranked employers (1-50) have average starting salaries in the lower \$50-70K range, suggesting that either graduates are happy to accept lower salaries for a highly-ranked employer.

[Q2] WHAT CULTURE DO THE TOP EMPLOYERS VALUE AND HOW DOES THIS CONTRIBUTE TO STARTING SALARY?

Tableau Public: <https://public.tableau.com/profile/group8.inf3050#!/vizhome/StudentQ2/Student-2>



Key Insights

Top values of the top 10 employers are Integrity, Trust/ Respect, Teamwork, Excellence. These are the same as the top values of the Top 100 Employers.

However, the values that correspond to higher salaries are a sense of community, sustainability and diversity, although the count of companies for these values are very low (2-3) suggesting this is unreliable.

Companies that value leadership are located more often in NSW, VIC, ACT and WA, while having a global culture was only significant in NSW and VIC.

ETHICAL ISSUES

When using any data set, it is essential to consider any ethical issues that may arise. Ethical issues have the ability to affect the stakeholders and therefore it is important to consider and comply with established standards of practice. Jessup and Valacich (2007) provide a framework that breaks down ethical issues into four areas: information privacy, information accuracy, information property and information accessibility. The ethical issues surrounding the use of 'Australia's Top 100 Graduate Employers' data set will be explored in these four key areas.

PRIVACY

Information privacy refers to the obligation of individuals to disclose personal information and the confidentiality of any disclosed personal information (Jessup and Valacich 2007). The data in the guide does not contain any personal identifying information, rather aggregated information about groups of individuals, therefore the issues surrounding information privacy are limited and generally negligible.

However, some considerations in relation to secondary privacy issues include, the disclosure of salary and superannuation information for graduates by employers, this may be considered personal information by some. It is also important to consider whether individuals should be obligated to disclose the information or opinions about their satisfaction with their hours worked, salary, career prospects and diversity. In this case the data was collected by surveys and interviews, it is unknown whether these were voluntary. In any case, if GradAustralia has ensured that they follow proper IT security standards such as ISO27001 (Standards Australia 2015) then confidentiality of any personal information would be largely assured.

ACCURACY

Information accuracy refers to the integrity of information and outlines those responsible for data integrity and its impact on people (Jessup and Valacich 2007). The 'Australia's Top 100 Graduate Employers' guide was developed using information gathered by GradAustralia from research, consultation with firms and survey results from university students all over the country, where employers were ranked in accordance with survey results (GradAustralia 2016). A key aspect to note in this project is that only 'featured employers' were included within GradAustralia's guide (both hardcopy and online), that is, firms that paid to be included (63 of the 100 employers). As such, data regarding more than a third of the Top 100 firms (37) were excluded from the project, this is a significant portion of the data set and may have impaired the integrity of data visualisations, skewing them significantly towards those that were featured in the guide.

Furthermore, since firms elected to be included in the study, information provided to GradAustralia may be subject to bias as firms able to only include information they want. This would affect the integrity of information gathered by GradAustralia, which acts in the good faith that the information provided by employers are accurate. Since the vetting process for this information is unknown, information accuracy could have been affected.

Moreover, in terms of recruitment process information, some employers elected to leave this section unstated and prompted further actions to retrieve information. This constrained the data set further

and negatively impacted on the accuracy of insights. However, this in itself was insightful as leaving out this information may indicate that selection processes are valuable to certain employers and could be a core differentiator in the way they source and evaluate applicants, thereby contributing to their success in the market. A prime example of this being the number one employer Google, who left this section unstated, but has a reputation for having a rigorous and unique recruitment process.

Another aspect that has affected the accuracy of the project was the use of different measures across organisations. Although most data were extracted using GradAustralia's guide, some measures such as company values and salary levels were taken from different sources. For example, salary levels for graduates were drawn from GradAustralia, Glassdoor, Payscale, RollonFriday and the respective employer's website, in order to complete the data set. Since data is not the same across data sources (by virtue of the fact that different organisations have supplied information and it is likely their methodology differs), companies would not have been assessed using equivalent standards and so this may have affected the accuracy of the data visualisations. As such any insights obtained from these data visualisations should be used with caution and any actions taken as a result will need to be justified with further analysis on more concrete data.

PROPERTY

Information property refers to the notion that any information must have a legal owner, this is separate from the rights to share information, which information owners can allow (Jessup and Valacich 2007). Assigning ownership of information, especially intellectual property, is important for legal purposes and to ensure the privacy of information.

It is envisaged that when the information about each employer was handed over to GradAustralia that there was some sort of agreement that GradAustralia would own any intellectual property derived from their information gathering endeavors, as the guide was initiated and produced by them. As such GradAustralia would take responsibility for the data gathered. A particular point of interest here is that if any personal information was collected, this may have resulted in an information privacy ethical issue, as employers have a legal responsibility to their employees. However, in this case this was not applicable.

In relation to the property of the resulting data visualisations from this particular effort, they will be free to any one to use, however as they were conducted under a University of Sydney curriculum, the intellectual property of the data visualisations should reside with the University with due credit given to GradAustralia.

ACCESSIBILITY

Information accessibility refers to the information an entity, individuals or organisation, has the right to obtain and use (Jessup and Valacich 2007). The 'Australia's Top 100 Graduate Employers' guide is readily accessible online and can be downloaded as a free eBook through GradAustralia's website. Accordingly, it is assumed that the data visualisations will be freely available to lecturers, careers advisors and students anyone who wishes to use them. Since the only requirement of access to the visualisations is an internet connection, it is likely that employers themselves will also have access and so would be able to benefit from any visualisation products of this data. As such, information accessibility is not an ethical issue that affects this endeavor.

CONCLUSION

The resulting data visualisations provided key insights into the 'Australia's Top 100 Graduate Employers' guide by answering questions that were relevant to each of the personas. The sense-making framework (Marjanovic 2016) shows how the steps of data, insight, action and feedback can be beneficial. In this case, the insights that have been gained can be further investigated and can contribute to improvement of the guide and assist students with their employment seeking in better ways.

In terms of learnings, the most significant and frustrating was the cyclical nature of designing our multidimensional model and data spreadsheet. While data entry may seem mundane, it requires clear and proactive thinking of how the data needs to be used for it to be structured effectively. In our case, we initially viewed the data from a database point of view, trying minimising the storage space required, which although correct for a transactional database, was not useable in Tableau or for a business warehouse as our dimensions were not framed around a business context.

Even once we established our multi-dimensional model, there was still an iterative process of developing our questions and our data so that we could provide interesting insights. The importance of data cleansing and standardising, especially in terms of consistency and completeness, was realised when some visualisations could not communicate any insightful information, and were rendered purposeless. Graduate salary, for example, was not provided for all companies, which led to initial visualisations being unreliable and inaccurate. We therefore turned to secondary sources to complete our dataset.

Despite doing this, there still remains unreliable information due to omission. Some companies hire graduates from multiple degree backgrounds, and salaries will differ depending on the role, but our dataset does not take this into account and only assigns one salary value to each company. This highlights the value of having a clean, accurate and complete dataset.

Regarding the data visualisations themselves, there was an element of considering user experience and design. Tableau is designed to provide interactive visualisations that enable the user to discover interesting trends by drilling down or rolling up on dimensions, but we also had to consider that the information being communicated was relevant and not overwhelming. Therefore, while our initial visualisations were simple illustrations, later visualisations utilised creative design by using colour and user enabled filters.

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