Transforming audit – through the use of data

Ben Jiang

Director – Data Analytics

October 2018

VAGO

Presentation Outline

A bit about the Victorian Auditor General's Office & recap on our DA roadmap

How we plan to use data as part of our audits of financial reports

Use of data analytics on performance audits

Questions

The Victorian Auditor-General's Office & our DA roadmap

What we do – Audits of Financial Reports

Audit opinions

550+

Opinions on the financial statements of agencies

110+

Opinions on the performance statements of agencies

1

Opinion on the Annual Financial Report of the State of Victoria

Review

1

Review of Estimated Financial Statements of the Victorian general government sector

Grant acquittals

80+

Parliamentary reports

Auditor-General's Report on the Annual Financial Report of the State of Victoria

Technical and Further Education Institutes: Audit Snapshot

Universities: Audit Snapshot

Water Entities: Audit Snapshot

Public Hospitals: Audit Snapshot

Local Government: Audit Snapshot

What we do – Performance Audits

- Around about 25 audits each year
- Assessing agency performance against criteria

Effectiveness

Definition:
Achievement of the objectives or other intended effects of activities at a program or entity level.

Examples:
- the agency has achieved its objective
- program recipients have responded in line with objectives
- the project has delivered the solution in accordance with requisite standards.

Economy

Definition:
Acquisition of the appropriate quality and quantity of resources at the appropriate times and at the best cost.

Examples:
- services, projects and goods are procured for the best possible price
- the agency has prevented or minimised wastage of resources
- desired quality standards have been achieved within time and budget parameters.

Efficiency

Definition:
Use of resources such that output is optimised for any given set of resource inputs, or input is minimised for any given quantity and quality of output.

Examples:
- resources are used to maximise output or activity levels
- data is actively used to minimise inefficiency
- controls and monitoring are applied to track and manage resource use and improve efficiency.

Compliance

Definition:
Compliance of an agency/program with all relevant Acts.

Examples:
- agencies can demonstrate compliance with objectives, functions and requirements of relevant legislation
- agencies have systems and processes to monitor compliance and address instances of noncompliance.

Our DA roadmap

2018 & 2019

Wave 1
'Descriptive & diagnostics analytics/

- Invest in streamlining collection and validation of core data needed on selected audits
- Build standardised FA financial cycle and customized PA dashboards to help auditors better plan and undertake audits
- Invest in basic machine learning systems and capabilities
- Invest in training DA staff to develop dashboards and analytics to better support audit divisions

2020 & 2021

Wave 2
'Predictive analytics'

- Widen investment in streamlining collection and validation of core financial data for more entities
- Invest in the collection of relevant operational and third party datasets which improve audit effectiveness through predictive analytics
- Pilot the use of artificial/augmented intelligence that enhance the predictive analytical capabilities of our audit dashboards and analysis of unstructured data
- Invest in training nominated audit staff as "DA champions" to assist in designing and building dashboards

2021+

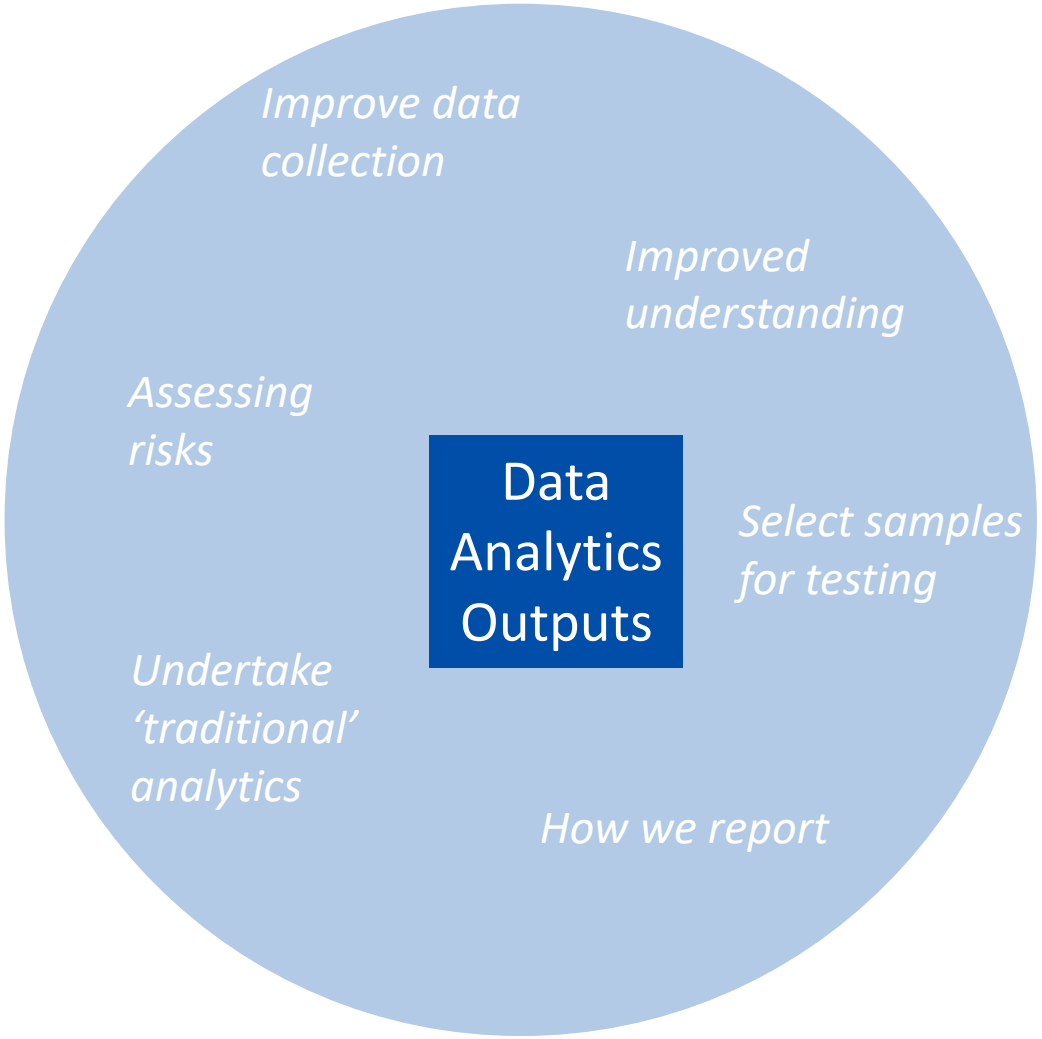
Wave 3
'Augmented Intelligence'

- Complete streamlining financial data collection and validation processes for all FA audits
- Leverage off earlier investments in data collection to develop sector based dashboards that aide in the execution of planned performance audits (PAs) and selection of future PAs
- Further our roll out off earlier investments in machine learning and artificial / augmented intelligence to produce more effective audits and reports
- Use of DA products and dashboards is ubiquitous

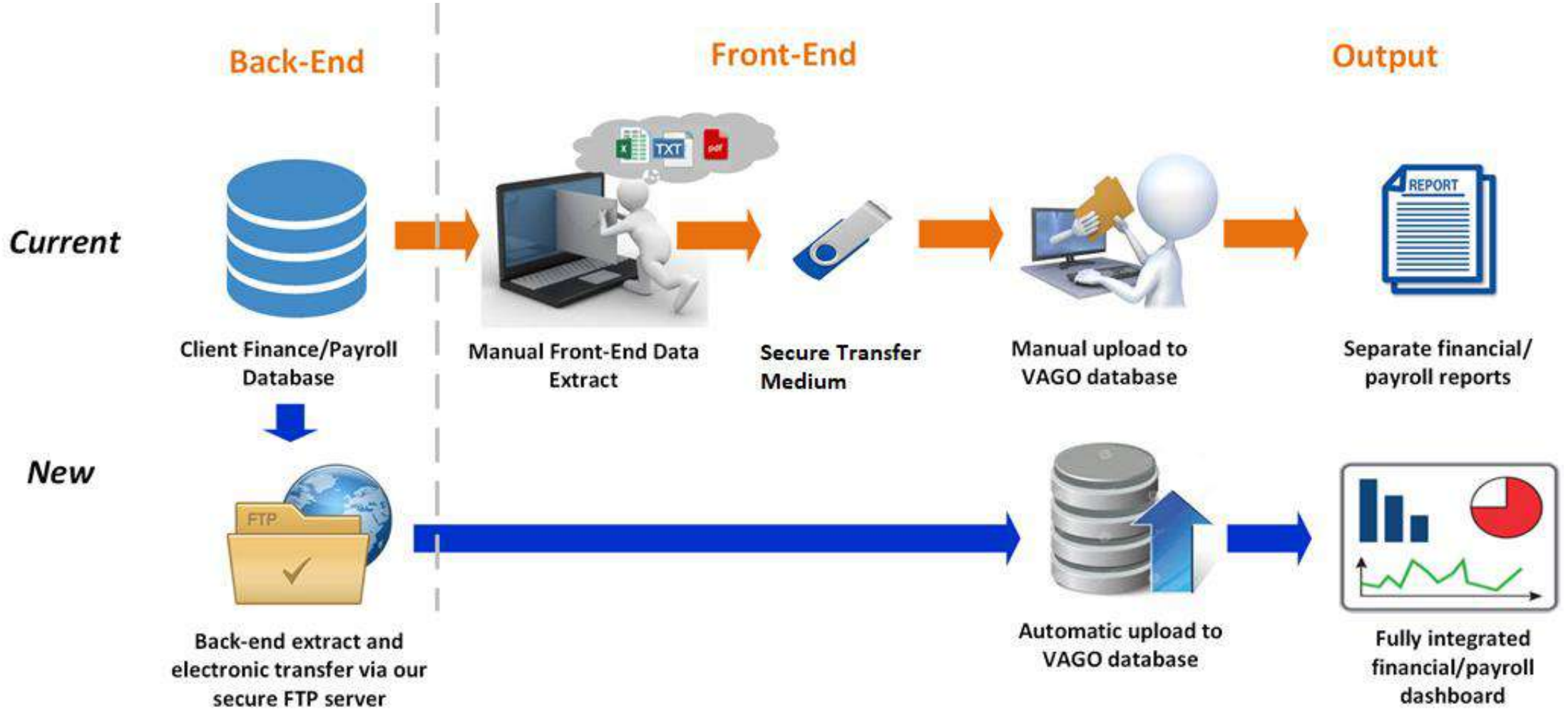
Improve accessibility to our work

How we plan to use data as part of our audits of financial reports

Objectives of our FA Analytics Toolset when complete

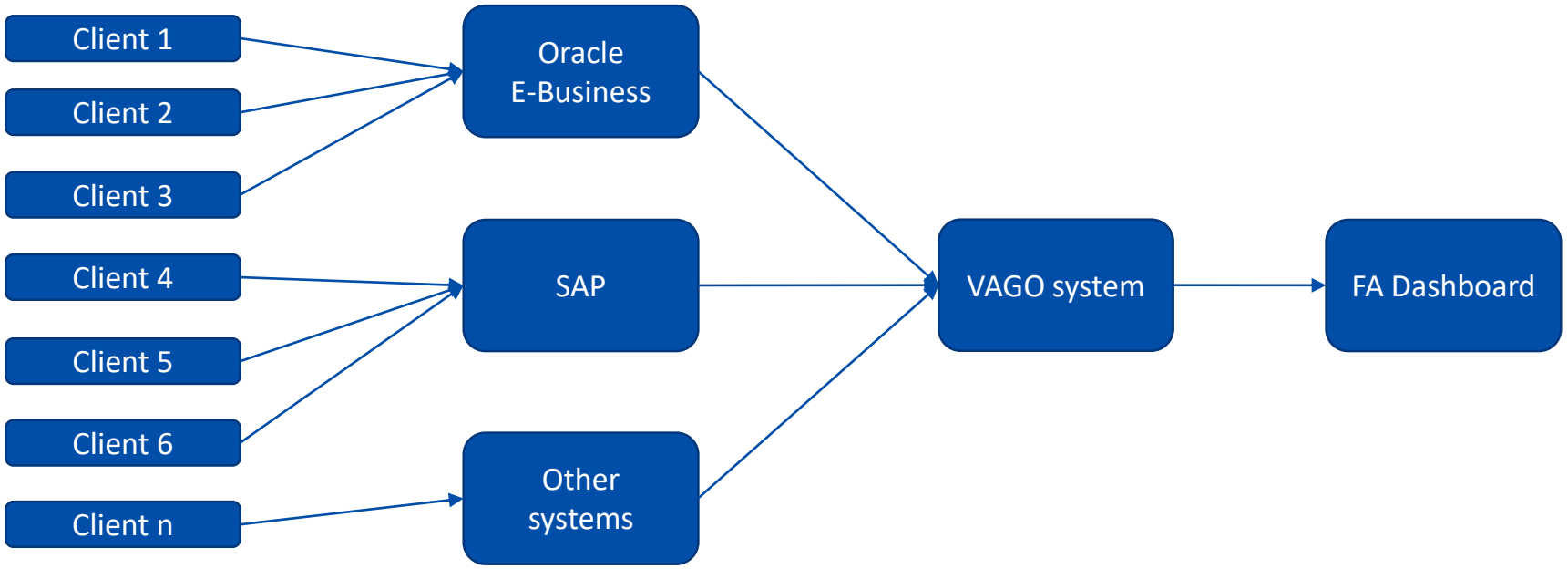


Improving data collection: changes to way we collect



Improving data collection: how does it work

This model allows us to write our analysis once and to have the analysis available across all clients.



Improving data collection: what your audit team will see

2015	2016	2017	01	02	03	04	05	06	07	08

GL First #	Y	GL ($'000)	HR ($'000)	Var. ($'000)	Var. (%)
	Total	**1,681,121**	**1,681,084**	**38**	**0%**
	2014	390,114	390,072	41	0%
5	2015	422,981	422,986	-5	0%
	2016	545,349	545,349	-1	0%
	2017	322,678	322,676	2	0%
	Total	**-230**	**-230**	**0**	**0%**
	2014	-84	-84	0	0%
4	2015	-58	-58	0	0%
	2016	-57	-57	0	0%
	2017	-31	-31	0	0%
	Total	**-179,318**	**-179,317**	**-1**	**0%**
	2014	-54,325	-54,325	0	0%
2	2015	-40,148	-40,149	1	0%
	2016	-52,807	-52,807	0	0%
	2017	-32,038	-32,036	-2	0%
	Total	**-1,501,573**	**-1,501,536**	**-37**	**0%**
	2014	-335,704	-335,663	-41	0%
1	2015	-382,775	-382,779	4	0%
	2016	-492,485	-492,485	0	0%
	2017	-290,609	-290,609	0	0%

Financial ... 2017

Period 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

VAGO Record Number	Employee String	Process Date	Effecti... Date	Finan... Year	Pay Fortni...	Pay Type Trans...		
Totals								
1	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	WCMO	Salaries, Wages, On-Costs	Salaries & Wages-Other
2	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	WCMO	Salaries, Wages, On-Costs	Salaries & Wages-Other
3	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	BTL	Bank, Tax, Deduction Payments	-
4	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	BTL	Superannuation Expenditure	-
5	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	ASU	Bank, Tax, Deduction Payments	Payment-Bank
6	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	NETB	Bank, Tax, Deduction Payments	Payment-Bank
7	Full Name-(2447)	19/3/2017	19/3/2017	2017	19	TAX	Bank, Tax, Deduction Payments	Deduction-Tax
8	Full Name-(2447)	2/4/2017	2/4/2017	2017	20	ANNO	Salaries, Wages, On-Costs	Annual Leave-On-Costs

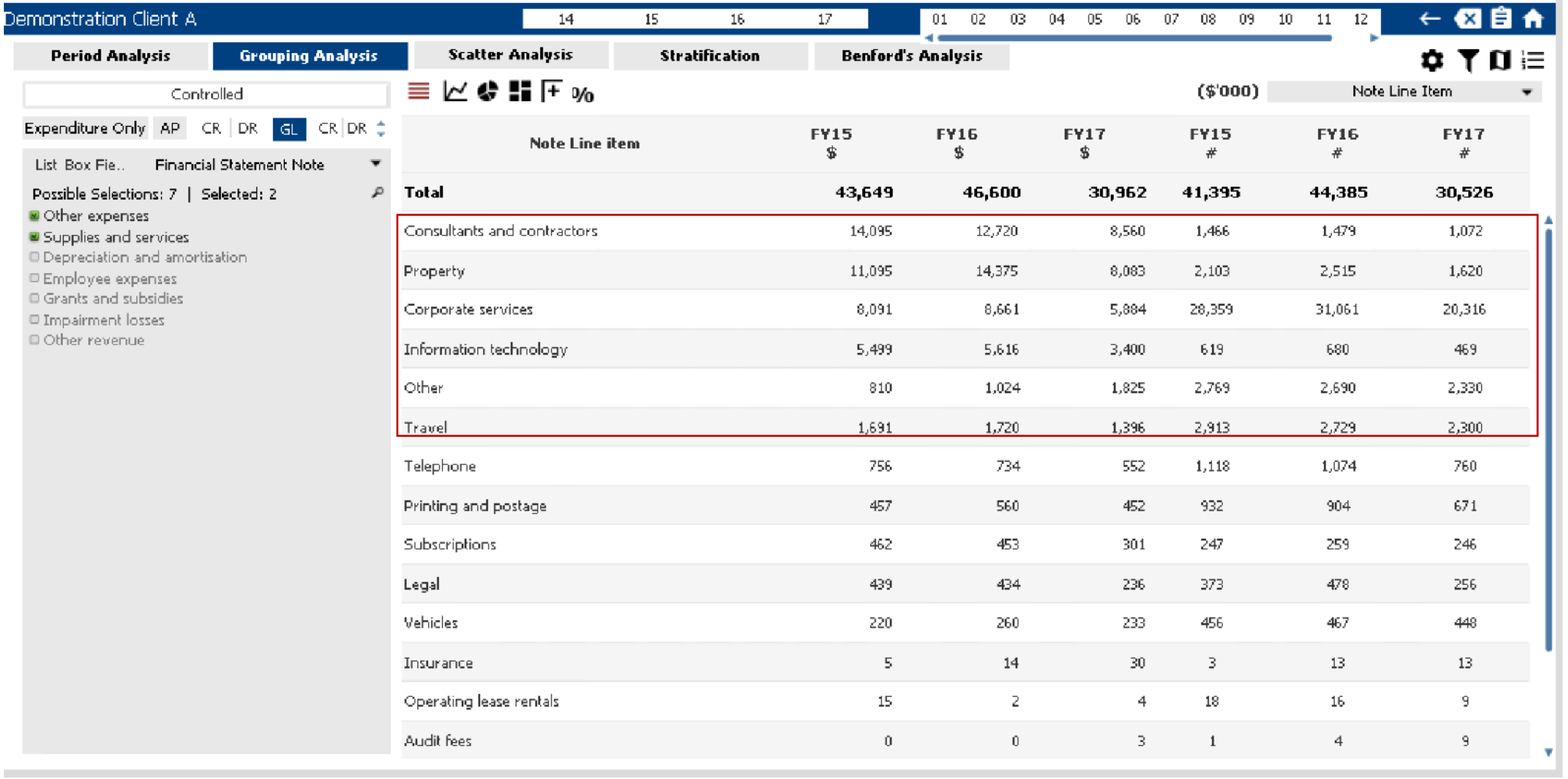
Improving our understanding

&

Improved focus on risks

Improved focus on risks: material areas of selected expenses

In this next example, we are going to show you how data analytics can be used on an audit of expenditure balances within a financial report



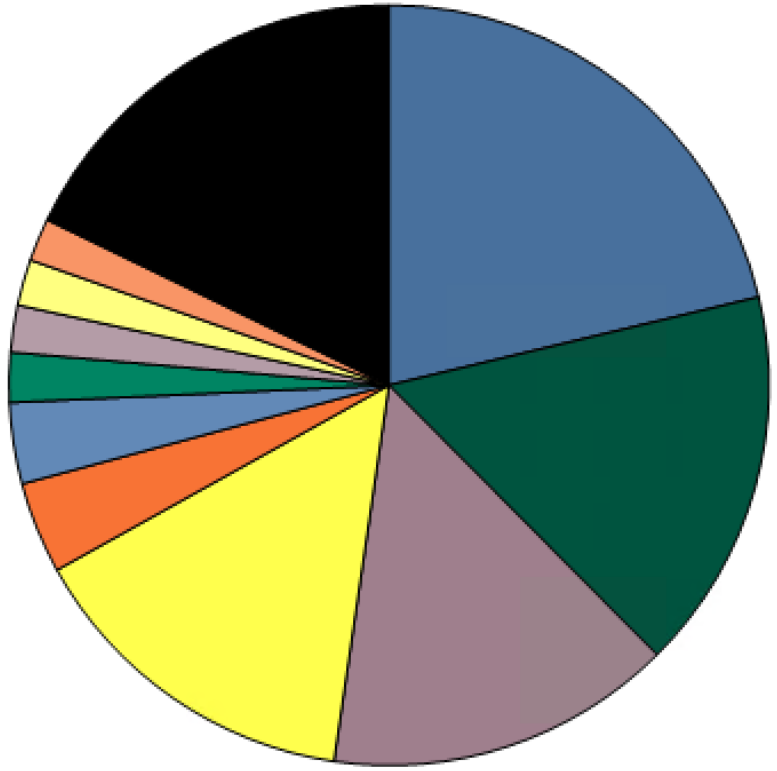
Note Line item	FY15 $	FY16 $	FY17 $	FY15 #	FY16 #	FY17 #
Total	**43,649**	**46,600**	**30,962**	**41,395**	**44,385**	**30,526**
Consultants and contractors	14,095	12,720	8,560	1,466	1,479	1,072
Property	11,095	14,375	8,083	2,103	2,515	1,620
Corporate services	8,091	8,661	5,884	28,359	31,061	20,316
Information technology	5,499	5,616	3,400	619	680	469
Other	810	1,024	1,825	2,769	2,690	2,330
Travel	1,691	1,720	1,396	2,913	2,729	2,300
Telephone	756	734	552	1,118	1,074	760
Printing and postage	457	560	452	932	904	671
Subscriptions	462	453	301	247	259	246
Legal	439	434	236	373	478	256
Vehicles	220	260	233	456	467	448
Insurance	5	14	30	3	13	13
Operating lease rentals	15	2	4	18	16	9
Audit fees	0	0	3	1	4	9

Improved focus on risks: procurement streams

Breaking expenditure up by purchasing stream can help better streamline the way in which we focus our audit efforts

Improved focus on risks: vendor analysis

Payments to four vendors account for around two thirds of expenditure



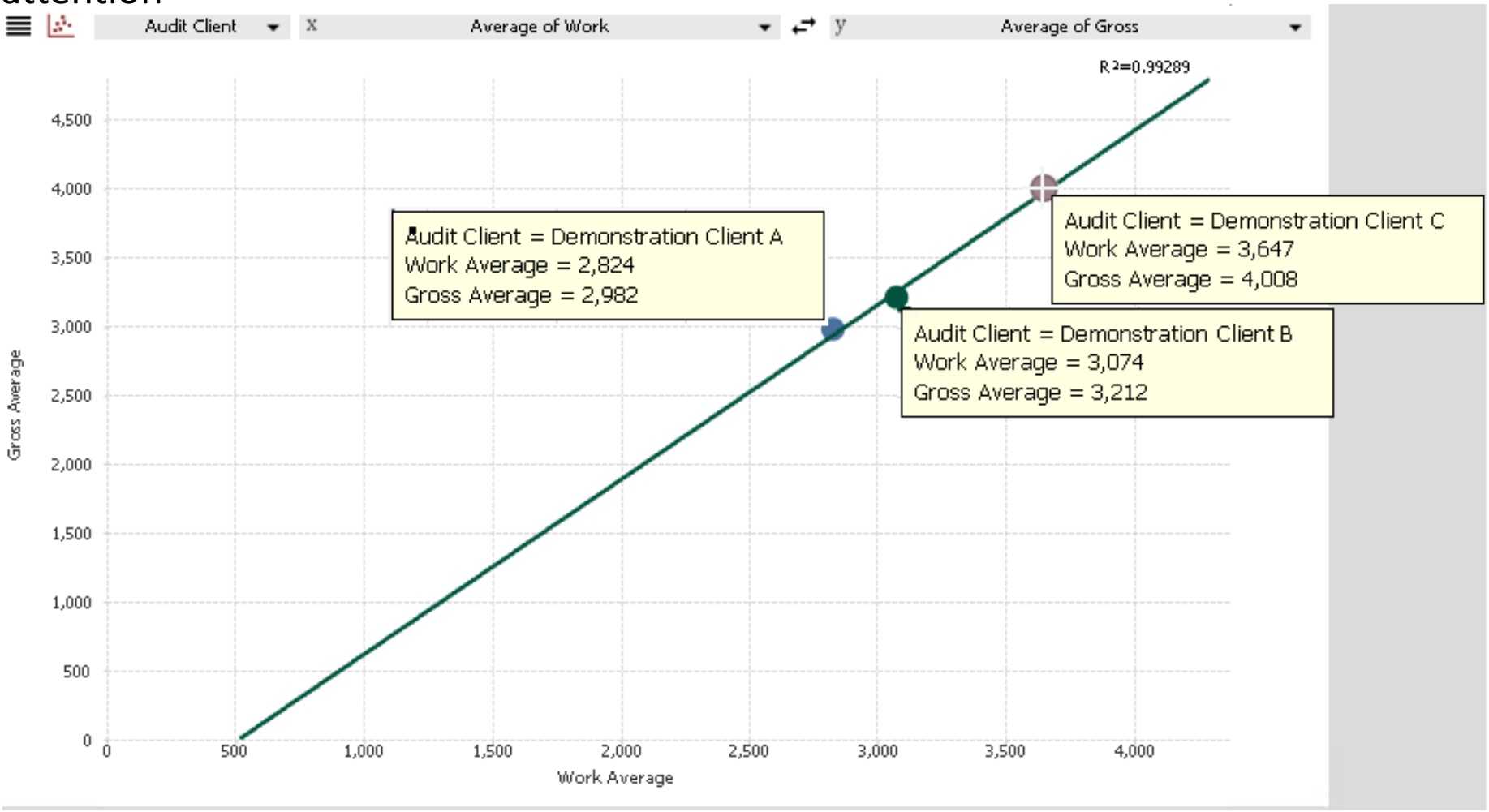
($'000) Vendor String

Only Positive Grouping Totals Included

Vendor (k)	
4008161 Demo Vendor 011026	3,610.20 k
4091120 Demo Vendor 018505	2,761.58 k
4990781 Demo Vendor 021571	2,508.14 k
4008173 Demo Vendor 011038	2,479.28 k
4071184 Demo Vendor 017028	662.01 k
4000319 Demo Vendor 008656	586.18 k
4009101 Demo Vendor 011966	359.58 k
4058304 Demo Vendor 016592	338.06 k
4027507 Demo Vendor 014306	332.76 k
4009811 Demo Vendor 012676	309.39 k
Others	3,026.09 k

Assessing risks: benchmarking

Benchmark like entities between each other for improved perspectives on risks and where to focus audit attention



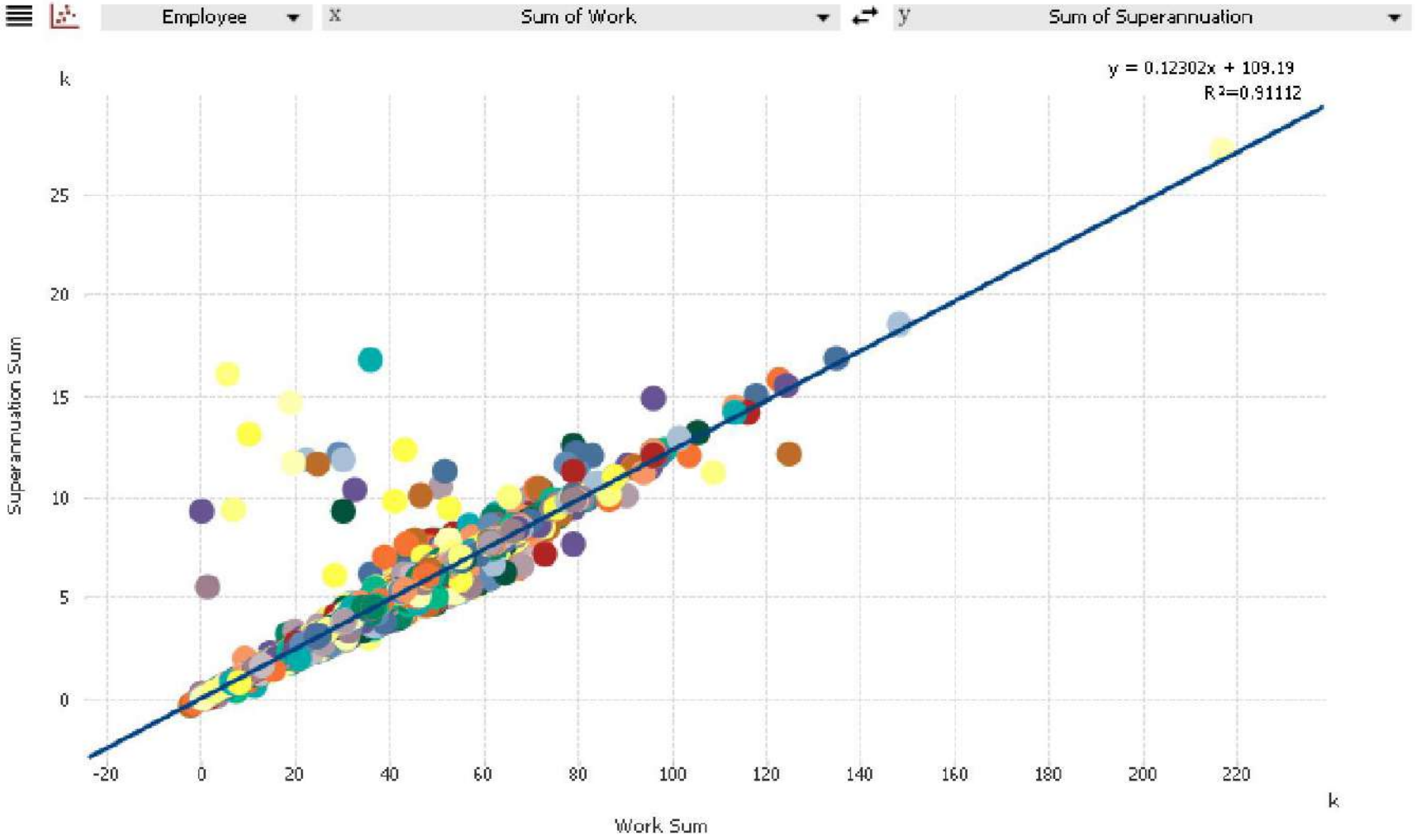
Undertaking more targeted analytics

&

Selecting more targeted samples

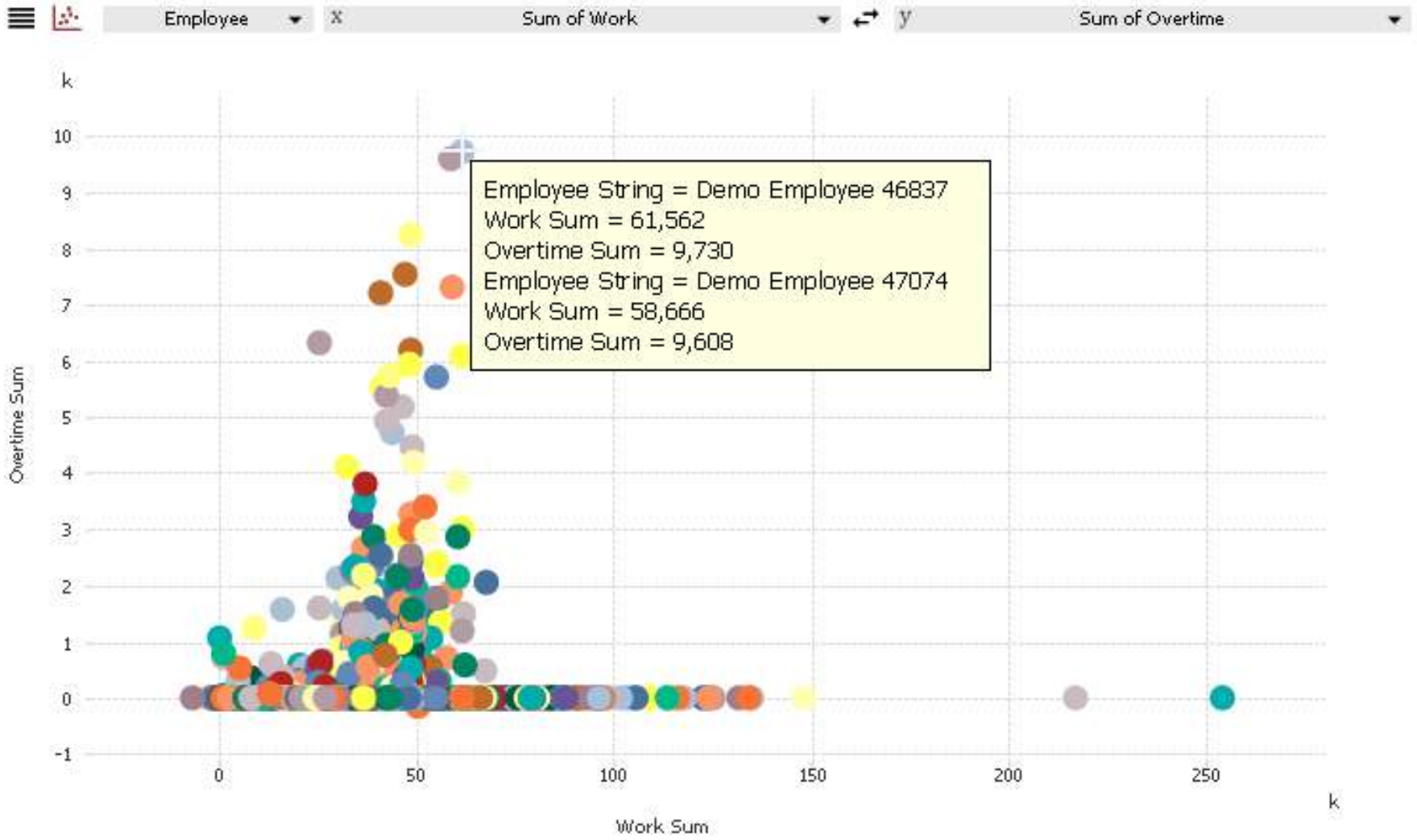
Selecting more targeted samples: super contributions

Benchmarking of employer super contributions against base pay



Selecting more targeted samples: overtime payments

Running analysis over payroll is only a few clicks away



Drilling down on potential outliers and comparing between years

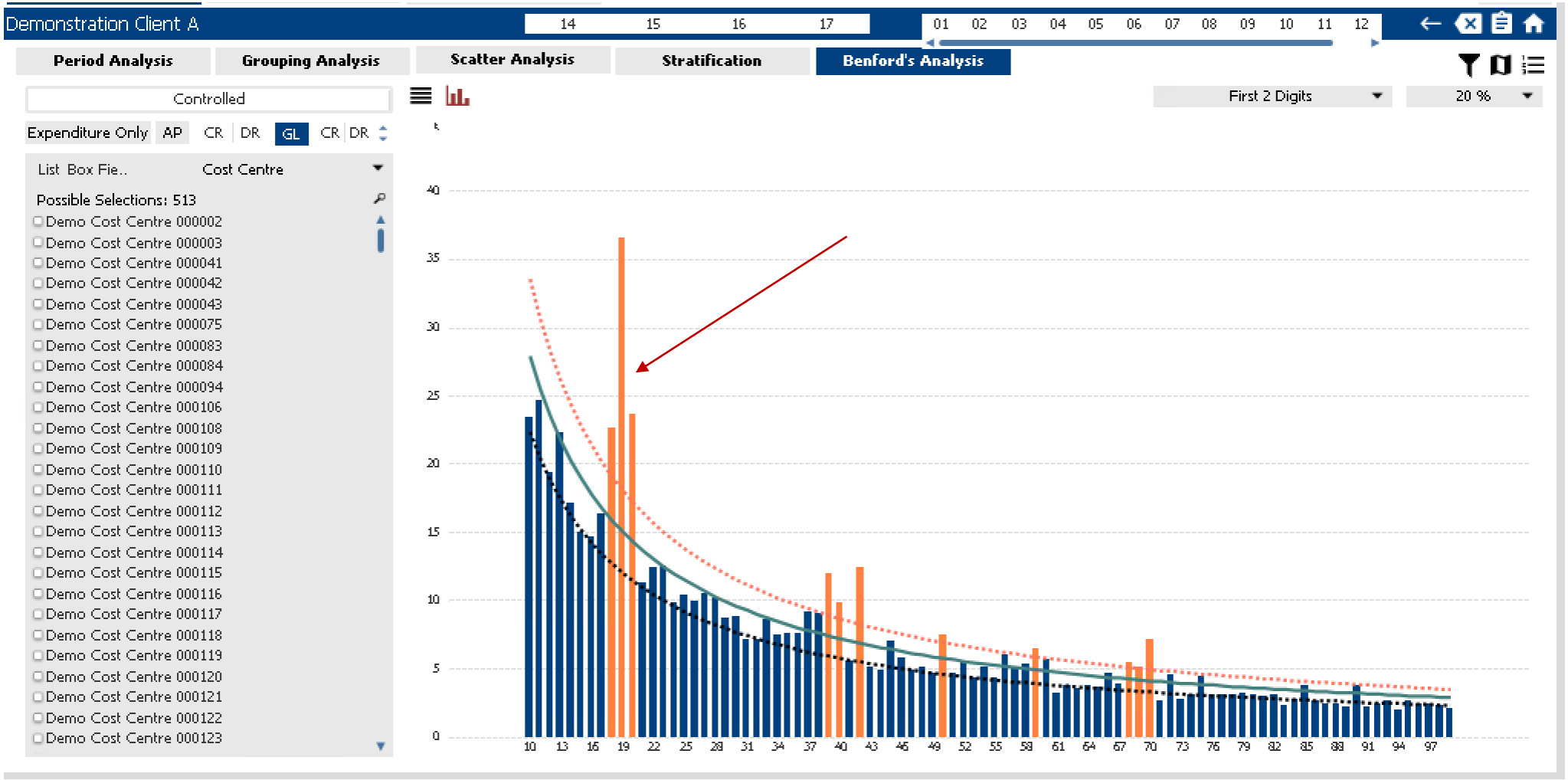
In this example, we examine the top 6 employees receiving over overtime between years and comparative periods.

First 6 months

Employee String	FY16 $	FY17 $	FY18 $
Total	**20,748**	**74,242**	**49,713**
Demo Employee 46837	2,525	18,551	9,730
Demo Employee 47074	4,616	15,447	9,608
Demo Employee 27250	3,968	4,811	8,274
Demo Employee 47001	3,619	10,135	7,545
Demo Employee 46746	3,773	17,955	7,331
Demo Employee 49051	2,246	7,343	7,225

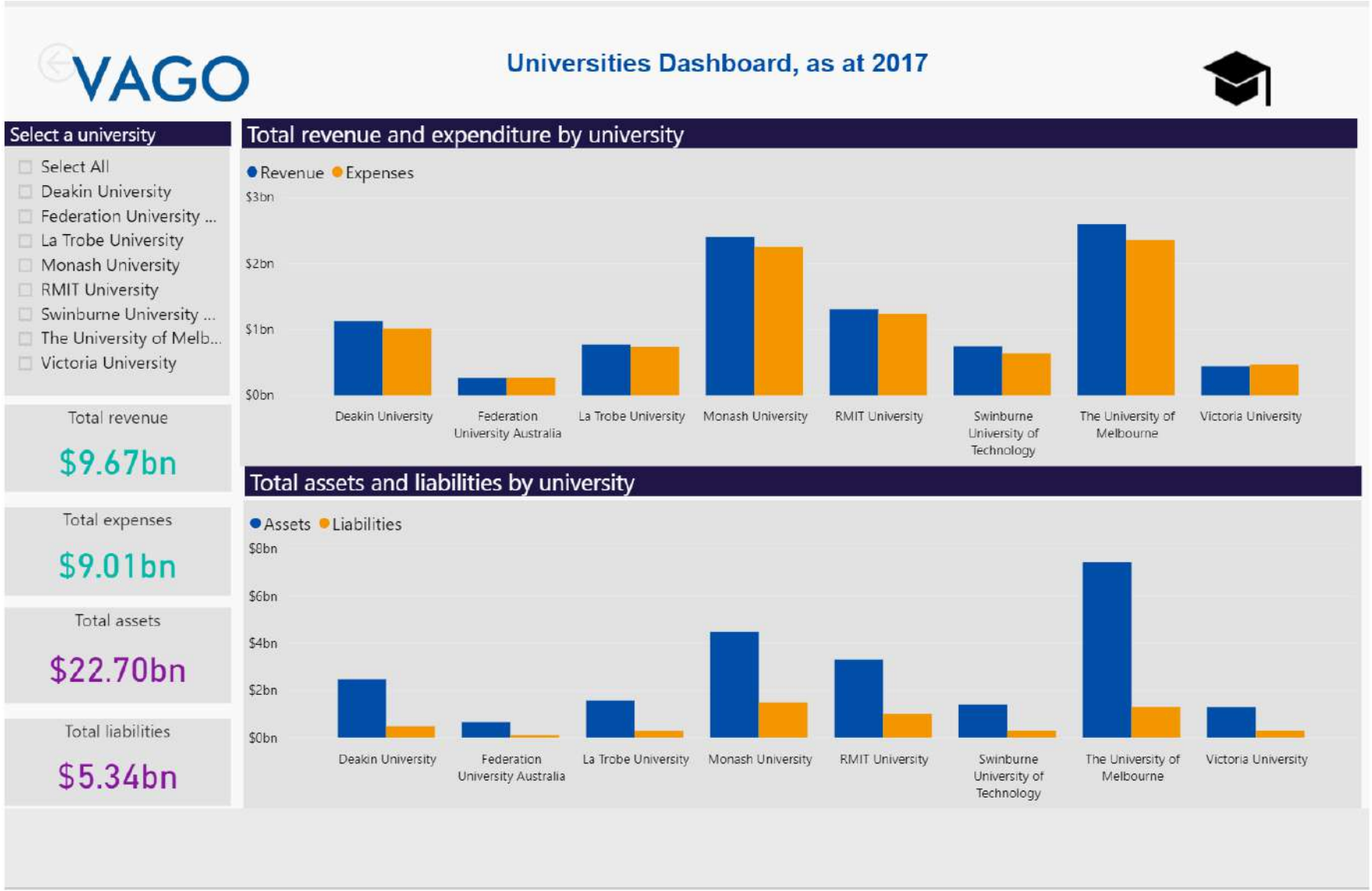
Selecting more targeted samples: order splitting

In this example, we will look at how a benfords analysis can help target our testing of order splitting.



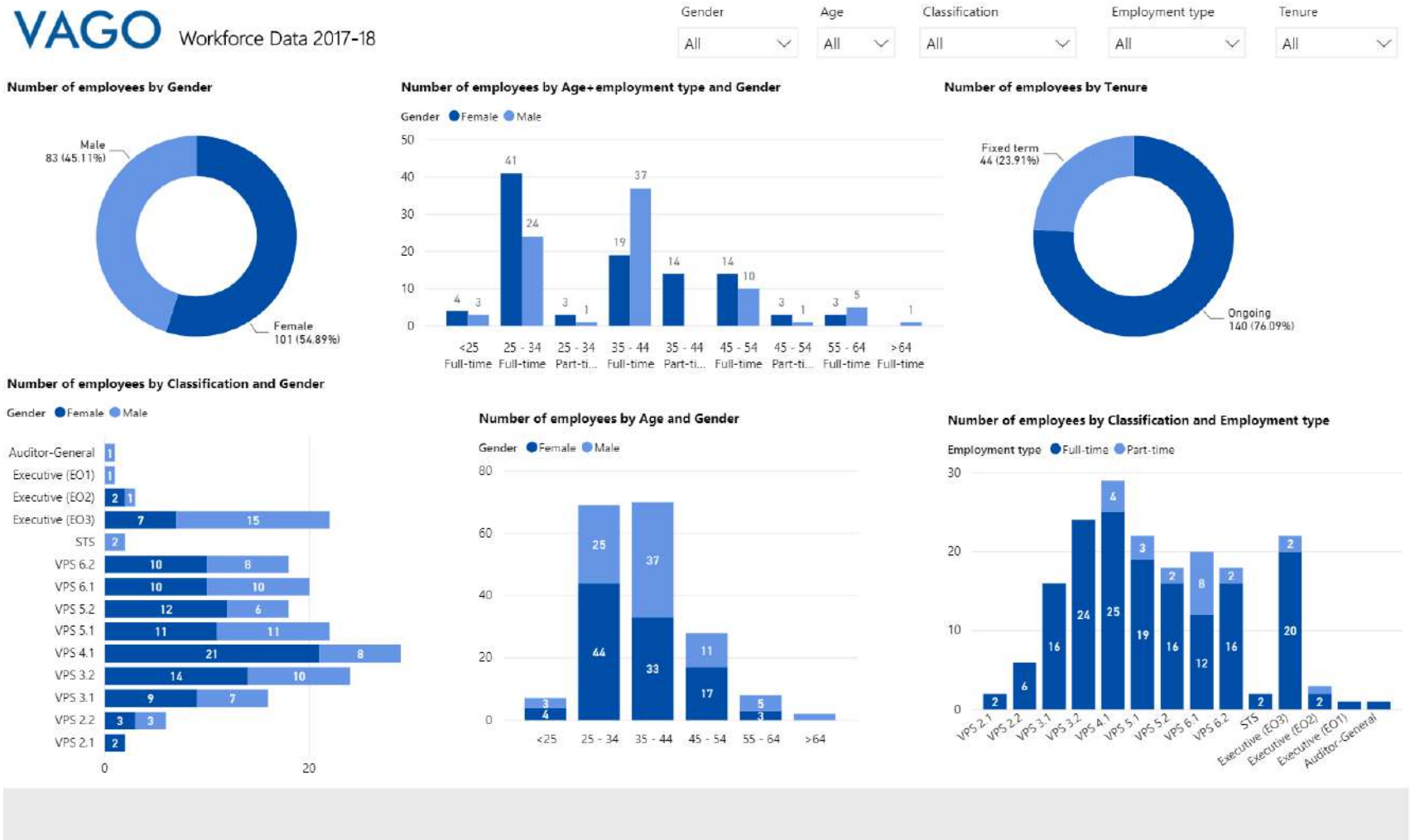
Reporting

Something simple – Results of 2017 audits: Universities



https://www.audit.vic.gov.au/report/results-2017-audits-universities?section=32835

Something simple – workforce statistics



https://www.audit.vic.gov.au/report/annual-report-2017-18

Something more sophisticated – Results of 2017 audits: Local Government (under development) – Part A Sector Overview

118.70M
Average Revenue per Council per Year

99.98M
Average Expenditure per Council per Year

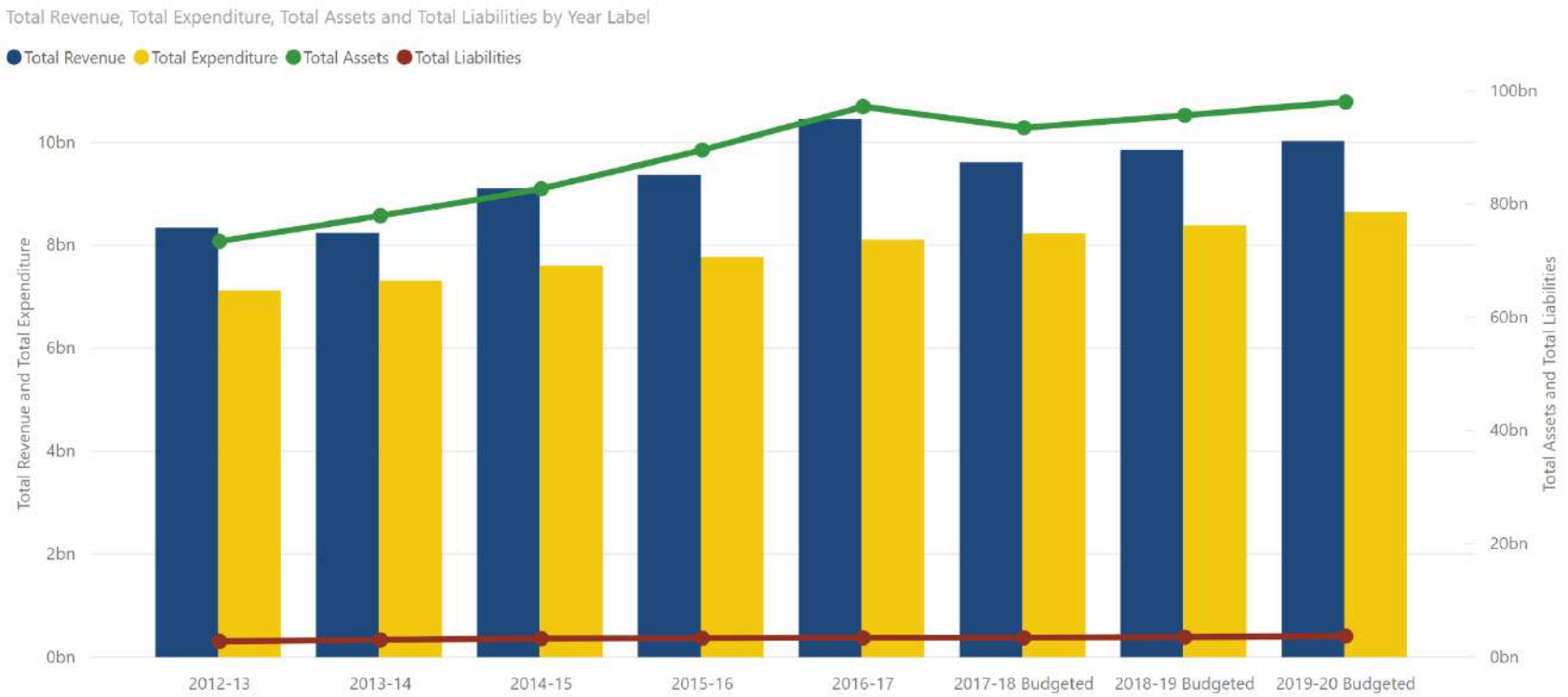
1.12bn
Average Assets per Council per Year

41.65M
Average Liabilities per Council per Year

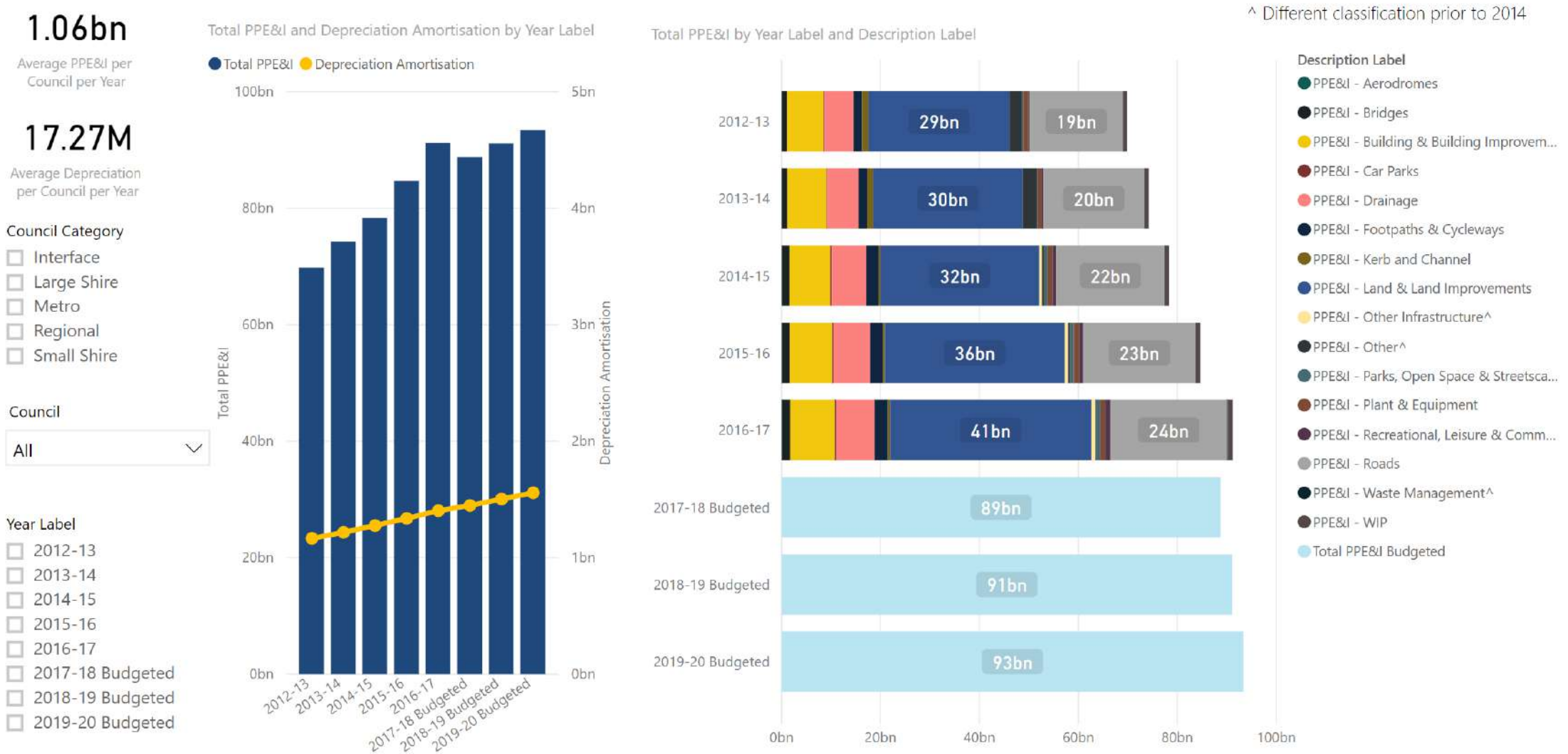
Council Category
- Interface
- Large Shire
- Metro
- Regional
- Small Shire

Council
All

Year Label
- 2012-13
- 2013-14
- 2014-15
- 2015-16
- 2016-17
- 2017-18 Budgeted
- 2018-19 Budgeted
- 2019-20 Budgeted

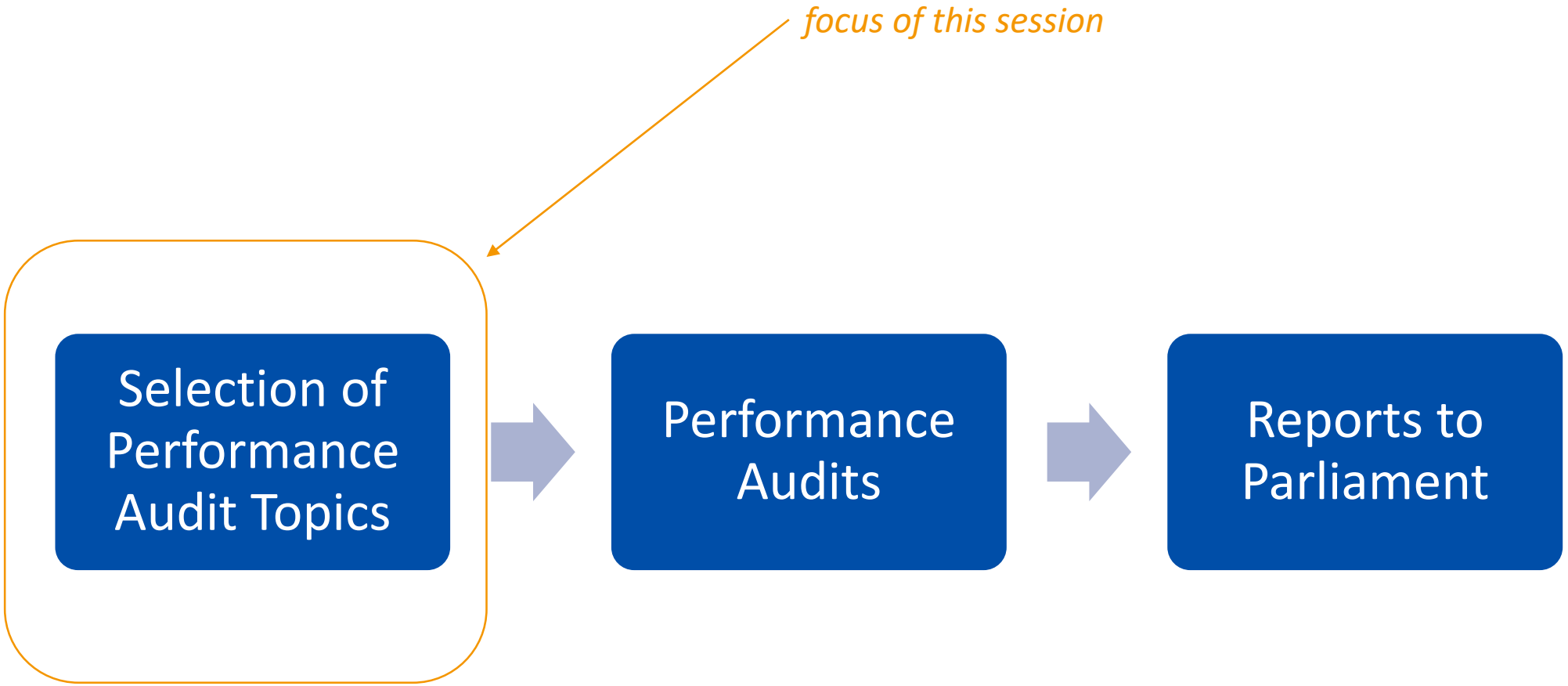


Something more sophisticated – Results of 2017 audits: Local Government (under development) – Part B Component Overview

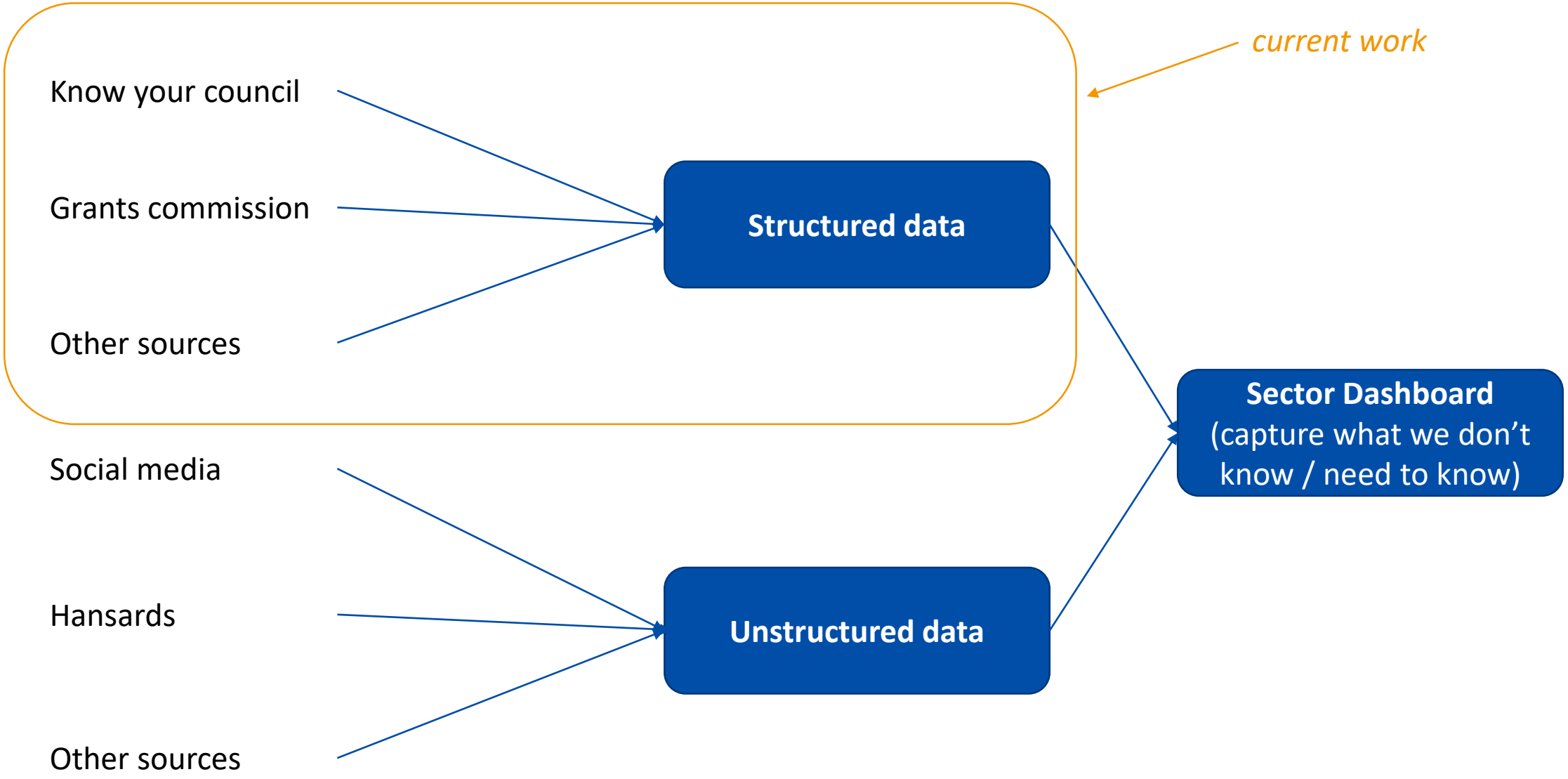


Our performance audits

Our approach

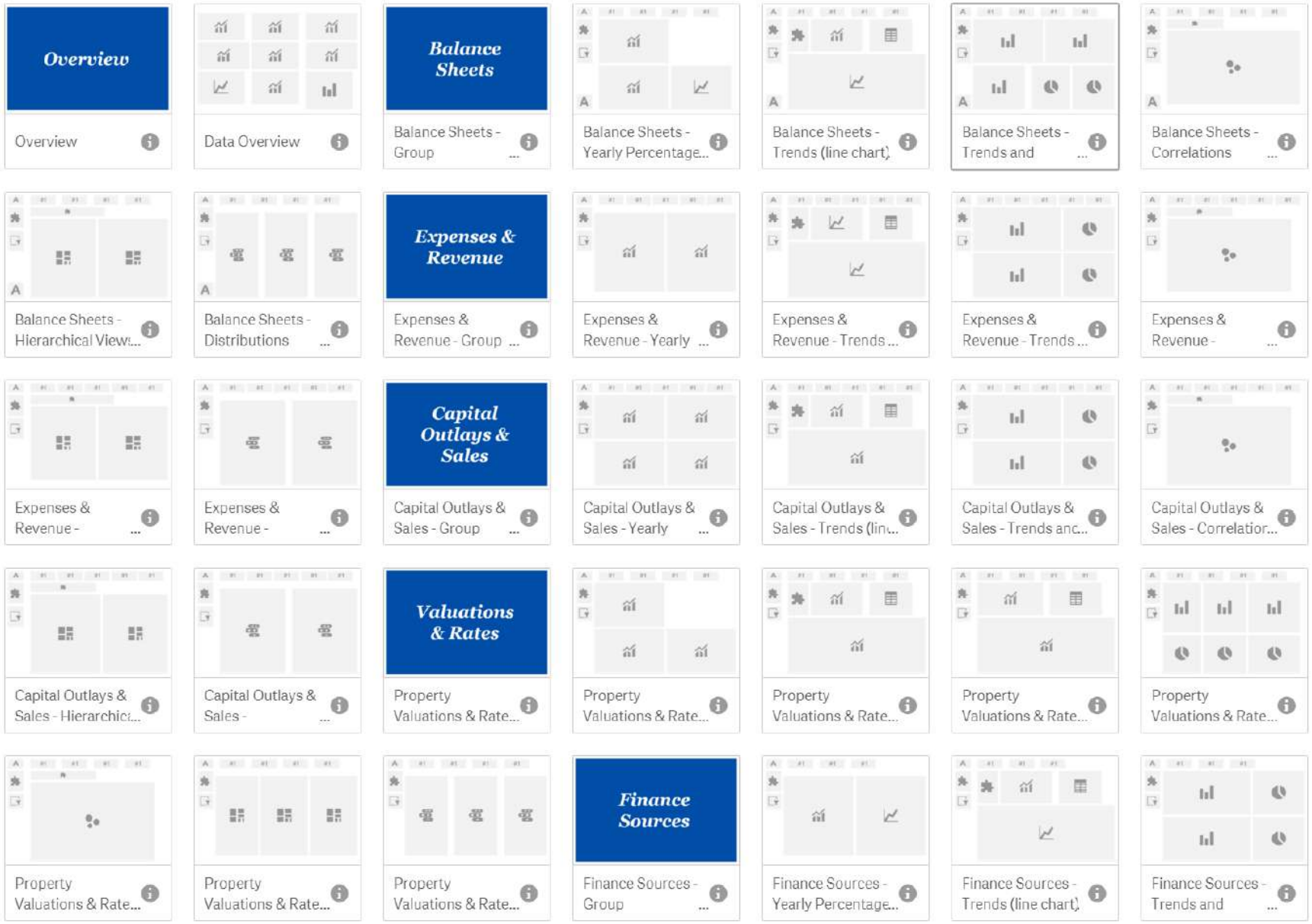


Selection of performance audit topics: environmental scanning

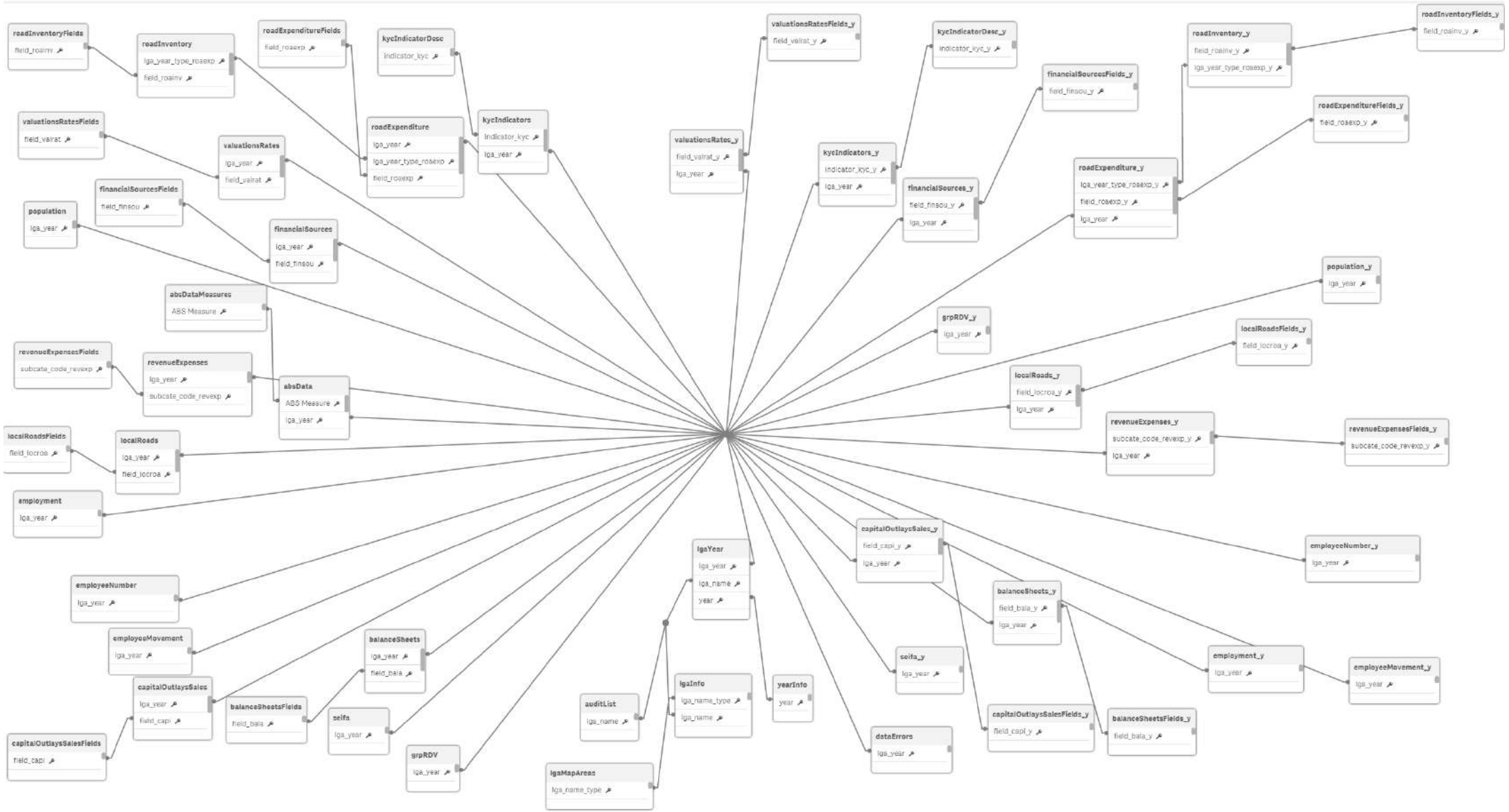


Sector dashboard – what it looks like in summary

Sector dashboard – what other analysis can it produce

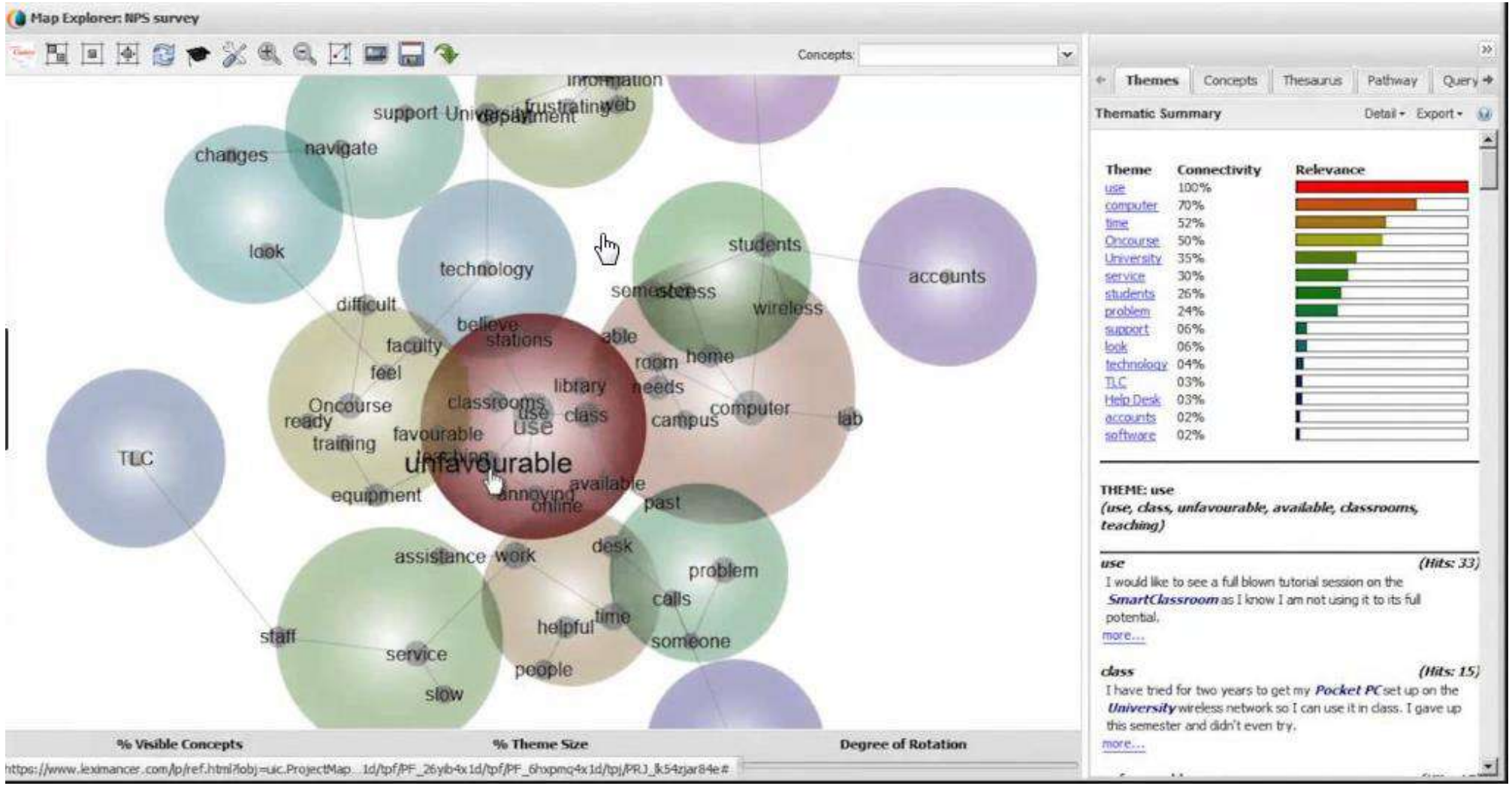


Sector dashboard – holding all this together



Mining of unstructured text – future

Condense reading time and identify topical issues of interest from large volumes of unstructured text.



Questions?

If you would like to know more about the Victorian Auditor-Generals Office's work on the local government and planning sectors, please contact:

Sheraz Siddiqui
Performance Audit Sector Director
Local Government & Planning
sheraz.siddiqui@audit.vic.gov.au
+ 61 3 8601 7128

Tim Loughnan
Financial Audit Sector Director
Local Government
tim.loughnan@audit.vic.gov.au
+ 61 3 8601 7086

For further information about anything within this presentation or our data analytics initiatives more broadly, please contact:

Ben Jiang
Director – Data Analytics
ben.jiang@audit.vic.gov.au
+61 3 8601 1689